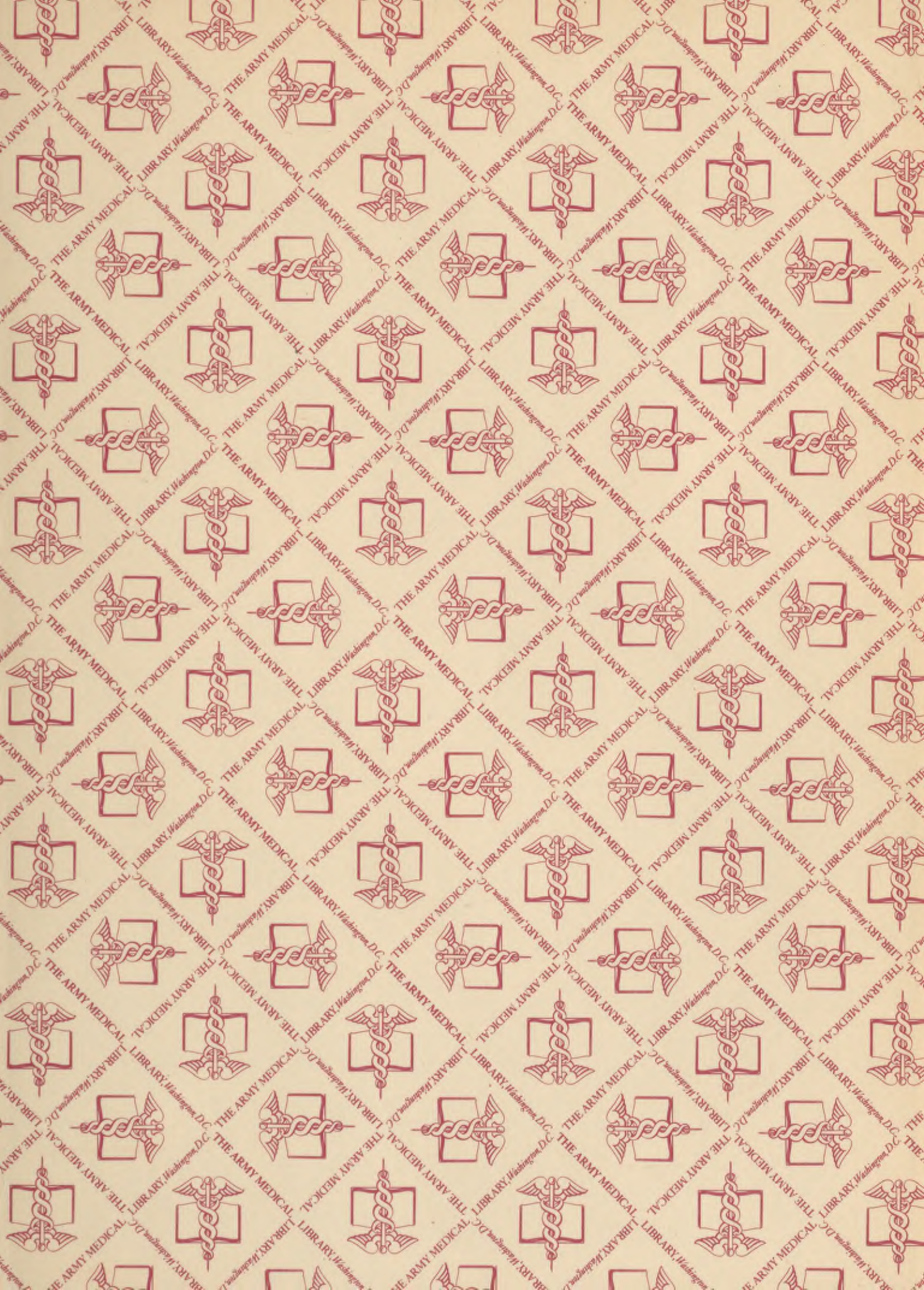
HONOLULU. CHAMBER OF COMMERCE.
PUBLIC HEALTH COMMITTEE. HOSPITAL
COSTS STUDY COMMITTEE

HOSPITAL COSTS IN HAWAII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Report of the

HOSPITAL COSTS STUDY COMMITTEE

PUBLIC HEALTH COMMITTEE
Chamber of Commerce of Honolulu
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## HOSPITAL COSTS STUDY COMMITTEE

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## PREFACE

The postwar rise in hospital costs has deeply concerned both hospitals and patients. In this report, comprehensive quantitative data are presented for the first time on the operation of hospitals in the Territory covering a period of years. Careful consideration is given in the text to the factors responsible for increased operating expenses, measures designed to improve economy and the problem of governmental subsidy. The committee and staff are to be commended on the timeliness of their study and their interpretation of the facts concerned with hospital economics.

LYLE G. PHILLIPS, M.D.
Chairman, Public Health Committee
Chamber of Commerce of Honolulu

# FOREWORD

The Committee on Hospital Costs has carefully examined the various aspects of hospital economics in the Territory during the past decade with a view to recommending measures for improving the solvency of these institutions. No one course of action can be followed as a solution, and no panacea is offered. The recommendations should, however, command the studious attention of all interested persons.

The committee has met regularly throughout the period of study, made numerous contributions and rendered many valuable suggestions to the staff in the conduct of its work. The first draft of the report was submitted to three mainland authorities in the field of hospital administration for their critical review. Findings were discussed also with representatives of the Honolulu and Territorial hospital councils prior to publication.

It is hoped that the study will be helpful in acquainting the public with the factors influencing hospital costs, and that it will assist the Territory and these institutions in resolving this problem.

DAVID R. OWENS, *Chairman*
Hospital Costs Study Committee
Public Health Committee
Chamber of Commerce of Honolulu

## ACKNOWLEDGMENTS

Grateful acknowledgment is due the governing boards and staffs of the hospitals studied in this report, the librarians of the Archives of Hawaii, and other persons and agencies too numerous to mention without whose cooperation the study could not have been made.

For their review of the manuscript and helpful criticism, we are especially indebted to Henry J. Southmayd, director of the Division of Rural Hospitals of The Commonwealth Fund; Arthur C. Bachmeyer, M.D., Director of Clinics and Director of Hospital Administration Course, University of Chicago; and James A. Hamilton and Associates, Hospital Consultants, University of Minnesota.


## GEOGRAPHICAL NOTE

The Territory of Hawaii consists of eight major islands and a number of lesser ones. The two largest cities are Honolulu, on Oahu, and Hilo, on Hawaii. There are five counties, but Kalawao (consisting of Kalaupapa Leper Settlement, on the Island of Molokai) is classified with Maui County for administrative purposes. These geographical units and their most important cities are listed in the following table:

| Geographical Unit | Land area in square miles 1940 | Population | |
|---|---|---|---|
| | | April 1, 1940 | July 1, 1948 |
| Territory of Hawaii[1] | 6,406 | 423,330 | 540,500 |
| City and County of Honolulu[1] | N.A. | 258,256 | 371,649 |
| Island of Oahu[1] | 589 | 257,664 | 371,649 |
| Honolulu city | N.A. | 179,326 | 277,129 |
| Rural Oahu | N.A. | 78,338 | 94,520 |
| Outlying islands[1] | N.A. | 592 | [2] |
| Hawaii County (Island of Hawaii) | 4,021 | 73,276 | 74,870 |
| Hilo city | N.A. | 23,353 | 29,620 |
| Maui County | 1,173 | 55,980 | 57,488 |
| Island of Maui | 728 | 46,919 | 48,544 |
| Wailuku city | N.A. | 7,319 | N.A. |
| Island of Molokai | 259 | 5,340 | 5,531 |
| Kalawao district | 14 | 446 | 411 |
| Kaunakakai village | N.A. | 722 | N.A. |
| Island of Lanai | 141 | 3,720 | 3,413 |
| Lanai City | N.A. | 3,597 | N.A. |
| Island of Kahoolawe | 45 | 1 | 0 |
| Kauai County | 623 | 35,818 | 36,493 |
| Island of Kauai | 551 | 35,636 | 36,283 |
| Lihue town | N.A. | 4,254 | N.A. |
| Island of Niihau | 72 | 182 | 210 |

[1]Outlying islands include Palmyra and the leeward islands, all under Territorial jurisdiction, as well as Midway and several scattered islands which are not. For census purposes they are often included with Oahu and the Territory. None has an area in excess of 5 square miles.

[2]Included with Honolulu city.

N.A. Not available.

*Source:* 1940 U. S. Census, Population, First Series, Number of Inhabitants, Hawaii, Tables 3 and 4, and Bureau of Health Statistics, Territorial Department of Health (quoted in Clarence Hodge, ed., *Hawaii Facts and Figures, 1948,* p. 12f).

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# Hospital Costs in Hawaii

## I. INTRODUCTION

Hospital care in general and allied special institutions has become big business in the Territory during the past ten years. Cost of operation in the most recent year studied was over eight and a half million dollars (as compared with two and a half million in 1939). Of this amount, over five million was spent by the non-profit voluntary group. More than 2,200 persons are employed in these institutions, which have had an annual payroll since 1947 exceeding five million dollars. The non-profit voluntary category employed over 1,400 of these workers. Since 1944, more than 60 per cent of the estimated total operating expense was allocated for payment of wages and salaries.

One out of eight persons in Hawaii entered a hospital in 1947 and approximately 94 per cent of the babies born in the Territory during the fiscal year were delivered in such places.

Revolutionary changes in science and the practice of medicine have enlarged both the scope and function of hospitals. Likewise, greater public acceptance and recognition of their role in promoting the health and welfare of the people has resulted in enlargement of facilities and increased use. The development of new techniques, diagnostic and treatment procedures has not only increased the life span but has caused a marked reduction in the average length of stay. The very advances which have made these changes possible have created, unfortunately, serious financial burdens for these institutions. Unlike other industry, which has effected a lowering of costs through technological advancement and the development of mass production techniques, hospital costs have increased with more widespread use of their facilities. This is due in part to the personal nature and complexity of such services which necessitate special skills and training.

Rising costs have posed a major financial problem both for the institutions and the communities they serve. Hospital care is extremely important to community health, yet it now threatens to become a luxury priced beyond the budget of average families in the Territory. High costs and low occupancy rates, in turn, endanger their solvency. These facts have occasioned the increasing concern of trustees, administrators, public officials and laymen who have in ever greater numbers recognized the need for a territory-wide evaluation of the problem.

The present study was initiated at the request of the Hospital Council of Honolulu and the Hospital Association of Hawaii. The former, in a letter dated June 9, 1948, asked the Public Health Committee of the Chamber of Commerce to make a study of standby costs in hospitals on Oahu. Subsequently, under date of July 22, 1948, the latter group requested that the study of "standby" costs be made on a territorial basis. Both organizations felt that such a study might serve as a basis for the territorial subsidization of hospitals in Hawaii. During the 1947–1949 biennium the non-profit voluntary hospitals received a subsidy from the territorial government amounting to $428,000, based largely upon the number of available ward beds.

The Public Health Committee agreed to undertake this assignment. A special study committee was established consisting of four of its members, two representatives of the community at large, and one individual from each of the counties of Kauai, Hawaii and Maui. It was deemed advisable not to appoint any member who might be associated directly or indirectly with an institution which would stand to benefit from any government subsidies, thereby eliminating any possibility of criticism that the study might be weighted in favor of the hospitals. The professional staff of the Public Health Committee was assigned the task of organizing the study, collecting, tabulating and analyzing data. The committee assumed responsibility for the preparation of conclusions and making recommendations. Throughout the progress of its work, meetings have been held with hospital administrators, trustees of the various institutions and members of the nursing profession. Though it has received valuable assistance from many institutions and individuals, which is gratefully appreciated, the committee has refrained from taking up the cudgels of any special group; it has served only in the interests of the public.

Whether or not government subsidy would prove to be the final solution of hospital difficulties, there was no doubt that careful consideration of the problem was indicated; and the magnitude of the economic and social aspects involved was recognized from the start. The precarious financial position of the hospitals, their significance to the health and welfare of the people, and the changing concept of the role of government in this field all suggested the complexity of the study.

The modern hospital plays an all-important part in the community health picture. Its value remains high even when one ignores the educational, out-patient, research and other related functions not strictly included in the traditional concept of hospitals. Consequently there has been an increasing feeling that some of the responsibility for their support should be assumed under general community auspices. Some persons regard hospitals as analogous to city fire or police departments maintained by the entire population because of their vital importance to the general security, even though required by only a few unfortunates. Others, wary of the degree of government control implicit in such a conception, reject this point of view. In any case, it is now felt to be more or less axiomatic that the community has a definite stake in its hospitals and should insure their uninterrupted maintenance.

The problem of finances, always somewhat in the background, has recently become quite pressing. Rising costs have affected hospitals in as great a measure as the private citizen. Endowment drives and similar measures have not been enough so that hospitals must either tap new sources of revenue, obtain subsidies, or increase their rates. Any additional stepping up of rates, however, will make such care too costly for a great number of persons. Hospital administrators contend that further rate increase could also very well defeat its own purpose, and price the hospital out of the market. Therefore, the welfare of the community and the individual citizen are here synonymous with that of the various hospitals, making a practical solution imperative.

Although the two hospital groups had requested only the consideration of "standby" costs, the limitations of this concept soon became apparent. "Standby," or "readiness to serve" costs have been likened to *overhead* in other types of business and enterprise. More specifically, they are the costs of maintaining facilities and staff sufficient to meet normal needs, but exclusive of the expenses of direct service actually incurred by the patient. Thus, plant repair, telephone, insurance and the salaries and meals of certain of the personnel would be regarded as "readiness to serve" costs, while X-ray film and patients' meals would be considered direct service costs.[1] Unfortunately, no *operational* definition could be evolved that was acceptable to all persons consulted; furthermore, "standby" costs seemed to offer no special key to the riddle of fair subsidy. It was then decided to broaden the scope of the study to embrace other significant aspects of hospital economics. The likelihood of evolving a reasonable solution to the financial dilemma was thus greatly increased.

The dimensions of hospital services are varied, their quality and value are difficult to measure, and the economic problems concerned with their costs are complex. Therefore it was necessary to collect comprehensive data over a period of years which would reflect trends. It was also agreed that the economic position of no one institution would be revealed, hence the data are combined on the basis of ownership, size and geographic location.[2] The study was designed so as to obtain accurate, pertinent and up-to-date information regarding the actual cost of hospitalization through examination of individual institution balance sheets throughout the territory; to determine the feasibility of a partial territorial subsidy based upon needs; to evolve an acceptable formula for such subsidiy, if found feasible; and to explore other possible sources of hospital revenue. Its scope included data for the following: all non military general and allied special hospitals in the Hawaiian Islands; the years 1939 to 1947 in summary form; the fiscal year 1947–1948 in detail; operating income, non operating income, operating expenses and depreciation of each institution; and other related social and economic factors.

Annual data are given for the nine years extending from 1939 through 1947, and for the most recent available year (1947, 1947–1948, or 1948) as well. Data for individual hospitals do not overlap prior to 1947, even though not all institutions reported on a calendar year basis. The most recent available year is not comparable to preceding years in this respect. In all save one case (Kapiolani Hospital) there was some overlapping, and for many hospitals the most recent data were for 1947. In general, the most recent available year (listed as 1947–1948 in the study) may be regarded as a 12-month period ending June 30, 1948 (and therefore overlapping 1947 by six months) in the case of the non-profit voluntary group, and as simply a reiteration of 1947 statistics in the case of the governmental, plantation and proprietary hospitals.[3] There were exceptions to this rule, of course—the governmental and plantation category each had one small hospital reporting on a fiscal year basis, thereby causing a slight modification in the 1947–1948 data relative to figures for 1947. This information is given more fully in Appendix Table 15.

A questionnaire was used for the collection of data from 39 institutions—extent of facilities and services rendered, operating income, operating expense, personnel and payroll information, distribution of income and expense, and other related data pertinent to hospital economy. Field trips were also made by the staff to insure validity, comparability and completeness in reporting. Data presented are very largely from unpublished records and reports in the files of the hospitals. In a number of instances, it was necessary to analyze basic information to secure more detail. Data on governmental and proprietary institutions are used merely for purposes of comparison and to add completeness to the picture.

The committee's recommendations were based upon this large volume of schedule and interview information, much of which is summarized in the appendix tables.

Data presented in the appendix tables document the text, and should not be interpreted independently.

## II. HISTORICAL AND GEOGRAPHICAL SETTING

Full understanding of the problem of hospital costs in Hawaii requires knowledge of its historical and geographical setting.[1]

Hawaii's first contact with white men brought about profound social, economic and public health problems. Captain James Cook's discovery of the Islands in 1778 led to the introduction of new diseases, which were spread further in later years by visiting whalers and trading ships. American missionaries, together with the first resident physician, settled in Hawaii in 1820, at a time when the native population had already been halved. The first sugar mill, 1835, introduced the plantation type of economy to the Islands. Thereafter a steady rise in the number of non-Hawaiians and mixed bloods accompanied the decline of the natives.[2]

Provision of adequate medical care was complicated by a number of factors during the first half of the nineteenth century. The great bulk of the population was distributed rather thinly among seven separate islands and supported by a primitive agricultural economy. Trained personnel and adequate facilities were almost unknown, despite the valiant efforts of a few pioneer physicians in the more thickly populated areas. The natives were deeply suspicious of Western medicine, even on those rare occasions when it was accessible and within their means. In addition, a large number of foreign seamen in need of medical and hospital care were dropped at Hawaiian ports of call. The groups most concerned about this situation were the various consulates and the Hawaiian government.

The medical indigency and alarming mortality of both natives and seamen led to the only possible choice: the establishment and support of local facilities by governmental funds. First came the seamen's hospitals—American, British and French. Since these institutions generally confined themselves to foreign sailors, and the small proprietary hospitals that emerged after mid-century were neither willing nor able to care for the moneyless Hawaiians, the monarchy eventually moved to build its own facilities.

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[1]See Henry J. Southmayd and Robert Jordan, "A Report on Readiness to Serve," *Hospitals*, August 1948.

[2]An exception is made in the case of historical tables concerning The Queen's Hospital, which has regularly published complete financial reports for almost a century.

[3]In addition, it was possible to include 1948–1949 data for the largest of these hospitals, The Queen's (which accounted for 34 per cent of the patient days in non-profit voluntary hospitals during the previous year), in Appendix Tables 1 and 2.

[1]See map, Fig. 1.

[2]Romanzo Adams, *Interracial Marriage in Hawaii* (New York: MacMillan, 1937), p. 8, and *All About Hawaii: Thrum's Hawaiian Annual and Standard Guide, 1948* (Honolulu: Star-Bulletin, 1948).

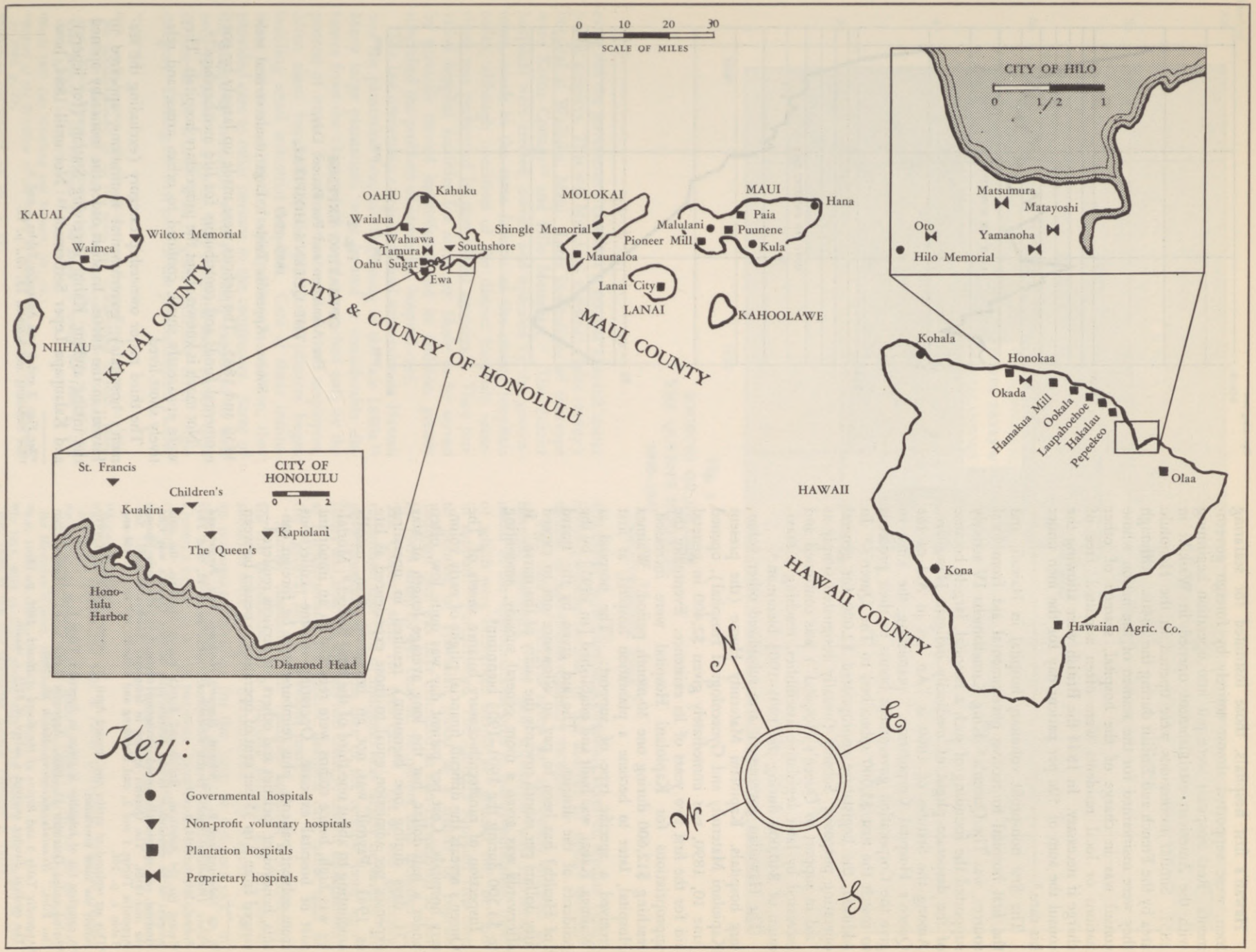



Fig. 1.—Map of Territory of Hawaii, with location of non-military general and allied special hospitals, 1948.

Hawaii's first hospitals, those instituted for seafaring men, were supported almost entirely by foreign governments. Real hospitals were put into operation beginning with the American establishment opened in Waikiki in 1837. Similar institutions were opened in the Honolulu area by the French and British during the 1840s. Although they were maintained for the seamen of the nation whose consul was in charge of the hospital, seamen of other nations or local residents were often admitted, free of charge if necessary. In 1844 the British were allowing the consul the sum of 50c per patient day for the men under his care.[3]

The first non-profit voluntary hospital in Hawaii, and the first hospital to receive governmental aid from local sources, was The Queen's.[4] King Kamehameha IV actively supported the founding of such a hospital, largely because of the desperate plight of medically indigent Hawaiians. Among the Statutes of 1860 is "An Act in Aid of the Queen's Hospital Corporation," permitting the king to give the Corporation government bonds or their proceeds to match the first $5,000 subscribed to The Queen's.[5] In addition, the Legislature appropriated $2,000 for general operating purposes. Subsidy (usually designated simply as "aid in support of Queen's Hospital") was continued and increased by later legislative assemblies, reaching a maximum of $40,000 during the 1901–1903 biennium.[6]

The Hawaiian government also subsidized other voluntary hospitals. Kapiolani Maternity Home (the present Kapiolani Maternity and Gynecological Hospital), opened June 10, 1890, was immediately given $2,400 in general aid for the first two years of its existence. Eventually the appropriations for Kapiolani Hospital were increased, reaching $12,600 during one 30-month period.[7] Waimea Hospital, later to become a plantation hospital, at first received a specific type of support: "The hospital at Waimea, Kauai, was built and established [in 1895] by the residents of the district. . . . The aid given by the Board [of Health] has been to pay an allowance not to exceed fifty dollars per month towards the salary of the nurse." It afterwards was given a more general subsidy, amounting to $3,500 during the 1901–1903 biennium[8].

Inspection of nineteenth-century balance sheets of The Queen's reveals the difficult financial plight of early voluntary hospitals. Cost per patient day was quite low, often under a half-dollar, but the long average length of stay (71 days during one biennium) resulted in operating expenses per admission equal to those experienced as late as 1941. Payroll was not an important item, usually amounting to about one-third of the total budget.[9] Mortality was high, hence coffins were regarded as an important part of hospital expense. Operating income—collections from solvent patients, plus reimbursement by foreign consuls, benevolent societies and others for services rendered—ranged from 8 to 35 per cent of operating expenses between

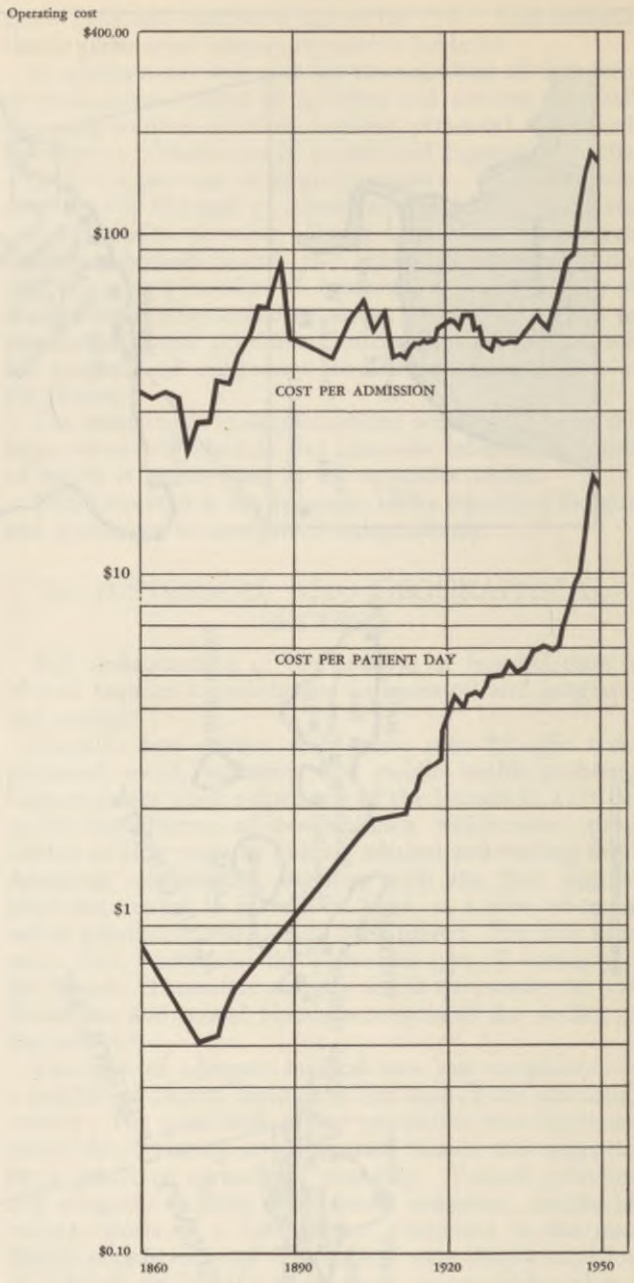



Fig. 2
OPERATING EXPENSE
Per Admission and Per Patient Day,
THE QUEEN'S HOSPITAL,
1859–1949
Source: Appendix Table 1, Logarithmic vertical scale

1859 and 1885. The deficits were made up largely by governmental funds and contributors for life memberships.[10]

Not much is known about the proprietary hospitals. They were apparently small, confined to urban areas, and relatively short-lived.

The third major ownership category (excluding the seamen's hospitals), governmental institutions, appeared in Hawaii in the 1860s. In short order the monarchy opened the insane asylum, Kalihi Receiving Station (for lepers), and Kalaupapa Leper Settlement.[11] Not until 1884, how-

[3]R. G. Nebelung and R. C. Schmitt, *Hawaii's Hospitals: Past, Present and Future* (Honolulu: Public Health Committee, 1948), pp. 9–12, and *The Friend*, July 1, 1844, p. 62f.

[4]Except for the American, British and French marine hospitals, the only hospital to be established in the Islands prior to The Queen's was City Hospital, an individually-owned institution operated in Honolulu during the mid-1850s. The Queen's opened in temporary quarters in 1859. See Appendix Tables 1 and 2, and Nebelung and Schmitt, *op. cit.*, p. 10f and Table 1, p. 26f.

[5]This act replaced an earlier one (passed April 20, 1859) containing approximately the same provisions.

[6]A complete list of subsidies is given in Appendix Table 3.

[7]Period ended December 31, 1903. Appendix Table 3 and "History From Our Files," *Honolulu Advertiser*, March 26, 1949.

[8]Appendix Table 3 and *Report of the Board of Health*, 1897, p. 12.

[9]The medical director received a salary of $125 a month.

[10]See Figs. 2 and 3 and Appendix Tables 1 and 2.

[11]See Nebelung and Schmitt, *op. cit.*, p. 11.

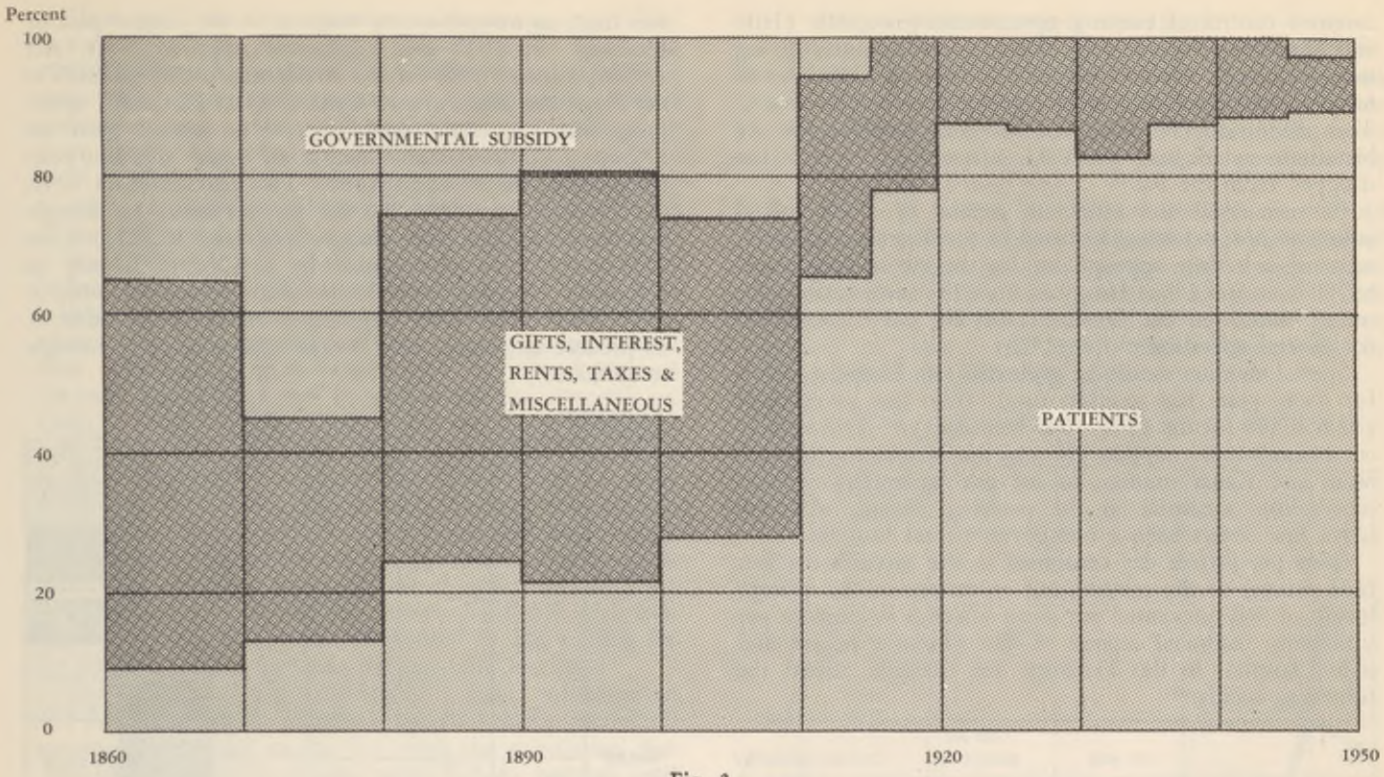



Fig. 3

SOURCES OF INCOME
THE QUEEN'S HOSPITAL
1859–1949

Source: Appendix Table 2

ever, did the government establish a general hospital under public auspices. This was Malulani, a district (later county) hospital at Wailuku, Maui. Later institutions of this type were Koloa Cottage[12] and Hilo Memorial.[13] The district hospitals were erected, owned and operated by the government, much in the same fashion as the county hospitals today, although operation of the district hospitals sometimes was performed by non-official agencies.[14] They provided hospital facilities for areas not likely to be served by privately owned institutions, and in addition greatly simplified the problem of indigents' hospital care.

The last ownership category to find expression in Hawaii was the plantation hospital, beginning in the late 1880s.[15] Many large plantations were located at considerable distances from the cities, which could be reached only by the poorest of roads. To ensure the health of their employees, often many hundreds to the plantation, planters began building small industrial hospitals. Care at these institutions was made a worker's perquisite. In addition, they provided care to other persons in the community. Some of the plantation hospitals were eventually expanded to well over 100 beds; as a group, they rendered more patient days service in pre-World War II years than any other single category. During the first part of the present century, Lihue and Eleele, both plantation hospitals, received regular Territorial subsidies because of the absence of nearby governmental or non-profit voluntary facilities.[16]

Free care of indigent cases was apparently implied in hospital subsidies. No such stipulation was specifically noted in the appropriations bills as finally published, most of which were earmarked simply as "general aid" or "aid in support." Furthermore, The Queen's supplied free care to persons of Hawaiian blood as a matter of course. Indigent care was later extended to non-Hawaiians, so that by 1903 some 69 per cent of the patient days recorded for The Queen's were for free care.[17] Yet it was generally recognized that care of indigents was largely dependent on governmental aid. By the turn of the century, both legislators and hospital officials had come to regard subsidization as reimbursement for specific indigent care rather than as the "general aid" of previous years.[18]

Shortly thereafter, the counties assumed responsibility for the hospitalization of indigent persons, and Territorial subsidies were promptly discontinued. On August 4, 1909, an ordinance providing for the "care of indigent sick" in the City and County of Honolulu was approved.[19] The Queen's began to accept patients "sent under contract to the county," as did other hospitals.[20] During the same year, the Hawaii, Maui and Kauai County governments either

[12] "A small hospital and diet kitchen" at Koloa, Kauai, erected in 1888. No patients showed up for two years, and it was closed in 1903. Thereafter a $75 per month subsidy was given the nearby McBryde Sugar Plantation's Eleele Hospital to assume county hospital functions in that area. (See *Reports of the President of the Board of Health* for 1888, p. 27f, 1902, p. 301, and 1903, p. 115.)

