SARKAR, Shyamalendu, 1941-

THE COPPER COUNTRY MEDICAL INDUSTRY OF MICHIGAN AS IT SERVES RURAL PEOPLE.

Michigan State University, Ph.D., 1969
Economics, agricultural

University Microfilms, Inc., Ann Arbor, Michigan

THE COPPER COUNTRY MEDICAL INDUSTRY OF MICHIGAN AS IT SERVES RURAL PEOPLE

By

Shyamalendu Sarkar

A THESIS

Submitted to

Michigan State University

in partial fulfillment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

Department of Agricultural Economics

1969

PLEASE NOTE:

Not original copy. Several pages have indistinct print. Filmed as received.

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ABSTRACT

THE COPPER COUNTRY MEDICAL INDUSTRY OF MICHIGAN

AS IT SERVES RURAL PEOPLE

By

Shyamalendu Sarkar

The Copper Country, which comprises four counties in the Western Upper Peninsula of Michigan (Houghton, Keweenaw, Baraga and Ontonagon), is a medically indigent region. Four major problems of the area mostly responsible for this situation are: (1) high proportion of aged residents; (2) high morbidity and mortality rate due to chronic illness; (3) a declining industrial base and low income opportunities, and (4) a declining young population. These problems indicate that the rural people of the Copper Country need much medical care but that their ability to obtain and pay for it is limited.

Since the research was aimed at estimating the additional medical facilities needed, the sources of finance and the plan required, the investigation concentrated on four features: (1) studying the levels and distribution of medical care expenditures in the Copper Country by types of services; (2) estimating the possible savings of medical dollars in the Copper Country which would result from eliminating the operational inefficiencies of

the hospitals, "high" incomes in the medical profession and "high" profits of the drug and medical equipment industries; (3) studying the role of voluntary health insurance in increasing the cost of medical care; (4) investigating the possible sources of financing the medical needs of the Copper Country.

In 1967 the total medical expenditure in the Copper Country was $9.4 million, which is about seven percent of the gross income of the region. Of this total, the hospitals received about 37 percent, the physicians 20 percent, dentists nine percent, druggists 14 percent, nursing homes 10 percent, while eye glasses, net insurance costs, etc. accounted for the rest.

On the average, the net income of physicians was $42,000, which is about 60 percent more than the average net income of dentists. Only about 17 percent of this difference could be explained by longer and costlier training in medicine, and the remainder may be attributed to the difficulty of entry into the profession. This "unexplainable" income difference of a physician and dentist is about $11,000. For all the physicians in the Copper Country, the total difference is about $300,000.

The drug manufacturers and retailers earned a high rate of profit. Their total unadjusted (accounting) and adjusted "unexplainable" profits, were about $46,000 and $118,000, respectively. The unadjusted (accounting) rates of "unexplainable profit-difference" of the drug manufacturers and drug retailers were computed by deducting average profit rates of all manufacturers and all retailers from profit rates

of drug manufacturers and drug retailers respectively. And their adjusted rates of "unexplainable profit-difference" were computed by deducting a "normal" rate of interest for industrial capital from the adjusted profit rate on equity (adjusted for intangibles, royalties and advertising) of the drug manufacturers and drug retailers.

The "unexplainable" unadjusted and adjusted profits in the medical equipment industry were about $4,000 and $14,000, respectively. The method of computation in this case was the same as in the drug industry.

Except for one hospital, D_s, all hospitals in the Copper Country did show some amount of operational inefficiency. The total "loss" due to this was about $510,000 which is about 13 percent of the total costs of operating all hospitals in the area.

The insurance companies paid about one-third of the total medical expenditure. Insured persons used more medical care than the uninsured. However, this did not necessarily mean that voluntary health insurance has caused an increase in the price of the medical care.

For adequate health care the Copper Country needs, at least, an additional 140 long-term beds, 13 physicians, seven dentists, 45 licensed practical nurses, 40 registered nurses and nine laboratory technicians. These facilities and personnel would cost about $2.17 million per year. The alleged savings from elimination of operational inefficiencies, and the "unexplainable" high incomes and profits in the medical industry amount to about $850,000 to $950,000 per year. It

would be difficult to raise the remainder within the area, because the counties already spend about 38 percent of their total revenue (including state aid) on health and medical assistance. The chances of any substantial state fund are also slim, because state aid already accounts for about 58 percent of total revenue of the area. And this is very high considering the state's share of only 37 percent for the rest of the counties in Michigan. It is evident that together with local and state participation, more federal aid through usual channels (medicaid, medicare, old age assistance, etc.) is needed to increase medical facilities in the Copper Country. However, present needs for external aid and medical facilities are likely to be temporary, because the population of the Copper Country is declining and incomes of families are gradually rising. Before any permanent construction is undertaken it must be determined whether present needs are likely to continue; for which additional studies are needed on demographic trend and composition, trend of morbidity and mortality rate and future income and employment possibilities in the Copper Country.

Further, for a more comprehensive and practical plan to provide adequate medical care in the Copper Country, additional research needs to be done on such things as optimum location of medical facilities, incentive plans to attract trained manpower, alternative methods of delivering medical services, ways to tap possible savings in the system and their redistribution to those who need them most, and above all, specific modifications needed in the state and federal programs for more effective financing of medical care.

ACKNOWLEDGMENTS

The author's debts are far too numerous to permit him to present a complete list. He is particularly indebted to the following people:

Dr. Glenn L. Johnson for serving as major professor and providing constructive criticism and constant guidance in the preparation of this thesis.

Mr. Ralph Noble for coordinating and supervising field work during the data collection phase of this study, and for his perceptive comments for improving presentation of this thesis. Dr. Vernon Sorenson, Dr. Rita Zemach, Mr. Neil Bracht and Dr. John Gill, who served as members of the guidance committee, for reading a draft of the thesis and giving perceptive comments and valuable suggestions in the final presentation of this thesis.

Dr. Lawrence L. Boger, Chairman of the Department of Agricultural Economics, for financial assistance which enabled me to do this research.

Mr. Neville Doherty for his valuable assistance in locating relevant literature in the beginning and several useful discussions and comments at different stages of the preparation of this thesis.

Mr. James Gooch, Dr. Roy Gummerson and others of the Michigan State University Cooperative Extension Center at Marquette, Dr. Kenneth C. Rowe, Messrs. Gordon Smith, Dale Minik, Kenneth M. Bray, Larry Maijala, James O'Brien, the administrators of the hospitals and nursing homes of the Copper Country and several others for their help in data collection.

However, the author is solely responsible for the errors and omissions in this thesis.

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CHAPTER I

INTRODUCTION

In the last quarter of a century medical science has developed spectacularly. Modern medical care is a better and more scientific product than ever before. A better informed American public, with a higher standard of living, is demanding and receiving a greater quantity and a higher quality of medical care than in the past. In fact, medical care today is considered to be one of the basic necessities of human life. An average American spends about six percent of his disposable income on medical care. About two decades ago, it was half of this, and at the pace medical care costs are increasing, expenditures may double in the next two decades. In fact, the rise in price of medical care during the last decade has been more than for most other consumer commodities.

These conditions have raised the problem of financing medical needs of aged, disabled, low-income and unemployed people. A significant proportion of these people can neither purchase pre-paid protection at adequate levels, nor pay at the time of illness.

People of the Copper Country (in the Western Upper Peninsula of Michigan, the area of the present study) are faced with similar problems. With its unique social, economic, and medical problems, the

Copper Country is typical of medically indigent regions. Four factors are responsible for this situation. (1) The proportion of aged residents is higher than the state average. About 15 percent of the population is above 64 years, whereas for the state it is only 8.5 percent. (2) The rates of morbidity and mortality caused by chronic illness are higher than for the rest of the state. (3) The income opportunities are lower. About 35 percent of all families and 71 percent of families with aged family heads have an annual income of less than $3,000. (4) The population of this area is gradually declining due mainly to migration of young people and death of high proportion of aged.

All these problems indicate that people of the Copper Country need much medical care but their ability to obtain and pay for it is limited. The present medical facilities in the Copper Country are inadequate both in quantity and quality. We believe that some alternative arrangements, besides voluntary health insurance, must be made to provide needed additional medical care facilities. They can be provided in two ways: (1) by getting more funds from private, county, state and federal sources, and (2) by reducing present costs of medical care.

For the former, we need to study local sources of funds and the present expenditure pattern of county government. The present state and federal aid to the area and future possibility of additional funds must be examined also.

For the latter, we need to measure possible operational inefficiencies of hospitals and nursing homes, differences in incomes of physicians and other comparable professionals, and differences in profit rates of the drug and medical equipment industries from the average profit rate of all the manufacturing industries. We also need to know whether voluntary health insurance is acting as a bargaining agent for hospitals and physicians, and causing price rises by encouraging insured people to overuse and misuse medical care facilities.

The share of hospitals in the consumer's medical dollar has been increasing continuously during the last decade. The phenomenal rise in hospital costs may be one reason for this. The index of hospital costs increased from 100 in 1957-59 to 200 in 1967, whereas general price levels increased to only 116 points during the same period. The reasons for this could be many, but we are interested in knowing if operational inefficiencies of hospitals are partly responsible. Under the present institutional payment system, nonprofit status of hospitals may not provide enough incentive for an efficient operation. If this is so, then there is some scope for reducing medical costs of the consumer by increasing operational efficiency of hospitals.

The general concensus is that physicians are in short supply, and their incomes are increasing faster than their number. Many believe that this is due to restrictions on the supply of physicians accomplished by restricting admission in medical schools and licenses for professional practice.[1] A few relevant questions are:

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[1] See Appendix A for specific citations.

How do incomes of physicians compare with those of other comparable professionals? Are earnings of physicians higher than those of dentists by a wider margin than can be explained by factors responsible for determining differences in incomes in different professions? If this is true, elimination of "unexplainable" higher income of physicians will reduce medical expenditures of consumers.

On several occasions drug manufacturers have been criticized in congressional hearings. They are accused of rigging prices, monopolizing markets by getting patent rights, and creating serious barriers to entry by extraordinary sales promotion and advertising of branded drugs to reap exorbitantly high profits for many years.[2] The opponents of this view feel that patent privileges to drug companies are essential to their continuing efforts in drug research and development of new drugs. They assert that investment in the drug industry is very "risky". The high profit rates are a sort of risk premium. It is important to study the real situation, particularly for the Copper Country, because there is no drug company in this region; all drugs are bought from outside. So profits of drug manufacturers would be a drain on the resources of the area. A comparison of profit rate of the drug industry with that of all manufacturing industries would show whether profit rate of the drug industry is more or less than the average profit rate of all other manufacturing industries. If profit rate of the former is consistently higher than of the latter, then savings can be made in drugs if this profit difference

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[2] See Appendix A for specific examples.

is eliminated. For similar reasons we need to study the medical equipment industry which now accounts for a sizable proportion of the consumer's medical expenditures.

The soaring burden of medical expenditures is shouldered to a great extent by health insurance companies--and they are assuming greater roles every day. As medical costs have increased in recent years, so have health insurance premiums. Many feel that voluntary health insurance systems have encouraged overuse and misuse of medical facilities and supported high prices of doctors and hospitals. This is one of the major causes of the phenomenal rise in medical costs.[3] A contrary view is that high premiums are in fact an effect of high medical cost, and insured people use more medical facilities because health insurance provides them the opportunity to buy needed medical care.

The above issues need to be given proper consideration because a large proportion of people in the Copper Country can neither afford health insurance nor pay at the time of illness.

Objectives

In view of the above problems and issues objectives of this thesis are geared to two primary questions: (1) What are the present medical needs of the Copper Country? (2) How can they be financed?

More specifically, the objectives of this thesis are:

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[3] See Chapter III and Appendix A for specific citations.

(1) To study the levels and distribution of medical care expenditures in the Copper Country by types of services.

(2) To estimate the total possible "savings" of medical dollars by eliminating possible operational inefficiencies of hospitals, unexplainable higher incomes of physicians compared to other professions, and the unexplainable higher profits of the drug and medical equipment industries compared to that of all manufacturing industries and the normal rate of interest on industrial capital.

(3) To study the role of voluntary health insurance in increasing the cost of medical care.

(4) To investigate possible sources of financing the medical care needs of the Copper Country.

Thus, this thesis focuses on the medical needs and financial problems of a primarily rural area with a declining population, inadequate medical facilities, low income families, a high proportion of old people, and a high incidence of chronic illness. Another Ph.D. thesis with similar objectives and approach is being prepared by Neville Doherty.[4] He is studying the Traverse City area of Michigan, which is primarily an urban area, with an increasing population, adequate medical facilities (among the best in the nation), and families having relatively high income. In other words, the situations in the Copper Country and Traverse City area are diametrically opposite. These two theses, when completed, will provide insight into specific problems of two types of communities, and the possible direction of

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[4] Neville Doherty is presently working with the U.S.D.A., but is enrolled for his Ph.D. at Michigan State University.

efforts needed to handle problems in these two different situations. A comparative study of these two regions may yield useful results of wider applicability for the nation as a whole.

Plan of Work

Chapter I presents the problems of the Copper Country and outlines the objectives geared to the problems. Chapter II presents a brief description of the general characteristics (population, education, incomes, employment, etc.) of the Copper Country and its medical industry (hospitals, nursing homes, physicians, etc.). Chapter III discusses the sources of data and methods of estimation, and provides an overview of the relevant literature. The total medical expenditures of the Copper Country and the total possible savings from elimination of operational inefficiencies of hospitals, unexplained income-difference between physicians and dentists, and unexplained profit-difference of the drug and the equipment industries from all manufacturing industries are examined in Chapter IV through IX. More specifically Chapter IV presents and compares the level and distribution of medical care dollars in the Copper Country and the United States. Chapter V compares the incomes of physicians and that of dentists to determine the total amount of unexplained higher incomes of physicians. Chapter VI and VII estimate the differences in the profit rates of drug and medical equipment industries from that of all manufacturing industries. The amount of consumers' medical dollars "lost" due to

operational inefficiencies of hospitals is estimated in Chapter VIII. The general expenditure and medical use patterns for insured and uninsured people are discussed in Chapter IX to see if insurance is associated with rising costs and medical care. Chapter X presents estimates of medical needs in the Copper Country and explores possible ways of obtaining funds to finance these needs. Chapter XI summarizes all the chapters and presents conclusions.

CHAPTER II

A DESCRIPTION OF THE COPPER COUNTRY

The Copper Country is in the Western Upper Peninsula of Michigan. It is bounded on the east by Marquette and Lake Superior; on the west by Gogebic County; on the north by Lake Superior, and on the south by Iron County. The Copper Country is comprised of four counties: Houghton, Keweenaw, Baraga and Ontonagon. The following pages describe the general characteristics and health care facilities of this area.

Population

There is a declining trend in the population of the Copper Country. While the state population has increased from 2,810,173 in 1910 to 8,584,000 in 1967, the Copper Country population has decreased from 110,031 to 51,410 during the same period.[1] Table 2.1 shows that the Copper Country is primarily a rural area. Except for Houghton, there is no really urban population in this region.

Although there has been a general declining trend in the total population of this area, the percentage of people of age 65 and over has been increasing continuously (see Table 2.2).

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[1] Adapted from Gordon Smith, p. 4. An estimate by Thaden shows that the population of the Copper Country will decrease to 49,520 by 1970. John F. Thaden, et al., The Need for a Retirement Home in a Twenty-seven County Area of Michigan and Wisconsin, Michigan State University. Cited by Gordon Smith, p.5.

TABLE 2.1--Population, by Age, Residence and County in the Copper Country in 1967

County	Total[a]	Age 65 and over[a]	Urban	Rural	
				Farm	Nonfarm
	number		percent		
Houghton	32,406	4,981	32.2	5.6	62.2
Keweenaw	2,081	324	0.0	5.0	95.0
Baraga	6,577	841	0.0	5.4	94.6
Ontonagon	10,346	1,186	0.0	6.0[b]	94.0
Copper Country	51,410	7,332	20.2	5.6[b]	74.2
Michigan	8,584,000[c]	729,640	73.4	5.6[b]	21.0

[a] The figures for 1967 were computed by straightline projections of 1960 figures given by Gordon Smith and 1970 figures given by Thaden. See Gordon Smith, pp. 4-5.

[b] "Vocational Technical Education Study," Gogebic-Ontonagon, Intermediate School District Studies, mimeo. (June, 1967), Table 1, p. 10.

[c] "Trends," State Data and State Ranking in Health, Education and Welfare, Part 2 (1960-67).

TABLE 2.2--Trend of Population, 65 and Over in the Copper Country, 1940-70

Year	Population of Age 65 and Over	Percent of Total Population
	number	percent
1940	5,653	7.81
1950	7,258	11.89
1960	7,384	13.23
1970	7,310	14.70

Source: Gordon Smith, "Multiple Factors Associated with Chronic Diseases and Aging in the Copper Country of Michigan," (1965), mimeo, p. 8.

This situation is primarily due to migration of young people to the metropolitan areas in pursuit of better jobs and earnings. The rising number of older people has an important significance in our study; they need more medical care than younger people, but they provide less tax money and have less income to pay for medical expenses.

Families

In the year 1960, the total number of families was 14,054[2] and the average number of persons per family was about 3.97. In 1965 average family size decreased to 2.5[3] which was about 1.2 persons per family less than the state figure in the same year. The median age of family heads in this area is alarmingly high--about 20 years more than for the average family head in the state.

Education

Educational levels in this area are low. The median education of the heads of the families is only nine and one-half years. The older people in general are less educated. As attitude toward health care is influenced by level of education, this factor may have an important bearing in our study. The following table shows the percentage of people with different levels of education.

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[2] U.S. Department of Commerce, Bureau of the Census, County and City Data Book (1967), pp. 172-181.

[3] Gordon Smith, p. 16. Unlike the Bureau of Census, the definition of family includes the single unmarried person. So the size of family here is smaller and number of families is larger (20,564) than would have been according to census definition.

TABLE 2.3--Education of the Heads of Families in the Copper Country

Years in School	Percentage
	percent
no education	0.4
5-6 grades	8.4
7-8 grades	32.3
9-10 grades	16.0
11-12 grades	27.7
1-2 years college	4.8
3-4 years college	3.2
more than 4 years college	1.2

Source: Gordon Smith, p. 19.

Incomes[4]

The Copper Country is an economically depressed area. About 35 percent of all families and about 71.6 percent of families with head of the family 65 and over receive less than $3,000 per annum. Table 2.4 shows percentage of people in each income group.

TABLE 2.4--Families by Income Categories in the Copper Country in 1967

Income	Houghton	Keweenaw	Baraga	Ontonagon	Michigan
dollars	percent				
$ 2,000-2,499	34.9	37.7	35.7	30.6	17.5
2,500-3,999	23.8	29.3	23.1	20.7	14.3
4,000-6,999	27.2	25.2	26.9	34.4	33.4
7,000-9,999	8.1	5.3	9.1	8.7	15.7
10,000 & over	6.0	2.5	5.2	5.6	19.1

Source: Gordon Smith, p. 26.

[4] Only monetary incomes from all sources are included. Excluded are incomes in kind and values of other income producing potentials.

As medical care is costly, income levels influence effective demand for medical services. From this point of view, Copper Country people are in an unfavorable situation. Probably a significant proportion of people are not able to meet their minimum medical needs. This point is elaborated more fully in Chapter X.

Occupation

Four major employers in the Copper Country are: government, lumber and wood products, mining and wholesale and retail trades. These are followed by food, textile, farming, construction, communication and transportation. Services including health care, account for only six percent of employment. The following table shows this.

TABLE 2.5--Employment by Occupational Categories in the Copper Country in 1967

Places of Employment	Percentage of total
	percent
Wholesale and Retail Trade	17
Government	15
Mining	14
Lumber and Wood Products	14
Food, Textile and Farming	12
Construction, Communication and Transportation	11
Services including Health Services	6
Metal Products	3
Finance, Real Estate and Insurance	1
Paper and Paper Products	1
Other	6
Total	100

Source: Adapted from Gordon Smith, p. 39.

Out of the four counties in the Copper Country, Houghton generates the most income, followed by Baraga, Ontonagon and Keweenaw in that order. The following table presents the employment potential and income of each county.

TABLE 2.6--Employment and Aggregate Income by County in the Copper Country

County	Number Employed[a]	Aggregate Income[b]
	number	(million dollars)
Houghton	10,241	86
Keweenaw	615	4
Baraga	1,862	27
Ontonagon	3,145	24
Total	15,863	141

[a] Figures are for the year 1960.

[b] Figures are for the year 1967 and were obtained by projecting figures of 1958 and 1963. The trend between 1958-63 and 1963-67 was assumed to be the same.

Source: U. S. Department of Commerce, Bureau of Census, County and City Data Book (1967) pp. 172-181.

Medical Care Facilities[5]

Health care facilities in the Copper Country are inadequate both in terms of quantity and quality. The situation is aggravated due to lack of adequate transportation and communication facilities.

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[5] For more detailed description of medical care facilities, see Gordon Smith, pp. 52-102 and Leo Reich, pp. 12-46.

Facilities

The Copper Country has five acute-care hospitals, five long-term care units and three service-providing units. They are:

a. Acute-care Hospitals

1) Calumet Public Hospital in Laurium
2) St. Joseph's Hospital, Hancock
3) Baraga County Memorial Hospital, L'Anse
4) Ontonagon Memorial Hospital, Ontonagon
5) La Croix Hospital, White Pine

b. Long-term Care Units

1) Maresh Nursing Home, Ontonagon
2) Winkler's Nursing Home, Baraga
3) Houghton County Medical Care Facility, Houghton
4) Lady of Mercy Nursing Home, Houghton
5) Long-term Care Unit of St. Joseph's Hospital, Hancock

c. Service-Providing Units

1) Western Upper Peninsula District Health Department
2) Western Upper Peninsula Health Service Council, Inc.
3) Rice Memorial Clinic

Besides these, Michigan Technological University has one First Aid Unit; however, its services are limited to the University only. A brief description of utilization and inventory of these facilities is presented in Table 2.7 and Table 2.8.

The service-providing agencies furnish various kinds of services related to health. The Western Upper Peninsula District Health Department provides many services such as: sanitary inspection of trailer parks, kitchen, food handlers, nursing homes, milk processing plants, drinking water, etc.

The Western Upper Peninsula Health Service Council, Inc. presently has three main projects: heart, cancer and stroke; alcoholism; and

TABLE 2.7—Utilization and Inventory of Acute Care Hospitals in the Copper Country in 1967

Items	Hospitals				
	A_s	B_s	C_s	D_s	E_s
Beds, number	80	155[a]	70	37	20
No. of patient days	25,138	51,102[b]	20,930	16,041	2,067
new born days	1,166	1,650	683	336	-
No. of admissions	223	330	170	67	36
Rate of occupancy (percent)	86.0	87.9	82.0	95.8	28.3
Average length of stay (days)	13.7	11.4	9.0	8.8	4.0
new born (days)	5.3	5.0	4.0	5.0	-
No. of patients discharged;					
of the county	1,540 (83.18)[c]	2,867 (92.6)	1,638 (75.4)	1,563 (96.1)	20 (100.0)
not of the county, but from Copper Country	280 (15.1)	145 (4.6)	501 (23.1)	13 (.8)	0 (0.0)
outside Copper Country	31 (1.7)	88 (3.0)	33 (1.5)[d]	50 (3.1)	0 (0.0)
Total no. of personnel	125	225[f]	156[d]	65	23[e]
No. of personnel per bed	1.56	1.45	1.76[g]	1.75	1.15
No. of physicians on staff	6	13	4	3	2
No. of registered nurses on staff	17	28	13	10	6
No. of licensed practical nurses	12	10	6	6	4
No. of major surgical procedures	217	854	357	162	n.a.[h]
No. of minor surgical procedures	436	426	806	659	n.a.
Other services	2	4	2	1	1

[a] includes 45 long-term beds
[b] includes 15,813 long-term patient days
[c] figures under parentheses are percentages of total
[d] includes 45 part-time workers
[e] includes 1 part-time worker
[f] does not include the nursing students
[g] does not include 12 consultants
[h] n.a. = not available

Source: Hospital Audit Reports of respective hospitals, supplemented by Leo Reich's study.