[13] Built 1897 (see Nebelung and Schmitt, *loc. cit.*).

[14] *Report of the President of the Board of Health to the Legislative Assembly of 1886*, p. 17.

[15] Nebelung and Schmitt, *op. cit.*, p. 12.

[16] Appendix Table 3.

[17] Report for calendar year 1903 in *Pacific Commercial Advertiser*, January 26, 1904.

[18] *Report of the President of the Board of Health, T. H., for the Six Months Ending June 30, 1905*, p. 10. See also comments of Dr. Wayson quoted by the *Hawaiian Gazette*, Honolulu, November 24, 1905.

[19] 0.9, 1909, sec. 2; R. O. 1942, sec. 902.

[20] In 1911, 8651 of 27,153 patient days at The Queen's were charged to contract cases of this sort (*Hawaiian Gazette*, February 2, 1912).

assumed control of existing governmental hospitals (Hilo and Malulani) or took steps to aid private hospitals giving indigent care.[21] After December 31, 1909, only one general hospital continued to receive subsidy from the Territory. This institution, The Queen's, received $24,000 for the biennium ended June 30, 1911, after which time it too dropped from the list.[22]

Between 1911 and 1939, no general or allied special voluntary hospital was subsidized by the Territorial government. Funds were appropriated for the tuberculosis wards of Waimea and Lihue Hospitals until the construction of a county sanatorium on Kauai, but this aid was not intended for general operating purposes.[23]

Special mention should be made of Leahi Hospital, which for many years has received funds from the government ($2,650,400 for the 1947–1949 biennium).[24] This subsidy corresponds to the support given by the Territory or Hawaii, Maui and Kauai counties to the governmentally-operated tuberculosis sanatoria in the outlying islands, although Leahi has always been a non-governmental hospital.

Costs per patient day continued to rise through the first four decades of the century, but reductions in the average length of stay prevented any great advance in expense per admission. Annnual reports of The Queen's, largest and oldest hospital in the Territory, for example, reveal the following trends:[25]

| Year | Av. stay | Cost per patient day | Cost per admission |
|---|---|---|---|
| 1910[a] | 23.6 | $1.82 | $42.50 |
| 1920 | 13.0 | 4.20 | 54.79 |
| 1930 | 9.3 | 5.22 | 49.58 |
| 1940 | 8.3 | 6.20 | 51.37 |

[a]Estimated.

The most rapid increase took place between 1918 and 1921, when per diem costs went up almost fifty per cent. Hospital care took a progressively smaller share of the family budget, because of increasing personal incomes and constant costs per admission; thus the actual burden of hospitalization on the average family became lighter during much of this forty-year period.

The relationship between operating income and operating expense during these years fluctuated much in accord with the business cycle. The Queen's Hospital first achieved operating solvency (income equal to expense, excluding non-operating items) in 1918; in 1914, a typical prewar year, only 55 per cent of operating costs had been matched by operating income. The brief depression following the armistice was paralleled by three years of deficits. Then, between 1922 and 1930, a period of national prosperity, there was a constant operating profit. Deficits marked the next nine years, relieved only in 1940 when income once again passed expense.

Subsidization once again became a Territorial policy during the depression of the 1930s. In 1933, the Legislature passed "An Act Authorizing and Empowering the Board of Supervisors of the County of Maui to Assist in the Maintenance of the Robert W. Shingle Memorial Hospital."[26] Shingle, a small general hospital operated by the Episcopal Church and chronically beset by large deficits, was then, as now, the only hospital in the central part of Molokai. In 1937 the Legislature approved "An Act Appropriating Funds for the Maintenance of Free Beds at the Kapiolani Maternity & Gynecological Hospital," specifying that Kapiolani should receive an annual grant of $7,500, provided it maintained at all times "five free beds for indigent maternity patients." Two years later, in 1939, the Territory gave $15,000 for the biennium to Shingle Memorial Hospital. The amount was raised to $25,000 for 1941–1943, and accompanied by a $20,000 subsidy to Kapiolani Hospital beyond the sum regularly granted it since 1937. The 1943 Legislature repeated the offer of its predecessor, except that it raised the subsidy to Shingle to $30,000.[27]

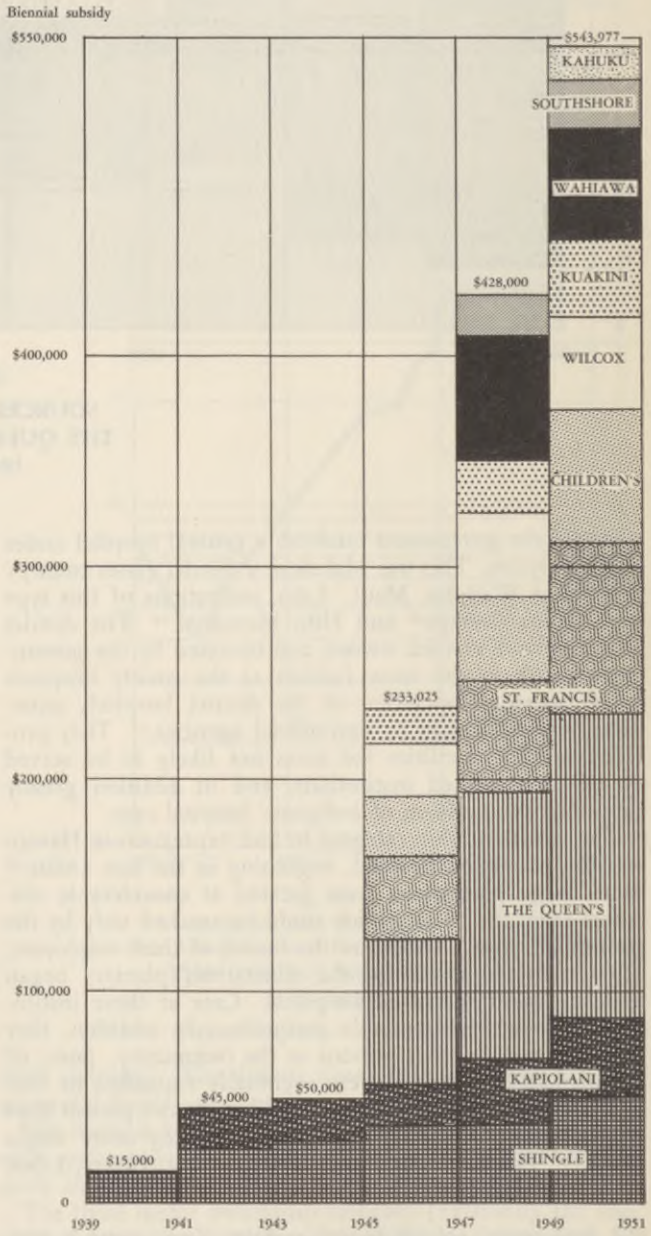



Fig. 4

TERRITORIAL SUBSIDIZATION OF HOSPITALS HAWAII, 1939–1951

Source: Appendix Table 6

[21]*Report of the President of the Board of Health for the 12 Months Ended June 30, 1910*, p. 3.

[22]Session Laws of Hawaii 1909, Act 150. (Hereafter, the initials *S.L.H.* will be used to denote Session Laws.)

[23]S.L.H. 1911, Act 155; S.L.H. 1913, Act 168.

[24]S.L.H. 1947, Act 203.

[25]See Fig. 2 and Appendix Tables 1, 4 and 5.

[26]S.L.H. 1933, Act 7.

[27]S.L.H. 1937, Act 176; S.L.H. 1939, Act 244; S.L.H. 1941, Act 273;

These subsidies were extended to the remaining voluntary non-profit hospitals in the Islands by the 1945 and 1947 Territorial Legislatures. In addition to appropriations made for tuberculosis sanatoria, leper hospitals, mental institutions and domiciliary establishments, subsidies to seven general and allied special hospitals in 1945, and nine such hospitals in 1947, were approved. The total appropriation for these establishments came to $233,025 for 1945–1947 and $428,000 for the following biennium.[28]

The 1945 and 1947 subsidies were in large part an effort to keep down the high cost of hospitalization. "The 1945 legislature appropriated lump-sum subsidies for the biennium to the city hospitals to aid in keeping down ward rates. These grants were computed on the basis of 50 cents for each day of ward care in each of the five hospitals on Oahu. . . . Not long after this appropriation was granted, a ruling was made that hospital employees would be included in the unemployment compensation program in effect in the Territory. This ruling necessitated the hospitals making contributions to this fund for their employees, the result of which was to increase the costs of operation. The hospitals maintained that this increased cost of operation offset the territorial subsidy, so that the purpose for which such subsidy was granted was not accomplished."[29] The subsidy for the following biennium was consequently increased.

The 1949 Territorial Legislature extended subsidization still further. Kahuku Hospital, operated under plantation auspices, was added to the list, with the stipulation that "this item shall not be payable to the Kahuku hospital until it becomes a non-profit community hospital." The ten general and allied special voluntary institutions covered by the appropriation were to receive $543,977 for the biennium.[30]

The 1940s witnessed other developments which affected hospital occupancy, income and costs in the Territory. These events, like the cost data, will be given detailed consideration on the following pages, but brief mention of them should be made here:

(1) The population was greatly increased, first by the arrival of defense workers, later by other persons.
(2) War jobs in Honolulu, Selective Service, and mechanization of the plantations led to the transfer of population from the outlying islands to Oahu.
(3) High prices and higher wages brought wartime prosperity to the Islands, although a new (and somewhat precarious) balance came into being following the death of price control in 1946. Plantations did not generally share in the boom and reported several important consolidations.
(4) Hospital wages and salaries were increased, but perquisites for employees were eliminated. Causes for the exceptional increase in average income for hospital personnel were (a) increased competition for workers, (b) relatively low pay scale prior to the war, and (c) adjustment for removal of perquisites.
(5) Plantation employees were placed on medical insurance plans, supplanting the old perquisite system.
(6) Plantation hospitals, either from obsolescence, consolidation, or decline in number of plantation personnel dwindled in number. The last year in which they rendered more patient days of service than any other category was 1939.
(7) Continued decrease in number of foreign-born Japanese in Hawaii and the wartime de-emphasis on Japanese culture served to hasten the disappearance of individually-owned proprietary hospitals, most of which were operated by Japanese physicians for members of their race.

It was only natural that these developments should react strongly on occupancy rates, bad debts, distribution of expenditures, profit and loss, and the relative amounts of service rendered by the four ownership categories. Trends in cost of living, per capita income, and population growth are given in Table 7 and Fig. 5. Other changes will be summarized in the following pages.

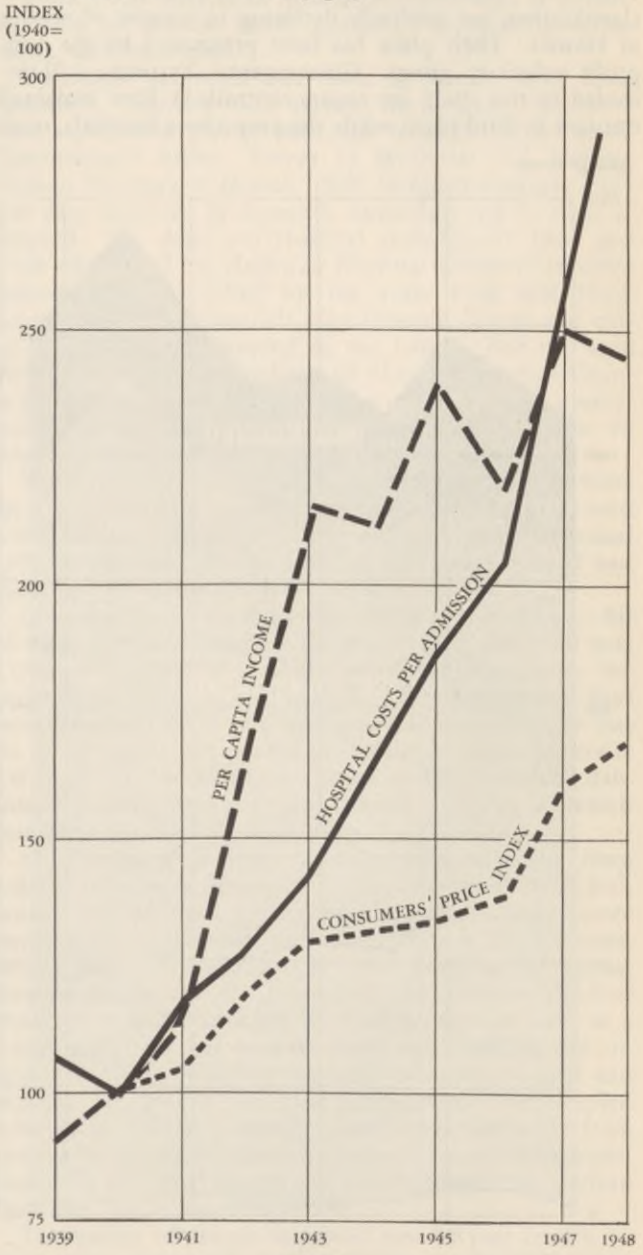



Fig. 5

PER CAPITA INCOME, CONSUMERS' PRICE INDEX, AND COST PER ADMISSION FOR ALL HOSPITALS, TERRITORY OF HAWAII, 1939–1948

Source: Appendix Tables 7 and 23

S.L.H. 1943, Act 191. See Fig. 4.
[28]See Appendix Table 6 and Fig. 4.
[29]*Public Medical Care in Hawaii* (Public Health Committee of the Chamber of Commerce of Honolulu, June 1947), pp. 44 and 45. The subsidies also extended to hospitals outside Honolulu, as noted in Appendix Table 6. There was some individual deviation from the ward bed basis of calculation.
[30]S.L.H. 1949, Act 335. See Appendix Table 6 and Fig. 4.

## III. FACILITIES AND SERVICES

Distinct changes have occurred in facilities and services during recent years. The non-profit voluntary category has become increasingly important, while plantation hospitals have reported progressively fewer patient days of service. An even greater percentage of admissions have gravitated to the 100-bed and over class of hospitals. Analysis of data by geographical location reveals vast differences within the Territory. Laboratory and X-ray examinations have become important features of hospital care and costs.

Whether measured by number of hospitals, total beds, admissions or average census, significant shifts are evident in the distribution of facilities and services by type of ownership. Plantation hospitals, once the most important classification, are gradually declining in volume of service in Hawaii. Their place has been preempted by the non-profit voluntary group. Governmental hospitals (all included in this study are county-controlled) have remained constant in third place, while the proprietary hospitals, most of which are operated by and for the Japanese segment of the population, have consistently reported an almost negligible average census. These changes are readily apparent in the following table, which gives the percentage distribution by ownership categories of patient days reported for three representative years:[1]

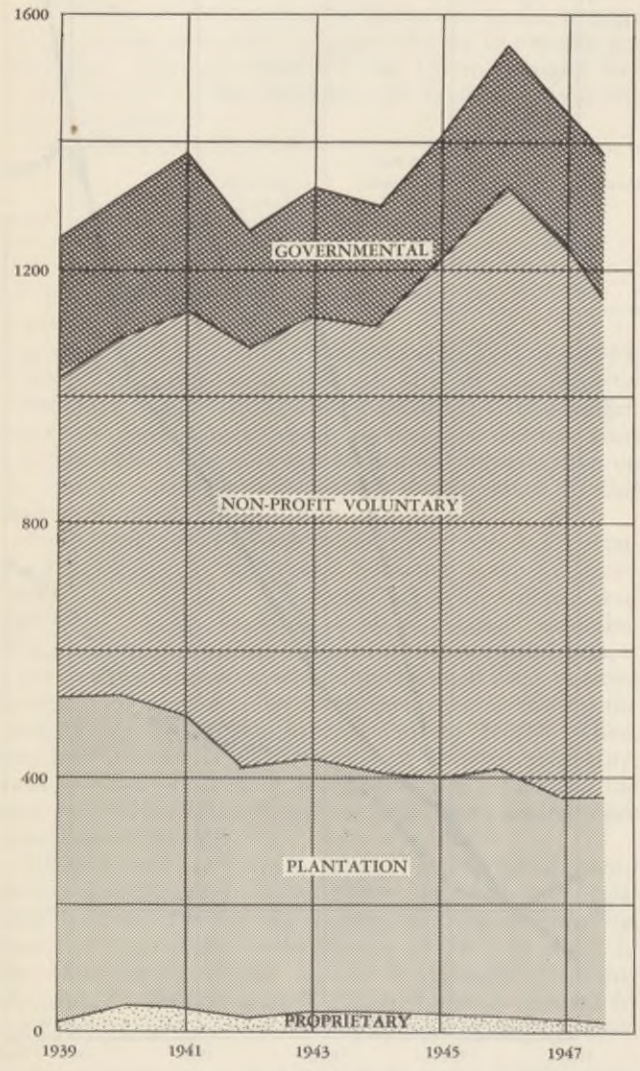



Fig. 6

AVERAGE CENSUS OF HOSPITALS BY OWNERSHIP
TERRITORY OF HAWAII
1939–1948

Source: Appendix Table 8

| Type | 1929[a] | 1939[b] | 1947 |
|---|---|---|---|
| Total[c] | 100 | 100 | 100 |
| Governmental | 17 | 18 | 15 |
| Non-profit voluntary | 33 | 40 | 59 |
| Plantation | 47 | 41 | 24 |
| Proprietary | 2 | 1 | 2 |

[a]Excludes hospitals not registered with the A.M.A., notably St. Francis (non-profit) and a number of small proprietary institutions. Average census was 152 for the governmental group, 292 for the non-profit, 410 for plantation, 21 for proprietary; total, 875.

[b]List incomplete for proprietary hospitals.

[c]Percentages may not total 100 because of rounding.

A trend toward greater use of the larger hospitals has also been evident. In 1929, the smallest category (under 35 beds) reported 30 per cent of the patient days; by 1947, this group was responsible for only nine per cent. During the same 18 years the 100-bed and over category rose from 34 to 59 per cent of the patient days. These changes are shown in the following table giving the percentage distribution of patient days:[2]

| Beds | 1929[a] | 1939 | 1947 |
|---|---|---|---|
| Total[b] | 100 | 100 | 100 |
| Under 35 | 30 | 14 | 9 |
| 35–99 | 36 | 44 | 33 |
| 100 and over | 34 | 43 | 59 |

[a]Average census was 260 for the under 35 group, 317 for the intermediate, 298 for the 100 and over; total, 875.

[b]Percentages may not total 100 because of rounding.

Since a slight upward trend is still evident in actual patient days for the Territory, a decreased percentage of the total need not be associated with absolute decline for any individual category. Total average census for the Islands came to 875 in 1929, 1,242 in 1939, and 1,458 in 1947. Among the ownership types, only the plantation hospitals actually dropped in average daily census between 1929 and 1947, the other kinds reporting absolute increases. During the same 18 years only the under 35-bed category among the three size groupings suffered real decline in census. Similar trends are revealed by tabulations of admissions data.

Two major factors in hospital occupancy in the Territory have been population growth and the decreasing average length of stay. Estimated population of the Islands was 358,000 in 1929, 415,000 in 1939, and 540,500 in 1948.[3] Furthermore, since average stay dropped from 9.5 days to 7.8 days between 1939 and 1947–1948, more admissions were needed to maintain the same average census. Occupied beds per 1,000 population declined from 3.0 in 1939 to 2.6

[1]Data for 1929 calculated from Nebelung and Schmitt, *op. cit.*, Table 34 (for hospitals registered with the A.M.A. only); data for 1939 and 1947 abstracted from Appendix Table 9. Complete annual data for 1939–1948 are given in Tables 8 and 9. See Fig. 6.

[2]Data for 1929 calculated from Nebelung and Schmitt, *op. cit.*, Table 34 (for registered hospitals only); data for 1939 and 1947 abstracted from Appendix Table 11. Average census is equal to total patient days divided by the total number of calendar days, hence is actually a measure of the same function. For complete annual data, 1939–1948, see Appendix Tables 10 and 11. For admissions data, see Fig. 7.

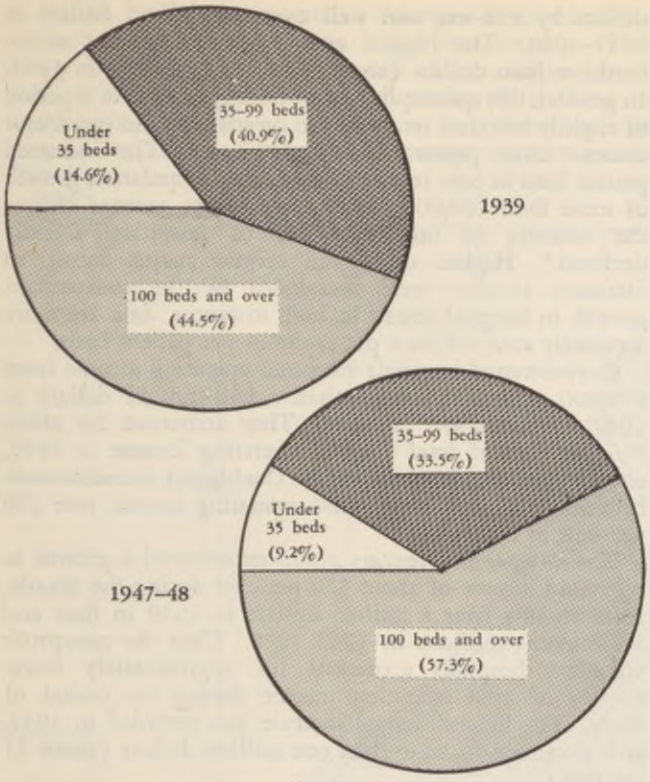



Fig. 7
ADMISSIONS, BY SIZE OF HOSPITAL
TERRITORY OF HAWAII, 1939 AND 1947–48
Source: Appendix Table 11

in 1947–1948, although admissions were at the same time pursuing an erratic course from 115 to 122 per thousand inhabitants.[4]

Considerable differences in hospital usage exist within the Territory.[5] The counties of Maui and Hawaii reported occupied beds and admissions per 1,000 population in 1947–1948 far above the Territorial average. Oahu and Kauai, meanwhile, had far fewer occupied beds and admissions relative to population than reported for the entire Territory. In Maui County, for example, almost one-fifth of the population entered general hospitals at some time during the year; in Kauai County, the ratio was about one-eleventh. It is hard to believe that such differences are entirely a result of differentials in community health. More likely, these variations stem from the presence of numerous county and plantation hospitals on Hawaii and the islands of Maui County, with attendant common use of perquisites, hospital insurance and indigent aid programs. In any case, hospital costs are closely tied to intraregional differences in hospital usage.

Still another factor in hospital costs is the frequency of surgical operations, laboratory examinations and X-rays. Surgery has fluctuated, standing at 0.44 operations per admission in 1939 and 0.39 during the first half of 1948 in Honolulu hospitals. The same institutions report a rise of 35 per cent (5.31 to 7.19 per admission) in laboratory examinations during this period, and a 17 per cent increase followed by a 27 per cent drop (0.64 to 0.75 to 0.55 per admission) in X-rays.[6]

[3]Data from Territorial Department of Health (see also Appendix Table 7).
[4]Appendix Tables 10 and 12.
[5]Appendix Table 13.
[6]See Appendix Table 14.

Obviously, trends in hospital costs can be understood only in relation to hospital facilities and usage. The growing importance of the non-profit voluntary group augurs well (in one sense, at least) for overall hospital solvency, since plantation and governmental hospitals are the chronic money losers in the hospital family. Greater use of 100-bed and over institutions means higher patient costs, because there is a high correlation between size of hospital and operating expense per admission. The relationships between facilities, services and costs will be discussed in detail in the following pages.

## IV. THE SAMPLE

Three major sources of information were used in obtaining data on hospital costs: published material, questionnaires, and interviews.

Very little published data could be found. Only three systematic, Territory-wide surveys of hospital costs have been made. The first of these, the Hospital Service Study Commission's *Report, Survey of Hospitals and Nursing Homes, Territory of Hawaii, 1946,* included summary 1945 cost data tabulated by function, ownership and location of hospital. The American Hospital Association's 1947 and 1948 editions of the *American Hospital Directory* reported somewhat greater detail for the years 1946 and 1947. Among individual hospitals, The Queen's, largest and oldest civilian general hospital in the Islands, had the most complete record. The auditors of Maui and Hawaii Counties issue annual reports which give information on county-controlled hospitals. Data for other institutions can be found to some degree in various isolated reports.

The bulk of the data tabulated in the present study came from questionnaire response and interviews, supplemented with field trips. Detailed questionnaires covering the period 1939–1948 were submitted to the thirty-nine general and allied special non-military hospitals.

Information was obtained from thirty-four hospitals. All of them provided data for the most recent available year (1947 or 1947–1948), and many listed figures for the entire decade covered by the study. Very few patient days were reported for the institutions unable to respond, so that the final sample is regarded as highly reliable. Appendix Table 15 lists the hospitals, their locations, years of establishment, 1947–1948 bed complements, and years for which data were available.

Magnitude of sample could be best estimated from published accounts of average census or patient days. Bed, census and admissions data are fortunately much more complete than corresponding information on hospital costs, having been printed regularly since 1928 in the annual hospital numbers of the *Journal of the American Medical Association,* and assembled, with other pertinent data, in a recent study.[1] It has been assumed that hospitals not included in the sample had the same operating income and expense per patient day that characterized the sampled institutions. Other estimates similarly stemmed from knowledge of the relationship between patient days represented by the cost sample and total patient days derived from the sources noted above.

The quality of sample improved year by year from a 59 per cent enumeration in 1939 to 97 per cent by 1947. Such progressive improvement was also experienced in individual size and ownership categories.

[1]R. G. Nebelung and R. C. Schmitt, *Hawaii's Hospitals: Past, Present and Future* (Honolulu: Public Health Committee, 1948).

Among ownership types, the *non-profit voluntary* hospitals were most adequately sampled. About 83 per cent of the estimated patient days recorded by this group were included for 1939, and a full enumeration was attained by 1944 and thereafter. Approximately half the patient days spent in *governmental* hospitals in 1939 and 1940 were sampled, a fraction raised to nineteen-twentieths for the period 1941–1946, and 100 per cent thereafter. *Plantation* hospital data were based on an 89 per cent sample in 1947, 40 to 62 per cent prior to that year. Least trustworthy was the sampling of *proprietary* hospitals, ranging from 6 to 32 per cent except for the years 1945 (66 per cent) and 1947 (81 per cent). As a result, only the two latter years are included in tabulations for this group.[2]

Among size categories, the 100-bed and over group was most completely sampled. The sample here ranged from 62 per cent in 1939 to 100 per cent in 1947 and 1947–1948. The intermediate group, 35–99 beds is represented by a 57 per cent sample in 1939 and a 94 per cent in 1947. Least adequate is that of the small hospitals (under 35 beds), ranging from a low of 46 per cent in 1940 to a high of 89 per cent in 1947.[3]

High reliability can be expected from such reporting. Assuming random selection of the samples, it is possible to apply statistical checks to determine the likelihood of various degrees of error due to lack of total enumeration. When calculated for the estimated cost per patient day of all hospitals, for example, such formulas indicated a maximum error of 3.7 per cent in 1939, and only 2.3 per cent in 1947–1948.[4] Extended discussion will be given these measures of reliability in a later section.[5]

## V. COSTS OF OPERATION

Basic to any study of hospital finances is consideration of operating income and operating expense. Included are receipts and expenditures for all hospital services rendered. Operating income embraces earnings from day-rate charges and fees for special professional services, such as physiotherapy, X-rays, or laboratory examinations. Included in operation expense are costs of administration, dietary items, professional services, and house and property maintenance.[1]

### TERRITORIAL TOTALS

Perhaps the simplest expression of operating costs during the past decade is through estimated totals for the Territory. Such estimates are also possible for the major components of operating costs, such as the number of hospital personnel. In either case, it is first necessary to assume that unsampled institutions have the same cost per patient day (or number of workers per occupied bed) reported by the hospitals included in the sample. This assumption is reasonable because of the magnitude of the sample, indicated in a preceding section.

*Operating Income*

The operating income of *all civilian, general and allied* hospitals in the Territory has experienced a spectacular rise during the past decade. From an estimated $1,288,000 in 1939, the figure increased to two and one half million dollars by mid-war and well over six million dollars in 1947–1948. The biggest annual spurt, one and seven-tenths million dollars (about 38 per cent), came in 1947. In general, this quintupling of operating receipts in a period of slightly less than ten years can be attributed to two major causes: more patients and higher rates. The increased patient load in turn resulted from a total population growth of more than 100,000 persons; per capita average census, the measure of individual use of hospitals, actually declined.[2] Higher rates, the second major factor in increased income, were occasioned by the concomitant growth in hospital costs. In both instances, data are more accurately analyzed on a per capita or per patient basis.

*Governmental* hospitals increased operating income from $96,000 in 1939 to more than a half-million dollars in 1947, or about 470 per cent. They accounted for about 7½ per cent of total hospital operating income in 1939, and 8½ per cent in 1947–1948. The biggest increases came between 1940 and 1944, when operating income rose 250 per cent in four years.

The *non-profit voluntary* group experienced a growth in operating income of about 370 per cent during the decade, from slightly over a million dollars in 1939 to four and seven-tenths millions in 1947–1948. Thus the non-profit voluntary hospitals accounted for approximately three-fourths of total operating income during the period of study. The biggest annual increase was recorded in 1947, and amounted to more than one million dollars (about 31 per cent).

Operating income of *plantation* hospitals came to only $174,000 in 1939, but increased 490 per cent to over one million by 1947–1948. Operating income as a percentage of the amount reported by all four ownership categories ranged from 9 in 1940, to 16 at the end of the period of study. The $583,000 (130 per cent) annual increase in 1947 undoubtedly was a result of discarding the perquisite system.

In 1947, the *proprietary* hospitals reported an estimated operating income of $103,000, less than 2 per cent of the Territorial total. Earlier data for this category were unreliable.

It should be remembered that, generally speaking, "hospital income" is but another way of saying "patient expense." The operating income estimated for hospitals in the above paragraphs is in reality the direct cost to patients of hospitalization. Both hospital income and hospital expense are relevant to the overall problem of hospital costs in Hawaii, and cannot be divorced.

Complete data are listed in Appendix Table 18.

*Operating Expense*

Operating expense has undergone a growth in the past decade only slightly less rapid than that found in operating income. In 1939, operating expense for *all hospitals* stood at an estimated $2,222,000; in 1947–1948, year of most recent available data, expense was eight and a half millions, almost four times as high. The biggest annual advance, one and seven-tenths millions in 1947 (about 28 per cent), was only scarcely more staggering than increases reported in earlier years. They accounted for more than ⅔ of 1 per cent of the total volume of business transacted in the Territory in 1947.[3]

[2] See Appendix Table 16.

[3] See Appendix Table 17.

[4] That is, other samples of this magnitude would give a mean cost per patient day no more than 3.7 (or 2.3) per cent beyond the sample mean 99.7 times out of 100.

[5] See Appendix Table 30.

[1] See *Hospital Accounting and Statistics* (Chicago: American Hospital Association, 1940), Part III.

[2] See Appendix Tables 7 and 12.

[3] $8,072,000 of $1,201,083,718. See Appendix Table 19, and Clarence Hodge, ed., *Hawaii Facts and Figures, 1948* (Honolulu: Chamber of Commerce, 1949), p. 23.

A cost breakdown by ownership types emphasizes the importance of the *non-profit voluntary* category. This group had estimated operating costs of one and one-tenth million dollars in 1939, five and two-tenths millions in 1947–1948 (see Fig. 8). Thus, like the other classes of hospital ownership, it experienced a steep rise in expenses

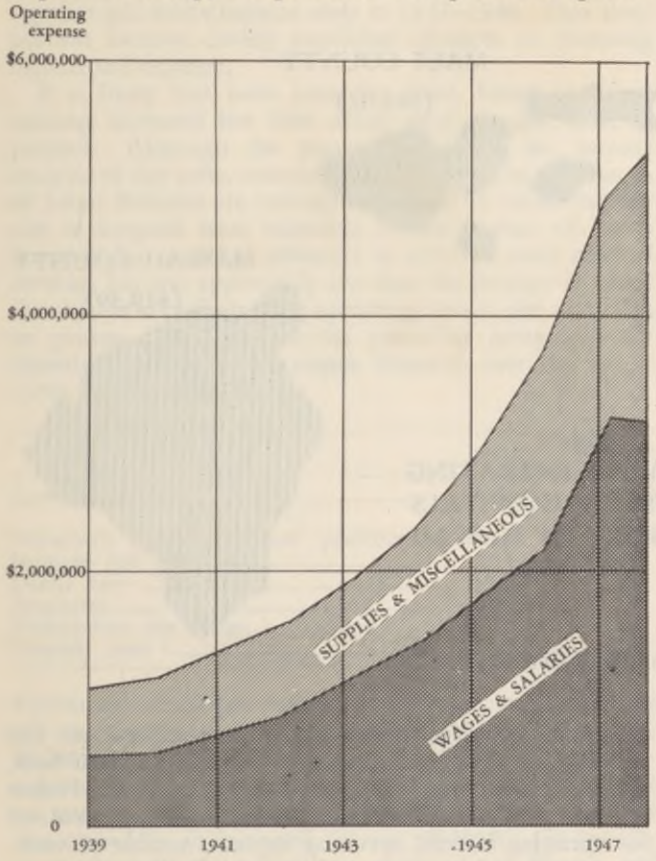



**Fig. 8**

**DISTRIBUTION OF OPERATING EXPENSES NON-PROFIT VOLUNTARY HOSPITALS HAWAII, 1939–1948**

**Source: Appendix Tables 19 and 32**

during the decade. The following table indicates the percentage increase during the decade and share of total operating costs during the year of most recent available data:[4]

| Type | % increase in costs 1939–1948 | % of total costs 1947–1948 |
|---|---|---|
| Total | 297 | 100 |
| Governmental | 345 | 14 |
| Non-profit voluntary | 375 | 61 |
| Plantation | 142 | 24 |
| Proprietary | Not available | 1 |

It should once again be pointed out that these data are estimated totals, and thus of rather limited significance. The relatively small increase in plantation hospital expenses, for example, is less a result of economical operation than of decreased use, caused by the decline in plantation population.

Complete operating expense data are given in Appendix Table 19.

[4]Calculated from Appendix Table 19.

*Personnel and Payroll*

Total hospital personnel and payroll data further emphasize the significance of hospitals to the areal economy. In 1947–1948 the thirty-nine hospitals included in the study employed 2,260 persons, 55 per cent more than in 1939, when hospital personnel numbered approximately 1,455. About 1.2 per cent of all persons at work in the Territory in December 1947 were employed in hospitals.[5] Wages and salaries paid to hospital personnel rose more than 330 per cent during the decade, from $1,228,000 to $5,330,000.

Among the various ownership categories, the *non-profit voluntary* group reported both the greatest number of workers and the greatest decennial increase. Employees in this group numbered 1,429 in 1947–1948, about 63 per cent of all hospital workers and 84 per cent more than estimated for the non-profit category in 1939. The *governmental* group employed 314 persons in 1947–1948, about 14 per cent of all hospital workers, representing an absolute increase of 80 persons (34 per cent) since 1939. The *plantation* hospitals, with 489 workers (22 per cent of the total) during the most recent year, had exhibited very little net increase since 1939. The *proprietary* hospitals had only 28 workers, including the owners and their wives, during the most recent available year (1947), or somewhat more than one per cent of the estimated total for all hospitals.

Student nurses, concentrated in three *non-profit voluntary* hospitals, increased from their prewar mark of 117 (in 1940) to a postwar high of 353 in 1948. Totals for student nurses are not included in personnel estimates, although they performed an appreciable amount of work for their institutions.

Estimated annual totals are given in Appendix Table 20.

## PER CAPITA COSTS

A far more meaningful expression of hospital costs than estimated Territorial totals can be found in calculations of per capita costs. Adjustment is thereby made for changes in total population, so that actual average cost per person is shown. Such calculations also have broad implications for community-wide hospital insurance programs, which must adjust their rates to a level slightly above the average per capita cost of the services they insure: Finally, per capita data help point out significant areal differences in the amount and quality of hospital care.

For the Territory as a whole, the per capita operating income of the hospitals has almost quadrupled in the past decade, rising from $3.10 in 1939 to $11.98 in 1947–1948. The same years witnessed a similar increase in individual incomes. As a result, the average man, woman or child devoted about one per cent of his income to hospitalization during the immediate prewar period, as low as 0.7 per cent during the war, and 1.4 per cent in 1947–1948. Hospital charges, exclusive of physicians' bills, thus took about 40 per cent more of the average person's income in 1947–1948 than in 1940.

These tabulations reveal that hospital insurance could have been provided in 1947–1948 at a rate of less than $12 a person, plus any necessary charges for administration and reserve funds.

Per capita operating costs (operating expense divided by population) trebled during the decade, rising from $5.35 in 1939 to $16.00 in 1947–1948. Thus the Islands devoted 1.6 per cent of total income to hospitals in 1939 and 1940,

[5]Hodge, ed., *op. cit.*, p. 26, and Appendix Table 20.

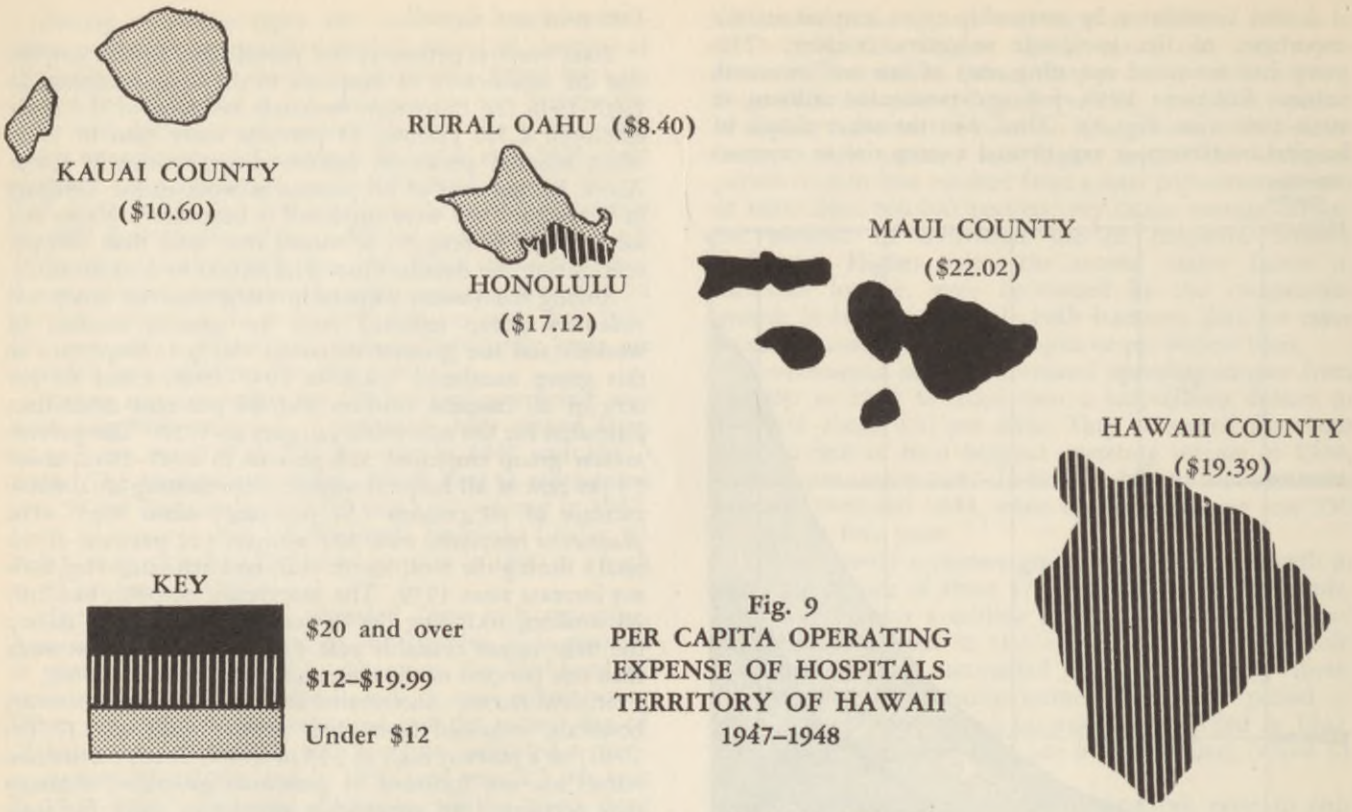



Fig. 9
PER CAPITA OPERATING EXPENSE OF HOSPITALS
TERRITORY OF HAWAII
1947–1948

Source: Appendix Table 22.

as little as one per cent in mid-war, and 1.8 per cent in the most recent available year.

An analysis of current (1947–1948) data reveals wide differences among the four Hawaiian counties. Honolulu includes more than half the total population of the Territory, and its five hospitals accounted for two-thirds of the operating income and 55 per cent of the operating expense reported for all hospitals. On a per capita basis, however, Maui and Hawaii Counties far outstrip the rest of the Territory, in hospital expense if not in hospital income. Maui hospitals spent $22.02 per Maui resident in 1947–1948, and Hawaii spent $19.39 for each of its residents, compared to expenditures of $14.90 on Oahu and $10.60 in Kauai County. These areal differences closely follow similar differences in hospital usage as indicated by occupied beds per 1,000 population. Per capita operating incomes show considerably less range. Deficits in Maui and Hawaii Counties are apparently paid out of plantation pockets and the county treasury.

Complete per capita cost data are listed in Fig. 9 and Appendix Tables 21 and 22.

## COSTS PER PATIENT

An even more refined expression of hospital costs is provided by patient day and admission ratios. Variations in both potential patients (total population) and actual usage (such as admissions per 1,000 population) are thereby controlled in analysis. Cost per patient day is more commonly used, but is complicated by the greater expense of the first few days of hospitalization and variations in average length of stay. Cost per admission is more rarely found in the literature, but through its use a patient is provided a handy omnibus measure of total costs of hospitalization. Other convenient ratios are personnel per 100 occupied beds, wages and salaries per 100 occupied beds, and other operating costs per 100 occupied beds. Patient day, occupied bed and admission ratios have been calculated for operating income, operating expense, number of workers, payroll and cost of supplies and miscellaneous items. As in other parts of the study, breakdowns have been made by ownership, size and location.

*By Ownership*

Ratios for the "all hospitals" category show a uniform rise during the decade. Income per patient day climbed from $3.57 in 1939 to $12.77 in 1947–1948, more than 250 per cent. Calculated per admission, the rise was slightly less than 200 per cent, from $33 to $98.[6] Operating expense per patient day was an estimated $5.18 in 1939, and $16.94, almost 230 per cent higher in 1947–1948. Cost per admission increased from $48 to $131, about 173 per cent. The greatest annual increase, both for income and expense, occurred in 1947.

Naturally enough, there was a corresponding rise in the three major components of the cost ratios, namely, number of hospital workers, compensation of workers, and cost of supplies and miscellaneous. Hospitals employed only 121 persons per 100 occupied beds in 1941, from 132 to 144 during the war, and 164 in 1947–1948. During the most recent year, 39 per cent of personnel (64 per 100 occupied beds) were of professional status. Annual compensation rose steeply, from $752 in 1940 to $2,368 in 1947—well over 200 per cent. Average income per capita in the

[6]Cost ratios were routinely carried to the nearest cent in the appendix tables, but the larger values are not necessarily significant to the final digit, hence are rounded here.

Territory advanced only 150 per cent in the same period.[7] Finally, the costs of supplies and miscellaneous items underwent a decennial increase of about 158 per cent, from $903 to $2,333. The biggest annual rise occurred for number of workers per 100 occupied beds between 1946 and 1948, for worker compensation between 1946 and 1947, and for supplies and miscellaneous costs in 1947–1948. This steep postwar increase closely paralleled advances in operating income and expense.

It is likely that basic rates for room, board and floor nursing increased less than actual total charges made to patients. Although the present study did not include analysis of day rates, mainland data supplied by the Bureau of Labor Statistics are indicative.[8] It will be noted that the rise in hospital rates estimated by the Bureau of Labor Statistics far exceeded advances in costs of other medical services, but was appreciably less than the increase in actual direct costs to patients (i.e., operating income per admission or patient day) listed in the preceding paragraphs for Hawaii. Data show percentage increases over the 1935–1939 national average:

| | 1947 | 1948 |
|---|---|---|
| Consumer's price index | 59.2 | 71.2 |
| Physician's services (general practitioners) | 30.3 | 36 |
| Surgeons and specialists | 29.4 | 36 |
| Dental care | 37.4 | 46 |
| Eyeglasses | 18.6 | 24 |
| Prescriptions and drugs | 15.4 | 22 |
| Hospital rates | 79.6 | 112 |

Operating income per patient day increased more than 250 per cent in Hawaii between 1939 and 1947–1948, it will be recalled. If local rates—as opposed to total charges—went up in the same proportion as mainland rates, it must be assumed that the difference between income and rates was caused by an increased volume of service per patient, in the form of more laboratory examinations, X-rays, and other special procedures. Data for the Honolulu hospitals (in Appendix Table 14) bear out this assumption with regard to laboratory examinations, but data for X-rays are inconclusive.

Comprehensive data for the *all hospitals* category are listed in Appendix Table 23.

Data for *governmental hospitals* in Hawaii show several variations from the pattern established for all hospitals. Operating income ratios have always been appreciably lower, income per patient day or admission ranging one-third to two-thirds as much as the corresponding values for total hospitals in the Territory. Operating income per patient day was only $1.15 for the governmental hospitals in 1939, but it increased sharply early in the war and stood at $6.64 in 1947–1948. Operating expense per patient day, similarly low relative to other ownership types in 1939 (at $3.24), also rose rapidly, and was 340 per cent higher ($14.26) in 1947–1948.

Other variations are shown in personnel, payroll, and supplies data for governmental hospitals. Workers per 100 occupied beds have always been few in comparison with other ownership groupings: no more than 116 before the recent war, and between 126 and 149 thereafter, with no major postwar increase. Few workers (never over 29 per cent) have had professional status. Wages and salaries increased more than $1,000 between 1942 and 1944, and stood in 1947–1948 at $2,564, about a tenth more than the average for all categories. Costs of supplies and miscellaneous items more than doubled between 1939 and 1942, then leveled off close to the average for total hospitals. In almost every respect, cost ratios were exceptionally low for the governmental group in 1939, soared early in the war, and quickly reached a plateau that endured into the postwar period and left them close to the average for all hospitals. Complete data are given in Appendix Table 25.

Unlike the governmental hospitals, the *non-profit voluntary* group registered the greatest increases in income and expense ratios after the end of the war. Representative years, extracted from Appendix Table 25, dramatically reveal the magnitude of the postwar spiral:

| | 1940 | 1945 | 1947–1948 |
|---|---|---|---|
| Income per patient day | $5.48 | $9.60 | $16.46 |
| Expense per patient day | 5.65 | 10.09 | 18.28 |
| Workers per 100 occupied beds | 146 | 143 | 183 |
| Average compensation | $710 | $1552 | $2198 |
| Cost of supplies, etc., per occupied bed | 1034 | 1463 | 2677 |

In almost every year these ratios have exceeded corresponding ratios for all hospitals. One exception has been in workers' wages and salaries, which have been relatively low in the non-profit voluntary group. The high income and cost data calculated for other criteria probably reflect the greater size of the typical voluntary hospital (128 beds, against an overall average of 60 for the Territory in 1947–1948), with the attendant presence of multiple complex services. For example, from 43 to 48 per cent of the workers were professional.

The most abrupt increases occurred in 1947 and 1947–1948. Both income and expense per patient day shot upward about four dollars (well over a third) in 1947. Personnel per 100 occupied beds numbered 145 in 1946, 164 the next year, and 183 in 1947–1948. Average wages and salaries were $1,650 in 1946, $2,229 in 1947. Supplies and miscellaneous came to $1,914 per occupied bed in 1947, $2,677 in 1947–1948. Reasons for these sharp rises probably included:

(1) Decontrol of prices in the middle of 1946;[9]
(2) Competition with other hospitals for personnel, especially in the professional classification;
(3) Discontinuance of perquisites by the largest hospital in this category in 1947, with attendant increases in wages and salaries, reflected in averages for the entire group; and
(4) Shorter hours.

A still different pattern is presented by the *plantation* hospitals. In 1939 they reported the extremely low operating income of 94c per patient day. By 1946 this figure had increased to $3.15. Then perquisites were largely abolished by the plantations, and most employees were placed on a medical care plan which greatly increased the operating income of the hospitals. In 1947 income per patient day was $7.92, more than recorded by the governmental hospitals but still far beneath the level established for all hospitals. Operating expense, meanwhile, remained constantly somewhat below the average for all institutions: $4.58 in 1939, $10.96 in 1946, and then, along with a

[7] See Appendix Table 7.

[8] Quoted by Frank G. Dickinson, "Medical Care Prices vs. Cost of Living," *J.A.M.A.*, 139:591 (February 26, 1949).

[9] Locally, the consumers' price index was 100 in 1940, 136.0 just before decontrol, 162.0 in June 1947, and 169.8 in June 1948 (see Appendix Table 7).

greatly increased payroll, $15.81 in 1947. The 1947 cost was therefore 245 per cent more than the corresponding value for 1939, and 44 per cent over 1946.

Plantation hospitals also show differences from other categories in the factors associated with operating costs. Workers per 100 occupied beds have always been few in number—85 in 1939, 121 to 133 during the war, 128 in 1946 and 138 in 1947. In the latter year only 26 per cent were professional. Wages and salaries have been highest of any group. The average was $1,089 in 1939, and changed but little from this value until the end of the war, when, in two years, it almost doubled ($1,436 in 1945, $2,759 in 1947). Supplies and miscellaneous items cost $745 per occupied bed in 1939, hovered between $1,154 and $1,345 during the war years, then surged upward by $500 (from $1,475) between 1946 and 1947. It is quite likely that the increase in costs of operation, both payroll and supplies, is really more apparent than real, since the years before 1947, when the increases occurred, lacked the presence of the two largest plantation hospitals in the sample.

Full data for this group are given in Appendix Table 26.

The lowest costs of any ownership category were reported by the *proprietary* hospitals. Inadequacy of sample makes data for years prior to 1945 unreliable, but in 1947 the proprietary group had an operating expense of only $9.67 per patient day. Income came to $12.34. Including the owner and his wife, personnel numbered only 121 per 100 occupied beds. Payrolls were quite low ($805) since the only salaried workers were practical nurses and a few clerical personnel. Costs of supplies and miscellaneous items almost doubled between 1945 and 1947, from $1,578 to $2,769 per occupied bed. Appendix Table 27 lists complete data.

Cost per patient day has varied greatly from hospital to hospital. As an example, values for the highest, lowest and median hospitals in the non-profit voluntary group can be quoted for three representative years:[10]

| | Operating cost per patient day | | |
|---|---|---|---|
| | Lowest | Median | Highest |
| 1939 | $ 3.65 | $ 6.70 | $ 6.76 |
| 1943 | 5.00 | 7.10 | 9.01 |
| 1947–1948 | 11.38 | 16.69 | 22.23 |

This range in average cost per patient day is not limited to only a few extreme cases. A common measure of overall dispersion is the standard deviation, explained more fully in Appendix Table 29. According to this measure, the middle two-thirds of the patient days recorded in the Islands lay between the following approximate values:[11]

| | All hospitals | Non-profit voluntary only |
|---|---|---|
| 1939 | $ 3.83– 6.53 | $ 4.88– 7.12 |
| 1943 | 5.76– 9.46 | 6.38– 9.08 |
| 1947–1948 | 12.71–21.17 | 15.26–21.30 |

The remaining patient days, one-third of the total, fell outside the indicated limits. Such data prove that wide individual differences in average expenses were quite general.

[10]See Appendix Table 28.

[11]From Appendix Table 29. The values quoted indicate the arithmetic mean plus and minus one standard deviation.

Verification of the reliability of these averages was tested by standard statistical procedures. Complete information is given in Appendix Table 30.[12]

A further breakdown of the gross figures discussed in the preceding paragraphs is enlightening. It is possible to make fairly detailed analyses both of sources of income and distribution of operating expenses for the most recent available year, 1947–1948.[13]

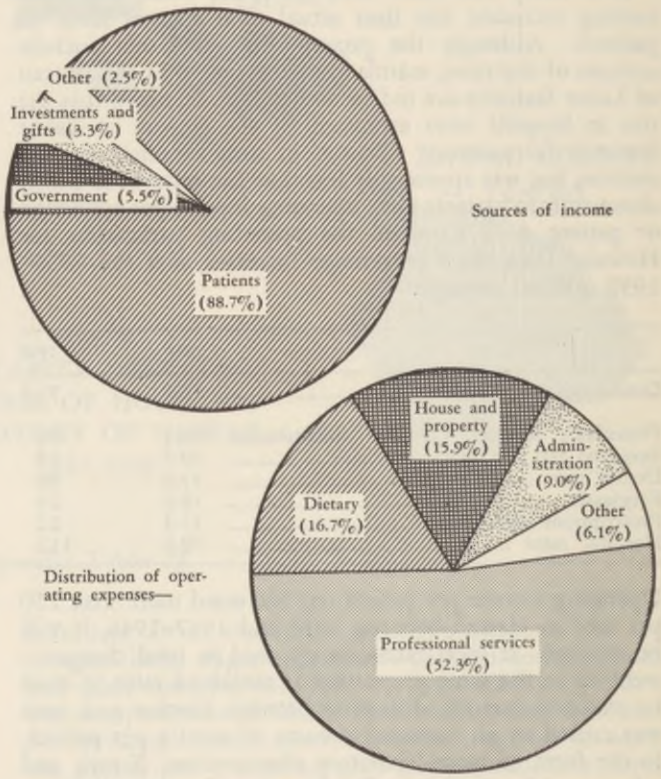



**Fig. 10**

**DISTRIBUTION OF INCOME AND EXPENSES, NON-PROFIT VOLUNTARY HOSPITALS, HAWAII, 1947–48**

**Source: Appendix Tables 31 and 33**

Total income of all hospitals amounted to eight and six-tenths million dollars, of which 73.7 per cent came from patients or their financial sponsors (including governmental agencies). Governmental subsidies, returns from investments, voluntary contributions and other sources provided the remainder.

Vast differences between individual ownership categories are apparent. The non-profit voluntary group received about 88.7 per cent of its funds from patients, 5½ per cent

[12]Had additional samples of like size been drawn, 99.7 per cent of the newly calculated means for "all hospitals" would have lain within 57c of the indicated average cost per patient day in 1939, 48c for 1943, and 39c for 1947–1948. Nineteen times out of twenty, samples as large as those actually taken would result in average costs within the following percentages of the averages given in Table 30:

| | 1939 | 1943 | 1947–1948 |
|---|---|---|---|
| All hospitals | 7.3 | 4.2 | 1.5 |
| Governmental | 9.9 | 2.2 | 0 |
| Non-profit voluntary | 7.0 | 4.4 | 0 |
| Plantation | 13.1 | 13.1 | 6.3 |
| Proprietary | [a] | [a] | 22.6 |

[a]Impossible to calculate, but unquestionably quite large.

[13]See Fig. 10.

from government, 3.3 per cent from investments and gifts (the only group reporting an appreciable amount from these sources), and the rest in miscellaneous non-operating income. The governmental hospitals got just half their income from the counties and Territory in 1947–1948, and only 46½ per cent from patients. The plantation hospitals depend almost entirely on the plantations (51.0 per cent) and patients, most of whom were covered by a hospital care plan. The proprietary institutions received all their funds from patients. These data are given in detail in Appendix Table 31.

It should be pointed out that very little free care is currently provided by Hawaii's hospitals.[14] Most charity cases are paid for by the counties at current hospital rates. The Territorial Department of Public Welfare has reimbursed hospitals for full costs since 1943, and other agencies, both official and voluntary, have similarly made full reimbursement for indigent cases. Income from these sources is classified as "operating income." Free care provided hospital employees, seldom a significant percentage of total care, has in most cases constituted the only type of free service.[15]

A breakdown of operating expenses into two classifications is possible for the entire decade of study. *Wages and salaries* constituted only 51 per cent of operating budgets in 1940, rose to 66 per cent by 1947, then fell to 62 per cent in 1947–1948. The same trend in payrolls is discernible for individual categories:[16]

| | % 1939 | % 1943 | % 1947–1948 |
|---|---|---|---|
| All hospitals | 52 | 58 | 62 |
| Governmental | 50 | 61 | 70 |
| Non-profit voluntary | 51 | 58 | 60 |
| Plantation | 56 | 56 | 66 |
| Proprietary | [a] | [a] | 22 |

[a]Insufficient data.

Conversely, the *cost of supplies and miscellaneous items* of operation relative to total operating costs declined until 1947, then rose to 38 per cent. These data were determined in large measure by the dropping of the perquisite system for employees, when a large proportion of operating expense formerly listed under "supplies and miscellaneous" was moved to the payroll column.

A more detailed analysis of operating costs covering only 1947–1948 is possible. More than half the operating expenditures went for professional services (medical, surgical, nursing, pharmacy, X-ray, laboratory), about one-sixth each for dietary and house and property, a tenth for administration, and the rest for other costs. Governmental hospitals spent the least for administration (7.4 per cent), plantation hospitals the most (12.3 per cent). House and property and dietary expenditures were reversed, with the governmental group spending most and the plantation hospitals least. Complete data are listed in Appendix Table 33.

*By Size*

Size of hospital is generally regarded as a major factor in hospital costs, but hard and fast generalizations are difficult to make for the Territory. As the present study progressed, it became increasingly obvious that type of ownership was considerably more important than bed complement, and often obscured or even negated the influence of size.

A few facts emerged from tabulation by size, however. Both operating income and operating expense—per patient day and per admission—were found to be greater in the larger (100 bed and over) hospitals. So were personnel per 100 occupied beds, both professional and non-professional. Little could be said about average salaries or cost per occupied bed of supplies and miscellaneous items, however, and year-to-year fluctuations made even the above generalizations inconstant. An analysis of the distribution of operating expenses in 1947–1948 revealed that the cost, percentagewise, of professional services was directly proportional to size, while the expenditure for administration was inversely correlated with bed complement. These findings generally accord with mainland trends reported by the American Hospital Association (in its annual *Directories*) and other agencies, which almost invariably show a close relationship between size of hospital and cost ratios.

Full information is given in Tables 34, 35, 36 and 37.

*By Area*

Hospital costs vary greatly throughout the Territory, but the island-to-island differences may well be results of ownership and size rather than location. The five Honolulu hospitals report the highest income and expense, both per patient day and per admission, as well as the highest ratio of income to expenditures; the lowest figures apply usually to Maui and Hawaii Counties. Analysis by type of ownership as well as by island for 1947–1948, however, reveals less startling differences:[17]

| | Av. bed complem't | Income per patient day | Expense per patient day | Ratio |
|---|---|---|---|---|
| Territory of Hawaii | 60 | $12.77 | $16.94 | 75.4 |
| City of Honolulu (total) | 185 | 17.20 | 18.90 | 91.0 |
| Rural Oahu | 44 | 10.00 | 16.81 | 59.5 |
| Non-profit voluntary | 50 | 11.08 | 14.52 | 76.3 |
| Plantation | 40 | 9.27 | 18.36 | 50.5 |
| Hawaii County | 41 | 6.92 | 13.11 | 52.8 |
| Governmental | 92 | 7.22 | 14.19 | 50.9 |
| Plantation | 32 | 5.22 | 11.83 | 44.1 |
| Proprietary | 16 | 12.34 | 10.23 | 120.6 |
| Maui County | 49 | 6.56 | 16.38 | 40.0 |
| Governmental | 43 | 5.41 | 14.41 | 37.6 |
| Plantation | 57 | 6.54 | 17.33 | 37.7 |
| Kauai County (total) | 65 | 12.73 | 14.13 | 90.0 |

Even after adjusting for ownership, as in the preceding table, one can detect significant differences. Plantation hospitals in rural Oahu and Maui County had considerably higher costs than the same type of hospital on Hawaii, although almost identical costs prevailed for governmental hospitals in Maui and Hawaii Counties. Ratio of income

[14]Free care: services rendered by the hospital for which it receives no reimbursement whatsoever.

[15]Reference can be made to the experience of The Queen's Hospital, which in 1940, for example, reported the following average daily census data (see *81st Annual Report*, 1940, p. 13):

| | | |
|---|---|---|
| Pay wards and private rooms | 207.8 | 77.7% |
| City and County and U.S.P.H.S. wards | 43.9 | 16.4% |
| Endowed beds | 12.2 | 4.5% |
| Employees | 3.6 | 1.4% |
| Total | 267.5 | 100.0% |

[16]See Appendix Table 32.

[17]From Appendix Table 38. All Honolulu hospitals were non-profit voluntary. Data for the two Kauai hospitals[a] (one non-profit voluntary and one proprietary) were combined to avoid disclosing data for individual institutions. Totals for a non-profit hospital on Molokai included with Maui County totals but not listed separately.

to expense is low for both plantation and governmental hospitals in the County of Maui. It would be unwise to base generalizations on so small a sample, however, since most of the variations undoubtedly represent individual differences. Among the factors involved are location of hospital, size, administrative practices, and a number of intangibles.

## VI. NON-OPERATING COSTS AND SOME SPECIAL PROBLEMS

Other important aspects of hospital economics are non-operating income and expense, depreciation on buildings, bad debts, and the costs of special services such as nursing education. All present distinct problems which can scarcely be divorced from hospital operation.

### THE NON-OPERATING ITEMS

A variety of items are classified as "non-operating." Non-operating income includes governmental subsidies, voluntary contributions, investment fund income, and miscellaneous income from non-hospital services, such as barber shops, gift shops, or the sale of drugs to the general public. Non-operating expense includes rentals, taxes, interest, and costs of non-hospital services. Depreciation on buildings is considered a non-operating expense, but, for reasons given in a later paragraph, is classified separately. The non-operating items are generally those not directly related to the amount of service rendered to patients, and often lack comparability from institution to institution.

During the past decade, non-operating income has ranged from $1.49 per admission in 1941 to $8.74 in 1947–1948. The non-profit voluntary group has consistently reported the greatest amount ($12.38 per admission in 1947–1948), followed by governmental hospitals ($4.30), plantation hospitals ($1.17), and the proprietary group (none). These ratios exclude sums provided by the counties and plantations to make up the inevitable annual deficits; such sums, which constitute non-operating income (but were unreported on the questionnaires), came to approximately the same amount encompassed under operating income. When these additional appropriations are included (as in Appendix Table 31, for 1947–1948), it can be seen that half the total budget of both governmental and plantation hospitals depended respectively on governmental and plantation funds—sums comprising almost all the non-operating income of these institutions. The non-profit voluntary category was the only one reporting any appreciable return from investments and gifts. The steady upward trend in non-operating income during the decade, apparent in three of the ownership categories as well as in the totals for all groups, can partly be ascribed to improved reporting for later years. Complete annual data are given in Appendix Table 39.

Non-operating expense for all institutions has climbed from 24c per admission in 1939 to $1.98 in 1947–1948. In the latter year, proprietary hospitals reported non-operating expenditures of $8.72 per admission; plantation hospitals, $4.49; non-profit voluntary, $1.38; and governmental, $0.05. The erratic upward trend apparent for the various groups is partly a result of better reporting and improved sample for the later years. Data are listed in Appendix Table 40.

The tax laws of the Territory are responsible for much of the difference reported in non-operating expenditures. According to the *Revised Laws of Hawaii, 1945* (C.94, Sec. 5151), the following institutions are exempt from real property taxes: The Queen's, St. Francis, Kapiolani, Leahi, G. N. Wilcox Memorial, Kona Japanese,[1] "or any hospital which maintains a free ward of not less than eight free beds; the property of all hospitals exempted from taxation being limited to that actually in use for hospital purposes." The governmental hospitals are also exempt from real property taxes. These taxes constitute a large non-operating item for the proprietary and plantation hospitals which do not qualify for exemption.

Non-operating income has always been greater than non-operating expense. During the past decade, non-operating income has ranged from 3.7 per cent of total income in 1941 to 8.2 per cent in 1947–1948. Non-operating costs have ranged from 0.5 per cent, in 1939 and 1944, to 1.5 per cent, of total expenditures in 1947–1948. Relative to total income, non-operating income has always been most important for the non-profit voluntary group (ranging from 4.4 per cent in 1941 to 9.6 per cent in 1947–1948), somewhat less so for the governmental hospitals, and least so for the plantation and proprietary group. These data omit funds applied to annual deficits by the counties and plantations. Non-operating expense has been highest (relative to total expense) for the proprietary group, followed by the plantation hospitals, the non-profit category (0 in 1939, 1 per cent in 1947–1948), and finally the governmental hospitals. Full information is given in Appendix Table 41.

### DEPRECIATION ON BUILDINGS

Depreciation on buildings is a special type of non-operating expenditure. According to the American Hospital Association, "the records of depreciation should be separated sharply from the operating expenses and from other non-operating expenses (such as interest or rents) involving cash payments."[2] Allowance for depreciation of equipment and fixtures is classified as an operating item.[3] In any case, the widely differing practices used by hospitals in Hawaii in computing building depreciation made tabulation of this item extremely impractical.

In passing, it should be noted that some authorities favor eschewing the entire concept of building depreciation. The costs of new physical plants have traditionally been covered by the proceeds of special fund-raising campaigns. Each generation pays for present facilities (through interest and principal on loans) either at the time of construction or during the period of use. The philosophy behind the use of a depreciation fund would assess the costs of future facilities against the previous generation.[4]

Depreciation taken by each hospital in the Islands was computed as a percentage of operating expense for purposes of comparison. The American Hospital Association suggests that "a current record be maintained of the estimated depreciation of the original value of the building structure, ranging from 2 per cent to 4 per cent, depending on the nature of the plant itself."[5] The Federal Government's reimbursable cost formula is a widely used method of calculating actual expenses of hospitals to provide a uniform and generally acceptable basis of governmental reimburse-

[1] A small establishment, also called Kona Community Hospital, which discontinued operation in January 1948. See Nebelung and Schmitt, *op. cit.*, p. 67.
[2] *Hospital Accounting and Statistics*, p. 44.
[3] *Ibid.*, p. 40 and p. 77.
[4] *Ibid.*, p. 77 and p. 90.
[5] *Ibid.*, p. 90.

ment for services rendered. It stipulates: "The basis for computing amount for depreciation should be the cost of the property when acquired or completed, plus cost of additions or improvements. . . .Allowance shall not exceed 2% a year based on total life of 50 years for brick buildings."[6] Unfortunately, postwar prices have increased the replacement costs of hospital buildings far beyond their original cost, thereby injuring the usefulness of this concept. There is also considerable difficulty in obtaining accurate, consistent data on either the original cost or present value of many hospital structures. In recognition of these difficulties, and in fairness to hospitals without a fixed practice of taking annual depreciation on buildings, the Federal formula permits an allowance of six per cent of total operating expenses in the calculation of total annual expenditures.[7] Lack of original cost data, differences in individual depreciation practices, and the need for comparable local data suggested use of operating expense as a base against which depreciation (even though originally calculated against original building costs) could be measured in the present study. Values higher than 6 per cent would then be considered excessive in view of the suggested Federal norm, which was also based on operating costs.