Note: The names of the hospitals have been replaced by code names (A_s, B_s, C_s, D_s, E_s) to avoid identification.

TABLE 2.8--Utilization and Inventory of Long-term Care Units in the Copper Country in 1967[a]

Items	Long-term Care			
	A_L	B_L	C_L	D_L
No. of beds	26	124	42	26
No. of patient days	9,400	43,030	15,215	9,491
Occupancy rate, percent	99.0	95.0	99.0	99.0
No. of patients discharged				
of the county	20 (77.0)[b]	99 (80.0)	34 (80.0)	20 (80.0)
not of the county but from Copper Country	6 (23.0)	21 (17.0)	7 (17.0)	5 (17.0)
outside Copper Country	-	4 (3.0)	1 (3.0)	1 (3.0)
No. of staff - total	14	82	39	16
No. of staff per bed	.54	.66	.92	.62
No. of R.N. on staff	2	10	2	-
No. of L.P.N. on staff	1	3	2	1

[a] Long-term care unit of St. Joseph's hospital is included in the acute care unit.

[b] Figures in the parentheses are percentages of total.

Source: Collected from Nursing Homes.

aging. The Council at Houghton covers the whole of the Copper Country area and Gogebic County.

The Rice Memorial Clinic provides diagnostic treatment and consultation service for psychiatric problems of children, and cooperates with other state and local agencies. The mentally ill patients are usually referred to Newberry State Hospital for treatment because there is no in-patient service available in the Copper Country.

Health Manpower

The ratios of physicians and dentists to population are much lower in the Copper Country than for the state and the nation. The ratio of physicians to population in the Copper Country is about 1:1773, whereas for the state and the nation, it is 1:814 and 1:780, respectively. The dentists are also in short supply. For each 10,000 persons there are only 3.6 dentists in Houghton, 2.8 in Baraga and 1.9 in Ontonagon. The national figure is 5.4 dentists per 10,000 persons. Table 2.9 shows these ratios.

It is relatively more difficult to give exact figures for nursing personnel by number and type, because they change continually. Many of the nurses presently employed are wives of university students or airmen stationed at the radar base in Keweenaw County.[7] Due to lack of competent graduate nurses less qualified persons sometimes are employed to do the work of graduate nurses. Table 2.10 shows number of nursing staff in 1967.

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[7] Gordon Smith, p. 50.

TABLE 2.9—The Ratios of Physicians and Dentists to Population by County in the Copper Country in 1967

County	Physicians* MD and DO	Physicians Ratio to Population	Dentists	Dentists Ratio to Population
	number	ratio	number	ratio
Houghton and Keweenaw	21*	1/1642	12	1/2874
Baraga	4	1/1644	2	1/3289
Ontonagon	4	1/2587	2½	1/4138
Copper Country	29	1/1773	16½	1/3116

* Two physicians are employed by the government, one is specialized in tuberculosis and the other is a psychiatrist.

Source: Leo Reich, pp. 36-38, supplemented by personal investigation.

TABLE 2.10—Nursing Personnel in the Copper Country in 1967

County	Practicing Registered Nurses	Practicing Licensed Practical Nurses	Private Nurses
	number		
Houghton and Keweenaw	124	22	10
Baraga	23	7	1
Ontonagon	27	9	1
Total	174	38	12

Source: Leo Reich, Tables 51-53.
Note: The above figures do not include nursing students or voluntary nurses.

CHAPTER III

METHODS OF ESTIMATION AND REVIEW OF LITERATURE

The present study is for the year 1967 and is limited to the Copper Country area of Upper Michigan, which is comprised of four counties: Houghton, Keweenaw, Baraga and Ontonagon. The data for all hospitals, nursing homes and related facilities have been gathered from hospital and nursing home administrators, physicians and other knowledgeable persons. Additional secondary data on the facilities were obtained from three studies by Gordon Smith[1], Leo Reich[2], and Williams and Works[3]. Data on demand and supply of doctors, profits on drugs and medical equipment, health insurance, and on many other related topics have been obtained from various secondary sources.

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[1] Smith, Gordon, "Multiple Factors Associated with Chronic Disease and Aging in the Copper Country of Michigan," (mimeo, 1965).

[2] Reich, Leo, "Inventory of Health Services and Facilities in Michigan's Western Upper Peninsula," ed. John S. Hiblock, Copper Country Health and Welfare Council, Inc., Hancock, Michigan, (mimeo, September 1967).

[3] Williams and Works, "The Economy of Houghton County, Michigan, Engineers - Surveyors - Planners"(mimeo, March 1967).

We have used secondary data and in some cases secondary techniques in estimating the magnitude of possible savings due to elimination of the "higher" incomes of physicians over that of dentists (a comparable profession), and the "higher" profit rates of the drug and the medical equipment industries over that of all manufacturing industries. The secondary data have been updated and modified to suit the need. However, many limitations in data and estimation techniques still remain. Due to these limitations, we do not claim to have made precise estimates of "loss" of consumers' medical dollars. In many cases alternative estimates (lower and upper bounds) have been presented. These estimates are, however, adequate for the purpose of this thesis.

It is difficult to measure the monopoly power of any industry, and we have made no attempt to measure the degree of it in the medical profession, or in the drug or equipment industries. The estimates of the "unexplainable"[4] higher incomes of physicians and the "unexplainable" high profits of the drug and medical equipment industries may indicate the possible presence of monopoly elements,

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[4] The word "unexplainable" used in the case of the incomes of physicians and the profits of the drug and equipment industry is synonymous with "income-difference" and "profit-difference." In other words, the difference between the incomes of physicians and dentists that cannot be explained by non-pecuniary advantages, variability of income and longer and costlier training in medicine was termed as "unexplainable" higher income of physicians. Similarly, the difference in the profit rates of the drug industry and all manufacturing industry was termed as "unexplainable" higher profits of the drug industry. The words "unexplainable incomes" and "unexplainable profits" have been interchangeably used with the words "income-difference" and "profit-difference" and have the same meaning throughout the thesis.

but a valid estimate of the degree of monopoly in them would require more thorough analysis. The following section presents some of the major difficulties in measuring monopoly.

The Nature of Difficulties in Measuring Monopoly[5]

It is very difficult, if not impossible, to measure precisely the degree of monopoly power of an industry. To be able to measure monopoly power we must know all the causal factors, and effects of monopoly. Further, these causes and effects must be numerically describable. Machulp nicely summarizes the basic difficulties in measuring monopoly.

> Any measurement of monopoly depends thus, first of all, on whether we are satisfied that our theories are valid; second, on whether they are complete; third, on whether the phenomena selected as the relevant ones can be discerned in reality; fourth, on whether they lend themselves to numerical description; and fifth, whether such numerical descriptions of all relevant phenomena are actually available.
>
> (Assuming that these conditions are fulfilled)
>
> There would still remain two difficulties that cannot be overcome: in the first place, we can never know whether all the monopoly power was used or whether much more power still exists than was used; secondly, the phenomena selected as affected or conditioned by monopoly may possibly be also affected or conditioned by other factors and it may not be feasible to separate the effects of the exercise of monopoly power from the effects of other forces.[6]

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[5] In the discussion of this section,I have heavily borrowed from Machulp's analysis of the difficulties in measuring monopoly. Fritz Machulp, The Political Economy of Monopoly (Baltimore: John Hopkins Press, 1952) pp. 469-528.

[6] Fritz Machulp, The Political Economy of Monopoly, (Baltimore: John Hopkins Press, 1952), pp. 472-73.

Three major factors that may cause monopoly are: collusion, concentration and barrier to entry.

The barrier to entry and collusion can take different forms, and though their effects can be perceived, their expression in numerical terms is very difficult. The study of concentration in this respect is much easier. It can be numerically expressed, but the problems here are of a different nature. The magnitude of concentration ratio depends upon the methods of computation and geographic differentiation (concentration in the local markets may be different from that in the national market). Further, the high concentration figures may not have much meaning if there is competition from foreign markets, or if close substitutes are available.

Two of the major effects of monopoly are: price inflexibility and high rate of profit. The prices must be controlled to keep them from fluctuating, and an industry having control on prices must have some monopoly power.

Profit rate is by far the best and most used criterion for measuring the degree of monopoly, but there are some basic difficulties in estimating profit rates. The magnitude of profit rate depends upon how it is measured -- the short-run profits may be different from long-run profits; profits computed on the book value of assets may be different from those calculated on the economic value of necessary assets. If the book value of the assets is more than the replacement costs of these assets, and if there are idle assets and unused capacity,

the computed profit rate may seem to be very low. Similarly, if profit rates are computed only on the necessary earning assets, the figures may be very high. Many other similar factors may distort the profit picture.

The Accounting Rate of Profit

The accounting rate of profit is a poor indicator of the degree of monopoly. In the short run, as demand increases, profits go up, and may remain high until more productive resources flow in, and supply adjusts to demand. So high profit rate may be just scarcity rent rather than monopoly profit. Even a competitive industry may have high profit rates under rapidly increasing demand, especially if the values of the assets are not adjusted upward accordingly. As the assets are only revalued after a considerable lapse of time, profit rates may seem higher than they actually are. Similarly, a monopolistic industry may show only a slim profit rate. Such an industry may have excessive outlays to maintain monopoly position, or the assets may have been valued so high that the total depletion and depreciation items might have been exaggerated.

The Adjusted Rate of Profit

The above discussions show that the accounting profit rate cannot be a reliable indicator of the degree of monopoly. Some adjustments have to be made for the items that affect its magnitude. Bain suggests

that a "theoretical profit rate" then can be compared with competitive profit rate (interest rate for industrial capital) to determine the actual rate of excess profit.[7]

To adjust the accounting profit rate one

> .... would have to examine revenues, operating expenses, fixed charges, depreciation, the type and amount of assets really necessary for the production of the actual output volume, and the valuation of these required assets at a 'replacement-cost-of-service-value'. The examination would be a frightfully laborious task and the adjustment, even if well-defined principles were agreed upon, would leave an embarrassingly wide leeway to the judgment and the imagination of the investigator.[8]

Although the adjusted rate of profit, admittedly, provides a much more reliable picture of profit, it is not without some limitations. It does not indicate whether the profits are high due to monopoly or monopsony position of the firms. Further, the profit rates of an industry, with excessive assets, may be low but it is difficult to say whether excessive assets are the results of free entry into industry (with product differentiation), or a device to block entry. When entry into an industry is easy more new firms may enter. A part of their assets may remain idle in the beginning, and also a part of the assets of the older firms may be rendered idle due to encroachments of the new firms on their (old firms) business. On the other hand, the older firms may increase their assets to create barriers to entry. The adjusted rate of profit cannot be used to differentiate between the two situations.

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[7] Joe S. Bain, "The Profit Rate as a Measure of Monopoly Power," Quarterly Journal of Economics, Vol. LV, (1941), 290.

[8] Machulp, pp. 495-496.

Lerner's Index provides another good measure of the degree of monopoly. Abba Lerner suggests that the relative gap between price (P) and marginal cost (MC) gives a measure of the degree of monopoly. His index was a ratio of price to the difference between price and marginal cost, i.e., $\frac{P - MC}{P}$. In perfect competition (P = MC), this index is equal to zero because the numerator (P - MC) becomes zero, and if price is infinity the index becomes equal to one. The values between zero and one indicate the different degrees of monopoly.[9]

It is difficult to use this method because the computation of the marginal cost of an industry is not always easy. This is further complicated by the difference in the short-run and long-run marginal costs. Enough data are not available on these to make any meaningful estimate of the degree of monopoly.

The above discussions indicate that any precise measurement of the degree of monopoly is a very difficult task. However, an approximate estimate can be made, but it must be interpretated in the light of the limitations of such measurements.

Kamerschen used adjusted profit rates in estimating "welfare losses" from monopoly in the American economy. His estimates were based on Internal Revenue's Statistics of Income data for corporations, partnerships, and sole proprietorships for the entire economy. Kamerschen adjusted the accounting profit figures for royalties, intangible

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[9] P. Lerner, "The Concept of Monopoly and the Measurement of Monopoly Power," Review of Economic Studies, Vol. 1 (1934) pp. 157-75.

assets, and advertising expenditures. Further, he computed rates of return on total capital and equity using incomes both before and after tax, then combined the above results to obtain average profit rates for all business establishments.[10]

Kamerschen also used Lerner's Index to measure degree of monopoly. As marginal cost (MC) is difficult to measure, he assumed constant cost industry (AC = MC). In such cases, the ratio of monopoly profits to total revenue (sales) coincides with the Lerner's Index. Data of this kind were easier to secure.

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[10] David R. Kamerschen, "An Estimation of the 'Welfare Losses' from Monopoly in the American Economy," Unpublished Ph.D. thesis, Michigan State University, 1964. He based his work on Harberger's study, which estimated the loss due to monopoly in the manufacturing industry, and found that it was only one-tenth of one percent of the national incomes. Arnold C. Harberger, "Monopoly and Resources Allocation," Proceedings of American Economic Review (May 1954), pp. 77-87; "The Measurement of Waste," Proceedings of American Economic Review (May 1964). Stigler criticised Harberger's study on three grounds: (1) It (Harberger's study) was based on only manufacturing corporations, that too only for the period of 1924-28. (2) Many of the assumptions were rather "heroic". (3) The statistical procedures were dubious. George J. Stigler, "The Statistics of Monopoly and Merger," J. of Political Economy (Feb. 1956), pp. 33-40; Walter Adams, "Consumer Needs and Consumer Sovereignty in the American Economy," J. of Business (July 1962), pp. 264-277.

A few other quantitative studies on monopoly are: David Schwartzman, "The Effect of Monopoly on Price," J. of Political Economy (Aug. 1959), pp. 352-362; "The Burden of Monopoly," J. of Political Economy (Dec. 1960) pp. 627-630. A.H.D. Kaplan, Big Enterprise in a Competitive System, (Washington: Brookings Institution, 1954). J. Fred Weston, The Role of Mergers in the Growth of Large Firms, (Berkeley, University of California Press, 1953).

Kamerschen considered the period of 1956-57 to 1960-61 as reasonably close to "long-run equilibrium," and computed excess profit by taking deviations of the adjusted and unadjusted profits from the long-run average profit rate.

This would provide a reliable estimate of loss due to monopoly. As Bain said,

> .... the only sort of excess profit, which might be expected to be reflected in long-term average excess profits of entire industries, are monopolistic excess profits. All other types of excess profits are likely to occur sporadically and irregularly, or to be confined to only part of the firm of an industry... Chronic excess profits are at least prima facie suspect of resulting from simple monopolistic restrictions, and if so, are undesirable.[11]

I have used both the accounting profit rates and the adjusted profit rates in computing the "profit-difference"[12] of the drug and equipment industries. To estimate the rate of "profit-difference", the accounting profit rates of the drug and equipment industries were compared with the average accounting (unadjusted) profit rates of all manufacturing industries, and the adjusted profit rates were compared with the competitive profit rate (interest rate for industrial capital). The former provided the lower bounds of total excess profits and the latter the upper bound. All profit computations were based on data after taxes.

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[11] Bain, pp. 377-378.

[12] The word "profit-difference" has been used in denoting the difference in the profit rates in drug and equipment industries from that of all manufacturing industries and from the "normal" interest rate for industrial capital which, according to our assumption, is equal to the competitive rate of profit. Henceforth, the word will be used with the same meaning; but will indicate that the "profit-difference" is in favor of the drug and the equipment industries.

Incomes of Doctors

The rising income of physicians has always been a controversial issue. Men in other professions have been critical about changing relative financial situation in favor of medical practitioners. Their financial success has been attributed to their short supply.

Methods of Estimating Doctors' Incomes

The gross incomes of physicians and dentists were computed by adding their incomes from different sources such as: patient visits, surgery, sales of goods, and other professional and consulting fees.[13] Business expenses of physicians and dentists are about 41 and 49 percent of their respective incomes. These expenses include materials and supplies, merchandise purchased, cost of labor, salaries and wages paid, depreciation, rent, taxes, repairs, interest, insurance cost, etc.[14]

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[13] An alternative approach would be to get data on total amount paid by consumers of Copper Country to doctors as visiting fees. To this should be added amount paid by insurance companies on behalf of individuals and hospitals. The total figure divided by the number of physicians will give gross income per physician.

[14] We expect that deductible income may be grossly inflated. A major factor in the understatement of physicians' net income is the possibility of charging to on-business expenses certain types of consumption expenditures. See W. Lee Hansen, "Shortages and Investment in Health Manpower," in Economics of Health and Medical Care, Ann Arbor, Michigan, Bureau of Public Health Economics and Department of Economics (University of Michigan, 1964) p. 85.

The computation of the "unexplainable" higher incomes of physicians compared to a similar profession is a difficult task. Hardly any estimate can be satisfactory enough to be acceptable without criticism. Our estimate of the "income-difference" of physicians is based on a study by Friedman and Kuznets. They carefully compared the incomes of physicians and dentists (though in some cases with limited data) with respect to different factors (such as cost and length of training, variability of income, non-pecuniary advantages and disadvantages, etc.) that could explain the differences in incomes in these two professions. They concluded that 17 percent of the higher incomes of physicians could be explained due to longer and costlier training in medicine. They attributed the remainder of the difference to restriction of entry into the medical profession.[15] It can be criticized on the grounds that a progressive income tax falls heavily on fluctuating incomes, so physicians generally with a greater variability of income would pay more taxes than dentists with relatively steady income. However, this is probably balanced out by greater non-pecuniary advantages of physicians (and thus more untaxed advantages) than that of the dentists.

The estimates of Friedman and Kuznets are still relevant, because the conditions surrounding these two professions have changed very little

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[15] Milton Friedman and Simon Kuznets, Income from Independent Professionals Practice, National Bureau of Economic Research (New York, 1945), p. 395.

(those which could explain the "income-difference" of physicians), except the income gap between physicians and dentists has rather widened in the recent years.[16] Further, the educational costs of medical students are now subsidized, so the cost of education for the individual physicians could not have increased more than that of dentists. Therefore, to estimate the total "unexplainable" incomes of physicians, we first compute the percentage difference in the average incomes of physicians and dentists in the Copper Country, then deduct 17 percent of the income to allow for costlier and longer training of the physicians. The rest of the difference could not be explained by other factors and may be attributed to the difficulty of entry into the medical profession.

The total amount of the "unexplainable" income of the physicians may be visualized as a "loss" to the consumers, and the amount of additional tax on these "unexplained" incomes, that flows out of the area, is a loss to the community. To estimate the total tax on the "unexplainable" income, we computed the amount of taxes on the total incomes of physicians without "unexplainable" income, and with "unexplainable" income. The difference between the two is total amount of tax on the "unexplainable" income.

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[16] Herman Miles Somers and Anne Ramsay Somers, Doctors, Patients and Health Insurance (Washington, D. C., The Brookings Institution, 1961), pp. 200-205.

The Drug Industry

Expenditures on drugs account for a significant proportion of the medical bills of consumers, and this proportion has been rising steadily. The general belief is that the drug industry has high profit rates, high concentration and market power, and high spurious product differentiation due to intensive advertisement and sales promotion. Thus, this implies serious monopolistic trend.[17]

These general beliefs may or may not be true. Even if true, they may or may not have much significance for the Copper Country medical industry. In Chapter VI we have estimated the extent of the possible savings to the consumers of the Copper Country if profit rate of the drug industry were the same as all manufacturing industries. The procedures followed in getting these estimates are explained below.

Estimation of the difference in the profit rates of drug industry and all manufacturing industries:

The Copper Country does not have any drug company. The drug stores, hospitals and doctors buy their drugs from outside. To compute total drug expenditures of this region, we have added up the sales figures of drug stores, hospitals and others.[18] The total amount was reduced by the markup of hospitals and drug stores to get total sales figures for drug companies to this community. This

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[17] For a detailed review of literature on the structure, conduct and performance of the industry see Appendix A.

[18] Hospitals buy 95 percent of their drugs from outside and only five percent from local drug stores. So to get the total figure we added 95 percent of the sales of hospitals to the sales of the drug stores.

figure multiplied by the "profit-difference" of the drug industry from that of all manufacturing industries gives the amount of money that flows out of the community, but for which no drugs are received. In other words, this additional amount goes to the drug industry due to its comparatively higher profit rates. Similarly, to compute the loss of consumer dollars due to higher profits of the drug retailers, compared to other retailers, we multiplied the total sales of the drug retailers by their rate of "profit-difference."

We have computed two types of "profit-difference" for both manufacturers and drug retailers, accounting "profit-difference" and adjusted theoretical "profit-difference." To compute the former we have subtracted the accounting profit rates (on equity) of all manufacturers from the accounting profit rates of drug manufacturers and the accounting profit rate of all retailers from that of drug retailers. To get our adjusted "profit-difference" we have first adjusted the accounting profit rates on equity for intangibles, royalties and advertisements,[19] then from this we deducted a normal interest rate of seven percent. It is assumed here that long-run competitive profit rate of an industry should be equal to the "normal" rate of interest on the industrial capital. The total sales of drug manufacturers and of drug retailers are multiplied by the rate of "profit-difference" on sales (computed on equity then

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[19] We computed the adjusted profits based on estimates by Kamerschen (see his method explained in earlier pages). The "unexplained" profit is the difference between present profit rate of the industry and long-run average profit rate (competitive rate) of all other industries.

converted to a percent of sales) to get the estimates of total amount of "loss" of consumers dollars in buying drugs. But the amount "lost" due to the higher profit of the drug manufacturers is a pure drain on the community's resources, because it flows out of the area.[20]

The Hospital Equipment Industry

Technological development in hospital equipment has contributed much to the productivity of hospitals and doctors. But the prices of these highly sophisticated instruments are also very high. Whether this is a result of a noncompetitive situation in the equipment manufacturing industry or a legitimate price rise is not clearly established.