Ratios were calculated for each ownership category for two years, 1939 and 1947–1948. In 1939, nine hospitals did not allow for depreciation. Seven hospitals reported amounts ranging from 0.1 to 17.6 per cent of operating costs (with a median of 4.8 per cent), and 23 did not volunteer information. In 1947–1948, 14 hospitals made no allowance for depreciation, 17 reported values ranging from 0.3 to 8.2 per cent of operating expenses (median of 1.7 per cent), three paid rent, and five did not report. By ownership categories, median percentages for institutions reporting depreciation of 0.1 per cent or more were as follows:

| | 1939 | 1947–1948 |
|---|---|---|
| All hospitals | 4.8 | 1.7 |
| Governmental | [a] | [b] |
| Non-profit voluntary | 4.8 | 2.3 |
| Plantation | 2.5 | 1.1 |
| Proprietary | [b] | [b] |

[a]No hospital reported taking depreciation.
[b]Not computed where base was less than 3.

If hospitals which reported not making an allowance for depreciation are included, the following medians prevail:

| | 1939 | 1947–1948 |
|---|---|---|
| All hospitals | 0 | 0.4 |
| Governmental | 0 | 0 |
| Non-profit voluntary | 1.7 | 1.6 |
| Plantation | 0.1 | 0.4 |
| Proprietary | [a] | 1.7 |

[a]Not computed where base was less than 3.

The decline between 1939 and 1947–1948 was less a result of administrative conservatism than of the method of calculation of depreciation. The amount was customarily based on original value of physical plant, which remained constant for most hospitals throughout the period; the method of comparison used above was based on operating expenses, which increased greatly during the decade, thereby making the ratio of depreciation to expense progressively smaller. In any case, it would seem that the Federal allowance of 6 per cent in the computation of reimbursable costs is extremely liberal.

Complete data on depreciation are given in Appendix Table 42.

## BAD DEBTS

In the present study, bad debts have been expressed as a percentage of operating income, which approximates the total charges made for services rendered. Except for the most recent year, information on bad debts has been extremely difficult to obtain from many hospitals. For this reason, no attempt has been made to estimate the dollar volume of bad debts. Percentage figures for a selected group have seemed feasible, however, even though they permit no Territory-wide dollar estimate.

In 1947–1948, the median hospital reported bad debts of 2.6 per cent of operating income. Thirteen had less than 2 per cent uncollectibles, nine reported ratios between 2 and 10, and only six exceeded 10 per cent bad debts. Eleven did not have data. Medians for individual ownership categories were 5.2 per cent for governmental hospitals, 1.9 per cent for the non-profit voluntary group, 0.6 per cent for plantation hospitals, and 7.2 per cent for proprietary hospitals. The two highest hospitals, with ratios of one-seventh ond one-third bad debts (the latter a very rough estimate), were both in the governmental category. Greater detail is given in Appendix Table 43.

Data for selected institutions reveal a downward trend in bad debts until the end of the war, followed by a rapid increase. Four non-profit voluntary hospitals, two governmental and two plantation hospitals reported data for at least four years each, and these establishments provided the basis for an annual series. No clear pattern is apparent in the ratios for the plantation group. The non-profit voluntary hospitals, however, exhibit a definite and constant decline, from 3.4 per cent in 1939 to 1.3 per cent in 1945. Thereafter the ratios rise: 2.3 per cent in 1946, 2.0 per cent in 1947, and 2.8 per cent (same as 1941) in 1947–1948. The lowest value for the two governmental hospitals was similarly achieved in 1945. These percentages bear a close relationship to the local business cycle, as can be seen by comparing bad debt data (Appendix Table 44) with per capita income (Appendix Table 7).

## NURSING EDUCATION

The costs of nursing education in Hawaii are borne almost entirely by three general hospitals, and hence constitute a special phase of the overall problem of hospital costs in the Islands. The three teaching hospitals—The Queen's, St. Francis and Kuakini—all classify the expense of their nursing schools as operating costs, and legitimate charges against the patients using these hospitals.[8]

The costs of nursing education are divided between salaries and supplies for the schools, students' maintenance and students' allowances; these costs are partly counterbalanced by income from students' fees and the value of

[6]U. S. Children's Bureau and Office of Vocational Rehabilitation, Federal Security Agency, and Department of Medicine and Surgery, Veterans Administration, "Hospital Statement of Reimbursable Cost," Joint Form 1, January 1947, p. 4b.
[7]*Ibid.*, p. 4a.

[8]Some hospitals providing specialized types of treatment, such as Leahi (for tuberculosis patients), provide instruction on an affiliation basis, but the major problem is in the three large schools of nursing.

their services. In 1948, income and expense were approximately as follows:[9]

| | | |
|---|---|---|
| Schools of nursing (salaries and supplies) | $104,149 | |
| Maintenance of students | 266,250 | |
| Allowances to students | 11,640 | |
| Other expenses | 15,119 | |
| | | $397,158 |
| Student fees | $ 18,298 | |
| Value of students' services | 260,712 | |
| | | $279,010 |

The net cost was therefore $118,148, or $378,860 if the value of students' services is disregarded. Value of services was estimated on the assumption that the average "effectiveness percentage" of student hours was 76.5 per cent as great as a corresponding number of graduate hours.[10]

The cost per student has risen in recent years. Net cost, excluding value of services rendered, came to $837 in 1946, $1,043 in 1947, and $1,067 in 1948. Including estimated value of students' services, the corresponding net costs per student were $176, $309, and $333.

A similar upward trend is apparent in cost of nursing education per patient day at the three teaching hospitals. Net cost since 1946 has been as follows:

| Year | Excluding value of services | Including value of services |
|---|---|---|
| 1946 | $0.95 | $0.20 |
| 1947 | 1.72 | 0.51 |
| 1948 | 1.94 | 0.60 |

A number of authorities feel that the training of nurses is more properly a function of the municipality or state, to be provided at community expense in colleges and universities, with supplementary clinical study in approved hospitals. A committee of local leaders in the nursing profession has specifically recommended that a central school of nursing be eventually established at the University of Hawaii, to supersede the present hospital classroom facilities.[11] Hospital administrators on Oahu generally voice their approval of this philosophy, but say that prospects of completely adequate training facilities at the University do not warrant such a transfer of responsibilities for many years. Meanwhile, the number of students continues to increase (from 117 in 1940 to 353 in 1948[12]), and the patients of Honolulu's general hospitals continue to pay a large share of the costs of their education.[13]

The related problem of intern training is less serious in its financial implications. Only three hospitals reported interns on their staffs in 1947, all of them on Oahu.[14] Since instruction was provided free by staff physicians, the only expenses of intern training were ascribed to maintenance and allowances. These costs, when expressed as a monthly average per intern or daily cost (for all interns) per patient, were found to be quite low:[15]

| Year | Monthly cost per intern | Cost for all interns per patient day |
|---|---|---|
| 1946 | $140 | 25c |
| 1947 | 155 | 39c |
| 1948 | 158 | 52c |

Administrators, when questioned, agreed that the average intern gave ample service in return for the $158 given him in compensation and maintenance each month.

## VII. PROFIT AND LOSS

Hospital solvency is best expressed, in general, by the ratio (multiplied by 100) between income and expense. Income may be either operating or total; expense may likewise include operating items or all expenses, although, for reasons previously outlined, the present study omits depreciation allowance. A ratio in excess of 100, say 115, indicates a profit of 15 per cent; likewise, a ratio of 70 would indicate a loss of 30 per cent.

### THE GENERAL PICTURE

The ratio of operating income to operating expense, which for all hospitals has fluctuated between 69 and 79 during the past decade, has shown even greater variations among the several ownership categories. The Territorial total stood at 69 in 1939, reached a high of 79 in 1945, and fell to 75 for 1947–1948. During this same period, the governmental group ranged from 37 in 1939 to 58 in 1944, and back to 47 in 1947–1948. A better record was reported by the non-profit voluntary hospitals: 91 in 1939, 102 in 1941 (their best year), and gradually down to 90 in 1947–1948. The plantation hospitals rose from a prewar low of 17 in 1941 to 31 in 1945. With the dropping of perquisites in 1947 they suddenly climbed to 50, i.e., recovered half their operating costs from operating income. The proprietary group reported ratios lying between 123 and 138. These data show only one group, the proprietary hospitals, to have been consistent money-makers; the non-profit voluntary category has usually lost money, as have in even greater degree the other two classes.[1]

Operating deficits over a ten-year period have been appalling. Operating income in this period has been $33,084,000 for all hospitals, or $13,203,000 less than the operating expense of over 46 million dollars. During the decade, governmental hospitals have lost $3,420,000, the non-profit group $1,424,000, and the plantation hospitals almost eight and a half millions.[2]

A somewhat different picture is presented by the ratios between total income and total expense. The figure for all hospitals ranged from a 1939 low of 72 to a 1945 high of 84. The most recent datum (1947–1948) was 81. Governmental hospitals stood at 37 in 1939 (their lowest), 61 in 1945 (their highest), and 50 in 1947–1948. Plantation hospitals hit a prewar low of 17 in 1941, and, after the removal of perquisites, a high of 49 in 1947–1948. These ratios exclude deficit appropriations by counties and plantations, unreported by the hospitals, which would have maintained a constant level of 100 for both these categories. The non-profit voluntary group lost money only in 1939 (at 96) and 1947–1948 (at 99); their total income (including subsidy) exceeded total expenditures by 6 per

[9]See Appendix Table 45.

[10]Blanche Pfefferkorn and Charles A. Rovetta, *Administrative Cost Analysis for Nursing Service and Nursing Education* (American Hospital Association and National League of Nursing Education, 1940), p. 29. No other definitive value has been determined.

[11]*Health Services and Statistics, T. H.* (Postwar Planning Committees on Health, Public Health Committee of the Chamber of Commerce of Honolulu, 1948), pp. 2 and 11; *Planning for Health in Postwar Hawaii* (Public Health Committee of the Chamber of Commerce of Honolulu, 1948), p. 68.

[12]See Appendix Table 20.

[13]See Appendix Table 45.

[14]Nebelung and Schmitt, *op. cit.*, Table 60.

[15]Based on data covering about 80 per cent of the interns at work in the Territory.

[1]See Appendix Table 46.

[2]See Appendix Table 47.

cent in both 1941 and 1943. The proprietary hospitals made a 1947 profit of about 14 per cent. These ratios differ from those based only on operating items because for two groups—the governmental and non-profit voluntary hospitals—non-operating income generally exceeded non-operating expense, whereas for the other two categories the reverse was true.[3]

Data for 1947–1948, the most recent available year, have been grouped into a frequency distribution, so that individual differences may be more readily apparent.[4] Ratios of operating income to operating expense have a considerable range: the least solvent hospital, a plantation institution, reported a value of less than 20, while the most solvent, proprietary hospital, had a ratio in excess of 140. Governmental hospitals clustered between 20 and 60. Among the non-profit voluntary group, three fell in the 70s, four in the 90s, and the remainder between these levels. When both operating and non-operating items (including subsidy) were considered, the least solvent hospitals were still below 20, the most fortunate financially in the 130s. Three of the non-profit voluntary made a slight profit, one as much as 6 per cent; the other six, all highly important because of the facilities and services they provided, reported losses as great as 4 per cent. Median hospitals had income to expense ratios as follows in 1947–1948:

| | Operating items | Total items |
|---|---|---|
| All hospitals | 54.0 | 51.1 |
| Governmental | 36.4 | 36.4 |
| Non-profit voluntary | 89.3 | 98.6 |
| Plantation | 49.6 | 48.6 |
| Proprietary | 124.6 | 92.4 |

## THE NON-PROFIT VOLUNTARY GROUP

The non-profit hospitals merit closer analysis, inasmuch as they provided more service than any other single class in the Islands.

A frequency distribution for this group covering operating (not total) ratios for the past decade reveals considerable individual differences. Every year until 1947, at least one hospital suffered a loss in excess of 30 per cent. Every year until 1947–1948, at least one establishment reported an operating profit, and once—in 1943—two hospitals made more than 10 per cent. For three consecutive years, 1941, 1942 and 1943, one of them reported a ratio over 120. It was not until 1947 that operating losses became general: eight out of nine in that year lost money, and all of them in 1947–1948.[5]

Operating losses were reported most frequently by the rural and small town hospitals. Almost without exception, operating income to operating expense ratios have lain below 100 throughout the decade for this group, as shown in the following table.[6]

[3]See Appendix Table 48.
[4]See Appendix Table 49.
[5]See Appendix Table 50.
[6]Two hospitals did not report for 1939 and 1941; one did not report for 1940, 1942 and 1943. Profit indicates ratios of 100 or higher.

| | Metropolitan hospitals | | Non-metropolitan hospitals | |
|---|---|---|---|---|
| | Profit | Loss | Profit | Loss |
| 1939 | 2 | 1 | 0 | 2 |
| 1940 | 2 | 2 | 0 | 2 |
| 1941 | 2 | 2 | 0 | 2 |
| 1942 | 3 | 1 | 0 | 2 |
| 1943 | 2 | 2 | 0 | 2 |
| 1944 | 2 | 3 | 0 | 2 |
| 1945 | 2 | 3 | 1 | 2 |
| 1946 | 2 | 3 | 1 | 2 |
| 1947 | 1 | 4 | 0 | 4 |
| 1947–48 | 0 | 5 | 0 | 4 |

A more detailed breakdown reveals the magnitude of individual differences in income to expense ratios. The following table points out the best, worst and median year during the past decade for each of these hospitals:

| | | Lowest | Median | Highest |
|---|---|---|---|---|
| Metropolitan hospitals | A | 95 | 104 | 125 |
| | B | 93 | 102 | 113 |
| | C | 84 | 96 | 108 |
| | D | 81 | 95 | 114 |
| | E | 83 | 92 | 101 |
| Non-metropolitan hospitals | F | 76 | 93 | 107 |
| | G | 67 | 84 | 96 |
| | H | 77 | 77 | 77 |
| | I | 36 | 54 | 78 |

Thus the difficult position of the non-metropolitan establishments is again emphasized. Because of the relatively small volume of admissions and patient days provided, however, their absolute (dollar) losses are considerably less than those of the metropolitan hospitals.

A somewhat different picture is presented by inclusion of non-operating items, as in Appendix Table 51 and below. The ratios summarized in the preceding paragraphs exclude such sources of income as governmental subsidy and investment funds, because these items are not directly related to the services performed by the hospitals. The resulting impression is hence gloomier than actual conditions warrant. Inclusion of the non-operating items distorts the picture in the opposite direction, since many gifts and endowments are earmarked by the terms of their presentation. Although no single gross index is adequate as a fair measure of hospital solvency, for completeness three different ratios have been used, namely, operating income to operating expense, total income excluding subsidy to total expenditures excluding depreciation on buildings, and total income including subsidy to total expenditures excluding depreciation.

The three types of profit and loss ratios have been juxtaposed to measures of various related factors in the following table. In general, it is apparent that these institutions had their best years in 1941–1944, when occupancy was high (often dangerously so), staffs small, and wages and other expenses low as indicated by the table following:[7]

[7]Extracted from Appendix Tables 8, 20, 25 and 51. See Fig. 11.

| Year | Income to expense ratios | | | Beds | | Personnel | | | Supplies & miscellaneous per occupied bed | Income per patient day | Expense per patient day |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Operating | Total | | Total | % occupied | Total | Per 100 occ. beds | Av. compensation | | | |
| | | Excluding subsidy | Including subsidy | | | | | | | | |
| 1939 | 91 | 96 | 96 | 752 | 66 | 775 | 154 | $729 | $1067 | $5.49 | $6.00 |
| 1940 | 97 | 101 | 102 | 766 | 74 | 829 | 146 | 710 | 1034 | 5.48 | 5.65 |
| 1941 | 102 | 105 | 106 | 773 | 82 | 858 | 136 | 830 | 1086 | 6.21 | 6.06 |
| 1942 | 99 | 104 | 105 | 791 | 83 | 911 | 138 | 964 | 1100 | 6.59 | 6.67 |
| 1943 | 99 | 105 | 106 | 862 | 80 | 952 | 138 | 1180 | 1193 | 7.65 | 7.73 |
| 1944 | 97 | 104 | 105 | 867 | 80 | 1032 | 149 | 1365 | 1390 | 9.04 | 9.34 |
| 1945 | 95 | 100 | 102 | 1052 | 77 | 1158 | 143 | 1552 | 1463 | 9.60 | 10.09 |
| 1946 | 92 | 97 | 100 | 1166 | 78 | 1316 | 145 | 1650 | 1735 | 10.45 | 11.31 |
| 1947 | 94 | 99 | 101 | 1181 | 73 | 1413 | 164 | 2229 | 1914 | 14.43 | 15.27 |
| 1947–48 | 90 | 95 | 99 | 1151 | 68 | 1429 | 183 | 2198 | 2677 | 16.46 | 18.28 |

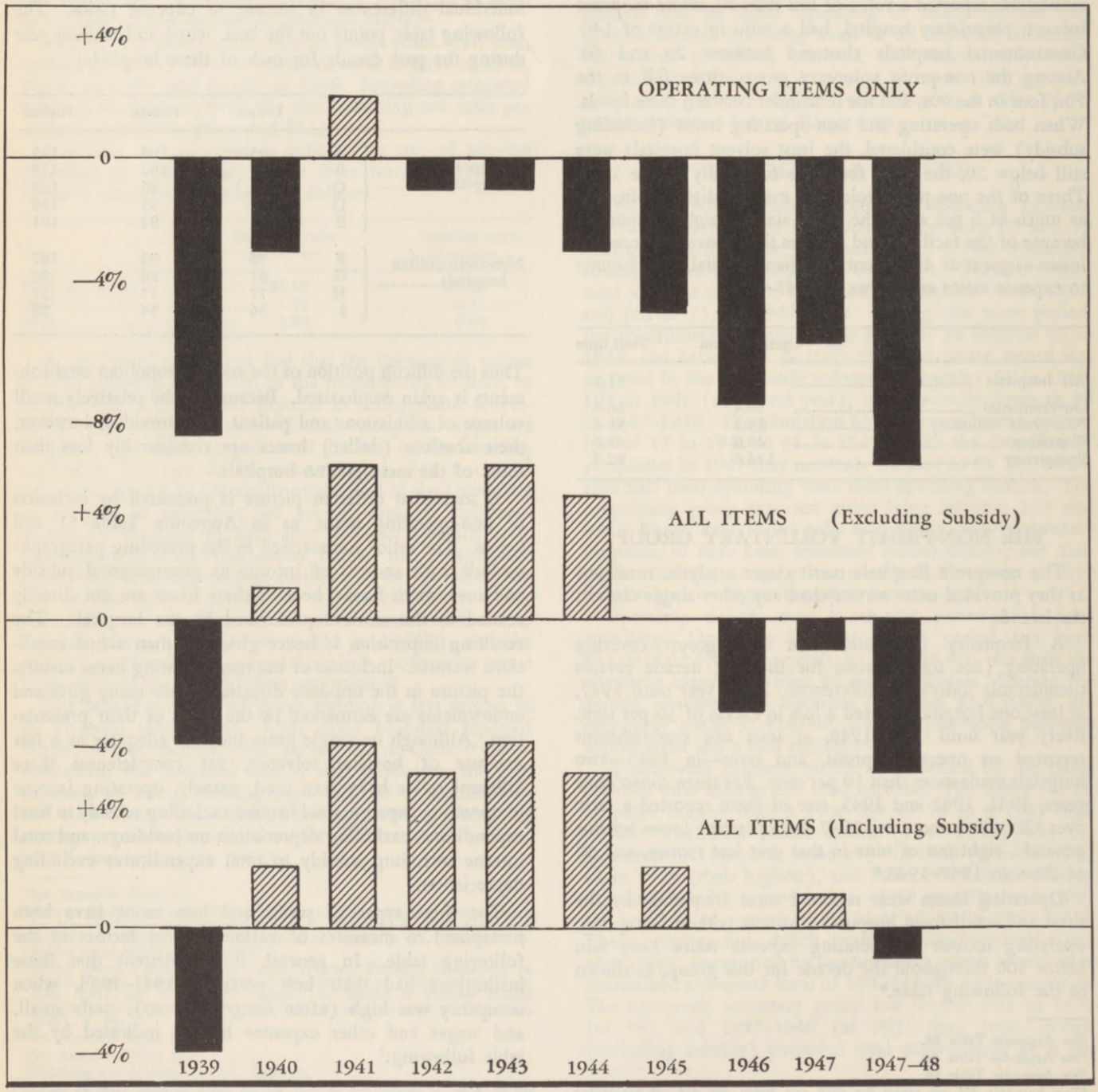



Fig. 11 — PROFIT AND LOSS — NON-PROFIT VOLUNTARY HOSPITALS, HAWAII, 1939–1948

Source: Appendix Table 51

In addition to the factors listed above, average length of stay, number of student nurses, and percentage of bad debts had a distinct bearing on solvency. Average stay ranged from 8.6 days in 1939 to 7.3 days in 1947–1948, but fluctuated considerably within these limits. Student nurses numbered only 117 in 1940, rose to 231 by 1942, fell to 191 in 1944, then began a steady increase to 353 in 1947–1948. A representative group of four institutions reported bad debts less recoveries of 3.4 per cent in 1939, a figure which declined to a low of 1.3 per cent in 1945, then climbed to the 1947–1948 level of 2.8 per cent of operating income.[8]

A year-by-year analysis shows the relationships between such criteria and hospital profit and loss:

*In 1939,* solvency was at low ebb. Staffs were fairly large (154 workers per 100 occupied beds), and only 66 per cent of the beds—a low mark for the decade—were filled. Per capita income for the Territory was still at a relatively low level.[9] As a result, the hospitals reported an operating deficit of nine per cent.

*In 1940,* hospital losses were cut appreciably. Operating income came to 97 per cent of operating expense, and total income exceeded total expenditures by 2 per cent. Factors in this improvement were increased occupancy (to 74 per cent), fewer personnel relative to census, and wage, salary and supply costs at a low point for the decade. Both income and costs per patient day fell to levels never again reached.

*The year 1941* was the only one characterized by an operating profit (2 per cent). Including non-operating items, profit was 6 per cent; even without subsidy (then negligible), income exceeded costs by 5 per cent. Workers per 100 occupied beds were fewer than at any other time during the decade under discussion (136); wages, salaries and supplies were still relatively low. In absolute terms, average census for the group had risen sharply, resulting in an average occupancy of 82 per cent, second highest of the ten-year period. Length of stay also increased somewhat. Likewise, income per patient day went up 73c, thereby outdistancing expenses.

*In 1942,* the ratio of income to expense declined slightly over the preceding year. There was a one per cent operating deficit, although total income was five per cent greater than total expenses. The wartime influx of population caused occupancy to reach 83 per cent, highest during this ten-year period. Personnel were added in proportion to increased census, so that workers per 100 occupied beds numbered 138, only two more than the preceding year. A slight increase in the cost of supplies and an appreciable rise in wage and salary levels pushed patient day expenditures to $6.67, but income per patient day increased almost as rapidly. It is likely that higher rates were largely responsible for the improved hospital revenue. Dangerously high occupancy percentages, meanwhile, made optimum use of facilities, thereby shaving average costs.

*The year 1943* was similar in most respects to the previous year. There was still a one per cent operating deficit, but total income was six per cent greater than total expenditures. As in all the war years, solvency was gained without the aid of large subsidies.[10] Total bed complement was increased by seventy-one, and occupancy fell slightly, to 80 per cent. Workers per 100 occupied beds remained at a low level, but wages and salaries rose sharply. Both costs and income per patient day continued to advance. Thus, solvency was once again predicated on small staff, few vacant beds, and sufficient community prosperity to pay approximately the full cost of services.

*In 1944,* hospital finances underwent a mild recession. The operating deficits increased to three per cent, although total revenues still exceeded total expenses by about five per cent. Both facilities and occupancy continued at 1943 levels, but personnel showed an absolute gain of 126. Compensation increased $185 per worker, and supplies and miscellaneous items went up proportionately, thus causing another sharp rise in cost per patient day. A higher cost of living and lower per capita income in the Islands discouraged rate increases of equal magnitude, so that patient day income lagged behind costs.

*In 1945,* deficits continued to mount. Operating loss now amounted to five per cent. Total income exceeded total expenditures by only two per cent. For the first time since the turn of the century subsidization was extended to all non-profit voluntary hospitals; without subsidies, total income would have just equaled total costs. There were significant increases in beds, average census, admissions and total personnel, but of different magnitudes. As a result, percentage occupancy actually declined, as did, to a lesser degree, workers per 100 occupied beds. The upward trend in wages, salaries and supplies boosted operating expenses to $10.09 per patient day, 49c higher than patient day revenues. Although Hawaii was enjoying considerable prosperity, dislocations occasioned by the end of the war plagued many institutions.

*The year 1946* witnessed still further declines. Operating deficits were reported at eight per cent, the worst since 1939. With respect to total income and expense, the hospitals broke even; but as noted previously not all non-operating income could be applied to current costs. Without the subsidies provided by the Territorial government, total revenues would have fallen short of total expenses by three per cent. Important increases were reported for total beds (114), average census (98), admissions (4,430), and total workers (158). Wages and salaries (up $98 a worker) were beginning to level off, but the death of price control in mid-year showed instantly in the cost of supplies (higher by $272 per occupied bed). Combined with these changes, which increased operating expenses to $11.31 per patient day, were factors definitely discouraging to concomitant increases in hospital rates. Chief among the latter were the increased cost of living (9 per cent in three months) and lower per capita income.

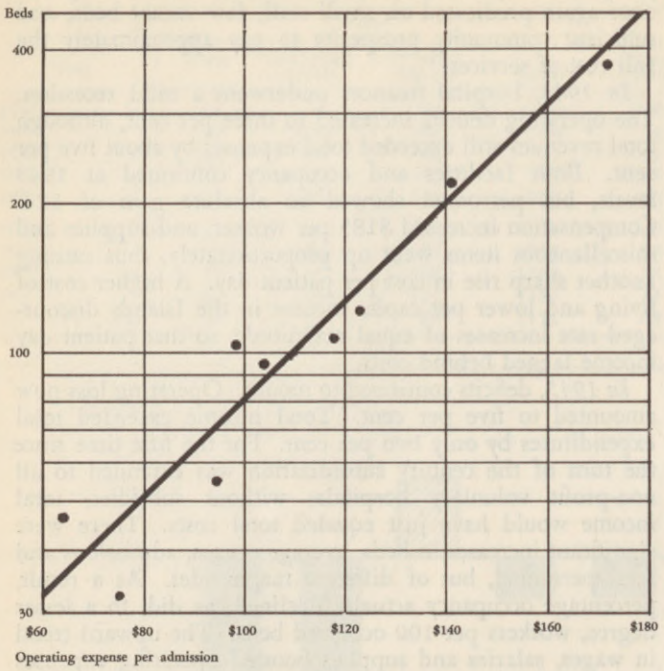
*In 1947,* solvency improved somewhat. The operating deficit was six per cent, the total deficit (excluding subsidy) only one per cent. Total income including Territorial subsidies surpassed total expenses by one per cent. Bed facilities were increased by 15, personnel by 97, although average census fell by 48. As a result, occupancy declined from 78 to 73 per cent, lowest since 1939, and workers per 100 occupied beds reached a new high (164). The average employee received $579 more than in the preceding year, and supplies and miscellaneous items cost $179 more per occupied bed. The inevitable growth in operating costs (now $15.27 per patient day) more than kept pace with the 38 per cent ($3.98 per patient day) increase in operating income. The latter figure probably reflects both higher rates and an increased volume of service per patient.[11] Economic recovery in the Territory (witness the $108 rise

[8]Data from Appendix Tables 8, 20 and 44.

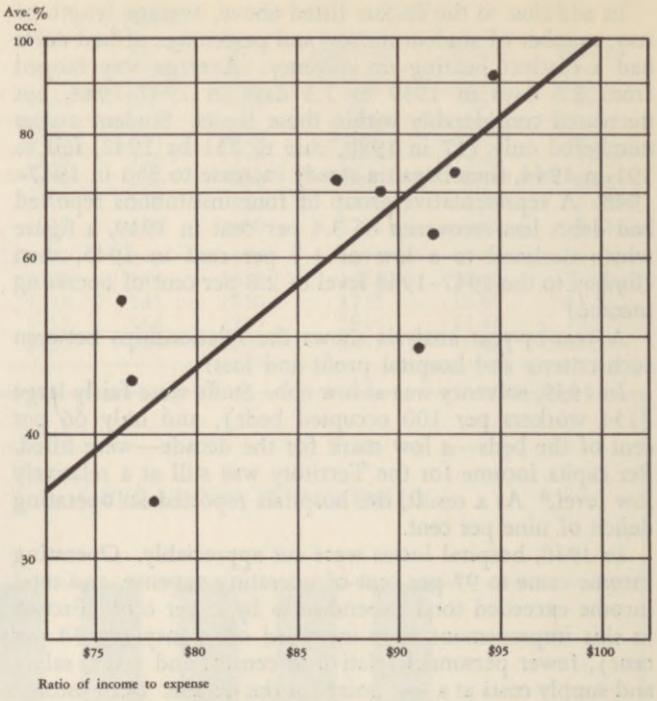
[9]See Appendix Table 7.

[10]Until 1945, only two hospitals received subsidies (see Appendix Table 6).

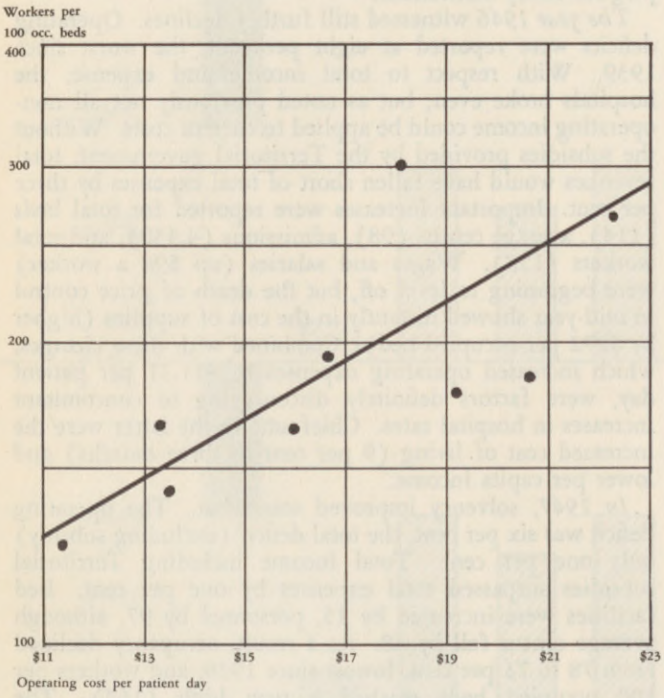
[11]Such as more laboratory examinations (see Appendix Table 14).



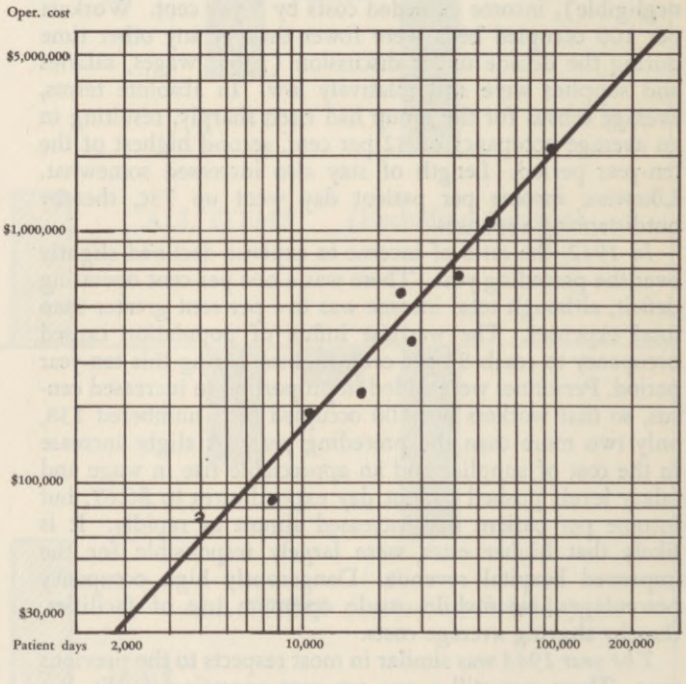

BEDS AND OPERATING EXPENSE PER ADMISSION
($\rho = +.97$)
(Semi-logarithmic scale)




PERCENTAGE OCCUPANCY AND RATIO OF INCOME TO EXPENSE
($\rho = +.70$)
(Semi-logarithmic scale)




WORKERS PER 100 OCCUPIED BEDS AND OPERATING COST PER PATIENT DAY ($\rho = +.85$)
(Semi-logarithmic scale)




OPERATING COST AND PATIENT DAYS
($\rho = +.98$)
(Logarithmic scale)

Fig. 12
INTERCORRELATIONS
NON-PROFIT VOLUNTARY HOSPITALS
HAWAII, 1947–48

Source: Appendix Table 54 and data from hospitals

in per capita income) fortunately facilitated the paying of such charges.

*The year 1947–1948* was characterized by severe strains on hospital finances. The operating deficit increased to 10 per cent, greater than at any time during the decade, and especially serious in view of the larger dollar volume of business transacted by the hospitals. Total revenues fell below total expenditures (by one per cent) for the first time since 1939. Had there been no subsidy the total deficit would have been considerably larger (five per cent). Decreases in census and admissions prompted a small reduction in bed complement, but occupancy continued to fall, standing at only 68 per cent. Sixteen added personnel contributed to an all-time high of 183 workers per 100 occupied beds. Average wages and salaries declined somewhat (to $2,198), but supplies and miscellaneous items rose steeply by more than $760 per occupied bed. As a result, cost per patient day climbed another three dollars, to $18.28. The passing of wartime prosperity combined with continued growth in the overall cost of living to weaken the ability of patients to pay the costs of hospitalization. The presence of these factors is indicated by lessened occupancy, rising bad debts (worst since 1941), and lagging hospital income. Operating revenues increased by two dollars per patient day, it is true, but this amount was only two-thirds the increase in expenses. Augmented staffs, low occupancy and increased costs of supplies were apparently the chief factors in the insolvency of 1947–1948.[12] There was ample evidence that many patients were becoming economically marginal—that continued increases in hospital rates would produce a strong, opposite reaction in occupancy levels.