To determine whether there is any degree of monopoly in the medical equipment industry or not, we need to study the degree of concentration, barrier to entry, rate of profit and other performance and structural characteristics of the industry. However, no attempt has been made to do any thorough market analysis necessary to determine the degree of monopoly. Further, such an analysis is much more difficult in this industry than in many others because medical equipment includes a variety of things from big costly Cobalt and X-ray machines to small,

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[20] The "higher" profits of the drug retailers remain in the area so it is not a "loss" for the community as a whole.

inexpensive surgical tools. And these things are manufactured by a number of different manufacturing industries. Further, each of these industries might be making a multitude of other things. The profit rates reported by Federal Trade Commission are generally very broad categories of industries such as for scientific instruments and related products (SIC Code 38), which together with many kinds of hospital equipment (surgical, orthopedic, prosthetic, ophthalmic, dental equipment, etc.) include many other kinds of equipment (engineering, optical, watches, clocks, photographic instruments, etc.). So to get meaningful estimates of profit rates of this industry we took a representative sample of three firms exclusively producing all kinds of hospital equipment. These firms account for about 19 percent of the total sales. We took a five year average (1963-67) of the rate of profit on equity. To estimate the accounting "profit-difference" of these firms, we deducted from their average profit rates a five-year average profit rate on equity of all manufacturing industries. To get our adjusted theoretical profit-difference (as in the case of drug industry), we made adjustments in the accounting profit rates, for intangibles, royalties and advertising,[21] and deducted from this a seven percent imputed rate of interest.[22] To estimate the total out-flow of money

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[21] In fact, we did not have any precise data for these adjustments, exclusively for hospital equipment. So we used Kamerschen's adjustment for instrument and related products (SIC Code 38), which includes most of the surgical, medical and dental equipment.

[22] We assumed that the long-run profit rate on equity should be equal to the "normal" interest rate for the industrial capital.

from the Copper Country, due to the "unexplainable" higher profit in this industry compared to that of all manufacturing by rate of "profit-difference" of the industry. To this we also added the resulting payment of additional interest on investment in equipment.

The figures for total expenditure on equipment in the Copper Country medical industry, for the year 1967, were computed as below:

Total expenses on equipment = Amount of consumable equipment bought in 1967,

plus total amount of depreciation (for the year 1967) of the durable equipment purchased in 1967,

plus total amount of depreciation (for the year 1967) of the durable equipment purchased earlier,

plus total amount of inputed interest on the above investments.

Estimation of the Operating Inefficiencies of the Hospitals

Hospitals today are drawing more attention than any other aspect of the medical industry. In the last decade the demand for hospital services has increased much more than the supply of such facilities. This is due to both the tendency of physicians to concentrate their activities in the hospitals, and preference of patients to utilize more hospital services. In spite of this pressure, hospitals today are providing more services of better quality. This, together with

many other reasons, led to a phenomenal rise in the price of hospital services. The index of prices rose from 100 in 1958-59 to 200.1 in the year 1967. This rise is more than for most other commodities. The stupendous rise in prices may to a certain extent seem fictitious, when we consider the quality of product present hospitals provide. As it is not possible to measure with any precision the product of a hospital, we do not know how much the rise of price is affected by an improved product over time.

In the Copper Country, the hospitals get the largest share of the consumers' medical dollar. So any amount of inefficiency in the operation of these hospitals would mean a significant loss to the consumers. The hospitals in this region may or may not be operating at the optimum operational efficiency, but the non-profit status of these hospitals, and the present institutional payment arrangements do not have any built-in incentive for efficient operation of these hospitals.

Recently, a number of studies have been made, on different aspects of hospital efficiency by Feldstein, Deeble, Hayes, Long and Rosenthal.[23]

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[23] M. S. Feldstein, Economic Analysis for Health Service Efficiency (North Holland Publishing Co: Amsterdam, 1967); "Studying Hospital Costliness," Hospital Services Finances, 1965; "Operational Research and Efficiency in the Health Service," The Lancet, 1963.

J. S. Deeble, "An Economic Analysis of Hospital Costs," Medical Care, 1965.

J. H. Hayes (ed.) Factors Affecting the Cost of Hospital Care. (New York: Blakiston, 1954).

F. Long, "Efficient Use of Hospitals," in S. J. Axelrod (ed), The Economics of Health and Medical Care, Ann Arbor, Michigan: 1964.

G. D. Rosenthal, "A Critical Comment," A study of selected variables on hospital utilization, Hospital Management, (Oct. 1964).

A review of these studies provides an insight into characteristics of an efficient hospital. From these and others, we have gleaned out five criteria for measuring relative efficiency of different hospitals based on operating ratios. These are:

(1) Length of stay: the shorter the stay the more efficient the hospital.

(2) Cost per patient day: the lower the cost per patient day, the more efficient the hospital.

(3) Cost per bed: the lower the cost per bed, the more efficient the hospital.

(4) Rate of occupancy: the higher the rate of occupancy, the more efficient the hospital.

(5) Number of personnel per bed: the lower the number of personnel per bed, the more efficient the hospital.

It is obvious that these indicators are interdependent, so they must be considered together in judging the operational efficiency of hospitals. Two other important factors that we must take into consideration before we can say something meaningful about operational efficiency are equality of care and types of cases (case mix).

To elucidate the nature of the problem involved in inter-hospital comparisons of operating efficiency, let us assume that 'a' and 'b' are two hospitals. A higher per patient day cost of 'a' in comparison to 'b' may not mean that 'a' is less efficient than'b'. The hospital 'a' may have a shorter length of stay, better quality of care or might have treated more difficult cases. Again,

from the shorter length of stay in 'a' than in 'b' we can hardly say that 'a' is more efficient than 'b'. The shorter length of stay in 'a' may be due to more personnel per bed and more intensive care, which may be reflected in higher cost per day. Similarly, higher or lower cost per bed, or more or less personnel per bed cannot tell us anything about operational efficiency. The rate of occupancy, in this respect, is a slightly better indicator—but by no means an absolute criteria. If there is unfulfilled effective demand for medical care, a low rate of occupancy may show delay on the part of the hospital management to organize and process patients through the usual tests before admission. Every hospital knows that an unoccupied bed also costs money. That is why they are sometimes criticized for keeping patients longer than required. The cost of an extra one or two days is paid by the insurance companies. This is a topic of our next section, so we will not develop it here.

Inter and intra-regional comparisons of these hospitals and nursing homes would give us some idea of the magnitude of their operational efficiencies. The comparison of the Copper Country hospitals with the average hospital of the state or United States may yield only a lower estimate of the "loss". This is because present extensive insurance coverage for hospital costs allows the average hospital to keep certain amounts of operational inefficiency. So any interhospital comparisons, in fact, may be a comparison of one inefficient hospital with another inefficient one.

So in some cases, it may be more meaningful for us to select relatively efficient hospitals to develop standards of performance for making comparisons. Two other considerations may vitiate our calculations: (1) the cost of providing medical services in Copper Country may be lower due to lower salaries of personnel (salaries account for about 60 to 70 percent of total hospital costs) and (2) the quality of care and the types of cases may differ widely in other parts of the nation. Because of these two reasons, the lower costs of Copper Country hospitals compared to average hospitals in the United States may not necessarily mean that the former are very efficient hospitals.

The "losses" due to operational inefficiency, are estimated separately for each acute care hospital in the Copper Country. We know that in a hospital, the length of stay, cost per bed and the rate of occupancy are interdependent. More intensive care increases the cost per bed, but reduces the length of stay and the rate of occupancy, and vice versa. As the rate of occupancy is a better indicator of operational efficiency and easy to quantify, we have converted all the administrative inefficiencies in the hospitals in terms of rate of occupancy. We have computed adjusted rate of occupancy by keeping the length of stay of the Copper Country hospitals equal to the state and national average. In other words, what would be the rate of occupancy in the Copper Country hospitals, if their average length of stay had actually been equal to that of state and national average?

Adjusted Rate of Occupancy (A.R.O.)

$$= \frac{\text{Total patient days} \times \text{Average length of stay for state and nation} \times 100}{\text{No. of beds} \times 365 \times \text{Present length of stay}}$$

$$= \text{Present rate of occupancy} \times \frac{\text{Average length of stay for the state and nation}}{\text{Present length of stay in the Copper Country hospitals}}$$

This A.R.O. is then compared with the "efficient"[24] rate of occupancy which is the average of the occupancy rate of relatively efficient hospitals. The difference between the two rates gives an estimate of how much the rate of occupancy is lowered due to the operational inefficiencies of the hospitals. A lower rate of occupancy means that some beds are left unoccupied. The number of unoccupied beds was computed by multiplying the percentage difference between the "adjusted" and the "efficient" rate of occupancy by the number of beds in each hospital. The number of unoccupied beds multiplied by the cost of maintaining an unoccupied bed gives the total increase in hospital costs due to maintenance of unnecesssary beds. In other words, the hospital services could be provided that much cheaper, if these unnecessary costs were eliminated.

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[24] An average rate of occupancy of all the comparable hospitals was termed as "efficient" occupancy rate. This is not necessarily the rate which would provide medical care at the least cost.

Hospital Insurance

Health insurance organizations play an important role in financing of present high cost of medical care. In the face of rising medical costs their role in the future will be still greater.

Voluntary health insurance often has been criticized on the ground that it has helped in the rise of medical costs, supported monopoly income of doctors and high cost of inefficient hospitals, and encouraged overuse and misuse of medical care facilities.[25] It is very difficult to say that private health insurance has caused a rise in medical costs. Perhaps it is more appropriate to say that it has helped perpetuate such situations. It is usually true that insured people use more medical care than uninsured, but it does not necessarily mean the former overuse medical care facilities.

A study of the effects of selected variables on hospital utilization by Durbin and Antelman shows strong positive correlation between length of stay and proportion of people covered by health insurance.[26] The number of admissions was also found to be positively correlated with the proportion of people covered by health insurance.[27]

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[25] For more citations, see Appendix A.

[26] This, however, does not prove that voluntary health insurance increases the length of stay.

[27] R. L. Durbin and G. Antelman (1964) "A Study of the Effects of Selected Variables on Hospital Utilization," Hospital Management (August, 1964), p. 57.

Another study by Ronald Anderson and Odin W. Anderson shows that uninsured people spent less and used less medical care than insured people. The number of admissions per 100 persons per year was also higher for insured persons. Although mean length of stay was higher for uninsured persons, total hospital days per 100 persons per year were higher for insured persons. From the figures in Table 3.1 below one may be tempted to conclude that differences

TABLE 3.1--Health Use and Expenditure of Insured and Uninsured Persons in the United States in 1963

Items	Insured	Uninsured
In-hospital surgical procedure per 100 persons per year, nos.	6	3
Admission per 100 persons per year, nos.	15	9
Mean length of stay per admission, days	7.0	8.8
Hospital days per 100 persons per year, days	101	84
Mean expenditure per family, dollars	429	201
Mean expenditure per individual, dollars	133	67

Source: Ronald and Odin W. Anderson, A Decade of Health Services, adapted from Tables 67, 68, 72 and 73.

between expenditures of insured and uninsured persons gives the extent of contribution of voluntary health insurance in increasing costs. It certainly would be naive to conclude this without considering many other related things.

If we assume that uninsured people are able to buy minimal amounts of medical care necessary to keep them healthy, then it is

clear that insured people are using more medical care facilities than necessary, or in other words, taking extra precaution (which may or may not be necessary) at no immediate extra cost, but future premiums are likely to be larger. A contrary argument may be that extra precaution enables early detection and cure of illness which, if delayed, may prove very costly. So extra precaution reduces high future medical costs. High costs of insured people now, thus, may be evened out by low costs in future.

It is possible that the present voluntary insurance system has helped increase the income of doctors and hospitals and overall price of medical care, but it is also possible that this has saved many families from being financially crippled and many hospitals from being insolvent. This issue is too clouded for us to make any meaningful estimate of the contribution of health insurance in increasing medical cost. However, most of the effects of voluntary health insurance in raising medical costs, if any, would be picked up in our analysis of the incomes of doctors and costs of hospitals.

Financing medical care needs:

A significant proportion of the population in the Copper Country either gets no medical services or gets only inadequate services. With its high incidence of chronic illness, abnormally high percentage of older people and very low per capita incomes, the Copper Country faces a unique situation of a medically indigent region. There is considerable need for medical care, with very little money to buy it. The need for

medical care of a particular region depends on the incidence of illness, general health status of the people, age composition, on the level of care the society considers to be optimum and many other associated factors. So the estimation of need is a difficult task. Further, need must be defined in more specific terms such as by kinds of care: mental, tuberculosis, chronic diseases, or acute illness, etc.[28]

The Public Health Services estimates that "the population will need about 1200-1300 days of service in hospitals equipped and staffed for the provision of diagnosis and medical treatment, and an additional 700-800 days of care per 1000 population in facilities designed to provide nursing care, but little active medical treatment."[29] The above estimates are believed to be conservative. They indicate the present need for general beds to be about 4.5 beds per 1000 population.

Lee and Jones estimate the need for physicians to be about 134.7 per 100,000 population. The estimate of need for physicians was based on a concensus of expert opinion on the number of

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[28] Cronin, Reed and Baney, "Hospital Beds in the United States, 1950," Public Health Reports, LXV, No. 45 (November 10, 1950). Quoted by Seymour E. Harris, The Economics of American Medicine (Macmillan Company, New York, 1964), p. 170.

[29] L. S. Reed and H. Hollingsworth, "How Many General Beds Are Needed," Public Health Service (September 1963); of Proceedings of National Health Conference (1938), pp. 44-45.

physician hours required to prevent, diagnose, and treat specific diseases and health conditions.[30] This study was done some 35 years ago; it is now hazardous to rely on such estimates, because since then there has been phenomenal development in all aspects of medical science.

The President's Commission on the health needs of the nation made six estimates of physician requirements based on a 1960 projected population of 171.2 million. The estimates were primarily based on existing physician-population ratio as the standard.[31]

The Copper Country is not a typical region in the United States, so its medical needs may not be comparable to average needs for the rest of the nation. Any estimate of need in the Copper Country must take into consideration the abnormally high incidence of chronic illness and the high proportion of older people in this region. So we have estimated the need for additional medical care in this region by our survey of the area. This was supplemented by information on facilities available in other parts of the state and nation.

We feel that the creation of the needed medical facilities by itself does not guarantee that the services will be bought by the people. The effective demand for medical care depends on the

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[30] Roger I. Lee and Lewis W. Jones, The Fundamentals of Good Medical Care, (University of Chicago Press, 1933), p. 115.

[31] Building America's Health, Vol. II, "America's Health Status, Needs and Resources," (U.S. Government Printing Office, 1953), pp. 183-85. Cited by Rashi Fein, The Doctor Shortage (The Brookings Institution, Washington, D. C. 1967), p. 9.

attitude of the people towards use of medical care, prices of medical services, financing methods, incomes, age distribution of the population, etc. The people of the Copper Country are in a very unfavorable situation from these points of view. The greatest stumbling block is the lack of funds. Voluntary health insurance is not a solution, because most of the people cannot pay for the high cost of insurance, and those who have such protection find it difficult to maintain the present level of protection. Some alternative ways of financing must be sought outside the disposable incomes of the people.

Alternative methods of financing:

Finances for providing additional medical care to the people of the Copper Country may be obtained in two ways: (1) by reducing the cost of medical care through elimination of existing operational inefficiencies of the hospitals, "unexplainable" higher incomes of physicians compared to that of dentists, and "unexplainable" higher profit rates of the drug and the medical equipment industries compared to that of all manufacturing industries, and (2) by getting more funds through county, state and federal sources.

To estimate the total funds needed to finance additional facilities, we have multiplied the number of additional beds, physicians, dentists, and nurses by the existing per unit cost of these facilities in the Copper Country. More explicitly, the total

number of beds have been multiplied by the average cost per bed in the area, and the number of physicians, dentists and nurses have been multiplied by their respective incomes per annum in the year 1967. All added together provide the estimate of additional funds needed per year at the level of costs existing in 1967.

We have then analyzed whether the elimination of operational hospital inefficiencies of the hospitals, "unexplainable" high incomes and "unexplainable" high profits in the medical profession, drug and medical equipment industries provide enough funds (through savings) to meet the needs of the Copper Country. We have not addressed here the question of how operational inefficiencies and "unexplainable" profits and incomes can be removed; nor have we suggested how can the alleged savings be distributed to those who need them most. More research is needed to say anything meaningful on these aspects of the problem.

We have then analyzed the possibility of getting additional funds from the county, state and federal sources. To know whether enough funds can be raised in the counties internally through taxation or other means, we have analyzed present revenues, expenditures and the percent of revenue allocated to health care and other programs of the counties. The possibility of raising more funds and transferring funds from the counties' other programs to health care is also investigated. We have also analyzed the state's share in total revenue of these counties in the Copper Country compared to

other counties in Michigan. This gives us an idea of whether a substantial amount of state aid can be expected or Federal aid would be necessary. We have made no attempt to discuss the welfare implications of these redistributions of income.

CHAPTER IV

DISTRIBUTION OF MEDICAL DOLLAR

The medical care system of the Copper Country, to reiterate, includes (in the summer of 1967) five acute-care units, five long-term care units (including the one at St. Joseph Hospital), three service-providing agencies, 29 physicians, 16 dentists, 174 registered nurses and 38 practical nurses. Behind these providers of services stand the drug suppliers, medical equipment manufacturers and many other directly and indirectly related businesses--all of which makes complete medical care possible.

This chapter presents the total expenditures needed to support the medical care system of the Copper Country, compares these expenditures with the national figures and finally, analyzes the distribution of medical dollars.

National Aggregates

The total national public and private expenditures for health and medical care reached an estimated $47.3 billion in the financial year 1967 or about 6.2 percent of the gross national product. Table 4.1 clearly shows that the total and per capita medical expenditures have been rising steadily. The rise may have been

TABLE 4.1—Aggregate and Per Capita Expenditures for Health and Medical Care in the United States 1959-1960 to 1967-1968

Year	Total*	Population	Average per Capita Expenditure	Medical Expenditure as Percentage of G.N.P.
	million dollars	million	dollars	percent
1959-60	26,660	179.4	148.61	5.4
1960-61	28,635	182.3	157.08	5.7
1961-62	30,699	185.3	165.67	5.7
1962-63	33,070	188.2	175.72	5.8
1963-64	35,594	190.9	186.45	5.8
1964-65	38,441	193.5	198.66	5.9
1967-68	47,266	197.9	238.83	6.2

* Includes both private and public expenditures

Source: For the years 1959-60 to 1964-65 see "Medical Care Financing and Utilization," Health Economic Series, No. 1-A (1967), T.2, p. 5.
For the year 1967-68, see "Trends," Health, Education and Welfare, (1967-68), Part I.

caused by combinations of increases in three things: population, per capita demand and prices of medical care. The overall percentage rise in expenditures has been more than the rate of growth of the national product. Medical care expenditures made up only 5.4 percent of G.N.P. in 1959-60, but rose to 6.2 percent in 1967-68. This indicates the growing importance of medical expenditures in the economy.

The index of medical care prices has been increasing faster than any other commodity. In the year 1967, the medical care price index went up to 136.7 points (1957-59 = 100). The greatest increase was in hospital charges (200.1). As a result the share of hospitals in the consumer's medical dollar has been increasing over time (see Table 4.2).

The Copper Country Health Expenditures

The composition of operating costs of hospitals, nursing homes and service-providing agencies show that salaries account for about two-thirds of all costs. In hospitals it is about 61 percent; in nursing homes 72 percent and in service-providing agencies 70 percent of the total operating costs. Other major components of costs in hospitals are equipment (6.3 percent), food (5.5 percent), drugs (4.2 percent), supplies (5.5 percent) and depreciation and interest (4.6 percent). In nursing homes, food is the next major cost and accounts for 7.8 percent of the total operating costs. Besides

TABLE 4.2--Private Expenditure for Health Services by Types of Expenditures in Selected Years from 1961-67 in the United States

Types of Expenditures	1961			1964			1967*		
	Total Expenditure	Percentage to Total	Per Capita Expenditure	Total Expenditure	Percentage to Total	Per Capita Expenditure	Total Expenditure	Percentage to Total	Per Capita Expenditure
	million dollars	percent	dollars	million dollars	percent	dollars	million dollars	percent	dollars
Total	19,978	100.0	110.25	24,842	100.0	131.18	29,706	100.0	150.11
Hospital Care	5,743	28.7	31.69	7,552	30.4	39.88	9,361	31.5	47.30
Physicians Services	5,472	27.4	30.20	6,775	27.3	35.78	8,078	27.2	40.82
Dentists Services	2,048	10.3	11.30	2,341	9.4	12.36	2,634	8.9	13.31
Other Professional Services	809	4.0	4.46	850	3.4	4.49	871	3.0	4.50
Drug and Drug Sundries	3,750	18.8	20.69	4,341	17.5	22.92	4,932	16.6	24.92
Eyeglasses and Appliances	783	3.9	4.32	1,043	4.2	5.51	1,303	4.4	6.58
Nursing Home Care	395	2.0	2.18	789	3.2	4.17	1,183	4.0	5.98
Net Cost of Insurance	978	4.9	5.40	1,151	4.6	6.80	1,324	4.4	6.69

Source: For the year 1961-64, Social Security Administration, Social Security Bulletin, "National Health Expenditures, 1950-64," (January, 1966), Tables 11-12.

* Obtained by linear projection of 1961 and 1964 figures.

salaries, the major components of costs in service-providing agencies are: supplies (6.2 percent), depreciation and interest (4.1 percent), and others which include rent, traveling and other miscellaneous expenses (11.5 percent). For details on cost see Table 4.3.

Composition of the Medical Dollar

The national trend in the distribution of the consumer's medical dollar indicates that the shares of hospitals and nursing homes have been steadily increasing. This is mostly due to two reasons: (1) the use of hospitals and nursing homes has increased tremendously during the last decade, and (2) the index of prices (especially that of hospital services) have increased more than most of the commodities.

In the Copper Country, hospitals get the largest share of the consumer's medical dollar--about 37 percent--followed by physicians with 20 percent, drugs with 14 percent, nursing homes with 10 percent and dentists with 9 percent. The rest, 10 percent, is accounted for by such items as eye glasses and the net cost of insurance. Table 4.4 presents these details.

In comparison to national figures, the shares of the hospitals and nursing homes in the Copper Country are substantially larger, but the physician's share is substantially lower. The shares of drugs (14 percent) and net insurance costs and glasses (6 percent) are lower than the national figures. But the share of dentists is about the same. Table 4.5 shows these comparisons.

TABLE 4.3—Composition of the Total Operating Costs of Hospitals, Nursing Homes and Service-Providing Agencies in the Copper Country in 1967

Types of Expenditures	Hospitals		Nursing Homes		Service-Providing Agencies	
	dollars	percent	dollars	percent	dollars	percent
Salaries and Wages	2,373,051	61.43	680,666	71.70	204,430	70.13
Equipment	242,826	6.29	36,513	3.85	6,825	2.34
Medical and Professional Fees	84,796	2.20	-	-	-	-
Food	212,914	5.51	74,387	7.83	-	-
Drugs	161,643	4.18	16,485	1.74	8,000	2.74
Utilities	95,376	2.47	35,783	3.77	5,799	1.99
Laundry	35,641	0.92	12,333	1.30	100	0.03
Repair and Maintenance	73,008	1.89	10,020	1.05	2,669	0.92
Supplies	212,536	5.50	26,874	2.83	18,022	6.18
Depreciation and Interest	179,194	4.64	11,363	1.20	12,046	4.13
Others	192,079	4.97	44,945	4.73	33,645	11.54
Total	3,863,064	100.00	949,369	100.00	291,536	100.00

Source: Computed from hospital records. For composition of the total operating costs of individual health care units, see Appendix B.