Added meaning is given the above profit and loss ratios by translation into corresponding dollar equivalents. Because of the increased volume of business and the declining purchasing power of money, profits and losses of relatively small magnitude percentagewise were inflated considerably in terms of dollars and cents. When operating items only were considered, there is a range from the $34,500 profit of 1941 (the only such year) to the biggest loss of the decade, $521,300 in 1947–1948, which was almost twice as much as the next worst year (1946). When all items except subsidy and depreciation are included, the range is from $93,000 profit in 1943 to $285,300 loss in 1947–1948. Another bad year was 1945, when over $103,000 were lost. Inclusion of subsidies cuts losing years to only two, 1939 ($40,600) and 1947–1948 ($76,300), and produces profits reaching as high as $116,800 (in 1943).[13] The 1945–1947 subsidy was ostensibly given to keep hospital rates within reach of the average person, but 1946 and 1947 were marked by exceptionally large increases in operating income. On the other hand, rates would have increased even more had there been no Territorial subsidization.

The benefits of subsidization were most perceptible among the rural hospitals. Data for 1947–1948 show that, for all hospitals, total deficit before subsidy came to 5.5 per cent of operating expense. Subsidization made up 4.1 per cent of that amount. When the five Honolulu hospitals are compared with their four rural and small town counterparts (at Wahiawa, Lihue, Aiea and Hoolehua), however, a vastly different picture appears:[14]

| | Metropolitan hospitals | Non-metropolitan hospitals |
|---|---|---|
| Deficit before subsidy as % of operating cost | 4.6 | 13.5 |
| Territorial subsidy as % of operating cost | 2.9 | 13.6 |

Thus the rural hospitals were able to maintain solvency only because of liberal Territorial subsidies. In fact, their losses, percentagewise, far exceeded the deficits of the metropolitan institutions; but subsidization was so great that the rural group, unlike the Honolulu hospitals, was actually able to break even.

## VIII. INTERCORRELATIONS

Some insight into the importance and interrelationships of the various items in hospital facilities and services, income and costs, can be gained from a factor analysis for the nine non-profit voluntary general and allied special hospitals in 1947–1948. Intercorrelations have been made of 35 items operative in the finances and related activities of these institutions (see Appendix Table 54 and Fig. 12).

### METHOD

Non-profit voluntary hospitals were ranked, in each of thirty-five measures of facilities, services, personnel and finances; each measure was then paired with each other measure to determine, through Spearman's formula for correlation from ranks, the degree of association.[1]

Correlation is expressed in rho ($\rho$) values, ranging from $-1.00$ (perfect but inverse) through .00 (none at all) to $+1.00$ (perfect and positive). If, for example, the rank-order correlation between number of beds and hospital rates were $+1.00$, it could be said that the hospital first in bed complement was also first in rates; the hospital second in beds, second in rates; and so on. A correlation of .00 would mean a complete lack of association, while a rho value of $-1.00$ would indicate that a high rank in one factor (say, beds) was associated with a low rank in the other (rates), and vice versa.

In general, rho values between .80 and 1.00 (negative or positive) show a high degree of association and are excellent for purposes of prediction or analysis.

Some discretion must be exercised in the interpretation of the following correlations. The sample is complete for Hawaii, but nevertheless based on a small number of institutions for only one year. There is the possibility that a high degree of correlation between two factors may be the result of mutual dependence upon some unknown third variable.

### FINDINGS

Findings can be grouped, for convenience, under six headings: bed, census and related data; personnel and payroll data; sources of income; distribution of operating expenses; income and expense ratios; and other ratios.

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[12]The continued rise in prices after 1947 could not have been responsible for all the increase in costs of supplies. One hospital official mentioned the large inventories collected in anticipation of the 1948 shipping strike. Another possible factor is the enlarged student bodies in the local schools of nursing. Maintenance costs of these students was almost entirely chargeable to "supplies and miscellaneous."

[13]See Appendix Table 52.

[14]See Appendix Table 53.

[1]Described in most standard texts on statistical method, for example, F. E. Croxton and D. J. Cowden, *Applied General Statistics* (New York: Prentice-Hall, Inc., 1940), p. 685.

*Bed, census and related data* included bed complement, admissions, average census, percentage occupancy, percentage of excess beds, average length of stay, and proximity to the largest city on the island. These items are important only to the degree in which they impinge on financial factors. Rho values for this grouping are listed in the vertical columns of Appendix Table 54a, and repeated in the horizontal rows of all four sections of Appendix Table 54.

*Personnel and payroll data* consisted of personnel and payroll grouping: total, professional and non-professional workers per 100 occupied beds, percentage of total workers who are of professional status, average wage or salary level, payroll per occupied bed, and percentage of operating budget devoted to payroll.

Total workers per 100 occupied beds correlated highly with operating expense per patient day ($\rho=+.85$),[2] and operating income per patient day ($\rho=+.82$). Values for non-professional personnel generally followed those for total workers per 100 occupied beds, except for a +.83 correlation with excess beds; that is, hospitals with more beds than they needed in 1947–1948 had large staffs of non-professional workers, while overcrowded hospitals had relatively few such workers per 100 occupied beds. Correlations for professional personnel were relatively insignificant.

Wage and salary level varied with the size of the hospital. High average worker income was found in company with large average census ($\rho=+.85$), bed complement and number of admission (for both, $\rho=+.82$). Average wage or salary correlated +.55 with both number of professional workers per 100 occupied beds and percentage of total workers having professional status, thus indicating that a major cause of this wage and salary differential between large and small institutions was the differing proportion of higher paid professional positions. From the available data, there is no reason to assume that the larger institutions paid more for the same kind of work.

The percentage of operating costs devoted to payroll had little correlation with other items of hospital size or finances.

*Sources of income* included patients' fees, government, gifts, investments, and all others.

A large proportion of total income derived from patients was associated with a low proportion from government and a relatively high ratio of income to expense. Hospitals which lost the most money, percentagewise, received a relatively low proportion of their total income from patients ($\rho=+.82$).

A high proportion of revenue from governmental sources was in addition indicative of small size in terms of both complement and admissions ($\rho=-.78$); low income and low cost per patient (with both, $\rho=-.75$); and little operating income relative to operating expenses ($\rho=-.75$).

Establishments receiving a relatively large percentage of their income from investments were the larger institutions, both in beds and admissions ($\rho=+.62$). They were also characterized by high operating income and cost per admission ($\rho=+.67$), and close proximity to the city ($\rho=+.78$).

*Distribution of operating expenses.* Operating expenses were classified as follows: administration, dietary, house and property (which included laundry, fuel, light, power, and maintenance of building and grounds), professional services (including cost of medical, surgical and nursing service, pharmacy and drugs, X-ray, radium, and laboratory), and outpatient services.

There was a slight tendency for hospitals spending a good deal on administration (relative to other operating expenses) to obtain very little of their income from patients ($\rho=-.60$) and a large share from governmental sources ($\rho=+.68$). Otherwise, percentage of operating expenses allotted to administration was correlated insignificantly with other factors in cost and facilities.

Hospitals spending relatively little on dietary items similarly spent little on house and property ($\rho=+.82$) and outpatient services ($\rho=+.82$). However, they did devote a good deal to professional service expenditures ($\rho=-.85$).

Expenditures for house and property were correlated inversely ($\rho=-.80$) with proximity to the heart of town, thus indicating the importance of this item to rural and suburban institutions.

Except for the correlations with dietary expenditures noted above, neither professional service nor outpatient costs were highly correlated with other factors. This lack of association is somewhat surprising with respect to personnel and payroll data, where high rho values would ordinarily be expected. There is a distinct implication that hospitals providing complete, well trained, well paid professional service likewise provided more complete and expensive other types of service, thereby precluding the possibility of a high correlation based on relative expenditures.

*Income and expense ratios.* Total operating income and expense, and operating income and expense per admission and per patient day were next intercorrelated with the other criteria.

Identical ranks were found for total income, operating income, total expense (excluding depreciation), and operating expense. That is, hospitals with the greatest absolute costs also reported the biggest absolute income, and vice versa. These items may thus be considered together.

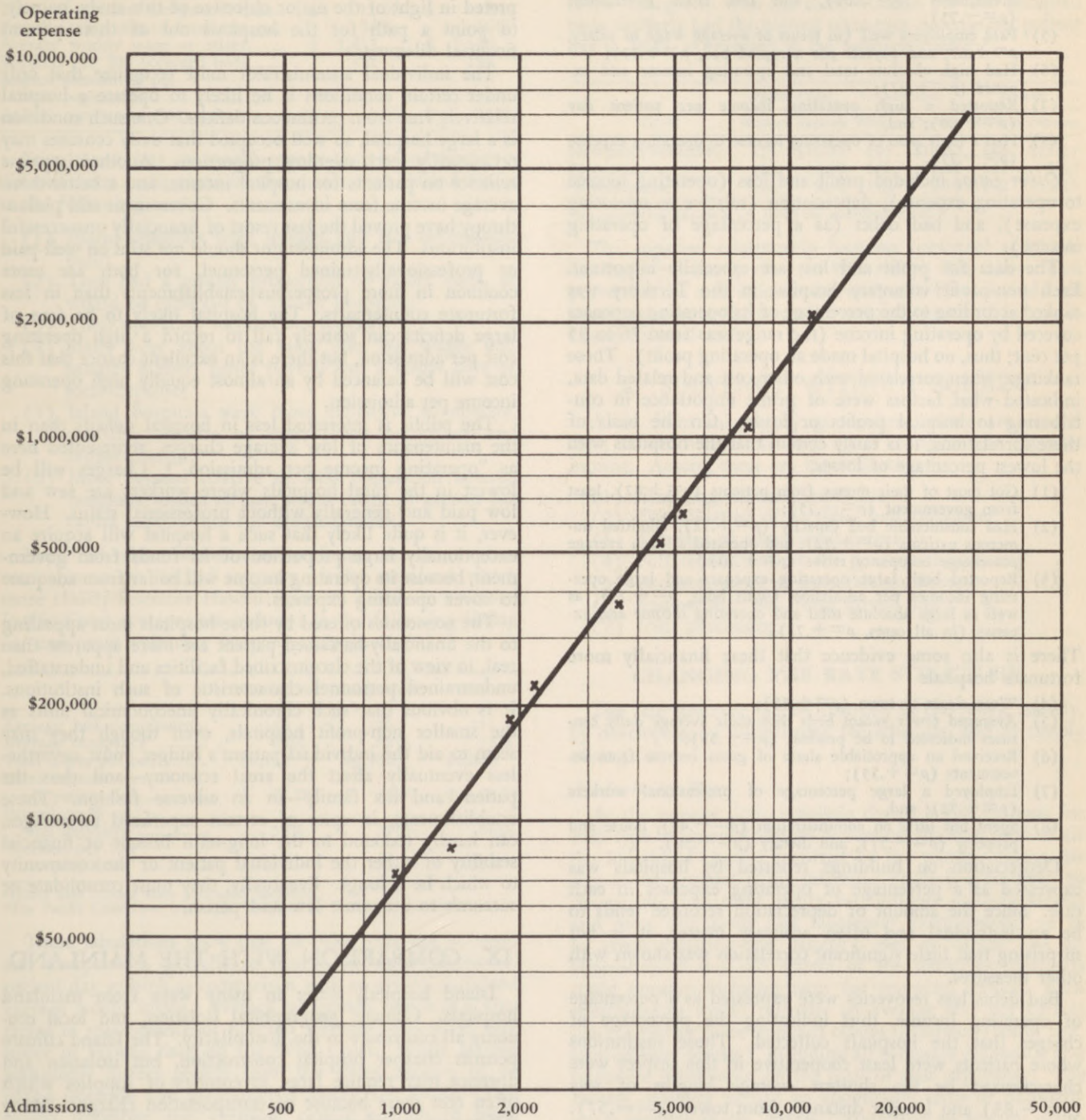
Absolute income and expense (total and operating) were correlated perfectly with number of beds and admissions,[3] and highly with average census ($\rho=+.98$),[4] operating income and operating expense per admission (for both, $\rho=+.97$), percentage occupancy ($\rho=+.83$), and average compensation of workers ($\rho=+.82$). These correlations, certainly not unexpected, are pointed up even further by the association between income and expense ratios (per admission, per patient day) and other criteria.

Operating income per patient day was highly correlated with operating cost per patient day ($\rho=+.93$), hence these two items may profitably be considered together. They were strongly associated with total workers per 100 occupied beds ($\rho=+.82$ and +.85, respectively) and non-professional workers per 100 occupied beds ($\rho=+.80$ and +.82, respectively). High correlations also appeared with payroll per occupied bed ($\rho=+.85$ and +.83). Operating income per patient day was closely related to both operating income and expense per admission ($\rho=+.80$) but operating cost per patient day showed a value of only +.58 for these two items.

[2]See Fig. 12.

[3]See Fig. 13.
[4]See Fig. 12.

Operating income and operating expense per admission are two extremely important measures of financial status that likewise may be considered together. Each is perfectly correlated with the other ($\rho = +1.00$), hence they show identical values with other measures of facilities, services, and costs. Unlike operating income and expense per patient day, these items make allowance for another extremely significant variable, average length of stay. Hospitals with the highest operating income and expense per admission, it can be said with reasonable certainty,




*Line of regression fitted by least squares method

Fig. 13

OPERATING EXPENSE AND ADMISSIONS
NON-PROFIT VOLUNTARY HOSPITALS*
TERRITORY OF HAWAII, 1947–48
($\rho = +1.00$) (Logarithmic scale)

(1) Had the largest number of beds ($\rho=+.97$),[5] admitted most patients ($\rho=+.97$), recorded the highest average censuses ($\rho=+.93$), and operated at high percentage occupancy levels ($\rho=+.75$);
(2) Were fairly close to town ($\rho=+.70$);
(3) Kept patients for longer periods ($\rho=+.70$);[6]
(4) Got more of their income from patients ($\rho=+.70$) and investments ($\rho=+.67$), and less from government ($\rho=-.75$);
(5) Paid employees well (in terms of average wage or salary, $\rho=+.67$; and payroll per occupied bed, $\rho=+.77$);
(6) Had high absolute total and operating income and expense ($\rho=+.97$);
(7) Reported a high operating income per patient day ($\rho=+.80$); and,
(8) Had a high ratio of operating income to operating expense ($\rho=+.77$).

*Other ratios* included profit and loss (operating income to operating expense), depreciation (relative to operating expense), and bad debts (as a percentage of operating income).

The data for profit and loss are especially important. Each non-profit voluntary hospital in the Territory was ranked according to the percentage of its operating expenses covered by operating income (the range was from 76 to 95 per cent; thus, no hospital made an operating profit). These rankings, when correlated with other cost and related data, indicated what factors were of prime importance in contributing to hospital profits or losses. On the basis of these correlations, it is fairly certain that the hospitals with the lowest percentage of losses,

(1) Got most of their money from patients ($\rho=+.82$), least from government ($\rho=-.75$);
(2) Had considerable bed capacity ($\rho=+.72$), admitted numerous patients ($\rho=+.72$), and operated at high average percentage occupancy ratios ($\rho=+.70$);[7]
(3) Reported both large operating expenses and large operating incomes per admission (with both, $\rho=+.77$), as well as large absolute total and operating income and expense (in all cases, $\rho=+.72$).

There is also some evidence that these financially more fortunate hospitals

(4) Were closer to town ($\rho=+.55$);
(5) Averaged fewer vacant beds than their average daily censuses indicated to be prudent ($\rho=-.53$);[8]
(6) Received an appreciable share of gross income from investments ($\rho=+.53$);
(7) Employed a large percentage of professional workers ($\rho=+.52$); and,
(8) Spent but little on administration ($\rho=-.47$), house and property ($\rho=-.57$), and dietary ($\rho=-.58$).

Depreciation on buildings reported by hospitals was expressed as a percentage of operating expenses in each case. Since the amount of depreciation recorded tends to be an individual and often arbitrary matter, it is not surprising that little significant correlation was shown with other measures.

Bad debts less recoveries were expressed as a percentage of operating income, thus indicating the percentage of charges that the hospitals collected. Those institutions whose patients were least cooperative in this respect were characterized by the shortest average lengths of stay ($\rho=-.83$) and longest distances from town ($\rho=-.57$). Other high correlations (such as expenditures for house and property, $+.77$) were undoubtedly fortuitous.

[5]See Fig. 12.

[6]Undoubtedly due to the serious nature of cases treated.

[7]See Fig. 12.

[8]Beds needed at 1947–1948 average census levels were calculated from a formula developed by C. Horace Hamilton ("Normal Occupancy Rate in the General Hospital," *Hospitals*, September 1946) and compared to the actual reported complement. The hospitals reporting the largest percentage losses also had the highest percentage of excess beds according to this formula; the hospitals with the smallest losses (percentagewise), meanwhile, often were operating too close to capacity for emergencies.

## SIGNIFICANCE

These correlations gain added significance when interpreted in light of the major objective of this study, namely, to point a path for the hospitals out of their present financial dilemma.

The individual administrator must recognize that only under certain conditions is he likely to operate a hospital relatively free from continuous deficits. One such condition is a large hospital, so well occupied that daily censuses may occasionally reach overflow proportions. Another is prime reliance on patients for hospital income, and a better-than-average income from investments. Government and philanthropy have proved the last resort of financially unsuccessful institutions. The administrator should not stint on well-paid or professionally-trained personnel, for both are more common in more prosperous establishments than in less fortunate counterparts. The hospital likely to be free of large deficits can scarcely fail to record a high operating cost per admission, but there is an excellent chance that this cost will be balanced by an almost equally high operating income per admission.

The public is interested less in hospital deficits than in the maintenance of low average charges, represented here as "operating income per admission."[9] Charges will be lowest in the rural hospitals where workers are few and low paid and generally without professional status. However, it is quite likely that such a hospital will acquire an exceptionally large proportion of its funds from government, because its operating income will be far from adequate to cover operating expenses.

The economies offered by those hospitals most appealing to the financially-harrassed patient are more apparent than real, in view of the circumscribed facilities and understaffed, undertrained personnel characteristic of such institutions. It is obvious that such chronically uneconomical units as the smaller non-profit hospitals, even though they may seem to aid the individual patient's budget, must nevertheless eventually affect the areal economy—and thus the patient and his family—in an adverse fashion. These establishments, in spite of certain superficial advantages, can hardly redound to the long-term benefit or financial stability of either the individual patient or the community to which he belongs. Eventually, they must consolidate or succumb to economic law and perish.

# IX. COMPARISON WITH THE MAINLAND

Island hospitals differ in many ways from mainland hospitals. Climate, geographical isolation, and local economy all contribute to the dissimilarity. The Island climate permits cheaper hospital construction, but isolation and distance may require large inventories of supplies which often cost more because of transportation charges. Many differences are even more subtle.

In 1947, island general and allied special hospitals, irrespective of ownership, exhibited the following quantitative differences from their mainland counterparts:[1]

[9]The hospital's operating income per admission is almost synonymous with the average patient's cost of hospitalization, as pointed out earlier.

[1]From Appendix Table 55, which includes data for each ownership category and for two years, 1946 and 1947. Excludes Federal hospitals.

| | U. S. | Hawaii |
|---|---|---|
| Average bed complement | 104 | 61 |
| Average occupancy | 77% | 62% |
| Total assets per hospital | $768,000 | $389,000 |
| Total assets per bed | $ 7,456 | $ 5,709 |
| Operating income per patient day | $ 9.71 | $ 11.73 |
| Total expenditures per patient day | $ 11.09 | $ 15.15 |
| Payroll as per cent of total cost | 54% | 66% |
| Average worker wage or salary | $ 1,437 | $ 2,368 |
| Workers per 100 occupied beds | 151 | 154 |
| Annual admissions per 1000 population | 110.5 | 127.8 |
| Annual per capita cost | $ 9.96 | $ 15.38 |

From these data, it would appear that Island hospitals differed from institutions of the continental United States in the following ways:

(1) Island hospitals were smaller and less expensively built;
(2) They had a greater proportion of vacant beds, as would be expected of smaller hospitals;[2]
(3) Their operating income was higher;
(4) Staffs were about the same size, but wages and salaries higher; hence payroll was a larger part of total expense;
(5) Island hospitals were more expensive to operate, probably because of their lower occupancy and bigger payroll;
(6) More persons relative to total population entered hospitals, which in turn was a factor in greater per capita expenditure for hospitalization.

Many of these differences tend to disappear when comparisons are limited to parts of the mainland which more closely resemble Hawaii than the nation as a whole. Pacific Coast averages are included in the following listing for non-profit voluntary hospitals only in 1947:[3]

| | United States | Pacific Coast | Hawaii |
|---|---|---|---|
| Average bed complement | 116 | 125 | 131 |
| Average occupancy | 79% | 82% | 73% |
| Total assets per bed[a] | $8,782 | $6,786 | $6,802 |
| Total expenditures per patient day | $ 11.78 | $ 16.07 | $ 15.27 |
| Payroll as % of total expenses | 54% | 58% | 66% |
| Workers per 100 occupied beds[b] | 161 | 175 | 164 |

[a]Island data include some plantation hospitals.
[b]The Pacific Coast ratio is strongly weighted by California (at 195).

These tabulations show that facilities were not so small and inexpensive, payrolls so liberal, or expenditures per patient day so high as comparison with an overall mainland average would imply. Average occupancy, which is a vital factor in maintenance of hospital solvency, was 9 per cent lower in Hawaii than on the West Coast. While Hawaii admittedly differs greatly from the states because of its island isolation and plantation economy, the Pacific Coast region resembles the Territory closely enough to bring out the relationship between hospital costs and regional characteristics of population and economic geography. It should be added that 1946 data are very similar and lead to the same conclusion.[4]

Closer inspection of comparative data for the Pacific Coast states and Hawaii emphasizes the importance of number of personnel in the determination of operating costs. Categories with the most workers per 100 occupied beds similarly had the highest operating expense per patient day in 1947, as revealed in the following table:[5]

| | Pacific Coast | | California | | Hawaii | |
|---|---|---|---|---|---|---|
| Type[a] | Workers | Expense | Workers | Expense | Workers | Expense |
| Non-profit voluntary | 175 | $16.07 | 195 | $18.62 | 164 | $15.27 |
| Proprietary | 152 | 14.99 | 162 | 15.41 | 121 | 9.67 |
| Governmental | 128 | 9.54 | 126 | 9.18 | 142 | 14.23 |

[a]No plantation hospitals are listed for mainland areas.

The apparent relationship between personnel and costs has been previously cited in this study. The above data prove that the association is not unique to Hawaii, and lend strong support to the analysis previously given of factors in Island hospital costs.

## X. SOLVENCY WITHOUT SUBSIDY

Aside from subsidy by government, there are several ways in which hospitals may effect economies or augment income. Among these are the following:

(1) Changing the rate structure;
(2) Consolidation of facilities and personnel;
(3) Transfer of educational functions;
(4) Full reimbursement for governmental cases;
(5) Encouragement of hospital insurance;
(6) Endowments and fund drives; and
(7) Joint purchasing.

### CHANGING THE RATE STRUCTURE

The rate structure can be changed in two ways, namely, by developing an all-inclusive fee schedule, and by simply raising rates.

*All-Inclusive Fees*

At the present time, hospitals charge a specific sum for each type of accommodation or service; the sum total of all the individual charges incurred by the patient during his stay in the hospital is his full bill. There is a tendency to charge less than costs justify for ordinary day-rate service and more for X-ray and laboratory examinations, so as to avoid violating the patient's idea of values. As an alternative to this old system of fee schedules, hospitals could develop inclusive rates for complete service. Each administrator would calculate an average cost per patient day for two or three standard classes of service (ward, bed, semi-private, private), including all necessary diagnostic and treatment procedures, on the basis of past experience. The patient, whether he had an abnormally large or unusually small recourse to the "extras," would pay an amount deter-

[2]See C. Horace Hamilton, "Normal Occupancy Rate in the General Hospital," *Hospitals*, September 1946.
[3]See Appendix Table 56. When the states and territories are ranked with regard to all hospitals, Hawaii had, in 1947, the highest cost per patient day, highest payroll per patient day, 22nd highest assets per bed, and 16th largest number of workers per 100 occupied beds. When rankings are limited to the non-profit voluntary group, Hawaii was second in payroll and total cost per patient day, and 17th in assets per bed.
[4]See *American Hospital Directory, 1947*, Section C. Comparative data fea- earlier years are not available.
[5]Mainland data from *American Hospital Directory, 1948*, pp. C-12–C-19. It should be added that this source also listed data for Hawaii, but grouped plantation hospitals with both the non-profit voluntary and proprietary categories. The sample was apparently somewhat smaller than that obtained for the present study. For these reasons, use has been made of data collected by the Hospital Costs Study Committee in mainland-Hawaii comparisons (see Appendix Tables 55 and 56).

mined by the average per diem cost for his class of accommodations and his length of stay. If the institution had access to considerable non-operating income, it could lower fees in proportion.

An even wider extension of this principle ultimately is anticipated by some writers. In a prophetic article, one authority states: "Costs and charges will be measured and expressed in larger units than laboratory tests, X-ray pictures, cardiograms or days of board and room care. The unit of cost will be the 'patient,' expressed in terms of average period of illness, or the 'potential patient,' expressed in terms of a year of potential service."[1]

Much merit can be seen in comprehensive fees. They would tend to spread the costs of hospitalization among all patients, so that the unfortunate person compelled to submit to an unusually large number of examinations and other specialized services would pay no more per day than the more fortunate patient. Although the latter person might well consider such treatment manifestly unfair, the unscientific method of pricing currently in use is even less just. All-inclusive rates would eventually improve public relations by avoiding arguments from uninformed patients quibbling over details in a more complex system of charging. There is also some possibility of introducing economies into billing and bookkeeping operations because of the simplification of rates.

*Raising Rates*

A more obvious but less promising solution to the hospital dilemma is in the raising of patient fees. Available evidence indicates rate increases generally to have dubious value to the hospitals, and no value at all to their patients.

Under normal conditions, the first result of increased charges is decreased occupancy. As rates go higher, more and more persons become "marginal": they delay entering a hospital until the last possible moment, try to leave before recuperation is complete, and prefer treatment for less serious injuries and ills either in physicians' offices or at home. In consequence, admissions, average stay and census decline.

Unusual social and economic conditions may modify such trends. An expanding economy, characterized by increases in areal population and per capita income, minimizes the effect of higher rates on hospital solvency. In a contracting economy, however, bed occupancy is likely to fall even without a change in fee schedules. These relationships are illustrated by the record of The Queen's Hospital during the late 1920s and early 1930s. The period between 1925 and 1929 was one of economic growth for the Islands. By 1933, however, the effects of the mainland depression had definitely spread to Hawaii. In these two four-year periods, the following percentage changes occurred in the hospital.[2]

| | 1925–1929 | 1929–1933 |
|---|---|---|
| Rates (income per patient day) | +17 | −10 |
| Admissions | +44 | −18 |
| Patient days | 0 | −16 |
| Ratio of income to expense | + 4 | −13 |

[1]C. Rufus Rorem, "The Hospital Economy," *The Modern Hospital*, August 1948, p. 66.

[2]From Appendix Table 1.

Even a 10 per cent reduction in rates was insufficient to stop the decline in admissions, census and financial solvency, in the face of the national depression. Yet during the prosperous 1920s a 17 per cent increase in charges per patient day had had no adverse effect on either occupancy or hospital finances.

Data for all non-profit voluntary hospitals for the past decade give added emphasis to the importance of occupancy and community prosperity in avoiding financial loss. From 1940 until the end of the war, the Territory (and especially Oahu) grew rapidly in population and wealth. Both curves leveled off somewhat after the end of hostilities. Paralleling general economic conditions were the trends in occupancy and solvency—low in 1939, high during the early 1940s, and declining thereafter.

That continued increases in hospital rates were dangerous was implicit in the postwar scene. Among the non-profit voluntary hospitals, the biggest rate increases came after 1946, accompanied by severe drops in occupancy. By 1947–1948, operating deficits increased so alarmingly that it became apparent that losses from lowered occupancy were more than offsetting revenue from higher fees. Since population was still increasing and per capita income had changed but little, the decline in average census was obviously produced by the steeper rate schedules. A dip in the business cycle, such as feared by many economists, would make still more potential patients marginal. In an attempt to keep hospital income abreast of advancing operating costs, the hospitals had almost priced themselves out of the market. Additional increases in rates could not safely be made.

Apart from their financial dilemma, hospitals have a moral responsibility to the community. Even now, many families of moderate means are indigent in the matter of hospital care. Further increases in rates are likely to deny needed attention to an ever larger segment of the population, many of whom will either delay going to the hospital, hasten their discharges, or forego hospitalization altogether. Such a development would certainly run counter to the best interests of the people, as well as the institutions that serve them.

Past experience proves in this Territory at least that decreased occupancy resulting from higher charges normally more than balances extra revenues such increases bring. Only in an expanding economy can fees be stepped up with safety.

## CONSOLIDATION OF FACILITIES AND REDUCTION IN PERSONNEL

Consolidation or curtailment of services are other means of reducing deficits. Action of this sort can range from minor administrative economies to the closing of entire hospitals.

*Physical Facilities*

Additional economies can be made without jeopardy to health or security by planned consolidation.

Small hospitals demand a large proportion of vacant beds for emergency purposes. A recent study of occupancy rates for establishments of various sizes has indicated the following rates to be normal for representative levels of average census:[3]

[3]C. Horace Hamilton, *op. cit.*

| Average Census | Normal % Occupancy | Needed Beds |
|---|---|---|
| 5 | 36 | 14 |
| 10 | 44 | 23 |
| 25 | 56 | 45 |
| 50 | 64 | 78 |
| 100 | 71 | 140 |
| 250 | 80 | 313 |

Thus a hospital with a high average census, such as The Queen's or St. Francis, can operate safely with 75 or 80 per cent of its beds filled, and have ample provision for the few days a year when beds are in great demand. Smaller hospitals, such as Wahiawa or Shingle, must average not more than 45 to 60 per cent occupancy, if they are to have facilities available for emergency needs.

There is a well-recognized statistical reason for the lower normal occupancy rates of smaller hospitals. Large groups are stable, predictable, and not given to sudden fluctuations or great extremes; the exceptional case has little effect on the overall average, which cancels out individual differences. Small groups, on the other hand, are unstable, unpredictable, and decidedly prone to erratic fluctuations and wide extremes; one exceptional case is likely to throw the entire average far off the expected course.

An excellent example of the operation of this relationship is provided by Ewa District, on the Island of Oahu. There are three hospitals in this district,[4] ranging in size from 42 to 52 beds. In 1947, they had a combined average census of 75, scattered among 142 beds. Had each hospital adhered to the formula referred to above, their combined bed capacity would have been only 135. If these three hospitals had consolidated into one central institution, they would have required just 110 beds for normal needs and a margin of safety. Thirty-two beds, or 23 per cent of the existing total, could thus have been eliminated without hardship through consolidation.

Specific recommendations for consolidation have already been made by the Territorial Board of Health in its recent *Report of Hospital Survey and Planning, Territory of Hawaii.* One major criticism directed by this study at local hospitals is "capacity too small for type of services or economical operation." Seventeen of the 39 hospitals included in the present study were so judged. The *Report* also pointed out a number of places where consolidation was indicated because of overlapping service areas.

The present study merely wishes to reiterate the importance of consolidation, particularly in the rural areas, as pointed out in the report noted above. Already this is being done in some instances throughout the Territory. Both clinical and preventive medical services could function to mutual advantage under such an arrangement.

*Personnel*

Economies could be effected by paring unnecessary personnel from payrolls.[5] Between 1941 and 1947–1948, the non-profit voluntary hospitals witnessed a two-thirds increase in number of workers, or 35 per cent more personnel per occupied bed. In some hospital jobs, it is true, average work hours per week dropped as much as 20 per cent. In addition, many institutions were offering a greater variety and volume of services to each patient in 1948 than they did in the prewar period. Even so, it is unlikely that the entire increase in personnel was caused by shorter hours and more services. Differences between individual hospitals in 1947–1948 reinforce such a conclusion. In that year, the nine non-profit voluntary hospitals reported workers per 100 occupied beds ranging from 125 to 300. Yet consideration of basic data reveals little difference otherwise between the two extremes in personnel, both of which were small rural institutions. Among the metropolitan group, the range was from 142 to 269 workers per 100 occupied beds. It is hard to escape the conclusion either that some were understaffed, others overstaffed, or both.

National standards and the individual hospital situations must set the limits to such reductions in facilities and staff. A hospital which exceeds the minimum desired ratios of personnel to patient load recommended by national accrediting bodies is justified in cutting staff where the surplus exists. The number of beds required for various levels of census has been calculated; unneeded wards can be closed in accordance with this formula.[6] However, reductions in services and staff should be made only after an intensive study of the individual hospitals.

## TRANSFER OF EDUCATIONAL FUNCTIONS

Still further savings could be made by the transfer of the academic phase of nurse training to the University of Hawaii.

As previously noted, the net cost of nursing education to the three major teaching hospitals in 1947–1948 was as follows:[7]

| | Total | Per student | Per patient day |
|---|---|---|---|
| Excluding value of students' services | $378,860 | $1,067 | $1.94 |
| Including value of students' services | 118,148 | 333 | 0.60 |

These costs, reported as operating expenses by the hospitals, were largely defrayed by income from patients.

According to many authorities, fairness to patients, to the students and to the hospitals dictates the transfer of nursing education. This practice already is in effect in some places on the mainland, such as the state of Washington. It is unfair to ask the patients of three Honolulu hospitals to pay for the training of nurses whose services are used elsewhere in the Territory. Likewise, it jeopardizes the economic position of the hospitals, inasmuch as the students they train often leave after graduation. Finally, the students are asked to pay for professional training which is supplied to students in other fields by tax-supported institutions. It is logical that nursing should be included in the public education system curriculum along with medicine, dentistry, and teaching.

Still another reason for this transfer is efficiency. Currently, fewer than 400 students are enrolled at the three teaching hospitals. Bringing them together in a central school of nursing for their classroom work would largely eliminate the duplication and overlapping of facilities and teaching personnel. Removal of this burden would immediately benefit the three teaching hospitals.