TABLE 4.4--Distribution of the Consumer's Medical Care Dollar in the Copper Country in 1967

Types of Expenditures	Total	Per Capita Expenditure	Average Family Expenditure[a]	Percentage of Total
	dollars			percent
Hospital[b]	3,517,932	68.43	171.07	37.30
Physicians	1,894,725	36.86	92.14	20.10
Dentists	847,110	16.48	41.19	8.98
Drugs[c]	1,306,328	25.41	63.53	13.85
Nursing Homes	973,732	18.94	47.35	10.32
Other Professional Services	338,301	6.58	16.45	3.59
Other[d]	552,687	10.75	26.88	5.86
Grand Total	9,430,805	183.45	458.61	100.00

[a] The total number of families is 20,564 (average size of the family is 2.5 and population is 51,410).
[b] Total amount of drugs sold by hospitals have been deducted before computation.
[c] Includes the total drugs sold by hospitals, doctors and drugstores.
[d] Includes the net insurance cost (3.86 percent) and eyeglasses, etc. (2 percent).

Source: Computed from collected data.

TABLE 4.5--A Comparison of the Composition of the Medical Dollars in the Copper Country and in the United States in 1967

Types of Expenditure	Copper Country	United States
	percent	
Hospital	37.30	31.50
Physician	20.10	27.20
Dentist	8.98	8.90
Drug	13.85	16.60
Nursing Home	10.32	4.00
Other Professional Services	3.59	3.00
Other*	5.86	8.80
Total	100.00	100.00

* Includes shares of eyeglasses and net cost of insurance.

Source: Table 4.2 and 4.4 of this chapter.

CHAPTER V

DOCTORS

Physicians play a vital role in the total medical care system. They activate almost all personnel and all hospitals and nursing home facilities, so it is quite natural to concentrate more on them in any study of the medical industry. Besides this, physicians account for about one-fourth of the total expenditure on medical care. In fact, if the present trend of rising demand and prices of their services continues, their share in the consumers' medical dollars will further increase in the future. The index of prices for physicians' services increased from 100 in 1957-59 to 137.6 in 1967; whereas during the same period the general price index rose to only 116.3 points. The productivity of physicians has also increased tremendously due to better transportation and communication facilities, reduced home calls, better hospital facilities, etc. But the general concensus is that the demand for physicians has increased faster than the productivity and the number of physicians, and the number has failed to increase fast enough due to restriction of entry into the profession.[1] As a result physicians are alleged to earn more than what would be justified by the free working of demand and supply of their services. If this

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[1] Friedman and Kuznets, p. 395.

is true, the situation in the Copper Country would be rather worse, because the ratio of physicians to population is about half the national average. However, some real questions can be raised at this point: whether an unrestricted supply of physicians would not jeopardize the quality of care; or whether it would be "better" for the people to have more physicians of inferior quality or less of superior quality; or whether there is any optimum combination of quality and number of physicians; or whether it is at all possible to reach a decision on such a combination. Most of these questions are pedantic in nature and not essential to our immediate interest in this chapter.

The Copper Country needs more medical facilities and more funds to finance these facilities. The funds can be obtained either by getting more money from the local, state or federal sources, or by reducing the cost of medical care. One of the possible items of savings could be in physicians' bills. The services of physicians account for about one-fourth of the total medical bill. We need to know if this is due to "unexplainable"[2] high incomes of physicians or due to some other reasons. We are also interested in knowing the total out-flow of money in income tax on such "unexplainable" incomes because this is a pure drain on the community's resources.

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[2] The word "unexplainable" is defined in Chapter III and also later in this chapter.

This chapter, first, estimates the gross income, investments, and the "unexplainable" higher incomes of the physicians (compared to that of dentists) in the Copper Country, then computes the amount of income tax on such incomes that flows out of the area. The details of estimation techniques are presented in Chapter III.

Incomes

The yearly average gross incomes of physicians and dentists in the Copper Country are about $70,000 to $51,000, respectively. After allowing for their business expenses, the net incomes of physicians and dentists (before income tax) are about $42,000 and $26,000, respectively (see Table 5.1).

TABLE 5.1—Incomes of Physicians and Dentists in the Copper Country in 1967

Incomes & Expenses	Physicians	Dentists
	----- dollars -----	
Gross Incomes[a]	70,175	51,340
Business Expenses[b]	28,533	25,259
Net Income	41,642	26,081

[a] For details of computations see Appendix B.
[b] U.S. Treasury Department, Internal Revenue Service, Statistics of Income, 1964, p. 31.

Note: Total deductible business expenses of the physicians and dentists were about 40.66 and 49.20 percent of gross receipts, respectively.

Tax

Physicians sometimes under-report their incomes and overstate their costs. A major factor in the overstatement of physicians' costs is the possibility of charging off as business expenses certain types of consumption expenditures.[3] The data compiled from an audit of internal tax returns by the Internal Revenue Service show that physicians under-report income by about eight percent of their net income; other independent professionals were also found to under-report incomes more or less to the same extent.[4] In other words, physicians and dentists pay taxes only on 92 percent of their net incomes. Average income taxes (computed) paid by each physician and dentist are about $11,000 and $5,000, respectively. Net income, after taxes, for physicians is about $31,000 and that of dentists is about $21,000 (see Table 5.2).

Estimation of the "unexplainable" difference in the incomes of physicians and dentists:

We have defined "unexplainable" higher incomes of physicians over that of dentists (a comparable profession) as the amount of income that cannot be explained due to variability of incomes,

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[3] W. Lee Hansen, "Shortages and Investments in Health Manpower," The Economics of Health and Medical Care, Bureau of Public Health Economics and Department of Economics (The University of Michigan, Ann Arbor, Michigan, 1964), p. 85.

[4] Marius Farioletti, "Some Income Adjustment Results from the 1949 Audit Control Program," An Appraisal of the 1950 Census Income Data, Vol. 23, Studies in Income and Wealth, (Princeton, N. J., Princeton University Press), p. 258.

TABLE 5.2--Net Income (before and after tax) and Income Tax of Physicians and Dentists in the Copper Country in 1967

Names	Net Income (before tax)	Untaxed Income[a]	Total Taxable Income	Income Tax	Net Income (after tax)[b]
	dollars				
Physicians	41,642	5,131	36,511	10,670	30,972
Dentists	26,081	3,886	22,195	5,082	20,999

[a] Includes under-reported incomes--eight percent of net income (before taxes) and tax exemptions for three persons ($1,800).

[b] Includes untaxed incomes.

non-pecuniary advantages and disadvantages, conditions of demand, and length and cost of training, etc. in the two professions. Of course, it is not easy to assess the quantitative importance of each of the above factors responsible for the difference in average incomes. In some cases, the effects of different factors are merged, and in others only a subjective evaluation is possible.

In computing the "unexplainable" income difference between physicians and the dentists, I have made no attempt to collect and analyze the data on the above income determining factors, partly because it is a very tedious and time consuming process and mainly because an excellent study by Friedman and Kuznets,[5] dealing particularly with this aspect, is available.

[5] Friedman and Kuznets, p. 394-95.

Friedman and Kuznets compare the income in medicine and dentistry and conclude that, at most, 17 percent of the additional incomes in medicine can be explained by the longer and costlier training needed to get into this profession. The influence of remaining factors such as: greater variability of income in medicine than in dentistry; non-pecuniary advantages and disadvantages of the two professions; conditions of demand for services, etc., go in favor of medicine. In other words, these factors partly counterbalance the extra cost of physician's training.

Friedman and Kuznets found that physicians' average incomes (arithmetic mean) were 32 percent more than that of dentists'. This difference in income evidently is not a temporary aberration. The difference in incomes has persisted for a long time and, in fact, widened in the recent years in favor of physicians. The difference in the costs and length of training in the two professions has remained more or less the same. In fact, today, medical education is heavily subsidized. So it seems relevant to use Friedman and Kuznets' estimate of the explainable difference between the incomes of physicians and dentists.

Friedman's original analysis neglected the effects of individual income tax. A progressive income tax collects more from fluctuating incomes, and physicians' incomes are more fluctuating than dentists'.[6]

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[6] William J. Shultz and C. Lowell Harris, American Public Finance, 7th ed. (Englewood Cliffs, N. J., Prentice Hall, 1959), p. 220.

But this is more or less compensated by the greater non-pecuniary advantages of physicians which are not taxed.

Another criticism may be that physicians work longer hours per week than other professionals, so the mean annual income of physicians may not be a good measure.[7]

Based on Friedman and Kuznets' estimates we have computed "unexplainable" higher incomes of physicians over that of dentists in the Copper Country in Table 5.3.

TABLE 5.3--The Total "Unexplainable" Higher Incomes of Physicians Compared to That of Dentists in the Copper Country in 1967

Items	Amount
	dollars
1. Net Income (before taxes)	
a) Physicians	41,642
b) Dentists	26,081
2. Difference (1a - 1b)	15,561 (59.66)*
3. "Explainable" Difference [17 percent x $26,081]	4,434 (17.00)
4. "Unexplainable" Difference [2 - 3]	11,127 (42.66)
5. Total "Unexplainable" Incomes of Physicians [27 (number of physicians)x 11,127]	300,429

* Figures under parentheses show percentages of dentist's income.

[7] For other criticisms, see Herbert E. Klarman, The Economics of Health, (Columbia University Press, New York and London, 1965), pp. 92-93.

Table 5.3 shows physicians in the Copper Country earned about 60 percent more than dentists, and about 43 percent of the difference ($11,127) cannot be explained by the factors enumerated before. There are 27 independent physicians in the Copper Country, so the total "unexplained" income of the physicians is equal to 27 x $11,127 = $300,429. This is the amount the consumers "lose", which they would not have if income of physicians were comparable to that of dentists, i.e., if the physicians earnings were only 17 percent higher than dentists.

Tax on "unexplainable" incomes of physicians and out-flow of money

A portion of the "unexplained" income of physicians flows out of the community in income tax. This can be visualized as a pure drain on the community's resources. Total tax on the "unexplained" income per physician is about $4,200 and for the whole Copper Country, with 27 private physicians, the amount is about $113,000.[8] From our previous calculations we know that the total "unexplained" incomes of the physicians were about $300,000. So about 38 percent of their "unexplained" incomes is taxed by government and never becomes directly available to them or to the community. The computations of tax on the "unexplained" income are as follows:

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[8] The total out-flow of money actually may be less than $113,000 because a part of the medical expenditure of the people (patients) is not subject to tax, so if this amount had stayed with patients, they would have paid higher taxes. In fact, this will happen only if patients' savings in physicians' bill put them in higher income brackets.

	Amount
Net Income (before tax) per Physician	
a) with "unexplainable" income	41,642[9]
b) without "unexplainable" income	30,515[9]
Tax on (a)	10,670
Tax on (b)	6,479
Tax Paid per Physician on "Unexplainable" Income	4,191
Total Tax on "Unexplainable" Income of Physicians (27 x $4,191)	113,157

[9] $26,081 (dentist's income) + 17 percent of $26,081 = $30.515. The rest is computed as in Table 5.2.

CHAPTER VI

THE DRUG INDUSTRY

Drug manufacturers have always been criticized for having serious monopolistic trends exhibited by collusion, price fixing, intense advertising, misuse of patent privileges and high profit rates.[1] The opponents of this view argue that high profit rates in the drug industry are justified because of the high risk of investment in the industry. Further, patent privileges are essential for the continuing research programs of the drug companies. The pros and cons of these arguments are presented briefly in Appendix A.

This chapter compares the profit rate of the drug industry with that of all manufacturing industries and the "normal" interest rate for industrial capital, which by our assumption is equal to the competitive rate of profit. This comparison provides an estimate of the magnitude of the "unexplainable" higher profits in the drug industry compared to that of other industries. The higher the profit of the drug industry the higher the prices drugs are likely to be, and as there is no drug company in the Copper Country, the higher the out-flow of money from this area would be.

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[1] For specific citations see Appendix A.

In other words, if the profit rate of the drug industry were the same as that of all manufacturing industries or equal to the "normal" rate of interest for industrial capital the drugs would have been cheaper and people would have saved money on drugs. Estimating these possible savings is the main objective of this chapter.

This analysis is carried out at two levels: manufacturers and retailers. The high profits of the drug manufacturers and drug retailers have different effects on the resources of the people and the economy of the Copper Country. Both are a "loss" to the consumer. They are paying more for the drugs than they would have if the prices were less, but the high profits of drug retailers located in the area are not a loss to the community except for the income tax on such profits which flows out of the area; whereas the high profit of the drug manufacturers, since they are not located in the area, is a pure loss to the community. The magnitudes of these are estimated in the following pages.

Profits in the Drug Industry

The profit rates of the leading drug manufacturers have been much higher than the leading firms in other industries. Table 6.1 shows the profit rates of 22 industries (12 firms in each) in the year 1966. The rate of return on stockholder's investment in the drug industry was double that of about one-third of all industries.

TABLE 6.1--Rates of Return of 12 Leading Firms in Selected Industries, 1966

Industry	Rate or Return
	percent
Drug and Medicine	21.1
Periodicals	20.1
Radio and Television Equipment	19.8
Motor Vehicles	17.1
Computing Machines	16.3
Glass Containers	14.7
Aircraft	14.6
Nonferrous Metals	14.4
Motor Vehicle Parts	14.1
Cigarettes	13.9
Baking Products	13.5
Petroleum Refining	12.2
Dairy Products	12.0
Malt Liquors	11.5
Pulp Paper	10.6
Knit Apparel	10.5
Distilled Liquors	9.1
Steel	8.5
Plumbing Fixtures	8.4
Cement	6.1
Meat Products	5.3

Source: Federal Trade Commission - Rates of Return for Identical Companies in Selected Manufacturing Industries, 1957-1966.

If we compare the profit rates of the drug companies with all the manufacturing companies, we find similar differences. Except for the year 1956 and 1966, the profit rates of drug industry were the highest among the 26 leading industries (see Table 6.2).

TABLE 6.2--Rates of Return of Drug Manufacturers and All Manufacturing Industries, 1956-67

Year	Profit Rates After Taxes as a Percent of Stockholders' Equity		Profit Rank of the Drug Industry Among All Manufacturing Industries*
	All Drug Manufacturers	All Manufacturers	
	percent		rank
1956	17.6	12.3	2
1957	18.6	11.0	1
1958	17.7	8.6	1
1959	17.8	10.4	1
1960	16.8	9.2	1
1961	16.7	8.8	1
1962	16.8	9.8	1
1963	16.8	10.3	1
1964	18.2	11.6	1
1965	20.3	13.0	1
1966	20.3	13.5	2
1967	18.7	11.7	1

* Rank among the 26 industries for which profits are reported separately in the Quarterly Financial Reports.

Source: Federal Trade Commission and Securities and Exchange Commission, Quarterly Financial Report, 1967.

A few researchers argue that due to the high risk of investment in the drug industry, the high rate of profit is justified in this industry. Conrad and Plotkin attempt to test the hypothesis that the level of an industry's profit rate is positively correlated with the degree of risk faced by firms within the industry. In other words, the more risky an industry, the higher its average profit.[2]

[2] U. S. Congress Senate, Competitive Problems in the Drug Industry, Hearings, before the subcommittee on Monopoly of the Select Committee on Small Business, a report by Gordon R. Conrad and Irving H. Plotkin, 90th Congress, 1st and 2nd Session, Part 5, 1967-68, pp. 1747-1748.

It is true that the drug industry is not risk-free, and risk does play a part in the high profits of the drug industry. But risk premiums for drugs are low. In 1959-1964 drug companies earned an average return of 18.32 percent. Fisher and Hall attribute 1.68 percent of this to risk.[3] Muller analyzes the report of Conrad and Plotkin and concludes that though the variability of profit in the drug industry is more than in others, it does not mean that the chance of losses in the drug industry is more, or the incentive to invest there is less. Muller compared profit rates of the aluminum industry (relatively risk-free) with that of the drug industry (so-called high-risk industry) and found that the average profit rate of the former is 7.8 percent with a standard deviation of 1.3 percent whereas the average rate of the latter was 17.5 percent with a standard deviation of 8.6 percent. This means that two-thirds of the time, aluminum company profits fell in the range of 6.5 and 9.1 percent and that of the drug industry was between 8.9 and 26.1 percent. This clearly shows that chances of making high profit in the drug industry are more than in the aluminum industry in spite of large variability in the drug industry. Muller after further analysis concludes that ".... the Conrad-Plotkin measure of risk turns out to be a better proxy of

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[3] Irving N. Fisher and George R. Hall, Risk and Corporate Rate of Returns, a paper presented before the Econometric Society (December 29, 1967). Cited by Willard F. Muller, Senate Hearings on Monopoly of the Select Committee on Small Business, 90th Congress, 1st and 2nd Sessions, 1967-68, p. 1835.

relative market power than of risk."[4] In other words, high concentration, high entry barriers and a high degree of product differentiation are the important factors that are behind the persistent high profits in the drug industry.

Estimation of "profit-difference"[5]

From the above evidence and discussion it is clear that compared to other industries, the drug industry usually earns a higher rate of profit. The reasons for this cannot be fully ascribed to investment risk in this industry. We have analyzed separately the effects of higher profits of the drug retailers and drug manufacturers on the resources of the individuals and the community. We have computed in Table 6.3 the difference between the profit rates of drug manufacturers and all manufacturers, and between drug retailers and all retailers. As mentioned earlier in Chapter III, two types of "profit-difference" have been computed: accounting (unadjusted) "profit-difference", and adjusted "profit-difference".

The computations in Table 6.3 show that the rate of "unexplainable" higher profit rate of the drug manufacturers was about 6.84 percent of equity. As the total average equity (1963-67) of the drug industry was about $3,906 million, the total profit in absolute dollars was about $267 million ($3,906 million x 6.84 = $267.17 million), which expressed

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[4] U. S. Congress, Senate, Competitive Problems in the Drug Industry, Hearings, before the subcommittee on Monopoly of the Select Committee on Small Business, a statement by Willard F. Mueller, 90th Congress, 1st and 2nd Sessions, Part 5, 1967-68, pp. 1829-1843.

[5] The term "profit-difference" is explained in Chapter III.

TABLE 6.3--Total "Unexplainable" Profits of Drug Manufacturers and Drug Retailers

Manufacturers and Retailers	Profits on Equity
	percent
Drug Manufacturers	18.84
All Manufacturers	12.00[a]
Difference	6.84
Drug Retailers	36.36[b]
All Retailers	19.19[c]
Difference	17.17

[a] Source: F.T.C., Quarterly Financial Report of manufacturing corporations, 1963-1967. The computed profit rates (after taxes) are averages of five years (1963-1967).

[b] Source: Orin E. Burley, Albert B. Fisher, Jr, and Robert G. Cos, Drug Store Operating Costs and Profits, (McGraw-Hill Book Company, Inc., N. Y. 1956) Tables 16.1 and 17.1, pp. 221, 242.

[c] Source: Internal Revenue Service, Statistics of Income, 1965, p. 32.

Note: See Chapter III and Appendix B.5 for a detailed discussion on the methods of estimating the profit rates of drug retailers and all retailers.

as a percentage of total sales ($6,407 million) comes to 4.17 percent. As only the figures for the sales of drugs are available in the Copper Country, expressing the "profit-difference" in terms of sales (though computed on equity) will facilitate our computation of the flow of money from the Copper Country, and the "loss" of consumers' medical dollars due to the "unexplainable" higher profits of the drug industry. Multiplying the total drug sales of $712,657 by the rate of profit-difference of 4.17 percent, we get $29,718 as the "unexplainable"

high profits of the drug manufacturers from the Copper Country. Similarly we have computed this for the drug retailers.

The total "unexplainable" profit-difference of the drug retailers was 17.17 percent (see Table 6.3) of equity. The total unexplained profit in absolute dollars was about $20,829 [equity ($121,425) x .1717]. The figure $20,829 when expressed as a percentage of the total sales ($505,936) comes to 4.12 percent. The mark-up of drug retailers on prescription and proprietary drugs was about 43 percent of total sales, and this is about $393,816. The total mark-up ($393,816 x the rate of "unexplained profit-difference") is $16,225. As in the case of drug manufacturers, this amount could be saved by the consumers of drugs, if the profit rates of drug retailers were equal to that of all retailers. So the total possible savings in drugs would be a minimum of about $46,000 if the "profit-difference" of the drug manufacturers and retailers were eliminated.

The adjusted theoretical "profit-difference" of the drug industry was also computed in the above way, except that the accounting profit rate of the industry was adjusted for intangibles, royalties and advertising (because these are not to be expected in a perfectly competitive industry) and then was compared with the "normal" rate of interest for industrial capital.[6] The

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[6] According to our assumption competitive rate of profit should be equal to "normal" interest rate for industrial capital.

adjustments raised the profit rate by 5.76 percent,[7] so the adjusted profit rate of the drug industry increased to 24 percent. Deducting a competitive rate of profit of 7 percent, which by our assumption is equal to the "normal" rate of interest, we get 17 percent as the "unexplainable" higher profit rate of the drug industry. The average (1963-67) total equity of the drug industry was about $3,906 million so the total amount of "unexplainable" profit was about $687.46 millions, which is about 10.63 percent of the total sales ($6,467 million). The total value of drugs sold by hospitals (valued at cost price) and drug stores is $1,106,473, so the total "unexplainable" higher profits of the drug industry from the Copper Country is $1,106,473 x .1036 = $117,618 maximum.[8] This is the amount that the consumers could save if the profit rate of the drug industry were equal to our assumed competitive rate of profit.

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[7] Computed by Kamerschen for Chemical and Allied Products. We have used this figure for drug industry because drugs in industry come in the same industrial grouping, and other better estimates for drug industries were not available. See Kamerschen, p. 153.

[8] We have assumed here that the ratio of equity to sales in drug stores is the same as that of drug manufacturers. This may not be a very realistic assumption, but we do not expect the margin of error to be large, because the rate of profit on sales and high profit rates are almost the same for both drug manufacturers and drug stores.

CHAPTER VII

THE HOSPITAL EQUIPMENT INDUSTRY

The technological progress in medical equipment has contributed much to the development of medical science. Sophisticated equipment has increased the productivity of doctors and enabled hospitals to provide many more services of better quality. Prices and needs for this equipment have been increasing fast, and now equipment constitutes a major item of the cost of medical care. In the Copper Country, equipment accounts for about 6.29 percent (second major cost) of total hospital costs, and 3.85 percent (fourth major cost) of the total costs of nursing homes.

We are interested in knowing whether the prices of equipment could be lower without lowering the profit rate of medical equipment industry below comparable industries.

As we have mentioned earlier, the Copper Country needs more medical care of better quality, but the ability of people to pay for this service is very limited. Therefore, if the medical equipment industry really earns a very high profit, this would not only jeopardize the quality and kind of services provided, but also further limit the already deficient resources.

This chapter estimates the magnitude of "unexplainable" higher profit rate of the medical equipment industry compared to all manufacturing industries. This will provide a measure of the possible

savings of the consumers' medical dollars through elimination of the "unexplainable" higher profit rate. The procedures for estimating this profit are outlined in Chapter III.