The training of interns and residents presents less of a problem. Only three hospitals regularly give such training,

[4]Excluding a 7-bed proprietary establishment. Closed in 1949.

[5]For additional discussion, see Martin R. Steinberg, "By Paying Less We Pay More," *The Modern Hospital,* May 1949, p. 63f.

[6]See C. Horace Hamilton, "Normal Occupancy Rate in the General Hospital," *Hospitals,* September 1946.

[7]See Appendix Table 45.

and two of them confine their efforts to only a few interns annually. At the remaining institution, it is evident that at least a small group of interns is an essential and relatively inexpensive adjunct to their program of care. Only when an excessive number of interns are admitted does this activity unduly affect the costs of hospitalization.

## FULL REIMBURSEMENT FROM GOVERNMENT

Hospital solvency could be further improved if governmental agencies uniformly made full reimbursement for their patients. A recent article states that:

> One of the reasons hospitals have closed their books in red ink for at least two years is that local, county and state governments have not paid full costs for the indigent patient care they finance. . . .
>
> The traditional inconsistency dates back to depression and pre-depression days, when these government units negotiated with hospitals individually in an attempt to buy care at the lowest possible rates.
>
> At that time, as is well known, occupancy had dropped to a record low point. Hospitals, to keep their doors open to the community, accepted almost any arrangement that would produce the income needed to keep a minimum staff on hand.
>
> As the country began to recover, the cost of hospital care began to rise. But local government reimbursements did not keep pace. These negotiated rates were not flexible, nor was there general pressure to change to a formula for payment.
>
> Then, during the war, Congress committed the federal government to a large-scale program for purchasing hospital care. The Emergency Maternity and Infant Care program administered by the U. S. Children's Bureau was set up to benefit the families of lower-pay-grade enlisted men in the armed services.
>
> Hospitals, through the American Hospital Association, and the federal government, agreed that this care for the wives and babies of servicemen should be furnished and paid for at cost. Under this agreement, the government reimbursable cost formula was devised.
>
> It simply defined what expenses could be classified as costs of care and thus determined what the federal government was to pay. With later improvements, this formula still is used by federal agencies that buy hospital care from voluntary hospitals. It is not generally used, however, by other government units.[8]

In Hawaii, the principle of full reimbursement is gaining ever wider acceptance among governmental agencies. Territorial units using the governmental formula include the Department of Public Welfare, Board of Health, Division of Vocational Rehabilitation, and other agencies. A number of voluntary health agencies similarly pay full reimbursable costs. The only large governmental unit which does not follow this practice is the City and County of Honolulu.

As noted before, the use of the governmental reimbursable cost formula has two advantages:

(1) It defines the exact cost per patient day of hospital service, hence is fairer to the hospital than the use of the regular rates of the institution, which usually lag behind costs; and,

(2) The governmental formula, by the simplicity of its application, greatly reduces the amount of clerical work ordinarily required in billing and budgeting.

This practice should be adopted by all local agencies of government.

## HOSPITAL INSURANCE

The development of hospital insurance augurs well for the hospital finances, from the point of view of both administrators and patients. The Hawaii Medical Service Association, a voluntary non-profit prepayment plan, was established in May 1938. By May 1949 its coverage had been extended to 30,640 persons, about six per cent of the total population.[9] A similar growth has occurred in various commercial plans.

More extensive coverage of the public under such programs would have a number of beneficial tendencies:

1. Bad debts would be materially reduced;
2. Occupancy, freed from major dependence on economic factors, would tend to become more stabilized, hence permitting better planning and more efficient utilization of hospital facilities; and
3. The burden would be spread in such a way as to minimize the cost to individual patients.

Unfortunately, hospital insurance is not yet sufficiently widespread to have any appreciable effect on the overall problem, the urgency of which necessitates turning to other means of alleviation. Over a period of years, however, hospital insurance is likely to prove a formidable tool for attacking the matter of hospital finances.

## ENDOWMENTS AND FUND DRIVES

Special fund drives and the seeking of endowments have been used rather successfully in financing hospital operating costs and deficits.

Endowments may be for a variety of purposes—a bed, room, or ward for indigent cases, a fund for general budgetary purposes, money for research in different fields of medicine or hospital activities, for scholarships and fellowships, or awards to deserving student nurses. Although most donors have asked that their gifts be applied to non-operating items, such endowments have always proved quite welcome.

Certain techniques directed toward the encouragement of endowments have been developed by the larger mainland hospitals. A New York hospital, for example, has prepared a brochure containing a descriptive list of memorial endowment possibilities, complete with prices. The brochure was sent to all attorneys handling estates of record in the hospital, to those making inquiries, and to many others where it might bring results.[10] Hospitals in Hawaii could do the same sort of thing.

Many authorities predict a decline in new endowment funds, although there is no universal agreement on this point. One author on hospital finances states:

> In recent years many writers on the future sources of hospital philanthropy have predicted fewer and smaller gifts for endowment purposes. They have offered several reasons for this prediction, but the principal one has been the effect of prewar and wartime taxes. . . .
>
> What seems to be overlooked by the forecasters is that tax laws at present greatly favor philanthropies. The government always has encouraged charitable giving, both in lifetime contributions and in bequests, by its liberal allowance of deductions for gifts. Today endowments are made at a lower net cost to the giver than ever before. This is one reason why more people now prefer to make contributions during their lifetime instead of bequests.[11]

Records of The Queen's Hospital reveal that gifts, interest, rents and similar non-operating revenues have accounted for a progressively smaller percentage of total income in recent years. This relative (if not absolute) decline has been in evidence for more than a third of a century, as shown in the following table:[12]

---

[8] "Deficits and Hospital Rates," *Trustee*, February 1949, p. 13f.

[9] Data from statistical department of Hawaii Medical Service Association.

[10] Joseph Turner, "Endowments: Attracting the Donor," *Trustee*, June 1948, p. 4.

[11] *Ibid.*, p. 2.

[12] Calculated from Appendix Table 2.

| | Income from gifts, interest, rents and miscellaneous sources | |
|---|---|---|
| | Per admission | % of total income |
| 1915–1919 | $12.56 | 21.8 |
| 1920–1924 | 7.95 | 12.3 |
| 1925–1929 | 7.80 | 13.2 |
| 1930–1934 | 9.52 | 17.3 |
| 1935–1939 | 7.05 | 12.3 |
| 1940–1944 | 8.49 | 11.7 |
| 1945–1949 | 11.05 | 8.4 |

It would seem likely that other hospitals in the Islands have witnessed a similar trend.

Another way of raising money is the special community fund drive. In urban areas such drives are sometimes simply part of the annual Community Chest campaign, where the hospital happens to be a member agency. More often, however, the drive is an independent effort of the individual hospital.

Fund drives may cover two different types of expense. Usually they apply to specific non-operating items, such as a new wing. They have also been used, however, to cover operating expenses. The replacement of expensive needed equipment is one type of specific operating expenditure that might be covered by a fund-raising campaign.

Regardless of the national trend, neither endowments nor fund drives are likely to prove a bountiful source of revenue to hospitals in Hawaii in the future. Together, gifts and investments supplied only 2.1 per cent of total hospital income in Hawaii in 1947–1948. For the non-profit voluntary group the amount was 3.3 per cent, compared to 0.1 per cent or less for the remaining ownership categories.[13] Furthermore, the growth and development of the voluntary health agency, usually with emphasis upon a particular disease that has a strong emotional appeal, has resulted in a multiplicity of drives tending to dry up public contributions. The expanding programs of the Community Chest agencies are resulting in increased demands upon the public for support. Consequently, it is highly improbable that endowments or special fund drives can be relied on for more than a small amount of aid. On the other hand, opportunities for tapping such possibilities have not entirely disappeared.

## JOINT PURCHASING

Additional savings could probably be effected through a centralized purchasing agency. Such a step has already been effected in Cleveland, and more recently by the Council of Rochester Regional Hospitals, where a program of centralized purchasing was initiated late in 1947. By early 1949 an official of the Council was able to report: "It is our belief that approximately sixteen per cent saving is passed on to our small hospitals and about ten per cent to the larger institutions."[14] The Capital Area Hospital Council of Washington, D. C., has "issued a list of fifteen items said to be available for group purchase 'at better prices than most hospitals are paying,' according to an official of the hospital council."[15] At least one mainland authority expects that "joint purchasing will become the regular policy for hospitals in the same trading area."[16]

[13]See Appendix Table 31.

[14]Letter to the Public Health Committee from Hubert B. Dates, Assistant Director of the Council, dated January 27, 1949.

[15]*The Modern Hospital*, February 1949, p. 166.

[16]Rorem, *op. cit.*, p. 67.

Unfortunately, factors in the local situation make the successful development of a joint purchasing program seem unlikely for some time to come. The purchases of administrators of governmental hospitals are circumscribed by Territorial law.[17] Individual loyalties to different local retailers, often grounded in wartime experiences, are common to most hospital officials. Honest differences of opinion with regard to group purchasing detail could conceivably occur, thereby creating some practical problems.

In spite of the inevitable difficulties involved in initiating a successful local program of centralized purchasing, it would seem that the economic benefits possible from such a system would well warrant an attempt at a future time.

Various roads to solvency short of subsidy have been suggested in the preceding pages. Changing the rate structure, consolidation of hospitals, reductions in personnel, transfer of the nursing education programs, full reimbursement by governmental agencies, fund and endowment drives, and joint purchasing will either reduce costs or improve income. Little, if any, help can be expected from additional rate increases, however.

It is possible that the steps suggested above will balance income and expenditures in many hospitals. In some it will merely cut deficits to more manageable sums, in others it may actually permit a slight operating profit. There remains considerable doubt, however, that action short of subsidy can permit a reduction in hospital charges.

Such a reduction in rates is imperative to any permanent solution to the hospital dilemma. As long as beds are needlessly vacant, both the people's health and hospital solvency suffer. Hospitals must price themselves back into the market, for the good of themselves and their patients.

Because a substantial reduction in rates is unlikely unless governmental funds are obtained, consideration of the problem of subsidization is next in order.

# XI. SUBSIDIZATION

The problem of hospital subsidization resolves itself into four distinct questions:

(1) Is governmental subsidization of general and allied special hospitals advisable?
(2) What ownership categories should be eligible for subsidy?
(3) What sort of formula should be selected for calculation of subsidy?
(4) What governmental controls should be attached?

## THE ADVISABILITY OF SUBSIDY

The hospital is a unique and essential institution. It is similar to a business enterprise in that it calls for a knowledge and skill in business administration, as well as an understanding of supply and demand for medical services. However, the fact that it is primarily a social service provided according to the needs of the individual, aside from his ability to pay, is of the utmost importance in any discussion of methods intended to promote hospital solvency. If the provision of services is regarded primarily as a responsibility of the general public, then the financing of such services must likewise be so regarded. Patients can be relied upon only to pay to the extent of their financial resources. Ability to pay is conditioned by the length of

[17]R.L.H. 1945, Sec. 355.

illness, the costs of such care and the effects of these costs on the future solvency of the individual. The hospitals, however, stand in complete readiness at all times to serve the public and it is this preparedness that contributes to increased operating costs, and sometimes insolvency.

The public at large thus bears part of the responsibility for the financial maintenance of its hospitals. The unfortunate eighth of the population that enters such places each year is responsible for only a fraction of the total expenditures of these facilities, yet finds itself burdened with the major share of the annual bill. Although any operational definition and isolation of "standby costs" becomes impractical when carried beyond the individual institution, the principle implicit in this concept remains decidedly relevant. Hospitals, like other forms of community service, insure protection for which everyone should be willing to pay. The burden should be spread equitably over the entire population. Territorial legislatures in the past have recognized and approved this principle through appropriations toward support of the non-profit voluntary institutions.

Some of the opposition to subsidy is based upon a false analogy between voluntary hospitals and other private enterprise. These critics assert that ordinary businesses do not ask for governmental support; in times of stress they curtail service or, if necessary, go out of business. Hospitals, however, are morally constrained to provide the best—and only the best—service presently known, yet make it available to persons of all income classes. This moral requirement is like asking manufacturers to produce custom made goods for a mass market. Here is a formidable difference between "business" and hospitals, which can hardly be ignored. The public accepts them as eleemosynary institutions and expects them to operate in the interests of the common weal.

Opposition stimulated by fears of rigid governmental controls and concomitant bureaucratic inefficiency would seem to be overdrawn. Proper safeguards could be taken to preserve the voluntary non-profit hospital system against harmful intervention.

Objections based on the increase in taxation likely to result from subsidies are not fully warranted. It is true that the hospital appropriations would of necessity come from tax revenues. It is also true, all other factors remaining equal, that any increase in taxes would be counterbalanced by a reduction in individual hospital bills. Thus, there would be no rise in the total cost of living to the half-million persons of the Territory, but merely a redistribution of that cost. If the appropriation of funds were made contingent on enforced economies, such as those suggested previously, subsidization, by hastening consolidation, eliminating duplication and encouraging efficient operation, could actually become a factor in reducing costs.

Finally, it should be stressed that subsidization is not likely to discourage good management. The proper kind of governmental aid, carefully administered, should have no greater an adverse effect as an incentive to good management than a large endowment fund.

## WHO SHOULD RECEIVE SUBSIDIES?

The six county hospitals already receive governmental aid. In past years their deficits have always been made up by county or (in the case of Kula General) Territorial funds. The question is not whether these institutions should be eligible for subsidy, but rather which level of government (Territory or county) should be responsible for the subsidy. Thus the problem of governmental hospitals falls outside the range of this study.

There is little reason for subsidizing the proprietary hospitals. They are frankly business ventures, in which a strong interest in profit naturally accompanies the usual motives of public service; furthermore they account for a negligible number of patient days annually, lack community representation in their operation, and practice closed-staff policies.

The case of plantation hospitals is a far more difficult one. They "do not confine their services to plantation populations alone; they serve others in their respective communities and they have in the past given splendid service. . . .Though these plantation hospitals, judged by their income tax status, are proprietary-profit hospitals because they are not tax-exempt, they usually operate at a loss, which is absorbed by the plantation. . . .At this time, the future of these plantation hospitals is unsettled."[1] There is no doubt that their importance is rapidly declining; both in absolute figures and in relation to other ownership categories; they have reported a drop in all measures of service—number of hospitals, total beds, average census, and admissions—since 1929.[2]

The case for and against subsidization of plantation hospitals reduces itself to a few major points. Factors favorable to subsidy include the following:

(1) Plantation hospitals are in reality non-profit voluntary institutions, no different from the hospitals that have been receiving subsidies for a number of years;
(2) They render a community service in many areas where other facilities are completely lacking (as at Pahala, Hawaii, and Lanai City, Lanai);
(3) They still provide an appreciable amount of service; and,
(4) Their financial position is less tenable than that of any other group (see Tables 46 and 48).

In opposition to these sentiments, the following arguments can be advanced;

(1) Plantation hospitals are in reality industrial hospitals, the chief purpose of which is to render a needed supplementary service to a private enterprise;
(2) Community-wide representation is largely lacking in their operation;
(3) They have closed staffs;
(4) In location they often do not conform to the needs of the general population;[3]
(5) In many cases their facilities are excessive, uneconomical, obsolete;[4]
(6) Their importance is declining so rapidly that governmental support would be useless.

It would be fair, on the basis of such arguments as presented above, to deny plantation hospitals immediate eligibility for subsidy, but simultaneously express the hope that, through consolidation and changes in policy of control, a number of these hospitals may make themselves acceptable for future subsidization. It seems reasonable to subsidize a modern, consolidated hospital operated under

[1]Board of Health, *Report of Hospital Survey and Planning, T. H.*, p. 50.
[2]Noted in a preceding section and Tables 8 and 9.
[3]Board of Health, *op. cit.*, pp. 92–94.
[4]*Ibid.*, Table 1.

genuine community auspices; the logic behind support of a number of scattered, privately operated semi-industrial hospitals is less evident.[5]

The non-profit voluntary hospitals are free of the objections listed against subsidization of the plantation and proprietary hospitals. Furthermore, there is ample precedent to justify aid to these institutions.

## THE CHOICE OF A FORMULA

The choice of a fair and suitable formula devolves upon the answers to three qualitative questions:

(1) What is to be the basis (ward beds, patient days, "standby" costs, operating costs) for calculation of subsidy?

(2) Should there be an adjustment for size of institution, to compensate for the greater expense per unit of service common to larger institutions?

(3) Is special consideration for needy geographical areas advisable?

### *Bases for Subsidy*

Three broad aspects of hospital operation suggest themselves as possible bases for calculation of subsidy. The first, facilities, involves a further choice between total beds, ward beds, and beds priced below a specified rate. A second basis, services rendered the community, is also an index of need, proper measures of which are total inpatient days or inpatient admissions. A third aspect of hospitals is financial condition; here, a choice is necessary between expenses ("standby," total, or operating) and deficit (total or operating).

A major objection can be made at once to the use of bed facilities in a formula for hospital subsidization: they often bear little or no relationship to either the census of the hospital, the needs of the community, or the financial characteristics of the institution. The average census, over an extended period of time, would appear to be a fair measure of the importance and need of a hospital in its community. Building on this datum, the bed requirements of an institution, to care for emergencies and times of high occupancy, can be determined with mathematical precision.[6] Few hospitals in the Territory are so scientific in planning their bed complements, however. Hawaii's rural hospitals have averaged less than 50 per cent occupancy every year since 1941,[7] resulting in vacant beds far in excess of emergency requirements. Cursory examination of ward bed to private room ratios reveals a similar lack of correlation with community needs, as well as variation inevitably resulting from differences in type and quality of service rendered. Subsidy based on beds priced below specified levels is equally inadequate, because room and board constitutes but a portion of the patient's total bill, and hospitals, as noted previously, customarily undercharge for these items. The net result of a formula based on beds, whether total, ward, or low cost, would thus be subsidization based on facilities rather than need and community service. If the uses of necessity were also served, as at Shingle Memorial Hospital, it would be incidental thereto; poorly located, unnecessarily large establishments would receive equal encouragement.

Patient days and admissions appear to be much more reasonable bases for subsidy. Unlike facilities, they are true measures of need; the community expresses its requirements in patronage, not the overplanning of architects and administrators. Furthermore, both patient days and admissions show a high correlation with economic factors.[8] This correlation is highest in the case of admissions, partly because of variations in average length of stay and the higher cost of the first few days of hospitalization.

Subsidy based on financial factors is still more direct, but entails two additional choices, one between "standby" costs, hospital expenses and deficits, the other between total items and operating items.

Two objections might be voiced against the use of annual deficits in calculation of governmental subsidy. First, it would bear little apparent relationship to the philosophy expressed in previous Territorial subsidization of hospitals, the request of the Hospital Council which initiated the present study, and the emerging concept of "readiness-to-serve." That philosophy, as noted elsewhere, has supported the wider distribution of hospital costs, in order to lighten the burden of the individual patient (now becoming a marginal buyer of hospital care) and implement the principle that hospital facilities, like police and fire protection, are, in part at least, a legitimate charge against the entire community. For the Territory to underwrite, partly or wholly, the losses of the hospitals, would be out of line with this philosophy. A second objection to the use of deficits in devising a formula is its negative effect as an incentive to good management.

Subsidy based on annual hospital expenses would appear to be somewhat more desirable. Unfortunately, it would put the Territory into the position of supporting costly but unnecessary facilities and the excesses of occasional inefficiency, even though the hospital managed to remain fairly solvent.

Were either of these possible bases of subsidy selected, it would be necessary to decide whether to limit the formula to operating items only, or to consider all items. Since the non-operating costs of hospitals are customarily met as they become necessary by either governmental aid, popular subscription or individual philanthropy, there seems little reason to base subsidy on anything more than operating items. Subsidy of hospitals based on individual deficits is a different matter, however. Most non-operating income is actually intended to be applied to operating expense, thus can hardly be ignored in determining profit and loss.

The concept of "standby" or "readiness-to-serve" costs has been much discussed by authorities in recent years, and its usefulness in dramatizing community responsibility in the maintenance of hospital facilities has been justly praised. These terms connote the yearly expense of keeping complete facilities and staff in readiness to care for a normal patient load, thereby excluding expenses actually caused by the individual patient—X-ray film, bandages, food, and the like. The following objections can be voiced regarding this concept:

(1) The concept of "readiness to serve" is nothing more than a philosophical abstraction. The only case on record in which an Island hospital was kept in complete readiness

[5]The 1949 Legislature specified that the lone plantation hospital approved for subsidy, Kahuku, must first become a non-profit community institution before receiving the appropriated sum.

[6]*Vide* C. Horace Hamilton, "Normal Occupancy Rate in the General Hospital," *Hospitals*, September 1946.

[7]Nebelung and Schmitt, *op. cit.*, Table 16.

[8]Among non-profit voluntary hospitals in 1947–1948, rho was + 1.00 for admissions and operating cost, + .98 for patient days and operating costs (see Appendix Table 54 and Figs. 12 and 13).

to serve for patients who never showed up occurred at the turn of the century.[9]

(2) Study of available literature fails to uncover any unanimity of definition of "readiness to serve." Especially lacking is a generally accepted operational definition, i.e., one which states exactly what steps are necessary in a practical, concrete situation to determine such costs.

(3) The detailed nature of the Southmayd-Jordan formula,[10] which appears to be by far the most acceptable definition of "readiness to serve" costs, could not be utilized in this study, because many of the hospitals have not kept detailed records of their fiscal activities, especially for a period reaching a full decade into the past.

(4) Furthermore, Southmayd and Jordan point out that "readiness-to-serve cost is far from being an exact mathematical tool. It would be possible to debate endlessly about which staff members' salaries are to be included and whether one-half or two-thirds of the cost of heat, light and power would be necessary to be ready for the first patient. It is not a particularly useful concept in comparing one hospital with another. . . .Variations in the size of the central community, whether it is essentially agricultural or agricultural combined with small industries, proximity to a large city and similar factors make each institution unique."

(5) Use of this concept would also imply an unequivocal support of the status quo. The "standby" costs of facilities of exactly the present magnitude and diversity, located just where they are at present, would be assumed by the Territory. Yet there is general recognition that some of the hospitals in the Hawaiian Islands are now ineptly placed, overexpanded, and uneconomical to operate. An acceptable formula for Territorial subsidization should be based only on services actually rendered. Subsidies based on "readiness to serve," through their normal and financial support of superfluous or improperly placed or constructed institutions, would indefinitely oppose the soundly-conceived consolidation of hospitals based on actual needs and services. "Readiness to serve" is a fair and constructive method of reimbursement or subsidization only when facilities are attuned to actual needs and usage. Too often, one is not a fair index of the other.[11]

(6) The concept of "readiness to serve" costs brings us no closer to a formula for subsidization. A formula based on, say, expenditures and number of admissions, would prove just as defensible, and far easier to evolve, explain and apply.

*Adjustment for Size*

If beds, patient days or admissions were chosen as the basis for subsidy, there might well be justification for making an allowance in the formula for size. Larger institutions render a more complete and complex type of service, hence, in spite of the economies of large-scale operation, usually have a higher cost per patient day or admission.[12] It would be only fair to give added help to these bigger hospitals, whether the adjustment were made on the basis of beds, average census or admissions. Since the recent Territorial master plan for hospitals[13] stigmatizes the majority of hospitals having fewer than 50 beds as "too small for type of services or economical operation" there would be the added advantage of encouragement to the type of institution recommended in the Territorial plan.

*Adjustment for Geographical Need*

Some areas need aid more than others. Examples are Molokai, central Oahu, and, to a lesser degree, eastern Kauai, all of which depend largely or wholly upon small, unprofitable voluntary hospitals. The five Honolulu hospitals reported a deficit, before subsidies, of 4.6 per cent of operating costs; the four non-metropolitan hospitals, 13½ per cent.[14] The geographical necessity of maintaining the solvency of a hospital on Molokai was recognized by the Territory as long ago as 1933, when it authorized the Board of Supervisors of Maui County to subsidize Shingle Memorial Hospital.[15] Six years later Shingle became the first voluntary hospital since the first part of the century to obtain Territorial assistance.[16] The 1947 legislative grants to both Shingle and Wahiawa Hospitals were put at a more generous level than the basis of subsidy (ward beds) warranted, partly in recognition of their areal importance.

Were inadequate provision to be made for such establishments in the final formula, there would be likelihood of curtailment of their services or perhaps eventual disappearance. Since no governmental economy or community benefit can result from stinting in the allotment of funds to such institutions, an upward revision of the formula for them would seem to be in order.

*A Suggested Formula*

Impartial analysis of three questions previously outlined indicates the following answers to be most reasonable:

(1) Admissions constitute the fairest and most logical basis for subsidy;
(2) The formula should make provision for the greater expenses of larger hospitals; and
(3) Special consideration should be given needy geographical areas.

A final formula embodying the above conclusions can be developed as follows: A percentage, to be decided by the Legislature, uniform for each group of hospitals and higher for the metropolitan group than for the rural and small-town group, is applied to the "normal" operating expense of each hospital to obtain the amount of subsidy. The "normal" operating expense is determined by substituting the admissions reported by each institution in the formula for a line of regression of the $Y=aX^b$ type, fitted by the method of least squares to a scatter diagram showing

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[9]Koloa Cottage, "a small hospital and diet kitchen" built by the monarchy on Kauai in 1888, was closed by the Board of Health in 1903 after a 24-month period of zero per cent occupancy. See *Reports of the President of the Board of Health* for 1888 and 1903.

[10]See H. J. Southmayd and Robert Jordan, "A Report on Readiness to Serve," *Hospitals*, Vol. 22, No. 8, August 1948, pp. 38–40.

[11]A sparsely populated area in one of the outlying islands presents an example of this difficulty. In 1947 this area had two hospitals, one with 42 beds but an average occupancy of only 36 per cent, the other with 28 beds and an average occupancy of nine per cent. The former admitted to a cost per patient day far above other rural hospitals of comparable size. "Standby facilities" in this area were obviously far beyond actual requirements.

[12]Mainland data tabulated by size of hospital are given in the statistical summaries of the *American Hospital Directories* for 1947 and 1948. The effect of bed capacity is obscured in Island cost data classified by size of hospital (Appendix Tables 34, 35 and 36) because the smallness of the sample precluded a size-by-ownership breakdown. A definite correlation between bed complement and costs for non-profit voluntary hospitals only is revealed in Appendix Table 54, however.

[13]*Report of Hospital Survey and Planning* (Territorial Board of Health, February 1948), Table 1.

[14]See Appendix Table 53.

[15]S.L.H. 1933, Act 7.

[16]S.L.H. 1939, Act 244.

the relationship between admissions and actual operating costs for all eligible hospitals during the period of subsidy.[17]

This sort of formula has definite advantages:

*It is based on actual amount of service rendered.* Admissions, like total patient days, are an excellent index of the need of the community for the hospital and the use they make of it.

*It ties subsidy to the normal costs of operation.* During past years there has been a remarkable correlation between admissions and operating costs, high enough to indicate that the level of one is the fairest possible measure of the level of the other.[18] Because of variations in the average length of stay and the relatively higher cost of the first few days, total patient days proved a less sensitive barometer of hospital costs. Whether administration is economical or extravagant, the amount of subsidy will be unaffected. Out-of-line costs will have little influence on the formula, which is determined by the experience of the whole group and is not greatly changed by only one institution. The Territory subsidizes only the normal costs of operation, and there remains a strong incentive to managerial efficiency.

*The formula gives added consideration to the larger hospitals.* Since the number of admissions determines the actual amount of subsidy, the larger institutions will not suffer from discrimination.

*Needy geographical areas are helped.* Larger percentage subsidies are suggested for the relatively needy rural group.

*The formula is completely objective.* Only one decision —the choice of percentages—is required of any policy-making subsidizing group. Once the data are collected, the formula gives identical results each time it is applied. Subjective judgments are largely eliminated.

This formula was originally derived from 1947–1948 data, then later tested on information for 1945, 1946 and 1947, as well as for 1947–1948. It applied almost equally well to all these years.

Calculation of "normal" operating expense was a simple matter. The line of regression, of the $Y=aX^b$ type (where X equals admissions and Y equals normal operating cost in thousands), was fitted by the method of least squares, as described in various texts in statistics.[19] The formula of the line thus derived for 1947–1948 data was $Y=0.00642X^{1.3465}$ or, more simply, $\log Y=1.3465 \log X-2.1926$.

"Normal" operating expense for all nine non-profit voluntary hospitals in 1947–1948, according to the proposed formula, was $5,189,000 or 0.9 per cent less than the actual operating expense of $5,238,000. Normal costs for individual hospitals ranged from 12 per cent less than the actual figure to 22 per cent more.[20] For the four largest hospitals, normal expenses were calculated to be 0.8 to 4.1 per cent greater or less than the corresponding actual values; for the five smaller hospitals, 7 to 22 per cent, only one of which, however, was over 12 per cent. These comparisons of normal expense, as calculated by the formula, with actual expense reported by the hospitals underscore the fairness and appropriateness of the method. The differences between normal and actual cost are portrayed graphically in the accompanying diagram (Fig. 13).

Actual illustration should clarify the operation of the formula. Assuming subsidization of 5 per cent for metropolitan hospitals and 15 per cent for the others, the total appropriation for 1947–1948 (the first half of the biennium) would have had to be $99,000 more than was actually the case. When expressed as percentages of actual operating expense, deficit (total before subsidy), actual subsidy and the subsidy assumed above would have been as follows:

| | | As pct. of actual operating expense | | |
|---|---|---|---|---|
| | | Deficit | Actual subsidy | Proposed subsidy |
| Metropolitan hospitals[a] | A | 3.5 | 5.4 | 5.4 |
| | B | 4.1 | 2.4 | 5.1 |
| | C | 4.2 | 3.1 | 4.8 |
| | D | 4.7 | 2.0 | 5.0 |
| | E | 7.2 | 2.9 | 5.1 |
| Non-metropolitan hospitals[b] | F | 9.0 | 9.0 | 13.0 |
| | G | 11.6 | 11.6 | 18.6 |
| | H | 17.5 | 15.8 | 14.2 |
| | I | 19.2 | 24.7 | 13.7 |
| Total | | 5.5 | 4.1 | 6.0 |

[a]Assuming subsidy of 5 per cent of normal operating expense.
[b]Assuming subsidy of 15 per cent of normal operating expense.

Use of "normal" costs rather than actual operating expenses would thus not affect subsidy appreciably. The metropolitan hospitals, subsidized at 5 per cent of their normal operating expenditures, would have received amounts equal to 4.8 to 5.4 per cent of their actual costs. The rural and small-town hospitals, with subsidies of 15 per cent of their normal costs, would have been given 13.0 to 18.6 per cent of their actual operating expenses. As noted before, a high correlation existed between admissions (and hence normal costs) and actual expenses of operation. Use of normal costs serves chiefly as a safeguard.

### *Government Controls*

Three specific controls might be retained by the Territory in its hospital subsidization program: compulsory uniform accounting for comparable periods by all institutions, assurance of economical and efficient use of governmental funds, and conformity to the Territorial hospital plan.

No objection can be made to a compulsory uniform accounting system, giving data for comparable periods. In the past, annual reports of local hospitals have classified accounts in radically different ways, held to different definitions of common concepts, and completed their fiscal years on May 31, June 30, November 30, and December 31. As a result, neither the hospitals nor the Territorial auditor has been able to make direct comparisons between the various establishments. Even more important, the formula for subsidization suggested in the present study requires precisely comparable data. This suggested control is not new, for the 1947–1949 appropriation stipulated that "none of the above enumerated hospitals for which moneys have been appropriated shall receive more than two-thirds of said moneys unless a uniform accounting system, which shall be prescribed for all such hospitals by the auditor

[17]This formula, stated more simply $\log Y = \log a + b \log X$ (when Y = normal operating cost, X = admissions, and a and b are constants), describes a line that appears straight on logarithmic paper.

[18]In 1947–1948, $\rho=+1.00$; in 1947, $\rho=+.97$; in 1946 $\rho=+.95$; in 1945, $\rho=+.93$.

[19]See, for example, F. E. Croxton and D. J. Cowden, *Applied General Statistics* (New York: Prentice-Hall, 1940), pp. 694–697.

[20]The only extreme difference between calculated (normal) and actual costs, 22 per cent, occurred for the one institution for which data later than the calendar year 1947 were not available. If costs rose for this hospital during the next 6 to 12 months as they did for all other hospitals, the gap between actual and normal expenses was in reality much smaller than indicated here.

of the Territory (who is hereby authorized and directed to prescribe such system) in consultation with such hospitals, shall be installed in such hospital prior to January 1, 1948."[21]

There is also good reason for insisting on conformity to the Territorial hospital plan, at least in its geographical requirements.[22] Such a provision would encourage consolidation and needed physical improvements, as well as safeguard public funds from inefficient use.

The above requirements should provide a certain assurance of economical and efficient use of subsidies. However, it is necessary to assume that hospital administration is intelligent and honest, as Territorial Legislatures have assumed in the past.

## XII. RECOMMENDATIONS

1. Hospitals should follow the recommendations for consolidation and location outlined in the Territorial Board of Health's *Report of Hospital Survey and Planning.*

2. The Territory of Hawaii should assume financial responsibility for all academic phases of nursing education. This activity should be established at the University of Hawaii. Hospitals having an affiliation with the University School of Nursing should be reimbursed by the Territory for any clinical instruction provided student nurses. Support of the nursing profession, University officials and government representatives should be solicited by the governing bodies of all hospitals with nursing education programs in order to effect this transfer during the 1951–1953 biennium, or as soon as possible thereafter.

3. Hospitals should institute a uniform accounting system giving comprehensive, comparable data for comparable periods of time.

4. Prior to the 1951 legislative session the local and territorial hospital associations or the territorial government, or both together, should initiate a personnel and services study of each institution receiving or seeking subsidy, to be made by an independent survey group, to determine where economies can be effected without jeopardizing maintenance of minimum desirable standards.

5. Hospitals, through the agencies of the local and territorial hospital associations, should explore the possibilities and advantages of joint purchasing practices and if found feasible should recommend their adoption by member hospitals.

6. All government agencies should pay full reimbursable costs for hospital services to government patients.

7. The hospitals should investigate the possible merits of developing all-inclusive fee schedules.

8. The hospitals should intensify their efforts to obtain endowments and other gifts.

9. Territorial subsidization is recommended for nonprofit voluntary hospitals, provided they have conformed or have initiated measures to conform to at least the first four recommendations listed above. The amount of subsidy should be determined by the following formula: A percentage, to be decided by the Legislature, uniform for each group of hospitals and with a differential in favor of the rural and small-town group over the metropolitan group, is to be applied to the "normal" operating expense of each hospital to obtain the amount of subsidy. The "normal" operating expense is determined by substituting the admissions reported by each institution in the formula for a line of regression of the $Y=aX^b$ type, fitted by the method of least squares to a scatter diagram showing the relationship between admissions and actual operating costs for all eligible hospitals during the period of subsidy.

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[21] S.L.H. 1947, Act 203.

[22] Territorial Board of Health, *op. cit.*

Table 1

OPERATING EXPENSE AND RELATED DATA, THE QUEEN'S HOSPITAL, 1859–1949

| YEAR[1] | BEDS[2] | TOTAL PATIENT DAYS | ADMISSIONS | AV. DAYS STAY | OPERATING EXPENSE | | | PAYROLL AS % OF EXPENSE | OPERATING INCOME[3] | RATIO OF INCOME TO COST[4] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | TOTAL | PER PATIENT DAY | PER ADMISSION | | | |
| 1859–61 | 124 | 12,907 | 309 | 42 | $ 10,775 | $ 0.83 | $ 34.87 | 46 | $ 1,167 | 10.8 |
| 1861–63 | N.A. | N.A. | 894 | N.A. | 13,697 | N.A. | 31.99 | 45 | 1,426 | 10.4 |
| 1863–65 | N.A. | N.A. | | N.A. | 14,899 | N.A. | | N.A. | N.A. | N.A. |
| 1865–67 | N.A. | N.A. | 527 | N.A. | 17,586 | N.A. | 33.37 | 35 | 2,957 | 16.8 |
| 1867–69 | N.A. | N.A. | 654 | N.A. | 21,430 | N.A. | 32.77 | N.A. | 2,424 | 11.3 |
| 1869–71 | N.A. | N.A. | 961 | N.A. | 21,448 | N.A. | 22.32 | 39 | 1,827 | 8.5 |
| 1871–73[5] | N.A. | 59,600 | 900 | 66 | 25,214 | 0.42 | 28.02 | 30 | 1,941 | 7.7 |
| 1873–75[5] | 100 | 56,900 | 862 | 66 | 24,486 | 0.43 | 28.41 | 33 | 3,384 | 13.8 |
| 1875–77 | N.A. | 57,018 | 798 | 71 | 29,650 | 0.52 | 37.16 | 30 | 4,782 | 16.1 |
| 1877–79 | N.A. | 55,500 | 934 | 59 | 34,058 | 0.61 | 36.46 | 28 | 7,813 | 22.9 |
| 1879–81 | 120 | N.A. | 962 | N.A. | 41,605 | N.A. | 43.25 | 33 | 11,042 | 26.5 |
| 1881–83 | N.A. | N.A. | 965 | N.A. | 47,583 | N.A. | 49.31 | N.A. | 16,900 | 35.5 |
| 1883–85 | N.A. | N.A. | 898 | N.A. | 55,102 | N.A. | 61.36 | 29 | 17,485 | 31.7 |
| 1885–87 | N.A. | N.A. | 932 | N.A. | 56,367 | N.A. | 60.48 | 29 | 18,077 | 32.1 |
| 1887–89 | N.A. | N.A. | 616 | N.A. | 52,009 | N.A. | 84.43 | 31 | 12,744 | 24.5 |
| 1889–91 | N.A. | N.A. | 931 | N.A. | 45,014 | N.A. | 48.35 | N.A. | 17,220 | 38.3 |
| 1891–93 | N.A. | N.A. | 1,086 | N.A. | 51,531 | N.A. | 47.45 | N.A. | 18,361 | 35.6 |
| 1893–95 | N.A. | N.A. | 1,198 | N.A. | 55,671 | N.A. | 46.47 | N.A. | 16,721 | 30.0 |
| 1895–97 | N.A. | N.A. | 1,359 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. |
| 1897–99 | N.A. | N.A. | 1,498 | N.A. | 65,080 | N.A. | 43.44 | N.A. | 24,781 | 38.1 |
| 1899–1901 | N.A. | N.A. | 1,765 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. |
| 1901–03[6] | N.A. | N.A. | 1,398 | 33.7 | 78,308 | 1.78 | 56.01 | N.A. | 28,045 | 35.8 |
| 1903–05 | N.A. | N.A. | 1,172 | N.A. | 74,783 | N.A. | 63.81 | N.A. | 26,317 | 35.2 |
| 1905–07[7] | N.A. | N.A. | 1,892 | N.A. | 97,508 | 1.93 | 51.54 | 39 | N.A. | N.A. |
| 1907–09 | N.A. | N.A. | 1,693 | N.A. | 100,517 | N.A. | 59.37 | N.A. | 44,760 | 44.5 |
| 1910 | N.A. | N.A. | 1,244 | N.A. | 52,867 | N.A. | 42.50 | N.A. | 35,882 | 67.9 |
| 1911 | 130 | 27,153 | 1,272 | 21.3 | 56,434 | 2.08 | 44.37 | N.A. | 39,485 | 70.0 |
| 1912 | N.A. | 29,410 | 1,426 | 20.6 | 60,556 | 2.06 | 42.47 | 42 | 44,557 | 73.6 |
| 1913 | N.A. | 32,550 | 1,612 | 20.1 | 73,676 | 2.26 | 45.70 | 39 | 49,884 | 67.7 |
| 1914 | N.A. | 33,979 | 1,702 | 20.1 | 80,042 | 2.36 | 47.03 | 38 | 43,955 | 54.9 |
| 1915 | N.A. | 30,047 | 1,706 | 16.9 | 80,305 | 2.67 | 47.07 | 38 | 57,907 | 72.1 |
| 1916 | N.A. | 31,729 | 1,810 | 17.5 | 88,183 | 2.78 | 48.72 | 33 | 69,434 | 78.7 |
| 1917 | N.A. | 35,455 | 2,154 | 16.5 | 101,126 | 2.85 | 46.95 | 32 | 96,198 | 95.1 |
| 1918 | N.A. | 38,158 | 2,361 | 16.2 | 113,729 | 2.98 | 48.17 | 36 | 118,764 | 104.4 |
| 1919 | N.A. | 45,801 | 3,150 | 14.5 | 164,852 | 3.60 | 52.34 | 32 | 153,053 | 92.8 |
| 1920 | 190 | 47,714 | 3,658 | 13.0 | 200,421 | 4.20 | 54.79 | 39 | 184,366 | 92.0 |
| 1921 | N.A. | 46,516 | 3,740 | 12.5 | 207,437 | 4.46 | 55.46 | N.A. | 204,482 | 98.6 |
| 1922 | N.A. | 51,703 | 3,788 | 13.6 | 211,826 | 4.10 | 55.92 | N.A. | 220,002 | 103.9 |
| 1923 | 187 | 54,111 | 4,336 | 12.5 | 226,566 | 4.19 | 52.25 | N.A. | 252,529 | 111.5 |
| 1924 | 249 | 59,327 | 4,628 | 12.4 | 271,825 | 4.58 | 58.73 | N.A. | 280,413 | 103.2 |
| 1925 | 285 | 62,635 | 4,987 | 12.2 | 288,604 | 4.61 | 57.87 | N.A. | 289,239 | 100.2 |
| 1926 | 274 | 64,152 | 5,589 | 11.2 | 290,328 | 4.53 | 51.95 | N.A. | 310,353 | 106.9 |
| 1927 | 274 | 63,430 | 5,736 | 10.8 | 302,671 | 4.77 | 52.77 | N.A. | 321,245 | 106.1 |
| 1928 | 263 | 60,692 | 6,554 | 9.1 | 309,084 | 5.09 | 47.16 | N.A. | 311,857 | 100.9 |
| 1929 | 258 | 62,623 | 7,189 | 8.7 | 326,453 | 5.21 | 45.41 | N.A. | 338,991 | 103.8 |
| 1930 | 258 | 65,060 | 6,850 | 9.3 | 339,637 | 5.22 | 49.58 | N.A. | 340,051 | 100.1 |
| 1931 | 284 | 66,167 | 7,608 | 8.5 | 360,318 | 5.45 | 47.36 | N.A. | 353,979 | 98.2 |
| 1932 | 282 | 54,858 | 6,538 | 8.2 | 314,557 | 5.73 | 48.11 | N.A. | 287,067 | 91.3 |
| 1933 | 264 | 52,430 | 5,874 | 8.2 | 281,160 | 5.36 | 47.87 | N.A. | 254,716 | 90.6 |
| 1934 | 264 | 59,805 | 6,718 | 8.7 | 321,684 | 5.38 | 47.88 | N.A. | 291,992 | 90.8 |
| 1935 | 254 | 66,829 | 7,392 | 9.0 | 365,771 | 5.47 | 49.48 | N.A. | 335,482 | 91.7 |
| 1936 | 300 | 71,272 | 8,097 | 8.6 | 416,031 | 5.84 | 51.38 | N.A. | 369,306 | 88.8 |
| 1937 | 300 | 78,736 | 8,718 | 8.9 | 479,637 | 6.09 | 55.02 | N.A. | 447,164 | 93.2 |
| 1938 | 284 | 86,998 | 9,409 | 9.2 | 534,022 | 5.45 | 56.76 | N.A. | 521,695 | 97.7 |
| 1939 | 284 | 87,601 | 10,301 | 8.5 | 558,374 | 6.37 | 54.21 | 54 | 537,700 | 96.3 |
| 1940 | 284 | 97,905 | 11,808 | 8.3 | 606,584 | 6.20 | 51.37 | 54 | 624,813 | 103.0 |
| 1941 | 290 | 109,702 | 12,660 | 8.7 | 696,842 | 6.35 | 55.04 | 55 | 739,498 | 106.1 |
| 1942 | 300 | 112,491 | 13,373 | 8.4 | 803,940 | 7.15 | 60.12 | 58 | 785,966 | 97.8 |
| 1943 | 312 | 112,232 | 13,408 | 8.4 | 948,548 | 8.45 | 70.74 | 61 | 913,050 | 96.3 |
| 1944 | 305 | 112,479 | 13,326 | 8.4 | 1,112,646 | 9.89 | 83.49 | 63 | 1,069,306 | 96.1 |
| 1945 | 384 | 124,443 | 15,019 | 8.3 | 1,301,360 | 10.46 | 86.65 | 63 | 1,272,270 | 97.8 |
| 1946 | 384 | 125,195 | 14,174 | 8.8 | 1,567,392 | 12.52 | 110.58 | 60 | 1,301,509 | 83.0 |
| 1947 (6 mo.) | 384 | 57,920 | 6,266 | 9.2 | 991,292 | 17.11 | 158.20 | 72 | 942,567 | 95.1 |
| 1948 | 384 | 98,435 | 11,796 | 8.3 | 2,032,230 | 20.65 | 172.28 | 57 | 1,814,971 | 89.3 |
| 1949 | 385 | 91,565 | 11,951 | 7.7 | 1,786,320 | 19.51 | 149.47 | N.A. | 1,604,466 | 89.8 |

[1]Biennial periods ended in June or July, 1861 to 1909; calendar years, 1910 through 1946; 6-month period ended June 30, 1947; 12-month periods ended June 30, 1948 and 1949. The first entry covers the 690-day period from August 1, 1859 (when the hospital was opened) to June 20, 1861. The last 6 months of 1909 are missing.

[2]Complement at end of period.

[3]Reimbursement from patients, government and other sources for specific services rendered, excluding general governmental subsidy (given 1859–1911 and 1945–1949) but including contracted care to indigents (beginning in 1909).

[4]Operating income as a percentage of operating expense.

[5]Patient days (and 1871–73 admissions) estimated from quarterly reports in the *Hawaiian Gazette*.

[6]Average stay and cost per patient day for calendar year 1903 only.

[7]Cost per patient day and payroll data for 18-month period ended December 31, 1906 only.

N.A. Not available.

*Sources: The Polynesian*, Honolulu, June 29, 1861; *Pacific Commercial Advertiser*, Honolulu, July 2, 1863, July 21, 1877, July 12, 1879, July 13, 1887, July 30, 1895, July 20, 1901, August 21, 1903, January 26, 1904, and July 19, 1907; *Hawaiian Gazette*, Honolulu, July 3, 1867, July 14, 1869, June 28, 1871, July 16, 1873, March 17 and July 7, 1875, July 13, 1881, July 15, 1885, July 30, 1889, July 18, 1893, July 16, 1909, and February 2, 1912; *Daily Bulletin*, Honolulu, July 9, 1887 and July 13, 1891; *Hawaiian Star*, Honolulu, July 30, 1897; *Evening Bulletin*, Honolulu, July 7, 1899; R. G. Nebelung and R. C. Schmitt, *Hawaii's Hospitals: Past, Present and Future*, Table 2; *Record of Trustees Meetings, 1859–1907, The Queen's Hospital* (bound manuscript in files of Hawaiian Trust Co., Honolulu), pp. 460, 468, 474 and 478; *Annual Report of The Queen's Hospital* for each year, 1910 through 1945; and questionnaires returned by the hospital. Data for 1949 are tentative.

Table 2

SOURCES OF INCOME, THE QUEEN'S HOSPITAL, 1859–1949

| PERIOD[1] | TOTAL ADMISSIONS | ESTIMATED TOTAL INCOME | ESTIMATED PERCENTAGE OF TOTAL INCOME[2] | | |
|---|---|---|---|---|---|
| | | | PATIENTS OR THEIR FINANCIAL SPONSORS | GIFTS, INTEREST, RENTS, TAXES AND MISCELLANEOUS | GOVERNMENTAL SUBSIDY |
| 1859–69 | 2,384 | $ 101,000 | 9.6 | 55.6 | 34.8 |
| 1869–79 | 4,455 | 147,000 | 13.5 | 32.1 | 54.4 |
| 1879–89 | 4,373 | 289,000 | 24.7 | 49.7 | 25.6 |
| 1889–99 | 6,072 | 359,000 | 22.1 | 58.4 | 19.5 |
| 1899–1909 | 7,920 | 516,000 | 28.4 | 46.0 | 25.6 |
| 1909–14 | 7,750 | 355,000 | 65.8 | 28.7 | 5.5 |
| 1915–19 | 11,181 | 646,000 | 78.2 | 21.8 | 0 |
| 1920–24 | 20,150 | 1,302,000 | 87.7 | 12.3 | 0 |
| 1925–29 | 30,055 | 1,802,000 | 86.8 | 13.2 | 0 |
| 1930–34 | 33,588 | 1,848,000 | 82.7 | 17.3 | 0 |
| 1935–39 | 43,917 | 2,521,000 | 87.7 | 12.3 | 0 |
| 1940–44 | 64,575 | 4,674,000 | 88.3 | 11.7 | 0 |
| 1945–49 | 59,206 | 7,785,000 | 89.1 | 8.4 | 2.5 |

[1]Ten-year periods ended June 30 for 1869, 1879, 1889, 1899, and 1909; 5½-year period ended December 31, 1914; five-year periods ended December 31 for 1919, 1924, 1929, 1934, 1939 and 1944; 4½-year period ended June 30, 1949.
[2]Before 1911 governmental reimbursement for indigent care was given in the form of general subsidies and the revenue from a seamen's tax. Special governmental grants for non-operating purposes listed with gifts and miscellaneous.
*Sources:* See source references for Table 1. Data estimated for missing years.

Table 3

SUBSIDIZATION OF GENERAL AND ALLIED SPECIAL VOLUNTARY HOSPITALS BY HAWAIIAN GOVERNMENT, 1858–1951[1]

| BIENNIAL PERIOD[2] | NUMBER OF HOSPITALS | AMOUNT OF SUBSIDY | | | |
|---|---|---|---|---|---|
| | | TOTAL | THE QUEEN'S | KAPIOLANI | ALL OTHERS[3] |
| 1858–60 | 1 | $ 2,000 | $ 2,000 | ..... | ..... |
| 1860–62 | 1 | 4,000 | 4,000 | ..... | ..... |
| 1862–64 | 1 | 6,000 | 6,000 | ..... | ..... |
| 1864–66 | 1 | 10,000 | 10,000 | ..... | ..... |
| 1866–68 | 1 | 10,000 | 10,000 | ..... | ..... |
| 1868–70 | 1 | 10,000 | 10,000 | ..... | ..... |
| 1870–72 | 1 | 8,000 | 8,000 | ..... | ..... |
| 1872–74 | 1 | 16,000 | 16,000 | ..... | ..... |
| 1874–76 | 1 | 21,000 | 21,000 | ..... | ..... |
| 1876–78 | 1 | 21,000 | 21,000 | ..... | ..... |
| 1878–80 | 1 | 17,500 | 17,500 | ..... | ..... |
| 1880–82 | 1 | 21,000 | 21,000 | ..... | ..... |
| 1882–84 | 1 | 15,000 | 15,000 | ..... | ..... |
| 1884–86 | 1 | 16,000 | 16,000 | ..... | ..... |
| 1886–88 | 1 | 12,000 | 12,000 | ..... | ..... |
| 1888–90 | 1 | 14,000 | 14,000 | ..... | ..... |
| 1890–92 | 2 | 22,400 | 20,000 | $ 2,400 | ..... |
| 1892–94 | 2 | 22,400 | 20,000 | 2,400 | ..... |
| 1894–96 | 2 | 23,600 | 20,000 | 3,600 | ..... |
| 1896–97 | 2 | 24,000 | 20,000 | 4,000 | ..... |
| 1898–99 | 2 | 24,800 | 20,000 | 4,800 | ..... |
| 1900 (12 months) | 2 | 3,191 | ..... | 2,200 | $ 991 |
| 1901–03[4] | 4 | 56,700 | 40,000 | 9,600 | 7,100 |
| 1903 (6 months) | 5 | 15,225 | 10,000 | 3,000 | 2,225 |
| 1904–05 (18 months) | 5 | 43,875 | 30,000 | 7,200 | 6,675 |
| 1905–07 | 5 | 38,200 | 25,000 | 7,200 | 6,000 |
| 1907–09 | 5 | 37,400 | 24,000 | 7,200 | 6,200 |
| 1909–11 | 1 | 24,000 | 24,000 | ..... | ..... |
| 1939–41 | 1 | 15,000 | ..... | ..... | 15,000 |
| 1941–43 | 2 | 45,000 | ..... | 20,000 | 25,000 |
| 1943–45 | 2 | 50,000 | ..... | 20,000 | 30,000 |
| 1945–47 | 7 | 233,025 | 67,525 | 20,000 | 145,500 |
| 1947–49 | 9 | 428,000 | 125,000 | 32,000 | 271,000 |
| 1949–51 | 10 | 543,977 | 143,445 | 36,135 | 364,397 |

[1]Includes only appropriations for general operating purposes. Excludes subsidies to governmental hospitals (Hilo Memorial, Malulani, and Koloa), mental, tuberculosis and leprosy hospitals, and tuberculosis wards of general hospitals.
[2]Biennial periods ended March 31 for years 1860–1896, December 31 for years 1897 and 1899, June 30 for years 1903, 1907–1911, and 1939–1951; calendar year for 1900; 6-month period ended December 31, 1903; 18-month period ended June 30, 1905. No subsidies appropriated before 1858 or between 1911 and 1939.
[3]Waimea Hospital, Kauai, 1900–1909; Lihue Hospital, Kauai, 1901–1909; Eleele Hospital, Kauai, 1903–1909.
[4]For comment see *Pacific Commercial Advertiser*, July 31, 1901.
*Sources:* *Biennial Report of the Minister of Finance to the Legislature of 1860*, Table B, p. 16; S.L.H. 1860, Appropriation Bill; S.L.H. 1862, Appropriation Bill; S. L. H. 1864–65, Appropriation Bill; S.L.H. 1866–67, Appropriation Bill; S.L.H. 1868, Appropriations Act; S.L.H. 1870, Ch. XLII; S.L.H. 1872, Ch. XXXV; S.L.H. 1874, Ch. LIX; S.L.H. 1876, Ch. LXIV; S.L.H. 1878, Ch. XXXII; S.L.H. 1880, Ch. XLVI; S.L.H. 1882, Ch. XLVI; S.L.H. 1884, Ch. LIV; S.L.H. 1886, Ch. XXXVIII; S.L.H. 1888, Ch. LXXV; S.L.H. 1890, Ch. LI; S.L.H. 1892, Ch. LXXVIII; Acts of the Provisional Government (1894), Act 84; S.L.H. 1896, Act 56; S.L.H. 1898, Act 58; *Report of President, Board of Health, from November 10, 1900 to February 1, 1901*, pp. 49 and 52; S.L.H. 1901, Act 4; S.L.H. 1903, Acts 10 and 13; S.L.H. 1905, Act 8; S.L.H. 1907, Act 127; S.L.H. 1909, Act 150; S.L.H. 1939, Act 244; S.L.H. 1941, Act 273; S.L.H. 1943, Act 191; S.L.H. 1945, Act 272; S.L.H. 1947, Act 203; S.L.H. 1949, Act 335.

Table 4
DISTRIBUTION OF OPERATING COSTS PER PATIENT DAY,
THE QUEEN'S HOSPITAL, 1921–1949

| YEAR[1] | TOTAL | ADMINISTRATIVE | HOUSEKEEPING[2] | NURSING CARE[2] | DIETARY[2] | PHARMACY | ALL OTHER ITEMS |
|---|---|---|---|---|---|---|---|
| 1921 | $4.45 | $0.32 | $0.28 | $1.05 | $1.51 | $1.29 | |
| 1922 | 4.10 | 0.27 | 0.27 | 1.06 | 1.32 | 1.18 | |
| 1923 | 4.20 | 0.26 | 0.28 | 0.94 | 1.35 | 1.37 | |
| 1924 | 4.59 | 0.29 | 0.32 | 1.05 | 1.48 | 1.45 | |
| 1925 | 4.62 | 0.30 | 0.32 | 1.09 | 1.52 | 1.39 | |
| 1926 | 4.52 | 0.31 | 0.30 | 1.01 | 1.50 | 1.40 | |
| 1927 | 4.78 | 0.32 | 0.25 | 0.95 | 1.58 | 0.16 | 1.53 |
| 1928 | 5.09 | 0.36 | 0.30 | 0.99 | 1.60 | 0.18 | 1.66 |
| 1929 | 5.21 | 0.37 | 0.30 | 1.04 | 1.55 | 0.30 | 1.65 |
| 1930 | 5.23 | 0.38 | 0.31 | 1.11 | 1.52 | 0.20 | 1.71 |
| 1931 | 5.44 | 0.41 | 0.32 | 1.24 | 1.44 | 0.24 | 1.80 |
| 1932 | 5.73 | 0.43 | 0.30 | 1.24 | 1.44 | 0.26 | 2.06 |
| 1933 | 5.36 | 0.46 | 0.28 | 1.09 | 1.37 | 0.27 | 1.89 |
| 1934 | 5.38 | 0.42 | 0.28 | 1.24 | 1.42 | 0.28 | 1.74 |
| 1935 | 5.50 | 0.41 | 0.29 | 1.35 | 1.48 | 0.28 | 1.69 |
| 1936 | 5.84 | 0.44 | 0.30 | 1.62 | 1.53 | 0.30 | 1.65 |
| 1937 | 6.09 | 0.46 | 0.31 | 1.72 | 1.58 | 0.33 | 1.69 |
| 1938 | 6.14 | 0.43 | 0.27 | 1.78 | 1.48 | 0.34 | 1.84 |
| 1939 | 6.37 | 0.47 | 0.28 | 1.63 | 1.48 | 0.38 | 2.13 |
| 1940 | 6.20 | 0.48 | 0.24 | 1.59 | 1.51 | 0.36 | 2.02 |
| 1941 | 6.35 | 0.47 | 0.24 | 1.61 | 1.54 | 0.34 | 2.15 |
| 1942 | 7.15 | 0.60 | 0.25 | 1.80 | 1.56 | 0.33 | 2.61 |
| 1943 | 8.45 | 0.71 | 0.38 | 2.10 | 1.86 | 0.33 | 3.07 |
| 1944 | 9.89 | 0.83 | 0.49 | 2.40 | 2.05 | 0.43 | 3.69 |
| 1945 | 10.46 | 0.81 | 0.50 | 2.75 | 1.97 | 0.49 | 3.94 |
| 1946 | 12.52 | Not available | | | | | |
| 1947 | 17.11 | | | | | | |
| 1948 | 20.65 | | | | | | |
| 1949 | 19.51 | | | | | | |

[1]Calendar years 1921–1946; six-month period ended June 30, 1947; 12-month periods ended June 30 for 1948 and 1949.
[2]Data for 1921–1926 not strictly comparable to later years.
*Source:* Quoted or calculated from annual reports of The Queen's Hospital (1921–1945) and questionnaires returned by the hospital (for 1946–1949).

Table 5
PERCENTAGE DISTRIBUTION OF OPERATING EXPENSES
THE QUEEN'S HOSPITAL, 1921–1949

| YEAR | TOTAL[1] | ADMINISTRATIVE | HOUSEKEEPING[2] | NURSING CARE[2] | DIETARY[2] | PHARMACY | ALL OTHER ITEMS |
|---|---|---|---|---|---|---|---|
| 1921 | 100.0 | 7.2 | 6.3 | 23.7 | 33.8 | 29.0 | |
| 1922 | 100.0 | 6.6 | 6.6 | 25.9 | 32.1 | 28.8 | |
| 1923 | 100.0 | 6.2 | 6.6 | 22.5 | 32.2 | 32.6 | |
| 1924 | 100.0 | 6.3 | 7.0 | 22.8 | 32.4 | 31.6 | |
| 1925 | 100.0 | 6.6 | 6.9 | 23.5 | 32.9 | 30.1 | |
| 1926 | 100.0 | 6.9 | 6.6 | 22.4 | 33.1 | 31.0 | |
| 1927 | 100.0 | 6.6 | 5.3 | 19.8 | 33.0 | 3.3 | 32.0 |
| 1928 | 100.0 | 7.1 | 5.8 | 19.4 | 31.4 | 3.6 | 32.7 |
| 1929 | 100.0 | 7.1 | 5.8 | 19.9 | 29.8 | 5.8 | 31.6 |
| 1930 | 100.0 | 7.4 | 5.9 | 21.2 | 29.1 | 3.8 | 32.6 |
| 1931 | 100.0 | 7.5 | 5.8 | 22.8 | 26.4 | 4.4 | 33.1 |
| 1932 | 100.0 | 7.9 | 5.1 | 21.6 | 25.1 | 4.8 | 35.6 |
| 1933 | 100.0 | 8.5 | 5.3 | 20.3 | 25.6 | 5.0 | 35.2 |
| 1934 | 100.0 | 7.8 | 5.3 | 23.0 | 26.4 | 5.3 | 32.3 |
| 1935 | 100.0 | 7.7 | 5.5 | 24.6 | 26.8 | 4.9 | 30.6 |
| 1936 | 100.0 | 7.7 | 5.0 | 27.6 | 26.2 | 5.3 | 28.1 |
| 1937 | 100.0 | 7.5 | 5.0 | 28.1 | 26.0 | 5.4 | 27.9 |
| 1938 | 100.0 | 6.9 | 4.3 | 29.0 | 24.2 | 5.4 | 30.1 |
| 1939 | 100.0 | 7.3 | 4.3 | 25.6 | 23.3 | 5.9 | 33.5 |
| 1940 | 100.0 | 7.7 | 3.8 | 25.7 | 24.4 | 5.8 | 32.6 |
| 1941 | 100.0 | 7.5 | 3.9 | 25.3 | 24.2 | 5.3 | 33.9 |
| 1942 | 100.0 | 8.5 | 3.5 | 25.2 | 21.8 | 4.7 | 36.3 |
| 1943 | 100.0 | 8.4 | 4.5 | 24.9 | 22.0 | 3.9 | 36.2 |
| 1944 | 100.0 | 8.4 | 4.9 | 24.3 | 20.8 | 4.4 | 37.3 |
| 1945 | 100.0 | 7.7 | 4.8 | 26.3 | 18.8 | 4.7 | 37.7 |
| 1946 | Not available | | | | | | |
| 1947 | | | | | | | |
| 1948 | | | | | | | |
| 1949 | | | | | | | |

[1]May not always actually add to 100.0, because of rounding.
[2]Data for 1921–1926 not strictly comparable to 1927–1945.
*Source:* Calculated from annual reports of The Queen's Hospital (see Table 4).

Table 6

TERRITORIAL SUBSIDIZATION OF GENERAL AND ALLIED SPECIAL VOLUNTARY HOSPITALS[1]

TERRITORY OF HAWAII

1939–1951

| NAME OF HOSPITAL | BIENNIUM | | | | | |
|---|---|---|---|---|---|---|
| | 1939–41 | 1941–43 | 1943–45 | 1945–47 | 1947–49 | 1949–51 |
| Total | $15,000 | $45,000 | $50,000 | $233,025 | $428,000 | $543,977 |
| Shingle Memorial | 15,000 | 25,000 | 30,000 | 36,000 | 36,000 | 50,677 |
| Kapiolani[2] | ..... | 20,000 | 20,000 | 20,000 | 32,000 | 36,135 |
| The Queen's | ..... | ..... | ..... | 67,525 | 125,000 | 143,445 |
| St. Francis | ..... | ..... | ..... | 36,500 | 52,000 | 79,935 |
| Kauikeolani Children's | ..... | ..... | ..... | 29,200 | 40,000 | 62,963 |
| Wilcox Memorial | ..... | ..... | ..... | 25,550 | 40,000 | 43,253 |
| Kuakini | ..... | ..... | ..... | 18,250 | 25,000 | 36,683 |
| Wahiawa | ..... | ..... | ..... | ..... | 58,000 | 50,918 |
| Southshore | ..... | ..... | ..... | ..... | 20,000 | 23,543 |
| Kahuku[3] | ..... | ..... | ..... | ..... | ..... | 16,425 |

[1]Kula General Hospital generally shared in the Territorial appropriations for Kula Sanatorium, not listed here.

[2]In addition to the regular annual grant of $7,500 for "five free beds for indigent maternity patients" (S.L.H. 1937, Act 176).

[3]"This item not to be payable to the Kahuku hospital until it becomes a non-profit community hospital."

*Souces:* S.L.H. 1939, Act 244; S.L.H. 1941, Act 273; S.L.H. 1943, Act 191; S.L.H. 1945, Act 272; S.L.H. 1947, Act 203; S.L.H. 1949, Act 335.

Table 7

POPULATION, INCOME AND CONSUMERS' PRICE INDEX

TERRITORY OF HAWAII

1939–1948

| YEAR | POPULATION[1] | | INCOME OF TERRITORY[2] | | CONSUMERS' PRICE INDEX[3] |
|---|---|---|---|---|---|
| | TERRITORY OF HAWAII[4] | HONOLULU[5] | TOTAL (IN THOUSANDS) | PER CAPITA | |
| 1939 | 414,991 | 154,476 | $136,210 | $328 | N.A. |
| 1940 | 426,654 | 180,986 | 152,410 | 357 | 100.0 |
| 1941 | 465,339 | 200,158 | 194,672 | 419 | 105.0 |
| 1942 | 474,351 | 206,002 | 290,318 | 612 | 119.6 |
| 1943 | 483,363 | 211,847 | 370,320 | 767 | 129.6 |
| 1944 | 492,379 | 217,692 | 370,531 | 753 | 131.8 |
| 1945 | 502,122 | 261,033 | 428,388 | 853 | 133.7 |
| 1946 | 519,503 | 267,710 | 407,866 | 784 | 136.0 |
| 1947 | 525,477 | 268,913 | 468,231 | 892 | 162.0 |
| 1948[6] | 540,500 | 277,129 | 473,439 | 876 | 169.8 |

[1]As of July 1. From Territorial Health Department (see *Business Service,* Honolulu Chamber of Commerce, September 1948, and *Annual Report of the Board of Health, T. H., 1948,* p. 42).

[2]Total taxable income from compensation and dividends. From *Business Service,* July 1948, and typed release of the Tax Commissioner.

[3]As of June 15 (average of March and September before 1943). Index, 1940 average=100. For the city of Honolulu. From *Cost of Living in Honolulu, 1940–1948* (Hawaii Employers' Council, April 1948), p. 5, and newspaper releases.

[4]Including Honolulu.

[5]City of Honolulu only.

[6]Population on January 1, 1948 was 532,990 (Territory) and 273,021 (Honolulu).

N.A. Not available.

*Source:* See above footnotes.