Hospital equipment is manufactured by several manufacturing industries. In most of them, such equipment accounts for only an insignificant proportion of the total production, so it is very difficult to compute profit rates separately. Chapter III describes in detail the computational difficulties and our estimation techniques in calculating the profit rate of the hospital equipment industry.

Estimation of the Difference in the Profit Rate of the Medical Equipment Industry and All Manufacturing Industries

The computation of "profit-difference" in the equipment industry is based on a sample of three firms exclusively producing all kinds of hospital equipment. Together they account for about 18.7 percent of the total sales of medical equipment. Table 7.1 gives a comparative picture of the net profits of the equipment industry and all manufacturing industry.

Table 7.1 shows that the average rates of profits (after taxes) on equity in the last five years (1963-67) were 15 and 12 percent for the equipment industry and all manufacturing industries, respectively. Therefore, if we take the profit rates of all manufacturing industries as a standard for our comparison we find that the rate of "profit-difference" is only three percent in the equipment industry. Expressed

TABLE 7.1--Profit of Hospital Equipment and All Manufacturing Industries, 1963-67.

Year	Total equity of hospital equipment	Net Profit (after taxes)[a]	Total equity of all manufacturing[b]	Net Profit (after taxes)[b]
	millions of dollars			
1963	72.42	8.36	189,678	19,483
1964	82.13	10.41	199,764	23,211
1965	91.38	13.59	211,717	27,521
1966	100.76	16.64	230,281	30,937
1967	112.87	19.96	247,584	29,008
Total	459.56	68.96 (15.00)[c]	1,079,024	130,160 (12.00)[c]

[a] Obtained from the records of individual firms. I am indebted to Neville Doherty for providing this information and advising me on the computation of the rate of "profit-difference".

[b] Source: Federal Trade Commission, Quarterly Financial Report, 1963-1967.

[c] Figures in parenthesis are percentages of totals.

in dollars, this three percent profit rate is equal to $2.76 million [3% (rate of profit-difference) x 91.91 million (average equity from 1963-67) = $2.76 million] which is about 1.04 percent of the average sales ($265 million) of the industry. The total expenditure on equipment in the year 1967 was $286,164. Multiplying this figure by 1.04 percent, we get the amount of "unexplainable" profits of $3,176

in the equipment industry. The cost of medical care in the Copper Country would have been lower by this amount if the rate of profit in the medical equipment industry were equal to that of all manufacturing industries.

It would probably be instructive to look into the adjusted theoretical "profit-difference" of the medical equipment industry. The procedure of estimating this is outlined in Chapter III and is the same as used in the case of the drug industry.

The average profit rate (after taxes) of the equipment industry from 1963-67 was 15 percent of the total equity. Adjusting this profit rate for royalties, intangibles and advertisement, we get a profit rate of 19.40 percent of the total equity.[1] As we defined earlier, the adjusted "profit-difference" is the difference between the rate of return on equity and the interest rate on industrial capital. The interest rate used in this case is seven percent. So the adjusted theoretical profit-difference is 12.40 percent of the total equity. Converting this into the total amount of profit in dollars it is $11.4 million [.1240 x 91.91 (average equity) = $11.39 million, which is 4.30 percent of the average sales ($265 million).[2]

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[1] Kamerschen estimated that profit rate increased by about 4.40 percent when adjusted for royalties, intangibles and advertisement. The figure 4.40 percent is actually for professional, scientific and controlling instruments, photographic and optical goods, watches and clocks, etc. But most of the major hospital equipment comes under this industrial group. Therefore, we do not expect the error to be significant. See Kamerschen, p. 153.

[2] We have converted the profit rate on equity as a percent of sale because this facilitates our computation of the total "loss" of Copper Country due to high profits of this industry.

In the whole Copper Country medical industry, the total expenditures on equipment in the year 1967 was $286,164. Multiplying this figure by 4.30 percent, we get the amount of "unexplainable" higher profits in the equipment industry. In other words, this is the amount the Copper Country has "lost" due to the higher profit of this industry compared to the competitive profit rate. Adding the total interest paid on this amount gives the total outflow of money from the community for which no equivalent amount of equipment was received (see Table 7.2).

From the results of Table 7.2, it seems that the outflow of money due to the "profit-difference" in the equipment industry is not substantial. Of course, in evaluating these results we must keep in mind that our estimate of profit was based on a sample of only three firms which accounted for 19 percent of total sales. However, we can safely conclude that the "loss" of consumers' medical dollars and the drain on the resources of the Copper Country, due to the "unexplainable" "profit-difference" in the equipment industry, are not very significant.

TABLE 7.2—Total "Loss" of Consumers' Medical Dollars Due to "Adjusted" and "Unadjusted" Profit-Difference of the Medical Equipment Industry in the Copper Country in 1967

Types of Profit-Difference	Rate of Profit-Difference	Total "Unexplainable" Profits	Total Interest paid	"Loss" to Consumers
	percent	dollars	dollars	dollars
Adjusted	4.30	12,305	1,476	13,781
Unadjusted	1.04	3,176	384	3,560

CHAPTER VIII

HOSPITAL EFFICIENCY

Hospitals, today, are the center of most medical activities. Both physicians and patients have tended to use them more extensively in recent years. The former find them suitable for their professional work, and the latter use them for better treatment and to be eligible for institutionalized payments. Also there have been extraordinary price increases for hospital services in the last decade. The index of prices of hospital services increased from 100 in 1958-59 to 200 in the year 1967; whereas in the same period the general price level went up to only 116. In fact, the rise in the prices of hospital services was more than for most other consumer commodities. The possible reasons for this could be many, but a few of the important ones are general expansion in the services offered by hospitals, general inflation, increase in population and increase in the individual demand for hospital services.

Hospitals today are mostly non-profit enterprises and receive most of their payments through health insurance organizations and the government. The non-profit status of hospitals under present institutionalized payment system (insurance, government payments, etc.) does not provide the necessary incentive for an

efficient operation. Also the lack of inter- and intra-hospital coordination among administrators, physicians and trustees results in unoccupied beds, unused equipment and general excess capacity in the hospitals.

In a place like the Copper Country, where 35 percent of the families are below the poverty line, and where a significant proportion of the people receive only inadequate medical care, any existing inefficiencies in the operation of medical facilities become a matter of great concern. The hospitals and the nursing homes receive about 48 percent of the total medical expenditure in the Copper Country, and this is significantly higher than the national figure of 36 percent. Therefore, any operational inefficiency in these facilities would mean a substantial "loss" of consumers' medical dollars. In view of the extensive medical needs of the people, with very limited funds to buy them, it is imperative that the existing operational inefficiencies be eliminated from the system.

The main objective of this chapter is to estimate the amount of operational inefficiency in the Copper Country hospitals and nursing homes. This will enable us to compute the amount of money that can be theoretically saved and made available for financing the medical needs of the people of this area.

Estimation of the Operational Inefficiency of the Hospitals Based on Their Operating Ratios

The term "efficiency" used in this chapter does not conform to the definition of market efficiency. For that reason "a hospital is efficient" does not mean that the hospital is of optimum size and the medical care is provided at the minimum possible cost. In fact, we have made no attempt to do any market analysis of the hospitals and medical care. All measurements of efficiency are strictly based on operating ratios of the hospitals, and the word "operating efficiency" has been used mostly in the relative sense. Five criteria have been selected to measure the operating efficiencies of the hospitals. They are:

1) length of stay
2) cost per patient day
3) cost per bed
4) number of personnel per bed
5) rate of occupancy

According to our assumptions, for a given quality of care and type of patient, a hospital is a more efficient operation if it has higher rate of occupancy, lower cost per patient day, shorter length of stay, lower cost per bed, and fewer personnel per bed. These indicators are interdependent, and the magnitude of one of them, without reference to the magnitude of the others, tells very little about the level of the operational efficiency. In other words, high per patient day cost in a particular hospital by itself does not

mean that that hospital is inefficient. The length of stay may be short enough to compensate for the high cost.[1] A comparison of the magnitude of the indicators in the Copper Country hospitals with that of the State and National averages would give us a better idea of their relative efficiency (see Tables 8.1, 8.2 and 8.3).

These tables, 8.1 and 8.2, show that the number of personnel per bed, on an average, is less in the Copper Country than in the rest of the state (2.56) and nation (1.87). Intensity of care in any hospital to a great extent depends on the number of personnel per bed. The more intensive the care ceteris paribus, the shorter the average length of stay. This may be one of the reasons for more than average length of stay and less than average per patient day cost for these hospitals. Personnel per bed is the lowest in hospital E_s (1.15); but it may not mean E_s has the greatest operational efficiency, because the rate of occupancy in this hospital is the lowest, which necessarily means a low requirement for personnel. In hospital B_s personnel per bed is only 1.45. This is actually an underestimation of the real situation. First, because it does not include the services received from student nurses,[2] and second, because it includes beds and personnel of its long-term unit. In other words, 1.45 personnel per bed is a combined figure of both

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[1] See Chapter III for detailed discussion.

[2] There are 65 nurses each working minimum of 16 hours per week. This is equivalent to 26 full-time nurses.

TABLE 8.1—Indicators of Operational Efficiency, Acute Care and Long-term Facilities in Michigan and in the United States

State or United States	Length of Stay in Acute Care	Cost per Patient Day		Personnel per Bed		Rate of Occupancy		Cost per Bed	
		Acute Care	Long-term	Acute Care	Long-term	Acute Care	Long-term	Acute Care	Long-term
	days	dollars		number		percent		dollars	
Michigan	8.10[c]	47.50[d]	22.34[d]	2.56[f]	n.a.[j]	79.4[c]	82.0[h]	13,397[e]	5,921[i]
United States	7.50[a]	48.28[b]	21.89[b]	1.87[b]	0.98[b]	76.0[b]	85.0[b]	11,817[a]	2,586[g]

[a] The figures for 1967 were obtained by straightline projection of figures of 1945-60 in "Medical Care Financing and Utilization," Health Economic Series, No. 1 (Washington, D. C., 1962) pp. 126, 160.

[b] The figures for 1967 were obtained by a straightline projection of the trend from 1961-65 in "Medical Care Financing and Utilization," Health Economic Series, No. 1-A (Washington, D. C., 1967) pp. 60-61.

[c] Source: Michigan State Plan, 1967-68 for Hospital and Medical Facilities Construction, Michigan Department of Public Health, pp. 484-85.

[d] Source: "Health Manpower," Social Security Bulletin, (September 1968), pp. 5-9.

[e] Computed from c and d above.

[f] Source: Leo Reich, Inventory of Health Facilities, p. 26.

[g] Computed by dividing total cost by number of beds as ($\frac{134,000,000}{512,052}$ = 2,586).

[h] Source: "Nursing Home Utilization and Costs in Selected States," Health Economics Series, No. 8 (Washington, D. C., 1968) p. 17.

[i] Computed as ($\frac{\text{cost}}{\text{no. of beds}}$ = $\frac{196,303,144}{33,154}$ = 5,921).

[j] n.a. = not available.

TABLE 8.2--Indicators of Operational Efficiency, Acute Care and Long-term Facilities in the Copper Country in 1967

Names	Average Length of Stay	Cost per Patient Day	Personnel per Bed	Rate of Occupancy	Cost per Bed
	days	dollars	number	percent	dollars
		ACUTE CARE			
Hospital A_s	13.7	31.03	1.55	86.0	9,751
Hospital B_s	11.4	29.58[c]	1.45[a]	87.9	9,752[c]
Hospital C_s	9.0	36.10	1.76	81.9	10,781
Hospital D_s	8.0	32.07	1.75	95.9	13,883
Hospital E_s	4.0	146.58	1.15	28.3	15,150

TABLE 8.2--(Continued)

Names	Average Length of Stay	Cost per Patient Day	Personnel per Bed	Rate of Occupancy	Cost per Bed
	days	dollars	number	percent	dollars
		LONG-TERM			
Nursing Home A_L	–[b]	6.94	.54	99	2,509
Nursing Home B_L	–	14.91	.66	95	5,175
Nursing Home C_L	–	10.00	.92	99	3,862
Nursing Home D_L	–	8.45	.62	99	3,085

[a] Includes long-term personnel and beds.

[b] Calculation of average length of stay in long-term care is not very meaningful, because most of the patients are residents of the nursing homes.

[c] This is, in fact, an average cost for long-term and acute care patients.

Note: Excluded from our analysis are: Rice Memorial Clinic, W.U.P.H.S.C. and Western U.P. District Health Service. This is because they do not provide direct medical services and are not comparable with others. Also the names of the hospitals have been replaced by letters to avoid identification. The subscripts s and L designate short-term and long-term, respectively.

long-term and acute care units. As the requirement of personnel per bed for long-term care is less than for acute care, the estimate of 1.45 personnel per bed is actually an underestimation.[3]

Except for hospitals E_s ($15,150) and D_s ($13,883), the cost per bed in the Copper Country, on an average is lower than the state ($13,397) or national ($11,817) averages. High costs per bed for E_s and D_s may not necessarily mean inefficiency in the operation of these hospitals, because the number of beds is much less than in others. And, as necessary overhead costs do not decrease proportionately with decreases in the number of beds, the lower the number of beds, the higher the cost per bed is likely to be. Besides this, variable cost per bed in the above two hospitals is also more, which again may not mean operational inefficiency because care in these two hospitals may be more intensive than in others. This is partly evidenced by their short length of stay per patient.

Average length of stay for Michigan and United States hospitals is shorter than for all hospitals in the Copper Country except hospitals D_s and E_s, but the reverse seems to be true for the cost per patient day. Length of stay and cost per patient day are interdependent. Both are influenced by types of cases, intensity of care and quality of services. More intensive care of better quality increases the cost per patient day, but reduces the average length of stay. Complex cases are likely to increase both cost and length of stay. So all other factors must be considered together before anything can be said

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[3] See Table 8.2.

about the relative operational efficiency of the hospitals. In our initial analysis, we would assume that the quality of service, intensity of care and types of cases (severity of illness) are the same in the Copper Country and in the United States hospitals.[4]

To make the Copper Country cost figures comparable to that of state and national figures, we adjusted the per patient day cost figures of the Copper Country hospitals, based on eight days as the average length of stay which is about the average for the state and the nation. The following computations will make it clear.

TABLE 8.3--Adjusted per Patient Day Cost at Hospitals in the Copper Country in 1967

Hospital	Length of Stay		Per Patient Day Costs	
	Present	Standard	Present	Adjusted
	--- days ---		--- dollars ---	
A_s	13.7	8.0	31.03	47.30
B_s	11.4	8.0	29.58	38.86
C_s	9.0	8.0	36.10	39.33
D_s	8.0	8.0	32.07	32.07
E_s	4.0	8.0	146.58	90.50

Adjusted per patent day cost =

$$\frac{\text{present length of stay} \times \text{present per patient day cost}}{\text{standard length of stay}} \pm X$$

[4] This evidently is not true, but this will enable us to know which hospitals in the Copper Country, even under such heroic assumptions, show significant inefficiency. We will later relax this assumption.

Where X = decrease or increase in per patient day cost due to release or occupancy of few beds. If length of stay in the hospitals decreases to eight days, a few beds will remain unoccupied, and unoccupied beds cost only 74 percent of an occupied bed. So total cost will decrease. For the same reason, cost will increase for hospitals with length of stay less than eight days.

This means if length of stay in hospital A_s was eight days instead of 13.7 days, per patient day cost would be $47.30 instead of $31.03, and similarly for the others. From the above computed figures, it is clear that hospitals A_s and E_s are providing care at a relatively higher cost than other hospitals in the area and D_s seems to be the most efficient one. We may note here that quality differences and other related matters have not been considered at this point.

From the above computations, adjusted per patient day costs in A_s is about equal, and in E_s about $43 (90.50 - 47.50 = 43.00) more than the state average. The total number of patient days in E_s is 2067 days, so the total loss due to operational inefficiency is 2067 x $43 = $88,881.

In comparison with the rest of the state and nation, the quality of care in the Copper Country hospitals is generally poorer and patient treatment there is of a relatively simpler type. We are judging quality based on existing technical manpower, and other

facilities in the hospital. The number of physicians, dentists and nurses per 100,000 population is much lower in the Copper Country compared to the rest of the nation (see Table 10.1). Individual departments in the hospital also seem to be insufficiently equipped with respect to specialists and equipment.[5] Due to lack of the proper facilities, complex cases cannot be treated effectively. This is partly substantiated by the attitudes of the people in the area. A study done by Gordon Smith shows that, in the case of a major illness, the majority of the people preferred to go outside Copper Country to get treatment.[6]

This shows that if adjustments could be made regarding quality of care and types of cases, a significant amount of inefficiencies could be located in other hospitals, too. Since the patients treated in the Copper Country are of a less serious type, and quality of care poorer than for the rest of the nation, it can be said safely that the length of stay in the Copper Country hospitals is longer than can be justified by other factors. Usually there is a tendency on the part of the hospitals to keep patients longer than required, if there are no patients waiting to occupy the beds. The cost of extra days is paid by the insurance companies.[7] In other

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[5] For departmentwise information on facilities, see Leo Reich, pp. 26-35. He gives a list of things that the Copper Country hospitals do and do not have.

[6] Gordon Smith, p. 37.

[7] Milton I. Roemer, and Max Shain,"Hospital Utilization Under Insurance,"American Hospital Association, Hospital Monograph Series 6.

words, the present rate of occupancy is not as high as it seems to be. An adjusted rate of occupancy would give a better indication of the number of unoccupied beds.

The average length of stay in the hospital for the state and the nation is about eight days, but the length of stay in most of the hospitals in the Copper Country is more than this. Based on eight days as a standard length of stay, we have computed adjusted rate of occupancy for all hospitals (see Table 8.4).

TABLE 8.4--Adjusted Rate of Occupancy of Copper Country Hospitals in 1967

Hospital	Beds	Patient Days	Length of Stay		Adjusted Rate of Occupancy
			Present	Standard	
	number		days		percent
A_s	80	25,138	13.7	8.0	50.27
B_s	110	35,289	11.4	8.0	61.68
C_s	70	20,930	9.0	8.0	72.82
D_s	37	16,041	8.0	8.0	95.80
E_s	20	2,067	4.0	8.0	56.63

Adjusted rate of occupancy (A.R.O.) was computed as follows:

$$\text{A.R.O.} = \frac{\text{Total patient days x Standard length of stay x 100}}{\text{No. of beds x 365 x Present length of stay}}$$

or

$$\text{A.R.O.} = \text{Present rate of occupancy} \times \frac{\text{Ratio of standard length of stay}}{\text{to present length of stay}}$$

Rate of occupancy is, as we have indicated before, a good relative indicator of hospital efficiency. A low rate of occupancy certainly indicates inefficiency of operation. The unadjusted occupancy rate

in the Copper Country hospitals is generally high except for hospital E_s where it is only 28.3 percent. Hospital D_s has highest rate of occupancy (95.8 percent) followed by B_s (87.9), A_s (86.0) and C_s (81.9) The average rate of occupancy is about 85 percent. We have indicated that this seemingly high rate of occupancy is due to the existence of "disguised" unoccupied beds, and when adjusted for length of stay, the rate of occupancy drops to about 67 percent. A review of the rate of occupancy in different hospitals in the state and nation, indicates that average rate of occupancy is about 85 percent.[8] Considering 85 percent as the "efficient" rate of occupancy, we have computed number of beds that are unoccupied in the Copper Country hospitals. An unoccupied bed is not a free bed. Green and Ober estimated that an unoccupied bed costs about 73.63 percent of the cost of an occupied bed.[9]

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[8] In fact 85 percent may be a slight underestimation for an efficient hospital. Long suggests that hospitals can keep high rates of occupancy by incorporating some flexibility in the hospital system. He made three suggestions: 1) coordination between hospitals to enable transfer of patients from one hospital to another; 2) having multi-purpose swing beds; 3) shifting patients from peak to off peak periods. In fact, one of the hospitals under Long's study, which had some of these flexibilities, had the rate of occupancy as 93 percent. Lee Millard F. Long, "Efficient Use of Hospitals," The Economics of Health and Medical Care (The University of Michigan, Ann Arbor, Michigan, 1964) pp. 211-226. Also in Copper Country hospital D_s could achieve an occupancy rate of 95.8 percent even after adjustments were made for length of stay. There seems no reason why other hospitals might not achieve that rate of occupancy.

[9] H. W. Green and G. R. Ober, Jr., "Hospitals and Their Use in Northeast, Ohio," Pt. 5 (1960) pp. 10-13 (mimeo.). Cited by Sooners, pp. 197-98.

The cost of an unoccupied bed in the Copper Country hospitals ranges from $7,180 to $11,154 per year. From this it is evident that keeping unoccupied beds is a costly affair for hospitals. This cost is finally paid by the users of these beds. Table 8.5 gives the number of unoccupied beds in each hospital and total cost of maintaining these beds. This amount can be saved by efficient administration and medical care can be provided to the consumer at lower prices.

Hospital D_s does not appear in Table 8.5 because its rate of occupancy is 95.8 percent even after adjustment for length of stay (see Table 8.4). According to our standards of operational efficiency hospital D_s is very efficient in the utilization of its beds. In fact, it may be even a little overcrowded. Hospital D_s probably could use more acute care beds.

There seems to be a significant amount of operational inefficiency of the utilization of beds in hospital A_s; however, certain points must be clarified here. Hospital A_s does not have a long-term unit, but occasionally some long-term patients are also admitted. This might have inflated the length of stay figure and consequently our estimate of unoccupied beds.

Hospital B_s also admits long-term patients, but there is a separate unit for it. So length of stay for acute care in this hospital is not likely to reflect the length of stay of long-term patients. Therefore, existence of unoccupied beds must be attributed either to surplus acute care beds or inefficient organization of hospital activities—both indicate inefficient operation.

TABLE 8.5--Number and Total Maintenance Costs of Unoccupied Beds in Hospitals in the Copper Country, 1967

Hospitals	E.R.O.[a]	A.P.R.O.[a]	Difference between A.P.R.O. and E.R.O.	Unoccupied Beds[b]	Cost per Unoccupied[c]	Maintenance Cost of Unoccupied Beds[d]
	percent	percent	percent	number	dollars	dollars
A_s	85.0	50.27	34.73	27.78	7,180	199,460
B_s	85.0	61.68	23.32	25.65	7,180	184,167
C_s	85.0	72.82	12.18	8.53	7,938	67,711
E_s	85.0	56.63	28.37	5.67	11,154	63,243
Total	-	-	-	67.63	-	514,581

[a] E.R.O. and A.P.R.O. designate "efficient" rate of occupancy and "adjusted" present rate of occupancy. The term "efficient" rate of occupancy is actually the average rate of occupancy of the comparable hospitals in the United States.

[b] Computed by multiplying percentage difference between adjusted and efficient rate of occupancy by the number of beds in the hospital.

[c] Obtained by multiplying total cost per bed by 73.63 — the cost of maintaining an unoccupied bed.

[d] Obtained by multiplying "b" and "c".

The reason for the present census problems (unoccupied beds) both in A_s and B_s can be traced back to July, 1951 when B_s was constructed with Hill-Burton funds. The original plan was to make B_s a "regional" center and close A_s. But the plan did not succeed for a number of reasons.[10] The result was that both hospitals exist side by side and neither has enough demand for acute care beds.

The E_s hospital is in a special situation. It is owned and operated by the mining corporation of White Pine. Out of its 20 beds only 10 are available for community service. Actually, this hospital has been constructed for the workers in the copper mines. As there are only 20 beds, the overhead cost per bed is the highest of the hospitals studied. This partly explains the high patient day cost of this hospital. So our estimate of total loss of $63,243 due to operational inefficiencies may actually be an underestimation.

The quality of care in the hospitals of the Copper Country can not be taken to be equal. In fact, a substantial difference in quality does exist in these hospitals. Our judgment is that B_s has the best quality of care followed by A_s, C_s, D_s and E_s.[11] The ranking is based on facilities and services available in these hospitals [12] but, as mere presence of facilities does not always insure their

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[10] Gordon Smith, p. 60.

[11] See Appendix B for our procedure in arriving at this conclusion.

[12] Joint Commission on Accreditation also judges quality based on the facilities and operation standards of the hospitals.

efficient use, there is some leeway for argument. D_S and E_S do not meet the standards of the Joint Commission on Accreditation of Hospitals, primarily because of deficiencies in operation standards, but also because of their physical plant deficiencies. This partly confirms our procedure and ranking of hospitals with respect to the quality of care (see Appendix B).

Another very special characteristic of the Copper Country which deserves consideration and has an important bearing on number of unoccupied acute care beds is the gradually declining population of this area. As a result, the demand for acute care beds is not increasing. It seems that increase in per capita income is not enough to compensate for the decrease in demand due to decline in population. This may be another reason why the acute care hospitals are admitting long-term patients. In evaluating the results of Table 8.5, all of these little details must be taken into consideration before any meaningful conclusions can be drawn.

The long-term facilities in the Copper Country are used almost to full capacity, and there does not seem to be any additional room for more patients. There is usually a long waiting list. The quality of care in these long-term units, except for B_L and C_L seems to be of an inferior type, but quality really does not matter here as much as in acute care hospitals. Most of the patients in the long-term units are residents of the facility. They come to stay here as long as they live and many of them are not confined to bed. This is either because they do not have anyone to take care of them or

because they get paid under medicare and other programs only if they are admitted to a hospital.

All the long-term units are private enterprises (except for B_L) and are run quite efficiently. The long-term unit B_L does have a slightly higher cost per patient day, but in my judgment the quality of care and other facilities are good and justify the additional costs.

CHAPTER IX

HEALTH INSURANCE

Since its inception in the 1930's, voluntary health insurance has grown very fast. Now about three-fourths of the American public has some form of health insurance, and about one-third of the total medical cost is paid through this channel. Health insurance has helped to equalize distribution of medical costs among individuals and families. It has also assured payments to providers of health care. But many believe that health insurance is not a neutral force in the medical market and that it has undesirable side effects. Health insurance usually raises demand for medical services by removing the financial barrier and transferring purchasing power from the well to the ill.[1] The increase in demand for medical care is positively associated with the increase in price of medical care which in turn pushes up health insurance premiums. Unlike automobile and other types of insurance premiums, health insurance premiums are not regulated. Each company makes its own rate.[2] How they reach this conclusion is a closely guarded

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[1] R. L. Dubin and G. Antelman, p. 57 and J. H. Hayes (ed.), Factors Affecting the Cost of Hospital Care, 1954.

[2] Somers, pp. 246-287.

secret. Whether rising health insurance expenditure is a cause or effect of rising medical costs is not a settled question. But the important point here is that a large number of underprivileged people in the Copper Country and elsewhere with no insurance have suffered disadvantages of spiralling prices without any of the offsetting advantages. For those with coverage, there now appears a formidable block against their increasing or even maintaining the present level of protection.

The general concensus is that insured people do use more medical facilities, but this by itself does not indicate that they use unnecessary medical care. Certainly, it cannot be denied that preventive care does payoff in the future. Due to these conceptual difficulties this chapter does not attempt to estimate effects of voluntary health insurance in increasing cost of medical care. Instead, it focuses attention on medical costs and patterns of use of insured and uninsured people in the nation. This would provide a notion of the differences in availability of medical care to insured and uninsured people. The analysis is carried further to see where people of the Copper Country stand in the national health insurance picture. In other words, what percentage of people in the Copper Country are insured against illness, and how does it compare with the national figure? The analysis reveals expected financial support for future medical needs of the area, and also provides a direction to our next chapter

where alternative methods of financial medical care in the Copper Country are explored.

The health insurance premiums received by all private insuring organizations in 1966 reached a total of $12.7 billion. The five year period from 1961 through 1966 showed a 54 percent increase in total amount of premiums received by insurers. In 1966, a total of $10.2 billion in health insurance benefits were paid to insured persons by all United States private insuring organizations, almost three times the amount for 1956.[2] The future role of insurance companies in financing health care is expected to be still larger. It appears that insured people use more medical services and spend more on their health than uninsured people. In 1962 health expenses per person per year of insured people was $143 and that of uninsured people $96 (see Table 9.1). Insured people consistently used more services than uninsured people (see Tables 9.2 and 9.3).

The figures in Tables 9.2 and 9.3 indicate that uninsured people use less medical care than insured people, but it is difficult to say that the former group uses less medical care because they cannot afford it or because they think it is unnecessary. Further, it is difficut to distinguish between necessary and unnecessary medical expenditure. At present insufficient data are available for a precise estimate of the extent of overuse and overexpenditure in medical care

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[2] 1967 Source Book of Health Insurance, Public Health Insurance Institute.

TABLE 9.1—Health Expenses per Person per Year, by Type of Expense and Hospital Insurance Coverage in the United States, July-December 1962

Items	Types of Expenses					
	Total	Hospital	Doctor	Dental	Medicine	Special and Other
	dollars					
All Persons	129	30	43	19	26	11
Insured	143	34	48	22	27	12
Uninsured	96	21	32	11	22	10

Source: Public Health Service, "Personal Health Expenses," Vital Health Statistics, Series 10, No. 27, (Washington, D. C. 1966), p. 31.

TABLE 9.2—In-Hospital Surgical Procedure Rate per 100 Persons per Year by Age, Sex, and Surgical Insurance Status, Twelve-Month Period in the United States, 1957-58

Items	Per 100 Person-Year	Insured Persons Years	Uninsured Persons Years
	number		
Total	5	5	4
65 Years and Older	7	7	7
Male	4	4	4
Female	5	6	4

Source: Ibid, p. 65, t. 58.

TABLE 9.3--Expenditures and Hospital Utilization of Insured and Uninsured People in the United States in 1963

Items	All Families	
	Insured	Uninsured
Mean Family Expenditures (dollars)	429	201
Number of Admissions to Hospitals per 100 persons-years (number)	15	9
Mean Length of Stay (days)	7.0	8.8
Number of Hospital Days per 100 persons-years (number)	101	84

Source: Ronald Andersen and Odin W. Anderson, A Decade of Health Services, (The University of Chicago Press, Chicago and London, 1967), pp. 131, 136.

caused by present health insurance institutions and their payment systems. But it is certain that those who cannot afford health insurance are really in a difficult situation because medical costs have gone up so high that any grave illness will be a financial disaster for them. A significant proportion of people in the Copper Country are in such a situation. In general they do not and cannot purchase adequate health protection with their present income without upsetting a precarious financial balance. The insurance coverage of the Copper Country is well below national averages (see Table 9.4).

About 30.7 percent of the people dropped policies for financial reasons and about 13.8 percent dropped for other reasons; these figures for people above 65 were 38 percent and 19 percent, respectively. The lack of proper health insurance, low income and higher medical needs (especially for the older people above 65) puts the Copper Country in a special group of medically indigent regions.

As we have mentioned earlier in Chapter II, the Copper Country has a high proportion of older people with high medical needs so insurance companies sometimes are reluctant to insure them with a high premium rate. About 71 percent of the families with family heads of 65 years and older earn below $3,000 per annum. This is why most of them cannot buy insurance protection and those having health insurance find it difficult to maintain the present level of protection. If the present trend continues, it is inconceivable that in future years

TABLE 9.4—Family Insurance Coverage in the Copper Country and the United States

Insurance Status	Copper Country		United States	
	All Families	Family Heads over 65	All Families	Family Heads over 65
	percent			
With Insurance	69	48	78	60
Without Insurance	31	52	22	40

Source: Gordon Smith, p. 32.

they can finance their medical needs without some alternative financing arrangements. Some alternative possibilities for financing medical needs in the Copper Country are analyzed in the next chapter.

CHAPTER X

FINANCING MEDICAL CARE NEEDS

It is not easy to estimate the need for medical care objectively, because it depends on the age distribution of the population, the economic condition and attitudes of people toward the use of medical care, and, above all, on incidence of illness and health status of the people. The need for medical care is actually a need for beds, physicians, dentists and the host of other things that make for complete medical care. A few attempts have been made in the past to estimate the needs for physicians and beds. A brief review of them has been presented in Chapter III.

Problems in the Copper Country

In Chapter II we discussed the general characteristics of the Copper Country. This chapter focuses on the economic, social and medical problems of the area, which are to a great extent responsible for the large number of medically indigent people in the Copper Country.

About 15 percent of the population in the Copper Country is 65 years or older, whereas it is only 8.5 percent in the state. Further the health of these older people is generally

very poor. The incidence of chronic illness in the Copper Country is much higher than for the rest of the state. For example, in the Copper Country, 918 per 100,000 persons were reported to be hospitalized with a heart condition, whereas the state figure was 388 per 100,000 persons. The number of people per 100,000 population with tuberculosis, cancer and diabetes, etc. was also found to be very high. The death rate from all causes in the Copper Country is about 15 percent, whereas it is less than nine percent for the rest of the state. As a result the medical needs of the people are very high. But, unfortunately, most of the people cannot get adequate medical care, because of the high prices of the existing facilities, and unavailability of the types of care they need.

The Copper Country is economically a depressed area. About 35 percent of all families and 71 percent of the families with an aged family head have an annual income of less than $3,000. The median income of all employed people in the Copper Country is $2,730 per year or $270 below the "poverty" level.

The general level of education of the people is low, and the older people have less formal education than the younger ones. An attitude study by Gordon Smith shows that the older people in this area also are less health conscious than the younger people.[1] More of the younger people favored preventive checkups.

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[1] Gordon Smith, p. 34.

Another unique feature of the Copper Country is its declining general population, but increasing population of older people. The younger people with generally higher incomes are migrating to the metropolitan areas. The result is that tax collections in this area are not increasing enough to finance the growing need for more medical care facilities.

Further, this area has an acute problem of attracting trained medical specialists. Physicians, dentists and nurses are in short supply. Besides this, the transportation and communication facilities are very inadequate, and the situation further deteriorates in the severe winter of the area.

Medical Needs of the Copper Country

It is evident from the above discussions that the Copper Country is not a typical region of America. So it seems that the previous estimates of the need for medical care for the nation as a whole (mentioned in Chapter III) are not really applicable for the Copper Country. However, a comparison of the ratios of beds and manpower to population in the Copper Country with that of the United States would give us some idea about the situation of medical facilities in the Copper Country.

Although Table 10.1 indicates that the number of acute-care beds are less, and the long-term beds are more in the Copper Country compared to the national average, the survey shows that about 140 additional long-term beds are needed in the Copper

TABLE 10.1--Medical Care Facilities in the Copper Country and in the United States in 1967

Items	Copper Country	United States
No. of acute care beds	317	1,671,125
No. of acute care beds per per 1,000 persons	6.17	8.45
No. of long-term beds	263	512,052
No. of long-term beds per 1,000 persons	5.12	2.95
No. of doctors	29.0	305,500
No. of doctors per 100,000 persons	56.4	154.40
No. of dentists	16.5	113,700
No. of dentists per 100,000 persons	32.0	57.46
No. of licensed practical nurses (L.P.N.)	45.0	320,000
No. of L.P.N./100,000 persons	88.0	161.73
No. of registered nurses (R.N.)	88.0	659,000
No. of R.N./100,000 persons	171.0	333.06

Source: For all figures for manpower see Public Health Service, "Health Manpower," Vital Health Statistics, Series 14, No. 1 (1968), pp. 4.7.

For beds, see Michigan Hospital, IV, No. II (November 1968).

Country, but the number of acute-care beds is about right. This may be due to the high proportion of old and disabled people in the area who need more nursing than hospital care. Half of the long-term beds should be enough to provide an extended care facility,[2] and the rest should provide general nursing care. The latter type may be located in nursing, convalescent or permit homes.[3]

In Keweenaw county, where there is no medical facility of any kind, the residential type care (permit homes) may be established to serve nursing needs of the area. Establishing a full-fledged extended care facility may not be economically desirable because the area is sparsely populated. These homes may be served by mobile medical units when needed, especially if patients cannot be brought to the hospital for treatment.

The number of acute-care beds is sufficient for the present needs.[4] In fact a few hospitals have a census problem. But I believe this is particularly due to the present low incomes and

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[2] In an extended care facility, the quality of care is better than in nursing, convalescent or permit homes, and only those patients are admitted here who need more skilled and intensive care. Most of the beds in the Houghton County Medical Care Facility are of this type.

[3] The permit homes are intended to provide shelter and some nursing care to those who are disabled by age and chronic illness, and need somebody to take care of them but do not need much medical attention. However, these homes, due to lower quality of services and lack of proper supervision may have difficulty in getting payments under the medicare program.

[4] However, the distribution of acute-care beds in the Copper Country is not necessarily optimum. Some relocation of beds from Houghton to Ontonagon may be desirable and similar other arrangements are not ruled out.

low effective demands of the people and once enough funds are made available the census problems in the acute care hospitals will be solved. A significant proportion of the population in the Copper Country neither can afford to pay for the cost of a severe illness themselves, nor can they afford to pay premiums for insurance companies to take care of these eventualities. The lack of finances coupled with low education and lack of health consciousness, have reduced the effective demand for medical care in the Copper Country.

The shortage of physicians, dentists and nurses is very evident in the Copper Country. Table 10.1 shows that to be equal to the national averages, the Copper Country needs an additional 50 physicians, 13 dentists, 38 licensed practical nurses and 88 registered nurses. This amounts to about double the present number. But the Copper Country is not a typical area of the United States, so the difference in the number of beds and manpower between the United States and the Copper Country may not reflect the needs of the area. The unique situations in the Copper Country must be taken into consideration in estimating the medical needs. The Copper Country is a semi-rural area[5] with high proportion of aged people who need relatively more nursing than dental or hospital care. The estimates show that an additional 13 physicians and seven dentists are required in this area. Of the 13 physicians, there should be two internists, two obstetricians,

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[5] In isolated semi-rural areas, on an average, there are 81 physicians per 100,000 persons.

one gynecologist, one eye-ear-nose-throat specialist, one uroligist, one pediatrician, two psychiatrists, one radiologist, and two general practitioners.

More nurses are needed to serve the available beds in the Copper Country; the addition of 140 long-term beds will further increase the need for nurses, particularly that of licensed practical nurses. The estimates show that about an additional 45 licensed practical nurses and 40 registered nurses are needed in the Copper Country. Besides this to perform the necessary laboratory procedures the area needs two medical technologists, one blood technician, one operating room technician, two dietitians, one nurse anaesthetist and one dental hygienist. For more efficient use, these technicians may have to be shared by the hospitals.

Table 10.2 presents the above estimates of the medical needs of the Copper Country and the additional funds needed to finance these needs.

Besides the needs shown in Table 10.2 a few hospitals should construct or expand their dietary area, storage space, in-service training and meeting rooms, maintenance shops, dining rooms, cardiac care units, obstetrical areas and ventilated post-mortem rooms. However, I have made no estimate of the funds needed for these expansions because these improvements can be delayed for a second stage of development after the necessary minimum facilities have been expanded to provide the immediate needs.

TABLE 10.2—Additional Needs of Beds, Manpower, and Funds in the Copper Country in 1967

Items	Number	Funds per year
		dollars
Physicians	13	$912,275
Internists - 2		
Obstetricians - 2		
Gynecologist - 1		
Eye-Ear-Nose-Throat Specialist - 1		
Urologist - 1		
Pediatricians - 1		
Psychiatrists - 2		
Radiologist - 1		
General Practitioners - 2		
Dentists	7	359,380
Nurses	85	422,500
Registered Nurses - 40		
Licensed Practical Nurses - 45		
Technicians	9	45,000
Medical Technologists - 2		
Physical Therapist - 1		
Blood Technician - 1		
Dietitians - 2		
Nurse Anaethetist - 1		
Dental Hygienist - 1		
Operating Room Technician - 1		
Long-term Beds	140	431,270
Extended Care Facility - 70		
Others (Nursing, Convalescent and Permit Homes) - 70		
Total Funds Needed		$2,170,425

Note: The funds needed were computed by multiplying the number of each item with the present rate of expenditure for the respective items. The salaries of R.N., L.P.N. and Technicians were taken to be $5,500 $4,500, and $5,000 per year, respectively. The funds needed for long-term beds was estimated by multiplying the number of extended care beds by the cost of an unoccupied bed for such care which is $3,829 (74% of the cost of an occupied bed in Houghton County Medical Care Facility), and other beds multiplied by $2,332 (74% of the average cost of an occupied bed in other types of nursing homes).

Estimating the need for more facilities would only be a statistical exercise, if people are not able to buy them. To utilize the described facilities, the Copper Country people must be willing and able to spend another two and one-half million dollars. Considering the economic conditions of the people, this expenditure can hardly be expected to come entirely out of the disposable income of the people without upsetting a precarious financial balance. Some alternative methods of financing this need must be sought.

Alternative Methods of Financing the Medical Needs

The possible sources of funds for financing the above mentioned medical needs are: private, philanthropy, savings from the elimination of the operational inefficiencies and "unexplainable" incomes and profits in the medical industry, county tax, and state and federal aid.

As we have seen above, under the present financial conditions of the people, private financing does not seem to be a very good possibility.

The role of philanthropy has decreased very much in recent years. In the Copper Country, all hospitals together get an average of about $75,000 a year. This includes imputed wages of voluntary labors and gifts from other sources. It is difficult to say how much additional funds could be made available from this source, but certainly it is not going to be anywhere near present requirements.

The previous chapters estimated the amount of savings that can be made by eliminating the present operational inefficiencies of the hospitals, "unexplainable" higher incomes of the physicians compared to that of the dentists and "unexplainable" higher profits of the drug and medical equipment industries compared to that of all manufacturing industries and normal rate of interest on industrial capital. Theoretically, total savings would be between about $860,000 and $950,000 (see Table 10.3). Even assuming that this saving can be tapped,[6] it would provide only 40 to 44 percent of the total need. It is evident that this saving is a difficult tap because it involves imposing control on the drug and medical equipment industries, opening more medical schools, improving the existing policies of admission in medical schools and licensing of private practitioners, etc. These changes are not likely to come in the short-run. Therefore, we must look for other sources of funds like county revenues, state and federal aids.

The total revenue of the Copper Country was about five million dollars in the year 1966 (this included state aid). Out of this amount, 37 percent was spent on health, welfare and medical assistance. In the individual counties, out of the total expenditures, the share of health, welfare and medical assistance was

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[6] This thesis does not focus on how this amount can be tapped, and how this would reduce the cost of medical care to those who need it most. This is one of the "undiscussed issues" later in this chapter.

TABLE 10.3—The "Loss" of Consumer's Medical Dollars Due to Operational Inefficiency and the "Unexplainable" Incomes and Profits in the Copper Country Medical Industry in 1967*

Items	Amount Lower-bound	Amount Upper-bound
	dollars	
"Unexplainable" incomes of physicians	300,429	300,429
"Unexplainable" profits of drug industry	45,943	117,618
"Unexplainable" profits of equipment industry	3,560	13,781
Operational inefficiency of hospitals and nursing homes	514,581	514,581
Total "loss"	864,513	946,409

* The words "unexplainable" incomes and profits have been defined in Chapter III. The "unexplainable" income and profit does not necessarily mean monopoly incomes or profits.

50 percent in Houghton, 21 percent in Ontonagon, 34 percent in Baraga and 19 percent in Keweenaw. It does not seem likely that a substantial amount of funds can be raised within the area, because the Copper Country is an economically depressed area and its people are generally poor. How much additional funds can be obtained from the state is difficult to say, because the state's share in total revenue of the area is already high; the share is 63 percent in Houghton, 48 percent in Ontonagon, 56 percent in Baraga and 62 percent in Keweenaw, whereas it is only 37 percent for all counties in Michigan (see Table 10.4). Two things are clear from Table 10.4: (1) the contribution of the state to total revenue of the Copper Country is substantially high, and (2) expenditures on health, welfare and medical assistance accounts for a substantial proportion of total expenditures of county governments. So it seems that more federal aid must be provided to finance medical needs of the area.

In 1967 the Copper Country received about $1.5 million of medicare and medicaid money, which is about 30 percent of the total experditures of hospitals, nursing homes and service-providing facilities, but when other medical expenditures (drugs, physicians' and dentists' bills, etc.) are included the percentage drops to 16 percent which seems low especially when we consider the high proportion of old and poor people in this area. Federal aid should cover larger portions of medical expenditures of this area by expanding its programs and removing payment bottlenecks. The standard of

TABLE 10.4--Total Revenue, Cost and Expenditure on Health, Welfare and Medical Assistance by Counties in 1966

County	Total Cost of the County Government	Share of the State	Total Cost of the County Government	Expenditures on Health, Welfare and Medical Assistance	Per Capita Expenditures on Health, Welfare and Medical Assistance
	dollars	percent	dollars	percent	dollars
Houghton	2,542,979	62.83	2,565,764	49.98	35.97
Ontonagon	1,150,056	48.45	1,007,969	21.31	20.30
Baraga	913,509	56.27	873,748	34.12	41.69
Keweenaw	409,217	62.28	371,391	18.52	28.45
Copper Country	5,015,761	58.29	4,818,872	38.68	25,28
All Counties in the State	452,960,217	37.04	461,686,181	37.70	22.24

Source: Michigan County Government Financial Report, Department of Treasury, (December 31, 1966), pp. 8, 9, 12, 13, 18, 19, 32, 33.

eligibility for receiving payments under medicare and medicaid programs may be too high for supervised residential type nursing homes, nonetheless these homes are useful in providing nursing care. Therefore, some changes in procedures must be made to enable these homes to get payments under medicare and medicaid programs.

However, it would be unwise and impractical to expect the federal government to shoulder the whole responsibility. A concerted effort at all levels--private, county, state and federal--must be exerted before medically indigent people of the Copper Country can be provided with adequate medical care.

However, the above needs for additional medical facilities and external aid are likely to be temporary. This is because overall population of the Copper Country has been declining continuously, and although the number of people above 64 years has been increasing in the last few decades, the rate of increase has been decreasing. In fact, projected figures show that there is likely to be a decline in the number of old people from 1970.[7] Thus, the above trends in population indicate that the need for beds (both acute-care and long-term), and medical personnel are likely to decrease in a decade or two.

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[7] Computed by Thaden et al. Cited by Gordon Smith, p. 9.

Further the economy of the Copper Country is recovering from a slump and per capita income is likely to increase in the future partly as the result of redistribution impact of death of the aged and partly as a result of higher retirement benefits; hence, the need for external aid may also decrease. The real aggregate income of the area has increased by $55 million between 1959 and 1967 and the real average family income also has increased by about $2,000 between 1950 and 1960.[8] With the possible development of outdoor and recreational facilities and better transportation and communication systems the incomes of the Copper Country are likely to be significantly higher in the future.

As the above facts indicate that the need for medical facilities may decline, construction of permanent facilities to handle temporary needs may not be economically sound. These facilities may become surplus in a decade or two as has happened with acute-care facilities. Thus temporary arrangements may be an appropriate way to handle present needs. New constructions may be justified by their long-term need. And, for a long-term projection of medical needs of the Copper Country, it is recommended that thorough studies be made on demographic trend and composition, trend of morbidity and mortality rate and future income and employment potentialities of the Copper Country.

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[8] See County and City Data Book, 1958 and 1967. Also see Table 3.6 of Chapter III.

Undiscussed Issues

For complete and effective planning of medical care in the Copper Country, further research is needed on the following issues.

1) The need for beds and manpower have been estimated, but no reference has been made as to their optimum location. Keweenaw county has no resident provider of health care, and the nearest hospital is Calumet Public Hospital in Houghton county. Similar problems exist in the southern part of Ontonagon, Houghton and Baraga counties where there is no hospital or nursing home within a 20 mile radius. On the other hand the two biggest hospitals of the Copper Country (B_s and A_s) are within 10 miles of each other, and these hospitals have some problems of keeping a high rate of occupancy with acute-care patients. So it seems that locational aspects may be important and any future plans for additional facilities should take this aspect into consideration.

2) Needed additional trained manpower would not be coming automatically in this region. The Copper Country is primarily a rural area and hospitals are not first class. The Copper Country provides neither attractions and facilities of metropolitan areas nor any hope for professional prospects. Therefore, some sort of incentive must be built into the system to attract private practitioners, or more salaried doctors should be appointed with relatively open service. One way to attract private practitioners may be to

improve their working conditions by providing office space, modern equipment, assistants and other professional attractions to compensate for disadvantages of the area. Also, local students concerned with medical needs of the community may be financed to receive medical education and they might hopefully come back to serve the community (such conditions may be attached to the financial help). However, more study needs to be done to develop a workable plan for this.

3) Estimates show that sufficient savings could be made by eliminating existing "unexplainable" profits and incomes and inefficiencies in the medical industry. Two important questions need to be answered in this connection: a) how can they be eliminated, and b) if they are eliminated, how can it be assured that the savings will go to persons who need them most?

To give a meaningful answer to these questions more research is needed. However, casual observations show that incomes of physicians are higher than other comparable professionals (such as dentists) because of the short supply of physicians which is partly evidenced by their longer working hours. The restriction of entry into the profession (partly due to restricting licensing of foreign-trained physicians and mostly due to control of admission in medical schools) may be one of the major reasons for the shortage of physicians. The supply of physicians can be augmented by either increasing the capacity of present schools or by opening more medical schools together with more freedom of entry into the profession. Of course, freedom of entry carried too far, may have deleterious effects on quality of doctors and consequently on quality of medical care. However, people do not

always need the highest kind of medical care and some intermediate kind may be sufficient in many cases. In fact, such care exists successfully in Britain (with midwives) and in Russia. In other words, it may be better to have second grade medical care in many cases than none at all.

The patent privileges and intensive advertisement and sales promotion of drug companies limit price competition and create product differentiation--both restrict the competitive nature of the industry. So I believe that restrictions on patent privileges and the expansion of power of the Food and Drug Administration to insure fully adequate drug plant inspection and control of drug advertising would help to reduce greatly non-competitive elements in the drug industry.

It is argued that the restriction on patent privileges might seriously jeopardize the research programs of drug firms. But contrary arguments are also available. ".... about two-thirds of the countries in the world prohibit them (patents) on the ground of public policy .... (and) in many foreign countries, drug research has been immensely productive in the absence of drug patents.[9] More research is needed to be able to say in precise terms whether abolition of patent privileges will do more harm than good.

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[9] U. S. Congress, Senate, Competitive Problems in the Drug Industry, Hearings before the Subcommittee on monopoly, 90th Congress, 1st and 2nd sessions, 1967-68, pp. 1995-96.

I have also made some observations for increasing operational efficiency in hospitals. More cooperation is needed among hospitals with respect to medical staff, distribution of patient loads, use of more specialized and sophisticated equipment and similar cooperation is needed within hospitals among hospital trustees, administrators and medical staff. All of them should join in efforts to promote early referral of acute patients to long-term facilities for the care of chronic illness and convalescence.

However, I feel that more work is needed in these areas to determine the possibility of the above adjustments in the Copper Country. In regard to the second question (how can savings be distributed to the most needy persons?), it is clear that unless some alternative arrangement is made, the alleged savings would accrue to those who are currently spending more on medical care. These persons may or may not be those who need the most medical care but cannot afford it.

4) I have suggested redistribution of income through taxation and aids at county, state or federal levels. But I have not spelled out the precise way this should be done. However, I have indicated that this can be done through present programs such as medicare, medicaid, old age assistance, etc. But again, no suggestions have been given about kinds of alternatives or modifications that are needed in the above program to get money to the right person and in the right amount and at the right time. This is a very important and relevant area of study but due to the limitations of the researcher,

this aspect has been left out of the present study. However, it may be instructive to express the feelings of hospital authorities at this point. The authorities feel that since medicare and medicaid payments are cost reimbursed, they do not provide any incentive to cut the cost of providing hospital services. On the other hand, administrative costs have gone up due to increased paper work needed to get payments under these programs. Further, the authorities feel that the proposed cut of the present two percent over the cost of hospitals will make their operation very difficult. The hospitals will have to operate in debt because payments for hospital services always lag behind expenditures needed to provide their services.

5) Every redistribution of income has some welfare implications. But to keep this thesis to manageable proportions, and to be able to focus on our main objective without crowding with side issues, I have avoided getting into the field of welfare economics.

6) The present system of delivering medical care may not be the best one. Long-term care is traditionally provided by nursing homes. A new method of providing nursing care by the Visiting Nurse Association is possible. Many other preferable alternatives to present methods of medical care are also possible. But the present study does not attempt to examine these alternatives. The discussions and conclusions of this thesis are presented in the light of the present system of providing medical care in the Copper Country.

CHAPTER XI

SUMMARY AND CONCLUSIONS

Summary

The Copper Country is in the western part of the Upper Peninsula of Michigan and comprises four counties: Houghton, Keweenaw, Ontonagon and Baraga. The population of this area is gradually declining and was 51,410 in 1967. Approximately 14 to 15 percent of the population is 65 years and older, which is substantially higher than the 8.5 percent for the state. The current incidence of chronic illness and death is much higher and the available medical services are much less than for the state or nation. Further, a significant proportion of the population cannot buy whatever services are available. More facilities, funds and income are needed in this area to provide adequate medical care to the people.

Since the research was aimed at estimating additional medical facilities needed, the sources of finance and plan required, the investigation concentrated on four features:

1. Studying levels and distribution of medical care expenditures by types of services.

2. Estimating possible savings of medical dollars by eliminating the operational inefficiencies of hospitals, "unexplainable" high income in the medical profession and "unexplainable" high profits of drug and medical equipment industries.
3. Studying effects of health insurance in increasing costs of medical care.
4. Investigating possible sources for financing medical needs of the Copper Country.

The Copper Country is primarily a rural area; only about one-fourth of the population is urban. The population is gradually declining, but the proportion of people above 64 years is increasing. The average size of a family is about 2.5 persons and 35 percent of the families earn less than $3,000 a year. The general level of education is very low and heads of families have only an average of nine and one-half years of schooling. The medical care facilities consist of five acute-care hospitals with 317 beds, five long-term care units with 263 beds and three service-providing agencies. Trained medical manpower is in short supply. The whole of the Copper Country is served by 29 physicians (two are government employees), 16 dentists, 45 licensed practical nurses and 88 registered nurses. To equal the national average the above staff should be about doubled (see Table 10.1).

The total expenditure on all types of medical care in the Copper Country was about $9.4 million in 1967. This is about 67 percent of the gross income for that year. Of the total consumers'

medical expenditures, 37 percent went to hospitals, 20 percent to physicians, nine percent to dentists, 14 percent for drugs, and 10 percent to nursing homes while the rest was used for other professional fees, eye glasses, net insurance costs, etc. The composition of medical expenditures in the United States is slightly different. The share to hospitals was 31 percent and to nursing homes four percent--both less than in the Copper Country. But the share to physicians was 27 percent and to drugs was 17 percent--both more than in the Copper Country (see Table 4.5).

The average gross income of physicians in the Copper Country is about $70,000 per year. Deducting their business expenses, which is 41 percent of gross income, their net incomes before and after taxes are $42,000 and $31,000, respectively, whereas the average gross income of dentists is about $51,000 and their business expenses are about 49 percent. Their net incomes before and after taxes are about $26,000 and $21,000, respectively (see Tables 5.1 and 5.2). Physicians and dentists invested about three and six percent, respectively, of their net incomes in the medical industry. Thus an average physician received about 60 percent more than an average dentist. About 17 percent of this difference could be explained by the longer and costlier training in medicine and the remainder may be attributed to the difficulty of entry into the profession. The computations show that each physician received an "unexplainable" higher income of about $11,000 compared to that of dentists, and for all physicians in the Copper

Country the total was about $300,000 (see Table 5.3). The total tax of about $113,000 on "unexplainable" income flows out of the area and is a pure drain on the community's resources.

Drug manufacturers earn a high rate of profit. In fact, since 1957 (except for 1966) the profit rates in the drug industry were the highest among all industries (see Table 6.2). Price competition in ethical drugs is restricted by patent privileges while intensive advertisement and sales promotion of particular brands may create barriers to entry. The total "unexplainable" higher profits of drug manufacturers and drug retailers from the Copper Country (compared to that of all manufacturers and retailers) were about $30,000 and $16,000, respectively. Unexplainable differences in profit (profit-difference) ratios (unadjusted profit-difference) were computed by deducting the profit rates of all manufacturers and all retailers from the profit rates of drug manufacturers and drug retailers, respectively. The total amount of "unexplainable" profit was computed by multiplying the rate of "profit-difference" by the total sales. In computing the adjusted "unexplainable profit-difference," it was assumed that the competitive rate of profit should be equal to the "normal" rate of interest for industrial capital. And this interest rate was then deducted from the adjusted accounting profit rates of the manufacturers and retailers to compute the rate of adjusted "unexplainable profit-difference," which multiplied by the total sales of drugs in the Copper Country equals the total adjusted "unexplainable" profit of about $118,000.

The hospital equipment industry showed unadjusted "unexplainable" profit of only $4,000 when its accounting profit rate was compared with that of all manufacturing. But when compared with the "normal" rate of interest (as in the case of the drug industry), which by our assumption is equal to the competitive rate of profit, the total adjusted "unexplainable" profit was $14,000. In other words, the expenditure of the Copper Country medical industry would have been about that much lower if there were no "unexplainable" profits in the medical equipment industry. Thus, this amount is also loss to the community.

The hospitals receive the largest proportion of the consumers' medical dollar in the Copper Country. In comparison to the national averages, the hospitals in the Copper Country have lower costs per patient day (except for hospital E_s), longer length of stay (except for hospital E_s), fewer personnel per bed, and generally a higher rate of occupancy (except for hospital E_s, see Table 8.1 and 8.2). The length of stay and rate of occupancy are interdependent, so to obtain a rate of occupancy comparable to that of the United States, it was adjusted for the length of stay. In other words, what would the rate of occupancy be in the Copper Country hospitals if the length of stay actually were equal to the average for the United States? The results show that, except for hospitals D_s, the actual rate of occupancy is much less in the Copper Country hospitals (see Tables 8.4) than the United States average. Considering 85 percent as the "efficient" rate of occupancy, the actual number of unoccupied beds was computed by multiplying the percentage difference between

"adjusted" and "efficient" rate of occupancy by the number of beds in the hospitals (see Table 8.5). The number of unoccupied beds was then multiplied by the cost of each unoccupied bed to get the total maintenance cost of such beds. This is about $510,000, which is about 13 percent of the total cost of all hospitals. In other words, hospital services could be provided that much cheaper if these operational inefficiencies were eliminated. The rate of occupancy in the long-term facilities is about 95 to 99 percent, which shows that these facilities are overcrowded; this is further substantiated by a long list of waiting patients.

The role of health insurance, in financing medical costs, has increased tremendously during the last two decades. About two-thirds of all medical expenditures are paid by insurance companies. Insured persons use more medical care than uninsured persons (see Table 9.2 and 9.3). It is difficult to say whether insured people use more medical care than necessary, or that uninsured people are not able to pay for the necessary medical care. With the spiralling price of medical care, the cost of insurance is also increasing, and the poor find it increasingly difficult to pay for insurance premiums. About one-third of all families in the Copper Country, and more than half the families with family heads over 64 years, do not have any insurance protection, but their medical needs are generally more than others. These are the typical, medically indigent families of the Copper Country.

Some alternative financial arrangements, besides insurance protection, are required to enable the medically indigent people to buy adequate medical care. To provide medical care to the presently underserved population in the Copper Country, the following additional facilities are needed: about 140 long-term beds, 13 physicians, seven dentists, 45 licensed practical nurses, 40 registered nurses and nine technicians. These facilities would cost the Copper Country people approximately $2.17 million per year (see Table 10.2). However, expressing the medical needs of the Copper Country in terms of manpower and dollars may actually be an oversimplification of the situation. The need for the above number of beds and trained personnel is, at best, an approximate estimate and does not promise any significant improvement in the quality of care. It does, however, give some idea of the magnitude of the current need. The total savings from the removal of inefficiencies and eliminating "unexplainable" incomes and profits in the medical industry amount to only about $860,000 to $950,000 (see Table 10.3). Even if this amount could be saved, an additional $1.25 million would remain to be funded through other sources. This could not be raised entirely within the counties because presently 38 percent of the total revenue of the counties (including state aid, which is 58 percent of the total revenue of the Copper Country) is spent on health, welfare, and medical assistance, and if the counties had to finance it by internal revenues, almost all the revenues of the counties would be exhausted and nothing

would be left for other programs (see Table 10.4). The state's average share in the total revenues of all counties in Michigan is about 37 percent. This shows that the state is already giving more than a proportionate amount of aid to the Copper Country (see Table 10.4). This reduces the likelihood that state aid could be increased enough to provide for all medical needs of the area. It seems clear that under the existing situation more federal aid in the form of medicare, medicaid, old-age assistance, etc. must be added to provide for additional medical needs. I feel that besides removing existing inefficiencies and "unexplainable" incomes and profits in the system, financial participation at all levels--county, state and federal--is needed to provide adequate medical care to the medically indigent people of the Copper Country. However, the above needs for additional medical facilities and external aid are likely to be temporary, because the overall population of this area is declining and the number of old people about 64 years, which has been increasing in previous years, now shows stabilizing trends. Further, the economy of this area is also gradually recovering from a slump. Consequently, construction of permanent facilities and long-term aid programs to handle present needs may not be economically sound. To determine whether needs are of permanent nature, it is recommended that thorough studies be made on the demographic trend and composition, trend of morbidity and mortality rate and future income and employment possibilities in the Copper Country.

However, for a more comprehensive and realistic plan to provide adequate medical care, additional research must be done on the following aspects: (1) optimum location of new facilities; (2) specific incentive plan to attract trained manpower to the area; (3) ways to remove operational inefficiencies in hospitals, eliminate "unexplainable" higher income in the medical profession and "unexplainable" higher profits in the drug and medical equipment industries without jeopardizing their efficient functioning; (4) ways to redistribute possible savings in the medical industry to the persons who need them most; (5) other alternative methods of providing medical care; (6) improvement needs in the federal programs for more effective financing of medical needs of the aged and the poor without reducing incentives of hospitals and nursing homes to decrease cost.

Conclusions

The Copper Country is a typical medically indigent region. With its high proportion of old people and high incidence of chronic illness, the area is in serious need of more long-term beds and trained manpower. Finances for these additional facilities cannot be entirely found by eliminating whatever operational inefficiencies and "unexplainable" income and profits exist. Sufficient increases in funds through county taxation does not seem to be a possibility either; so I feel that under the present situation more state and federal aid must be provided to

finance additional medical needs of the people. However, present needs for additional medical facilities and external aid may be temporary because the population of the Copper Country is declining and income per family is gradually increasing. Consequently, before constructing permanent facilities, it must be determined whether the needs are likely to continue.

Other related problems such as optimum location of facilities, attracting trained manpower to the area, and effective ways of reducing medical costs by minimizing inefficiencies of the medical industry, redistribution of incomes in favor of those who need it most, and alternative ways of providing medical care, must be studied before any realistic plans can be made to meet the medical needs of the Copper Country.

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APPENDIX A

APPENDIX A

I. Incomes of doctors:

The rising incomes of physicians have always been a controversial issue. Men in other professions have been critical about the changing relative financial situation in favor of the medical practitioners. A few of the view points on these are as follows:

In the years 1942-52, an average of 13,400 students was admitted to the practice of law each year.[1] During the same year the number of individuals admitted to the practice of medicine averaged 6,259 a year[2] or less than half the number being added annually to the legal profession. The result is that the supply position of doctors per 100,000 population decreased from 164 in 1910 to 132 in 1955, whereas that of lawyers increased from 125 to 146 in the same period.

From this it would seem that (if we assume competition prevails) the incomes of lawyers must be consistently higher than that of doctors. But if we look into the income position of the two professions, we find that though initially lawyers had slightly higher incomes than doctors, this position has long

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[1] Cunningham and Reed, Guide to Learning and Living, (Simon & Schuster, 1955), pp. 17-18.

[2] Medical Licensure Statistics for 1966, 161 Journal of American Medical Association, 357 (May 26, 1956).

been reversed in favor of doctors. In the 1930's lawyers' average incomes decreased to 57 percent as much as doctors'.[3]

In a comparative study of incomes of different professionals, Friedman and Kuznets find that the incomes of physicians are about 32 percent higher than that of dentists. They can explain only 17 percent of the difference by higher cost and longer duration of training of physicians. They attribute the unexplained 15 percent to difficulty of entry into medicine.[4] Were the entry into the two professions equally easy, the number of physicians should have been three times the number of dentists to wipe out the income differences[5] But the ratio of physicians to dentists at that time was only 2:1.[6] More recently, Friedman points out that the only way physicians could raise their income is by restricting supply. This they have accomplished through their control over the state licensure mechanism.[7,8]

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[3] Loevinger, pp. 615-618.

[4] Milton Friedman and Simon Kuznets, Income from Independent Professional Practices, National Bureau of Economic Research (New York, 1945).

[5] Ibid, p. 133.

[6] Ibid, p. 29.

[7] Milton Friedman, Price Theory: A Provisional Text, (Chicago: Aldine, 1962) pp. 159-161.

[8] For a criticism of Friedman and Kuznets' study see Herbert E. Klarman's The Economics Health, (Columbia University Press: New York, 1965), pp. 90-94.

In the post-war period, the difference between physicians' income and other professions has widened.[9] And there is every reason to believe that the shortage of physicians has persisted if not intensified.[10]

Sanders believes that the published income figures of physicians are too low. As an evidence he cites many vacancies in the Department of Health with salaries more than presently reported income figures of physicians. These positions remain unfilled even though the advantages there (shorter and more regular hours, retirement benefits, etc.) are much greater than in independent practices.[11] Of course he neglects the fact that these positions include administrative duty (which many physicians do not like) and do not have the charm and freedom of an independent practice.

There are several opposing views on the subjects of supply and incomes of physicians.[12] But the concensus seems to be that

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[9] Herman Miles Somers and Anne Ramsey Somers, Doctors, Patients and Health Insurance, (Wash., D.C.:The Brookings Institute, 1961) pp. 200-5.

[10] Paul A. Samuelson, Economist, First edition (New York, McGraw Hill, 1948), p. 95.

[11] Barker S. Sanders, "Discussion of Structure, Uses and Inadequacies of the Official Price Deflectors," Proceedings of the Business and Economic Statistics Section of the American Statistical Association, (Wash. D.C.: The Association, 1959) pp. 320-322 cited in Klarman, p. 91.

[12] For an interesting discussion of different views see the Economics of Health by Herbert E. Klarman (Columbia University Press: New York, 1965) pp. 88-101.

physicians are in short supply. To cope with the increasing population, another 10 to 30 four-year medical schools need to be established in the near future. This point of view is also shared by the American Medical Association.[13]

The American Medical Association (AMA) has been very successful in controlling the supply of physicians and maintaining the high incomes of the profession. The AMA enjoys a very large membership and keeps a strong control on its members because of its ability to both benefit and punish members. A key function of the AMA is inspection and approval of medical schools. About 50 percent of the applications to enter the medical profession are rejected. Of course, this keeps the standard of medical profession high. But the stricter the standards set for the profession, the smaller the number of those able to qualify and the smaller the supply of professional services available to the public. Loevinger says ".... reasonable balance must be struck between standards adequate to maintain a high level of professional competence and necessity for permitting a sufficient number of persons to enter the profession each year to provide the services required by the public.[14]

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[13] Herman Miles Somers and Anne Ramsey Somers, Doctors, Patients and Health Insurance (Washington, D. C., The Brookings Institute 1961), pp. 124-125. Cited in Herbert E. Klarman, The Economics of Health (Columbia University Press: New York, London, p. 101, Somerses, pp. 124-125, Cited in Klarman, p. 101.

[14] Loevinger, pp. 615-6

2. The Drug Industry

In the last few decades, the drug companies, through their research units, have contributed much to the development of new drugs. The prices of these new drugs are generally very high, and the general concensus is that if a competitive situation existed in the drug industry, the prices could be much lower. That is why drug manufacturers were criticized in several congressional hearings. The following pages are devoted to general discussions of the structure, conduct and performance in the drug industry.

Pricing Practices:

For more than a dozen years, drug manufacturers have been involved in a world-wide cartel to fix the price of broad-spectrum antibotics (effective against both gram positive and gram negative bacteria) at identical, grossly inflated, and unconscionably high prices. A cartel of five pharmaceutical firms: Charles Pfizer and Company, Inc., American Cynamid Company, Bristol-Myers and Company, Inc., the Squibb Division of Olin Mathieson Chemical Corporation, and the Upjohn Company, fixed the prices of broad-spectrum antibotics at an unreasonably high level and conspired to follow that unilaterally. Pills with production cost of only 1.6 cents were sold to the American public, until recently, at 51 cents each and now sell for about 30 cents per pill.[15]

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[15] Hearings before the Senate Subcommittee on Antitrust and Monopoly, 87th Congress, 1st Session, (December 7-9, 1961), pp. 2407-8.

In February 1969 the same firms, under antitrust laws, were accused of harvesting huge profits by rigging the price of a wonder drug and were forced to offer a payment of $120 million to settle almost 100 civil law suits.[16]

In 1960 Shering bid $17.97 on Prednisone, an important drug for arthritis, on a contract to the military procurement agency. Its price to the druggist at that time was $170 for the same bottle (5 m.g. tablets, 1000 per bottle) selling under the trade name, Meticorten. Shering did not get the order from the military. One of the smaller companies won with a bid of about $10. According to the 1966 Redbook, which published the prices provided by the drug companies themselves, Shering is still selling at the price of $170 to the druggists. If a doctor writes a prescription under the generic name "Prednisone" instead of "Meticorten," the consumer can buy the identical drug for less than $20.[17]

Another example is the case of Reserpine, an important hypotensive drug. In 1959 CIBA was bidding 60 cents on sales to the military. At the same time, its price to the druggist was $39.50 for the same quantity (25 m.g. tables per 1000 bottle). By 1964, the military people were buying them for around 47 cents and according to the 1966 Redbook, CIBA's price for the same day sold under its trade name "Serpasil," was $39.50. Including the druggist's mark-up the consumer paid about $65.[18]

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[16] The State News (Michigan State University), February 7, 1969, p. 3.

[17] U.S. Congress, Senate Hearings, 89th Congress, Session 2, PA 3 pp. 2886-2912.

[18] Ibid., pp. 2886-2912.

Similarly, Tetracyclene was sold at prenegotiated prices under different names by different companies, Cynamid sold it as Chromycin, Pfizer as Tetracyn and Upjohn as Panmycin. They charged almost 50 times the cost of the product. They also secured patent rights by misrepresentation in the Patent Office.[19]

Product Differentiation:

Drug firms are able to differentiate their products by brand names and intensive advertising. Evidence at the 1956-60 Senate Antitrust Hearings on the Drug Industry indicates that drug companies spend about one-fourth of the sales dollar on promotion or about $4,000 a year per doctor.[20] Camanor and Wilson studied 41 industries and found that all but two had lower advertising to sales ratios than that of drug manufacturers. Their studies also revealed that advertising outlays represent less than half of the total selling expenditures of drug companies.[21]

In fact, most doctors depend upon the advertisers to tell them about the drugs. Due to their busy schedules, doctors cannot keep pace with the multitude of drugs coming into the market. So doctors tend to recommend the highly publicized brands they are most

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[19] For a very interesting and illuminating discussion of this see 89th Congress Session 2, part 3, pp. 2886-2912.

[20] Administrative Prices in the Drug Industry, Hearings before the Senate Committee on Antitrust and Monopoly, 86th Congress, Session 2 (1960) part 18, pp. 10454-58.

[21] William E. Camanor and Thomas A. Wilson, "Advertising, Market Structure and Performance: An Empirical Analysis," Review of Economics and Statistics, (November 1967), Appendix, Table 2.

familiar with. This is why about 90 percent of the prescriptions today are written with expensive brand names, even though cheaper generic equivalents are available. The sales of prescription drugs[22] have been increasing for the last few decades. Between 1929 and 1956 retail prescription sales grew from $140 million to $1.5 billion, an increase of almost 1,000 percent, and nearly three times as fast as total drugstore sales.[23] This trend is still continuing. It is in the prescription drugs that drugstores and companies make great profit. If a doctor prescribes a particular brand of medicine, the drugstores are legally allowed to fill the prescription with that brand only.

Sometimes doctors hold stocks in drug companies, this is another reason why they tend to recommend specific brands.[24] A study at the University of Wisconsin shows that, indeed, doctors holding stock prescribed the brand of their companies about 19 percent of the time in 1963 and 13 percent of the time in 1964 and more than the doctors with no stock. More than coincidently, their (doctors with stock) patients paid an average of 33 percent more for drugs than patients of the other physicians (without stock) did in 1963, and an average of 20 percent more in 1964.[25]

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[22] Prescription drugs are those which are sold under doctor's authorization plus those nonprescription drugs for which doctors wrote a prescription.

[23] Lucy M. Kramer, "Drug and Medicines," Public Health Reports (October 1958) p. 932.

[24] 89th Congress, Session 2, pp. 11929-11931.

[25] 89th Congress, Session 2, (May 19-June 6, 1966) pp. 11929-11931.

Concentration:

The degree of concentration in the drug industry is also very high. Seven major drug groups: antibotics, hormones, diabetic drugs, sulfas, vitamins, and tranquilizers, accounted for about two-thirds of the total value of all ethical drugs in 1958. The Kefauver committee analyzed 51 products in these six groups and found that 15 leading drug companies controlled the production as follows: "....In 27 of the products more than one-half of the entire United States output is produced by one of the 15 companies... In sulfa drugs one company accounts for 100 percent of the output in eight of the nine products. In tranquilizers the conditions of monopoly prevails in six of the seven products. In antibotics (other than penicillin) the total output is produced by one company in five of the products, and in hormones and vitamins, three out of the nine. In eight additional products concentration takes the form of duopoly (control by two) while in ten others the entire output is produced by three companies. Against the typical structure of concentration in manufacturing industries, it is indeed, remarkable that in only six of the 51 products are there as many as four producers."[26]

Patent privileges:

Patent privileges seriously limit price competition among ethical drugs. Holders of patents may control output legally, thus maintaining the price at a high level. Drug patents may not create absolute

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[26] U.S. Congress, Senate, Report 448 of the Committee on judiciary made by its subcommittee on Antitrust and Monopoly, 87th Congress, 1st Session, Study of Administered Prices in the Drug Industry, June 27, 1961, pp. 68-99.

monopolies because only a few patents are without substitutes, but they do create a formidable barrier to entry. Patents are legal on the ground that they help research and development, but very little of the research is original. Most of it is just a molecular juggling of the original products. Drug companies reap high profit on these patented drugs.

Profits:

The profit rates in the drug industry have been one of the highest among all industries. Especially after 1956 the drug industry has consistently ranked first or second in the level of profit rates. The table below gives a comparison of the profit rates of large drug companies and that of all leading manufacturers.

TABLE A.1--Rates of Return of Leading Drug Manufacturers and All Leading Manufacturers in 1950 to 1966

Year	Drug Industry[a]	All Manufacturing[b]	Ranking of Leading Drug Companies Among All Leading Manufacturing Companies
1950	19.6	17.3	6
1952	12.7	12.7	11
1954	12.8	12.8	8
1956	18.2	13.8	2
1958	20.2	9.3	1
1960	18.4	10.3	1
1961	17.6	9.8	1
1962	17.1	10.6	2
1963	17.8	11.5	2
1964	18.9	12.3	2
1965	21.0	13.4	2
1966	21.1	13.3	1

Source: Report of the Federal Trade Commission, "Rate of Return for Identical Companies in Selected Manufacturing Industries, 1955-66," and Moody's Industrial Manual, 1952-54. Quoted in 90th Congress, Part 5, Session 1 and 2, p. 1825.

[a] Based on eight largest companies from 1950 to 1953 and 12 largest companies from 1954 to 1966.

[b] Based on eight largest companies from 1950 to 1953 and 12 largest companies from 1954 to 1966 except for two industries.

3. Health Insurance

It is sometimes argued that prepaid health insurance, besides giving financial protection against illness, is encouraging overuse and misuse of medical care facilities. The role of health insurance companies in financing medical care cannot be denied -- it is indeed an extraordinary system. However, many are critical of the effects of extensive health insurance. Some criticisms are presented below.

Health insurance has made it very easy for doctors and hospitals to get payment of their bills. Some doctors put up their charges after consumers have already bought particular units of services. A rise in the price of an appendectomy, which has been "bought" but which may or may not be necessary, will cost the consumer nothing in the short-run or until the policy is renewed.[27]

According to many surveys, private hospital insurance has resulted in unnecessary hospital stays, unnecessary diagnostic procedures, unnecessary treatments and surgical operations.[28] A study by Columbia University in 1962 showed that over one-third of all hysterectomies performed were unnecessary.[29]

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[27] H. M. Somers and A. R. Somers, Doctor, Patients and Health Insurance, 1961; and M. G. Taylor, The Administration of Health Insurance in Canada, 1956.

[28] J. H. Hayes (ed.), Factors Affecting the Cost of Hospital Care, 1964.

[29] R. E. Trussell, New York Times, May 11, 1962.

APPENDIX B

TABLE B.1—The Total Expenditures of the Copper Country Medical Facilities by Major Components in 1967

Code Names of Facilities	Total Cost	Salaries and Wages	Equipment	Medical and Profes. Fees	Food	Drugs	Utilities	Laundry	Repair and Mainten-ance	Supplies	Dep. and Interest	Other
	dollars											
A_s	780,158	470,914	42,431	47,015	40,185	32,152	16,509	22,170	8,371	42,685	36,346	21,370
B_s	1,511,546	996,500	76,039	--	101,000	45,600	37,150	5,619	58,000	76,283	56,207	59,148
A_{sp}	56,274	35,009	1,200	--	--	--	1,796	--	1,500	1,663	7,690	7,413
A_L	65,238	36,993	3,484	--	10,803	1,000	3,441	500	597	1,934	3,663	2,823
B_{sp}	71,674	58,708	1,400	--	--	--	2,500	--	924	6,000	1,100	1,042
B_L	641,718	506,348	17,083	--	39,820	8,885	24,042	8,433	9,123	17,466	4,000	6,518
C_{sp}	133,588	100,713	3,000	--	--	--	1,000	--	155	5,359	2,721	20,640
C_L	162,213	92,325	10,833	--	15,764	4,600	4,800	1,000	100	4,974	2,000	25,817
C_s	754,690	438,642	51,528	--	35,955	36,955	22,606	2,658	1,443	50,625	53,559	60,719
D_s	513,670	301,912	38,754	37,781	23,744	30,620	11,111	2,194	3,694	27,943	13,146	22,741
D_L	80,200	45,000	5,113	--	8,000	2,000	3,500	2,400	200	2,500	1,700	9,787
E_s	303,000	16,583	34,074	--	12,000	16,316	8,000	3,000	1,500	15,000	19,926	28,101
D_{sp}	30,000	10,000	1,225	--	--	8,000	500	100	90	5,000	535	4,550
Grand Total	5,103,969	3,258,147	286,164	84,796	287,301	186,128	136,958	48,074	85,697	257,432	202,603	270,669

Note: Computed from the audited records of the respective medical care facilities.

Subscripts: s = short-term
L = long-term
sp = service providing

APPENDIX B

TABLE B.2--The Total Revenues, Expenditures, and Profits in the Copper Country Medical Care Facilities in 1967

Code Names of Facilities	Total Revenue	Total Cost	Net Profit and Loss
	dollars		
A_s	772,681	780,158	-7,477
B_s	1,564,750	1,511,546	53,204
A_{sp}	59,094	56,274	2,820
A_L	80,882	65,238	15,644
B_{sp}	95,694	71,674	24,020
B_L	641,718	641,718	-
C_{sp}	163,513	133,588	29,925
C_L	171,122	162,213	8,909
C_s	755,043	754,690	353
D_s	514,024	513,670	354
D_L	100,000	80,200	19,800
E_s	267,417	303,000	-35,583
D_{sp}	30,000	30,000	-
TOTAL	5,215,938	5,103,969	111,969

Note: Computed from the audited records of the respective facilities.

Subscripts: s = short-term
L = long-term
sp = service providing

TABLE B.3—Total Income of Physicians and Dentists in the Copper Country in 1967

Professions	Visits per Doctor per Day	Fee per Visit	Income from Visits	Income from Surgery*	Income from Goods Sold	Gross Income
	number		dollars			
Physicians	40	4	48,000	20,675	1,500	70,175
Dentists	26	4	31,200	18,640	1,500	51,340

* In the year 1967, the physicians in the Copper Country performed 1,590 major and 2,321 minor surgeries.

Source: Colleged by survey of the area and hospital records.

TABLE B.4--Business Receipts and Expenses of Physicians and Dentists

Items	Physician	Dentist
	percent	
Business Receipt	100.00	100.00
Business Deductions, Total	40.67	49.20
Cost of Goods Sold, Total	2.99	8.39
Inventory, Beginning of Year	.06	.02
Merchandise Purchased	.71	.73
Cost of Labor	.62	1.69
Materials and Supplies	1.15	3.52
Other Costs	.52	2.42
Less Inventory, End of Year	.07	.02
Depreciation	3.31	3.26
Taxes	1.00	1.18
Rent	4.11	4.36
Repairs	0.39	.48
Salaries and Wages	10.59	11.84
Insurance	1.09	.75
Legal and Professional Fees	1.48	2.60
Commissions	.04	.05
Amortization	.01	.02
Retirement Plans, etc.	.02	.01
Interest	.38	.56
Bad Debts	.02	.04
Casualty Losses	.05	.01
Depletion	.02	.01
Other Business Deductions	15.15	15.64
Net Profit (Less Loss)	59.33	50.80

Source: Computed from Table 3, p. 31 of the Statistics of Income..... 1964, Internal Revenue Service.

B.5 The Methods of Estimating Profit Rate of Drugstores

A typical drugstore has eight departments: prescription, proprietary, toiletries, sundries, tobacco, confections, magazines and fountain. We are interested in knowing the profit rates of only prescription and proprietary departments. These two departments account for about 45 to 50 percent of the total sales of the drugstores. To estimate the "rate of unexplainable profit-difference" of drugstores (see Chapter VI), I computed the combined profit rates of the prescription and proprietary departments in 12 stores studied by Burley, Fisher and Cox (see Table B.5 below).

TABLE B.5--Combined Profit Rate of Prescription and Proprietary Departments

Departments	Total Sales	Gross Margin	Operating Cost	Net Profit (before tax)
Prescription	329,840	160,302 (48.6)	108,188 (32.8)	52,115 (15.8)
Proprietary	176,096	56,175 (31.9)	37,685 (21.4)	17,081 (9.7)
Total	505,936	216,477 (42.79)	145,873 (28.83)	69,196 (13.68)

Source: Adapted from Table 16.1, p. 221 and Table 17.1, p. 242 of Drug Store Operating Costs and Profits by Orin E. Burley, Alberts B. Fisher, Jr. and Robert G. Cox. New York: McGraw-Hill Book Company, Inc. 1956.

For Table 6.3 in Chapter VI we needed to compute the profit rate (after tax) as a percentage of equity. But the total equity figure is not available for the above drugstores. The total sales figure of $505,936 was multiplied by 0.2411 to convert it to total equity figure. The factor 0.2411 was computed by taking a ratio of total equity to total receipts of all drugstores.[1] The total equity of the 12 stores was computed to be $121,425. The profits after taxes ($44,154) was computed by deducting an income tax of 36 percent[2] from the net profit before tax ($69,196). Finally, net profit of $44,154 was expressed as a percentage of the total equity ($121,425), which comes to be 36.36 percent.

The major limitations of the above estimates are: (1) the sales and profit data of the prescription and proprietary departments of the drugstores are for the year 1950-51, and the situation might have changed since then. But as the sales and profits in the prescription drugs have increased in the recent years, the profit rates may be slightly underestimated. (2) The ratio of the total equity to receipts for all the drugstores was used to compute the total equity figure of prescription and proprietary departments, which may underestimate or overestimate (the direction is not clear) the equity figure. However, this is the best possible estimate that could be obtained with the data available.

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[1] Internal Revenue Service, Statistics of Income, 1965, p. 192.

[2] The figure 36 percent was computed by taking a percentage of the total income tax (paid by all retailers) to total net income of all retailers. Source: Ibid, p. 255.

B.6 The Procedures for Determining the Quality of Care in the Copper Country Hospitals

The quality of care in hospitals was determined by the number of services and facilities available in each. These facilities, common to all hospitals, were generally eliminated, because we are interested here only in the relative quality of care in these hospitals. The facilities are listed in Table B.7. The hospitals were then ranked with respect to the number of facilities in each department. The one with maximum number of facilities was ranked 1 and so on. Two or more hospitals with the same number of services in a particular department were assigned the same rank. The rank for each hospital was then added for all 17 items in the list. The one with minimum rank totals was considered to have the best quality of care, because we assumed that the quality of care is positively correlated with the number of available facilities. The major limitation of this procedure is in that the items in the list are not weighted according to their contribution to the quality of care. Further, the availability of facilities does not guarantee their efficient use. However, this procedure is partly in line with the accepted procedure of the Joint Commission on the Accreditation of Hospitals.

In Table B.7 it is evident that the hospital B_s has the maximum facilities, followed by A_s and C_s. The hospitals D_s and E_s have equal rank totals. It is difficult to say which of them has

higher quality of care. Neither of these hospitals meet the standards of the Joint Commission on the Accreditation of Hospitals. However, Michigan Hospital Service (Blue Cross) has provisionally approved D_s but not E_s. So we may say that hospital D_s has a slight edge over E_s.

Based on the following analysis, we rank the hospital B_s as having the best quality of care, followed by A_s, C_s, D_s and E_s in that order, but the difference between the last two is negligible.

TABLE B.7—Inventory of Selected Health Services and Facilities in Hospitals in the Copper Country in 1966

Serial Number	Service Facilities	Hospitals				
		A_s	B_s	C_s	D_s	E_s
1.	In-service Nurse Program	–	x	–	–	–
2.	Board-eligible Surgeon	x	x	–	–	–
3.	Surgical Equipment					
	Gas Anesthesia Equip.	x	x	x	x	x
	Defibrillator-Cardioscope Pacemaker	x	x	x	–	x
	Suction Equipment	x	x	x	x	x
	Cystoscopy Room	–	x	–	–	–
4.	Laboratory					
	Pathologist	x	x	x	x	–
	Clinical Laboratory	x	x	x	x	x
	Morgue Facilities	x	x	–	–	–
	Pathology Laboratory Facilities	–	–	x	x	x
	Blood Bank	–	x	x	–	–
	Medical Technologists	x	x	–	–	–
	Laboratory Technicians	x	x	x	x	x
5.	Radiology					
	Radio Diagnostician	x	x	x	x	x
	Radiologist	x	x	x	x	x
	Routine Chest X-ray	x	x	–	–	–
	X-ray Therapy (Deep)	–	x	–	–	–
	Radiologic Technician	x	x	x	x	x
6.	Department of Obstetrics					
	Delivery Room	x	x	x	x	x
	Nursery	x	x	x	x	x
	Premature Nursery	–	x	–	–	–
7.	Pharmacy					
	Pharmacy Department	–	x	–	–	–
	Drug Room	x	–	x	x	–
	Pharmacist, full-time	–	x	–	–	–
	Pharmacist, part-time	x	–	x	–	–

TABLE B.7--Continued

Serial Number	Service Facilities	Hospitals				
		A_S	B_S	C_S	D_S	E_S
8.	Physical Therapy					
	Physical Therapy Dept.	-	x	-	-	-
	Physical Therapy Service	x	-	x	-	-
	Physical Therapist, Reg.	-	x	-	-	-
9.	Department of Pediatrics					
	Pediatric Department	x	x	x	x	x
	Pediatric Dept., Isolated from Med./Surg. Patients	-	x	-	-	-
10.	Department of Medicine					
	E.K.G. Facilities	x	x	x	x	x
	Psychiatric Holding Units	-	x	-	-	-
	Emergency Department	x	x	x	x	x
	Medical Staff Library	x	x	x	x	x
	Respiratory Care	-	x	-	-	-
11.	Dietary Department					
	Dietary Department	x	x	x	x	x
	Dietitian, Registered	-	x	-	-	-
12.	Laundry					
	Own Laundry Facility	-	x	x	x	x
	Laundry Contract	x	-	-	-	-
13.	Hospital Policy					
	Hospital Accepts Pts. with Limited Resources	x	x	x	x	-
	Hospital Has Nursing Procedure Manual	x	x	x	-	-
	Hospital Has Automatic Stop Order on Dangerous Drugs	x	x	-	-	-
	Consultation Required for C-section	x	x	-	-	x
	Sterilization	x	x	-	-	x
	Hysterectomy	x	x	-	-	x
14.	Inventory of Major Equipment					
	B.M.R.	-	x	x	x	x
	Infra Red	-	x	x	x	x

TABLE B.7--Continued

Serial Number	Service Facilities	Hospitals				
		A_s	B_s	C_s	D_s	E_s
	Whirl Pool	-	x	x	x	x
	Mamography	-	x	x	x	x
	Defibrillator Pacemaker	x	x	x	-	x
	Ultra-sonic	-	x	x	x	x
	Image Amplification	x	x	x	-	x
	Microtone	x	x	x	-	-
	Auto-technician	x	x	x	-	-
	Cryostat	-	-	x	-	-
	Particle Counter	-	x	-	-	-
	Microtome Sharpener	-	x	-	-	-
	Deep X-ray	-	x	-	-	-
	Archilles Tendon Reflexometer	-	-	-	x	-
	Spirometer	-	-	-	x	-
	Aerosol Generator	-	-	x	-	-
	Tank Respirator	-	x	-	-	-
	PH Meter	-	x	-	-	-
	Hubbard Tank	-	x	-	-	-
15.	Inventory of Laboratory Procedures					
	Electrolytes	x	x	x	x	x
	Blood Bank	-	x	x	-	-
	Trypsin	x	x	-	-	-
16.	Major Diagnostic Procedures					
	Pap Smear	x	x	x	x	x
	A-Beta Hemolytic	x	x	-	-	-
	Titer	x	x	-	-	-
	Blood O_2 or CO_2 Tension	-	x	x	-	-
	Vital Capacity	x	x	-	-	-
	Exercise Tests	-	x	-	-	-
	Pulmonary Compliance	-	x	-	-	-
	Airway Resistance	-	x	-	-	-
17.	Staff					
	No. of Beds per Physician	13.33	8.46	17.50	12.33	20.00
	No. of Beds per R.N.	4.71	3.93	5.38	3.70	3.33
	No. of Beds per L.P.N.	6.67	11.00	11.67	6.17	5.00

TABLE B.7--Continued

Serial Number	Service Facilities	Hospitals				
		A_s	B_s	C_s	D_s	E_s
	Total No. of Personnel per Bed	1.56	1.45	1.76	1.75	1.15
	Administrator					
	Trained	x	-	-	-	-
	Untrained	-	x	x	x	x

Source: For items 1 through 16, see Leo Reich, "Inventory of Health Services and Facilities in Michigan's Western Upper Peninsula," ed. John S. Hiblock, Copper Country Health and Welfare Council, Inc., Michigan, (September 1967, mimeo.).

Information in item 17 was gathered by survey.

Note: x means that the particular service is present.
- means that the particular service is absent.

TABLE B.8--Rank of the Hospitals with Respect to the Availability of Different Facilities in the Copper Country in 1966

Serial Number	Service Facilities	Hospitals				
		A_s	B_s	C_s	D_s	E_s
1	In-service Nurse Program	2	1	2	2	2
2	Board-eligible Surgeon	1	1	2	2	2
3	Surgical Equipment	2	1	2	3	2
4	Laboratory	2	1	2	3	4
5	Radiology	2	1	3	3	3
6	Department of Obstetrics	2	1	2	2	2
7	Pharmacy	1	1	1	2	3
8	Physical Therapy	2	1	2	3	3
9	Department of Pediatrics	2	1	2	2	2
10	Department of Medicine	2	1	2	2	2
11	Dietary Department	2	1	2	2	2
12	Laundry	1	1	1	1	1
13	Hospital Policy	1	1	3	4	2
14	Inventory of Major Equipment	4	1	2	3	3
15	Inventory of Laboratory Procedures	2	1	2	3	3
16	Major Diagnostic Procedures	2	1	3	4	4
17	Staff	2	2	3	1	2
	Rank Totals	32	18	36	42	42

Note: Rank of 1 means the best facility. So least overall rank total means the hospital has the best facilities and services available. The ranks are based on the number of facilities available in each department. A department was ranked 1 if it has maximum number of facilities.