Table 8

ESTIMATED TOTAL HOSPITAL FACILITIES AND SERVICES BY OWNERSHIP
TERRITORY OF HAWAII
1939–1948

| TYPE OF HOSPITAL | 1939[1] | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1947–48 |
|---|---|---|---|---|---|---|---|---|---|---|
| *Number of hospitals*[2] | | | | | | | | | | |
| Total | 39 | 44 | 42 | 40 | 40 | 38 | 39 | 42 | 39 | 39 |
| Governmental | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Non-profit voluntary | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 9 | 9 |
| Plantation | 24 | 24 | 23 | 22 | 22 | 20 | 20 | 20 | 18 | 18 |
| Proprietary[3] | 3 | 7 | 6 | 5 | 5 | 5 | 5 | 8 | 6 | 6 |
| *Number of beds* | | | | | | | | | | |
| Total | 2041 | 2161 | 2111 | 2212 | 2419 | 2298 | 2317 | 2437 | 2367 | 2337 |
| Governmental | 326 | 384 | 381 | 414 | 566 | 557 | 404 | 402 | 402 | 402 |
| Non-profit voluntary | 752 | 766 | 773 | 791 | 862 | 867 | 1052 | 1166 | 1181 | 1151 |
| Plantation | 930 | 914 | 885 | 931 | 904 | 780 | 783 | 768 | 699 | 699 |
| Proprietary[3] | 33 | 97 | 72 | 76 | 87 | 94 | 78 | 101 | 85 | 85 |
| *Total average census (excluding newborn)* | | | | | | | | | | |
| Total | 1242 | 1304 | 1376 | 1257 | 1321 | 1298 | 1404 | 1552 | 1458 | 1381 |
| Governmental | 222 | 213 | 240 | 181 | 198 | 187 | 192 | 224 | 221 | 221 |
| Non-profit voluntary | 500 | 566 | 636 | 657 | 690 | 694 | 810 | 908 | 860 | 783 |
| Plantation | 508 | 485 | 465 | 398 | 399 | 380 | 368 | 388 | 354 | 354 |
| Proprietary[3] | 12 | 40 | 35 | 21 | 34 | 37 | 34 | 32 | 23 | 23 |
| *Admissions (excluding newborn)* | | | | | | | | | | |
| Total | 47704 | 53369 | 54620 | 54638 | 56400 | 58166 | 60648 | 68130 | 67225 | 64913 |
| Governmental | 5966 | 6995 | 6097 | 5775 | 7486 | 7655 | 7928 | 8749 | 9197 | 9192 |
| Non-profit voluntary | 22253 | 25454 | 28573 | 30163 | 31384 | 32495 | 35816 | 40246 | 41658 | 39377 |
| Plantation[3] | 18970 | 19110 | 18450 | 17630 | 16460 | 16370 | 15300 | 17510 | 15271 | 15245 |
| Proprietary[3] | 515 | 1810 | 1500 | 1070 | 1070 | 1646 | 1604 | 1625 | 1099 | 1099 |
| *Average bed complement* | | | | | | | | | | |
| Total | 52 | 49 | 50 | 55 | 60 | 60 | 59 | 58 | 61 | 60 |
| Governmental | 65 | 64 | 64 | 69 | 94 | 93 | 67 | 67 | 67 | 67 |
| Non-profit voluntary | 107 | 109 | 110 | 114 | 123 | 124 | 132 | 146 | 131 | 128 |
| Plantation | 39 | 38 | 38 | 42 | 41 | 39 | 39 | 38 | 39 | 39 |
| Proprietary[3] | 11 | 14 | 12 | 15 | 17 | 19 | 16 | 13 | 14 | 14 |
| *Average percentage occupancy* | | | | | | | | | | |
| Total | 61 | 60 | 65 | 57 | 55 | 56 | 61 | 64 | 62 | 59 |
| Governmental | 68 | 55 | 63 | 44 | 35 | 34 | 48 | 56 | 55 | 55 |
| Non-profit voluntary | 66 | 74 | 82 | 83 | 80 | 80 | 77 | 78 | 73 | 68 |
| Plantation | 55 | 53 | 53 | 43 | 44 | 49 | 47 | 51 | 51 | 51 |
| Proprietary[3] | 36 | 41 | 49 | 28 | 39 | 39 | 44 | 32 | 27 | 27 |
| *Average length of stay*[4] | | | | | | | | | | |
| Total | 9.3 | 8.6 | 9.6 | 8.5 | 8.5 | 8.1 | 8.4 | 8.4 | 7.9 | 7.7 |
| Governmental | 11.6 | 9.6 | 14.7 | 11.2 | 9.7 | 9.1 | 8.9 | 9.4 | 8.8 | 8.8 |
| Non-profit voluntary | 8.6 | 8.2 | 8.5 | 8.0 | 8.1 | 7.8 | 8.3 | 8.2 | 7.5 | 7.3 |
| Plantation | 9.8 | 9.3 | 9.2 | 8.3 | 8.8 | 8.5 | 8.7 | 8.0 | 8.2 | 8.2 |
| Proprietary[3] | [5] | [5] | [5] | [5] | 11.3 | 10.4 | 8.8 | 9.4 | 7.7 | 7.7 |
| *Live births*[6] | | | | | | | | | | |
| Total T. H. | 9033 | 9523 | 9603 | 10377 | 10977 | 12211 | 12597 | 11945 | 14050 | 14522 |
| No. in hospitals (all categories) | 5736 | 6666 | 7346 | 8551 | 9616 | 11006 | 11480 | 10996 | 13169 | 13738 |
| Percentage | 63.5 | 70. | 76.5 | 82.4 | 87.6 | 90.1 | 91.2 | 92.1 | 93.8 | 94.6 |

[1]Kula General reported with Kula Sanatorium in 1939, hence not included.
[2]Non-military general and allied special.
[3]Approximate for earlier years.
[4]Hospitals sampled in cost study only.
[5]Inadequate sample.
[6]Years ended June 30th, 1939 through 1948.

*Source:* Questionnaires returned by the hospitals; R. G. Nebelung and R. C. Schmitt, *Hawaii's Hospitals: Past, Present and Future*, Tables 24, 44–51 and 52b; *Annual Reports of the Board of Health, T. H.* for each year, 1944 through 1948.

Table 9

PERCENTAGE OF ESTIMATED TOTAL HOSPITAL FACILITIES AND SERVICES BY OWNERSHIP
TERRITORY OF HAWAII
1939–1948[1]

| TYPE OF HOSPITAL | 1939[1] | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1947–48 |
|---|---|---|---|---|---|---|---|---|---|---|
| *Number of hospitals* | | | | | | | | | | |
| Total (actual) | 39 | 44 | 42 | 40 | 40 | 38 | 39 | 42 | 39 | 39 |
| Governmental | 13 | 14 | 14 | 15 | 15 | 16 | 15 | 14 | 15 | 15 |
| Non-profit voluntary | 18 | 16 | 17 | 18 | 18 | 18 | 21 | 19 | 23 | 23 |
| Plantation | 62 | 55 | 55 | 55 | 55 | 53 | 51 | 48 | 46 | 46 |
| Proprietary[2] | 8 | 16 | 14 | 12 | 12 | 13 | 13 | 19 | 15 | 15 |
| *Number of beds* | | | | | | | | | | |
| Total (actual) | 2041 | 2161 | 2111 | 2212 | 2419 | 2298 | 2317 | 2437 | 2367 | 2337 |
| Governmental | 16 | 18 | 18 | 19 | 23 | 24 | 17 | 16 | 17 | 17 |
| Non-profit voluntary | 37 | 35 | 37 | 36 | 36 | 38 | 45 | 48 | 50 | 49 |
| Plantation | 46 | 42 | 42 | 42 | 37 | 34 | 34 | 32 | 30 | 30 |
| Proprietary[2] | 2 | 4 | 3 | 3 | 4 | 4 | 3 | 4 | 4 | 4 |
| *Total average census* | | | | | | | | | | |
| Total (actual) | 1242 | 1304 | 1376 | 1257 | 1321 | 1298 | 1404 | 1552 | 1458 | 1381 |
| Governmental | 18 | 16 | 17 | 14 | 15 | 14 | 14 | 14 | 15 | 16 |
| Non-profit voluntary | 40 | 43 | 46 | 52 | 52 | 53 | 58 | 59 | 59 | 57 |
| Plantation | 41 | 37 | 34 | 32 | 30 | 29 | 26 | 25 | 24 | 26 |
| Proprietary[2] | 1 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 2 |
| *Total admissions* | | | | | | | | | | |
| Total (actual) | 47704 | 53369 | 54620 | 54638 | 56400 | 58166 | 60648 | 68130 | 67225 | 64913 |
| Governmental | 13 | 13 | 11 | 11 | 13 | 13 | 13 | 13 | 14 | 14 |
| Non-profit voluntary | 47 | 48 | 52 | 55 | 56 | 56 | 59 | 59 | 62 | 61 |
| Plantation[2] | 40 | 36 | 34 | 32 | 29 | 28 | 25 | 26 | 23 | 23 |
| Proprietary[2] | 1 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 |

[1]Non-military general and allied special. Because of rounding, percentages may not total 100.
[2]Approximate.
*Source:* Calculated from Table 8.

Table 10

ESTIMATED TOTAL HOSPITAL FACILITIES AND SERVICES
BY BED COMPLEMENT
TERRITORY OF HAWAII
1939–1948[1]

| BED COMPLEMENT | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1947–48 |
|---|---|---|---|---|---|---|---|---|---|---|
| *Number of hospitals* | | | | | | | | | | |
| Total | 39 | 44 | 42 | 40 | 40 | 38 | 39 | 42 | 39 | 39 |
| Under 35 | 18 | 21 | 19 | 15 | 14 | 14 | 17 | 20 | 17 | 17 |
| 35–99 | 16 | 18 | 18 | 19 | 19 | 18 | 15 | 14 | 16 | 16 |
| 100 and over | 5 | 5 | 5 | 6 | 7 | 6 | 7 | 8 | 6 | 6 |
| *Number of beds* | | | | | | | | | | |
| Total | 2041 | 2161 | 2111 | 2212 | 2419 | 2298 | 2317 | 2437 | 2367 | 2337 |
| Under 35 | 372 | 391 | 342 | 266 | 248 | 255 | 350 | 368 | 330 | 332 |
| 35–99 | 874 | 968 | 957 | 941 | 981 | 955 | 810 | 744 | 915 | 898 |
| 100 and over | 795 | 802 | 812 | 1005 | 1190 | 1088 | 1157 | 1325 | 1122 | 1107 |
| *Total average census*[2] | | | | | | | | | | |
| Total | 1242 | 1304 | 1376 | 1257 | 1321 | 1298 | 1404 | 1552 | 1458 | 1381 |
| Under 35 | 171 | 177 | 148 | 114 | 97 | 104 | 143 | 140 | 125 | 125 |
| 35–99 | 541 | 561 | 590 | 517 | 487 | 466 | 422 | 401 | 478 | 462 |
| 100 and over | 530 | 566 | 638 | 626 | 737 | 728 | 839 | 1011 | 855 | 794 |
| *Total admissions*[2] | | | | | | | | | | |
| Total | 47704 | 53369 | 54620 | 54638 | 56400 | 58166 | 60648 | 68130 | 67225 | 64913 |
| Under 35 | 6939 | 7978 | 5597 | 5127 | 3997 | 5126 | 6052 | 6691 | 6029 | 5982 |
| 35–99 | 19529 | 23016 | 23489 | 23500 | 20036 | 21046 | 18966 | 17770 | 21816 | 21731 |
| 100 and over | 21236 | 22375 | 25534 | 26011 | 32367 | 31994 | 35630 | 43669 | 39380 | 37200 |
| *Average bed complement* | | | | | | | | | | |
| Total | 52 | 49 | 50 | 55 | 60 | 60 | 59 | 58 | 61 | 60 |
| Under 35 | 21 | 19 | 18 | 18 | 18 | 18 | 21 | 18 | 19 | 20 |
| 35–99 | 55 | 54 | 53 | 50 | 52 | 53 | 54 | 53 | 57 | 56 |
| 100 and over | 159 | 160 | 162 | 168 | 170 | 181 | 165 | 166 | 187 | 185 |
| *Average percentage occupancy*[2] | | | | | | | | | | |
| Total | 61 | 60 | 65 | 57 | 55 | 56 | 61 | 64 | 62 | 59 |
| Under 35 | 46 | 45 | 43 | 43 | 39 | 41 | 41 | 38 | 38 | 38 |
| 35–99 | 62 | 58 | 62 | 55 | 50 | 49 | 52 | 54 | 52 | 51 |
| 100 and over | 67 | 71 | 79 | 62 | 62 | 67 | 73 | 76 | 76 | 72 |
| *Average length of stay*[2] | | | | | | | | | | |
| Total | 9.5 | 8.9 | 9.2 | 8.4 | 8.5 | 8.2 | 8.4 | 8.3 | 7.9 | 7.8 |
| Under 35 | 9.0 | 8.1 | 9.6 | 8.1 | 8.9 | 7.4 | 8.6 | 7.6 | 7.6 | 7.6 |
| 35–99 | 10.1 | 8.9 | 9.2 | 8.0 | 8.9 | 8.1 | 8.1 | 8.2 | 8.0 | 7.8 |
| 100 and over | 9.1 | 9.3 | 9.1 | 8.8 | 8.3 | 8.3 | 8.6 | 8.4 | 7.9 | 7.8 |

[1]Non-military general and allied special hospitals.
[2]Excluding newborn infants.
*Source:* Questionnaires returned by the hospitals and R. G. Nebelung and R. C. Schmitt, *Hawaii's Hospitals: Past, Present and Future,* Tables 44–51 and 52b.

Table 11
PERCENTAGE OF ESTIMATED TOTAL HOSPITAL FACILITIES AND SERVICES
BY BED COMPLEMENT
TERRITORY OF HAWAII
1939–1948[1]

| NUMBER OF BEDS | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1947–48 |
|---|---|---|---|---|---|---|---|---|---|---|
| *Number of hospitals* | | | | | | | | | | |
| Total (actual) | 39 | 44 | 42 | 40 | 40 | 38 | 39 | 42 | 39 | 39 |
| Under 35 | 46 | 48 | 45 | 38 | 35 | 37 | 44 | 48 | 44 | 44 |
| 35–99 | 41 | 41 | 43 | 48 | 48 | 47 | 38 | 33 | 41 | 41 |
| 100 and over | 13 | 11 | 12 | 15 | 18 | 16 | 18 | 19 | 15 | 15 |
| *Number of beds* | | | | | | | | | | |
| Total (actual) | 2041 | 2161 | 2111 | 2212 | 2419 | 2298 | 2317 | 2437 | 2367 | 2337 |
| Under 35 | 18 | 18 | 16 | 12 | 10 | 11 | 15 | 15 | 14 | 14 |
| 35–99 | 43 | 45 | 45 | 43 | 41 | 42 | 35 | 31 | 39 | 38 |
| 100 and over | 39 | 37 | 38 | 45 | 49 | 47 | 50 | 54 | 47 | 47 |
| *Total average census*[2] | | | | | | | | | | |
| Total (actual) | 1242 | 1304 | 1376 | 1257 | 1321 | 1298 | 1404 | 1552 | 1458 | 1381 |
| Under 35 | 14 | 14 | 11 | 9 | 7 | 8 | 10 | 9 | 9 | 9 |
| 35–99 | 44 | 43 | 43 | 41 | 37 | 36 | 30 | 26 | 33 | 33 |
| 100 and over | 43 | 43 | 46 | 50 | 56 | 56 | 60 | 65 | 59 | 57 |
| *Total admissions*[2] | | | | | | | | | | |
| Total (actual) | 47704 | 53369 | 54620 | 54638 | 56400 | 58166 | 60648 | 68130 | 67225 | 64913 |
| Under 35 | 15 | 15 | 10 | 9 | 7 | 9 | 10 | 10 | 9 | 9 |
| 35–99 | 41 | 43 | 43 | 43 | 36 | 36 | 31 | 26 | 32 | 33 |
| 100 and over | 45 | 42 | 47 | 48 | 57 | 55 | 59 | 64 | 59 | 57 |

[1]Non-military general and allied special hospitals. Percentages may not exactly total 100 because of rounding.
[2]Excluding newborn infants.
*Source:* Calculated from Table 10.

Table 12
TOTAL BEDS, OCCUPIED BEDS AND ADMISSIONS PER 1,000 POPULATION
GENERAL AND ALLIED SPECIAL HOSPITALS
TERRITORY OF HAWAII
1939–1948[1]

| YEAR | PER 1,000 ESTIMATED POPULATION | | |
|---|---|---|---|
| | BEDS | OCCUPIED BEDS[2] | ADMISSIONS[2] |
| 1939 | 4.9 | 3.0 | 115 |
| 1940 | 5.1 | 3.1 | 125 |
| 1941 | 4.5 | 3.0 | 117 |
| 1942 | 4.7 | 2.7 | 115 |
| 1943 | 5.0 | 2.7 | 117 |
| 1944 | 4.7 | 2.6 | 118 |
| 1945 | 4.6 | 2.8 | 121 |
| 1946 | 4.7 | 3.0 | 131 |
| 1947 | 4.5 | 2.8 | 128 |
| 1947–48[3] | 4.4 | 2.6 | 122 |

[1]Approximately comparable mainland data are given in R. G. Nebelung and R.C. Schmitt, *Hawaii's Hospitals: Past, Present and Future,* Tables 9, 14 and 19.
[2]Excludes newborn infants.
[3]Using January 1, 1948 population.
*Source:* Calculated from Tables 7 and 8.

Table 13

HOSPITAL FACILITIES AND SERVICES
BY CIVIL DIVISION
TERRITORY OF HAWAII
1947–1948[1]

| AREA | HOSPITALS PER 100,000 POPULATION | BEDS PER 1,000 POPULATION | OCCUPIED BEDS PER 1,000 POPULATION[2] | ADMISSIONS PER 1,000 POPULATION[2] | AVERAGE PERCENT OCCUPANCY[2] | AVERAGE LENGTH OF STAY |
|---|---|---|---|---|---|---|
| Territory of Hawaii | 7.3 | 4.4 | 2.6 | 122 | 59 | 7.8 |
| City and County of Honolulu | 3.3 | 3.3 | 2.2 | 110 | 67 | 7.3 |
| City of Honolulu | 1.8 | 3.4 | 2.5 | 121 | 73 | 7.5 |
| Rural Oahu[3] | 7.5 | 2.9 | 1.4 | 79 | 48 | 6.4 |
| Hawaii County | 21.5 | 7.7 | 4.0 | 144 | 51 | 10.0 |
| Maui & Kalawao Counties | 15.8 | 7.8 | 3.7 | 185 | 47 | 7.3 |
| Kauai County | 5.6 | 3.6 | 2.1 | 95 | 57 | 7.9 |

[1]Ratios based on population estimates for January 1, 1948.
[2]Excluding newborn infants.
[3]City and County of Honolulu exclusive of the City of Honolulu.
*Source:* Questionnaires returned by the hospitals; R. G. Nebelung and R. C. Schmitt, *Hawaii's Hospitals: Past, Present and Future*, Table 52b; and *Annual Report of the Board of Health, T. H., 1948*, p. 42.

Table 14

SURGICAL OPERATIONS, LABORATORY EXAMINATIONS AND X-RAY EXAMINATIONS
HONOLULU HOSPITALS
1939–1948

| YEAR | HOSPITALS REPORTING[1] | ADMISSIONS | SURG. OPERATIONS | | LAB. EXAMS | | X-RAY EXAMINATIONS | |
|---|---|---|---|---|---|---|---|---|
| | | | TOTAL | PER ADMISSION | TOTAL | PER ADMISSION | TOTAL | PER ADMISSION |
| 1939 | 2 | 12,588 | 5,538 | 0.44 | 66,819 | 5.31 | 8,016 | 0.64 |
| 1940 | 3 | 18,663 | 8,162 | 0.44 | 99,498 | 5.33 | 10,157 | 0.54 |
| 1941 | 3 | 20,813 | 8,686 | 0.42 | 109,230 | 5.25 | 11,790 | 0.57 |
| 1942 | 3 | 21,780 | 6,734 | 0.31 | 89,792 | 4.12 | 10,520 | 0.48 |
| 1943 | 3 | 22,819 | 8,989 | 0.39 | 83,766 | 3.67 | 14,365 | 0.63 |
| 1944 | 5 | 30,352 | 14,704 | 0.48 | 155,412 | 5.12 | 19,880 | 0.65 |
| 1945 | 5 | 32,733 | 15,733 | 0.48 | 174,511 | 5.33 | 24,612 | 0.75 |
| 1946 | 5 | 35,773 | 15,858 | 0.44 | 229,638 | 6.42 | 25,711 | 0.72 |
| 1947 | 5 | 37,059 | 16,920 | 0.46 | 246,739 | 6.66 | 26,087 | 0.70 |
| 1948[2] | 5 | 19,314 | 7,463 | 0.39 | 138,916 | 7.19 | 10,663 | 0.55 |

[1]The Queen's Hospital and Children's Hospital, 1939–1948; Kuakini Hospital, 1940–1948; Kapiolani and St. Francis Hospitals, 1944–1948.
[2]Half-year for The Queen's, St. Francis, Kapiolani and Children's Hospitals; full year (ending June 30) for Kuakini Hospital.
*Source:* Calculated from R. G. Nebelung and R. C. Schmitt, *Hawaii's Hospitals: Past, Present and Future*, Tables 53–57.

Table 15

NON-MILITARY GENERAL AND ALLIED SPECIAL HOSPITALS

TERRITORY OF HAWAII

1947–48

| NAME OF HOSPITAL | TOWN AND ISLAND | YEAR OPENED | BEDS | YEARS OF DATA[1] |
|---|---|---|---|---|
| *Governmental hospitals* | | | | |
| Hilo Memorial Hospital | Hilo, Hawaii | 1897 | 183 | 1941–1947 |
| Malulani Hospital | Wailuku, Maui | 1884 | 82 | 1939–1947 |
| Kohala County Hospital | Kohala, Hawaii | 1924 | 50 | 1939–1947 |
| Kona Hospital | Kealakekua, Hawaii | 1913 | 42 | 1941–1947 |
| Hana Hospital | Hana, Maui | 1920 | 25 | 1939–1947 |
| Kula General Hospital | Waiakoa, Maui | 1932 | 20 | 1947–1948 |
| *Non-profit voluntary hospitals* | | | | |
| The Queen's Hospital | Honolulu, Oahu | 1859 | 384 | 1859–1948 |
| Saint Francis Hospital | Honolulu, Oahu | 1927 | 213 | 1940, 1942–48 |
| Kuakini Hospital | Honolulu, Oahu | 1900 | 120 | 1939–1948 |
| Kapiolani Maternity & Gyn. Hospital | Honolulu, Oahu | 1890 | 105 | 1944–1948 |
| Kauikeolani Children's Hospital | Honolulu, Oahu | 1909 | 102 | 1939–1948 |
| G. N. Wilcox Memorial Hospital | Lihue, Kauai | 1938 | 94 | 1939–1948 |
| Wahiawa General Hospital | Wahiawa, Oahu | 1942 | 55 | 1945–1948 |
| Southshore Hospital[2] | Aiea, Oahu | 1898 | 46 | 1947 |
| Robert W. Shingle Memorial Hospital | Hoolehua, Molokai | 1931 | 32 | 1939–1948 |
| *Plantation hospitals* | | | | |
| Puunene Hospital | Puunene, Maui | 1912 | 95 | 1947 |
| Paia Hospital | Paia, Maui | 1906 | 78 | 1947 |
| Pioneer Mill Co., Ltd. Hospital | Lahaina, Maui | 1908 | 65 | 1941–1947 |
| Oahu Sugar Co., Ltd. Hospital | Waipahu, Oahu | 1898 | 52 | 1939–1947 |
| Ewa Plantation Co. Hospital | Ewa, Oahu | 1890 | 44 | 1939–1947 |
| Pepeekeo Hospital | Pepeekeo, Hawaii | 1910 | 44 | 1939–1947 |
| Olaa Hospital | Olaa, Hawaii | 1900 | 44 | ..... |
| Waialua Hospital | Waialua, Oahu | 1898 | 37 | 1939–1947 |
| Hawaiian Agricultural Co. Hospital | Pahala, Hawaii | 1915 | 37 | 1939–1947 |
| Waimea Hospital | Waimea, Kauai | 1895 | 36 | 1943–1947 |
| Honokaa Sugar Co. Hospital | Haina, Hawaii | 1900 | 30 | 1939–1947 |
| Kahuku Hospital | Kahuku, Oahu | 1912 | 28 | 1939–1947 |
| Laupahoehoe Sugar Company Hospital | Papaaloa, Hawaii | 1916 | 27 | 1939–1947 |
| Lanai City Hospital | Lanai City, Lanai | 1925 | 26 | 1939–1948 |
| Hakalau Plantation Company Hospital[3] | Hakalau, Hawaii | 1930 | 20 | 1939–1947 |
| Maunaloa Hospital | Maunaloa, Molokai | 1939 | 19 | 1939–1947 |
| Hamakua Mill Co. Hospital | Paauilo, Hawaii | 1892 | 11 | ..... |
| Ookala Hospital[3] | Ookala, Hawaii | 1935 | 9 | ..... |
| *Proprietary hospitals* | | | | |
| Matayoshi Hospital | Hilo, Hawaii | 1922 | 33 | 1945, 1947 |
| Oto Hospital | Hilo, Hawaii | 1934 | 16 | 1943–1947 |
| Matsumura Hospital[4] | Hilo, Hawaii | 1923 | 8 | 1947 |
| Tamura Hospital[5] | Waipahu, Oahu | 1933 | 7 | ..... |
| Okada Hospital | Honokaa, Hawaii | 1937 | 6 | 1939–1947 |
| Yamanoha Hospital[6] | Hilo, Hawaii | 1917 | 5 | ..... |

[1]Statistical summaries in this report are based on data for these years. Some hospitals submitted fragmentary data for other years, but such information was neither included in the statistical tables nor noted above. Most recent available year was calendar year in most cases. Only one hospital (Kapiolani) was able to furnish information for the calendar year 1948. For Kula, The Queen's, Kuakini, Wahiawa, and Shingle, most recent available year was 12-month period ended June 30, 1948; for St. Francis, November 30, 1948; for Children's, August 31, 1948; for Wilcox, October 31, 1948; for Lanai City, May 31, 1948.

[2]Plantation hospital prior to 1947.

[3]An earlier, smaller hospital antedated 1928.

[4]Present owner since 1938.

[5]Closed March 31, 1949.

[6]Present location since 1939.

*Source:* Questionnaires returned by the hospitals and plantations; interviews with owners and administrators; R. G. Nebelung and R. C. Schmitt, *Hawaii's Hospitals: Past, Present and Future,* Table 1 (year of establishment corrected for some hospitals); *American Hospital Directory, 1948.*

Table 16
ESTIMATED PERCENTAGE OF TOTAL HOSPITALS, BEDS, AND PATIENT DAYS IN SAMPLE BY OWNERSHIP
TERRITORY OF HAWAII
1939–1948

| TYPE OF HOSPITAL | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1947–48 |
|---|---|---|---|---|---|---|---|---|---|---|
| *Number of hospitals* | | | | | | | | | | |
| Total | 51 | 48 | 55 | 60 | 65 | 71 | 74 | 67 | 87 | 87 |
| Governmental | 60 | 50 | 83 | 83 | 83 | 83 | 83 | 83 | 100 | 100 |
| Non-profit voluntary | 71 | 86 | 71 | 86 | 86 | 100 | 100 | 100 | 100 | 100 |
| Plantation | 46 | 46 | 52 | 55 | 59 | 65 | 65 | 65 | 83 | 83 |
| Proprietary[1] | 33 | 14 | 17 | 20 | 40 | 40 | 60 | 25 | 67 | 67 |
| *Number of beds* | | | | | | | | | | |
| Total | 58 | 59 | 69 | 71 | 77 | 82 | 84 | 83 | 96 | 96 |
| Governmental | 48 | 45 | 95 | 94 | 96 | 96 | 95 | 95 | 100 | 100 |
| Non-profit voluntary | 85 | 94 | 85 | 94 | 92 | 100 | 100 | 100 | 100 | 100 |
| Plantation | 41 | 41 | 50 | 47 | 56 | 59 | 60 | 60 | 91 | 91 |
| Proprietary[1] | 18 | 6 | 8 | 8 | 25 | 23 | 32 | 22 | 74 | 74 |
| *Total patient days* | | | | | | | | | | |
| Total | 59 | 64 | 71 | 76 | 80 | 85 | 88 | 88 | 97 | 97 |
| Governmental | 50 | 46 | 95 | 93 | 95 | 96 | 96 | 96 | 100 | 100 |
| Non-profit voluntary | 83 | 94 | 84 | 91 | 91 | 100 | 100 | 100 | 100 | 100 |
| Plantation | 40 | 40 | 46 | 47 | 57 | 57 | 61 | 62 | 89 | 89 |
| Proprietary[1] | 27 | 7 | 6 | 10 | 26 | 25 | 66 | 32 | 81 | 81 |

[1]Approximate (especially 1939).
*Source:* Questionnaires returned by the hospitals and Table 8.

Table 17
ESTIMATED PERCENTAGE OF TOTAL HOSPITALS AND PATIENT DAYS IN SAMPLE BY BED COMPLEMENT
TERRITORY OF HAWAII
1939–1948

| BED COMPLEMENT | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1947–48 |
|---|---|---|---|---|---|---|---|---|---|---|
| *Number of hospitals* | | | | | | | | | | |
| Total | 51 | 48 | 55 | 60 | 65 | 71 | 74 | 67 | 87 | 87 |
| Under 35 | 50 | 38 | 42 | 47 | 50 | 57 | 65 | 50 | 76 | 76 |
| 35–99 | 56 | 61 | 67 | 68 | 74 | 78 | 80 | 79 | 88 | 88 |
| 100 and over | 40 | 40 | 60 | 67 | 71 | 83 | 86 | 88 | 100 | 100 |
| *Total patient days* | | | | | | | | | | |
| Total | 59 | 64 | 71 | 76 | 80 | 85 | 88 | 88 | 97 | 97 |
| Under 35 | 54 | 46 | 47 | 54 | 56 | 63 | 76 | 64 | 89 | 89 |
| 35–99 | 57 | 67 | 66 | 68 | 70 | 79 | 79 | 80 | 94 | 94 |
| 100 and over | 62 | 66 | 80 | 88 | 89 | 91 | 95 | 95 | 100 | 100 |

*Source:* Questionnaires returned by the hospitals and Table 10.

Table 18
ESTIMATED TOTAL OPERATING INCOME
ALL CIVILIAN GENERAL AND ALLIED SPECIAL HOSPITALS
BY OWNERSHIP
TERRITORY OF HAWAII
1939–1948[1]

| YEAR | TOTAL | GOVERNMENTAL | NON-PROFIT VOLUNTARY | PLANTATION | PROPRIETARY |
|---|---|---|---|---|---|
| 1939 | $1,288 | $ 96 | $1,007 | $ 174 | [2] |
| 1940 | 1,482 | 117 | 1,140 | 187 | [2] |
| 1941 | 1,816 | 178 | 1,435 | 169 | [2] |
| 1942 | 2,028 | 189 | 1,582 | 235 | [2] |
| 1943 | 2,551 | 287 | 1,926 | 312 | [2] |
| 1944 | 3,089 | 416 | 2,295 | 319 | [2] |
| 1945 | 3,760 | 461 | 2,838 | 358 | $103 |
| 1946 | 4,491 | 529 | 3,464 | 443 | [2] |
| 1947 | 6,195 | 534 | 4,532 | 1,026 | 103 |
| 1947–48 | 6,384 | 537 | 4,716 | 1,028 | 103 |

[1]In thousands of dollars. It was assumed that hospitals not included in the sample had the same operating income per patient day as those in the same ownership category that did return questionnaires.
[2]Values were calculated for this column and used in computing the "total" column, but omitted from a separate listing because of inadequacies of the sample.
*Source:* Questionnaires returned by the hospitals and Table 16.

Table 19
ESTIMATED TOTAL OPERATING EXPENSE
ALL CIVILIAN GENERAL AND ALLIED SPECIAL HOSPITALS
BY OWNERSHIP
TERRITORY OF HAWAII
1939–1948[1]

| YEAR | TOTAL | GOVERNMENTAL | NON-PROFIT VOLUNTARY | PLANTATION | PROPRIETARY |
|---|---|---|---|---|---|
| 1939 | $2,222 | $ 260 | $1,101 | $ 853 | [2] |
| 1940 | 2,368 | 282 | 1,175 | 888 | [2] |
| 1941 | 2,786 | 370 | 1,400 | 971 | [2] |
| 1942 | 3,136 | 476 | 1,602 | 1,029 | [2] |
| 1943 | 3,590 | 582 | 1,946 | 1,042 | [2] |
| 1944 | 4,249 | 714 | 2,373 | 1,114 | [2] |
| 1945 | 5,039 | 812 | 2,982 | 1,170 | $75 |
| 1946 | 6,298 | 969 | 3,747 | 1,542 | [2] |
| 1947 | 8,072 | 1,147 | 4,796 | 2,049 | 80 |
| 1947–48 | 8,527 | 1,152 | 5,237 | 2,057 | 80 |

[1]In thousands of dollars. It was assumed that hospitals not included in the sample had the same operating expense per patient day as those in the same ownership category that did return questionnaires.
[2]Values were calculated for this column and used in computing the "total" column, but omitted from a separate listing because of inadequacies of the sample.
*Source:* Questionnaires returned by the hospitals and Table 16.

Table 20
ESTIMATED TOTAL PERSONNEL AND PAYROLL
GENERAL AND ALLIED SPECIAL HOSPITALS
TERRITORY OF HAWAII
1939–1948

| YEAR | NUMBER OF WORKERS[1] | | | | | STUDENT NURSES | PAYROLL (IN THOUSANDS) |
|---|---|---|---|---|---|---|---|
| | ALL HOSPITALS | GOVERNMENTAL | NON-PROFIT VOLUNTARY | PLANTATION | PROPRIETARY | | |
| 1939 | 1,455 | 234 | 775 | 435 | [2] | 120 | $1,228 |
| 1940 | 1,572 | 250 | 829 | 450 | [2] | 117 | 1,264 |
| 1941 | 1,631 | 258 | 858 | 465 | [2] | 175 | 1,440 |
| 1942 | 1,687 | 261 | 911 | 485 | [2] | 231 | 1,679 |
| 1943 | 1,723 | 252 | 952 | 484 | [2] | 213 | 2,119 |
| 1944 | 1,832 | 260 | 1,032 | 504 | [2] | 191 | 2,667 |
| 1945 | 1,943 | 286 | 1,158 | 472 | 27 | 214 | 3,111 |
| 1946 | 2,158 | 309 | 1,316 | 495 | [2] | 254 | 3,918 |
| 1947 | 2,245 | 315 | 1,413 | 489 | 28 | 302 | 5,323 |
| 1947–48 | 2,260 | 314 | 1,429 | 489 | 28 | 353 | 5,330 |

[1]Full-time personnel plus one-half the number of part-time workers. Excludes student nurses.
[2]Inadequate sample.
*Source:* Estimated from questionnaires returned by the hospitals and Table 16, on assumption that, for each ownership category, personnel reported in sample bore the same ratio to total personnel that occupied beds reported in sample bore to total occupied beds. Data for student nurses represent a complete enumeration, however.

Table 21
POPULATION AND INCOME OF THE HAWAIIAN ISLANDS
RELATIVE TO HOSPITAL INCOME AND EXPENSE
1939–1948

| YEAR | HOSPITAL OPERATING INCOME | | HOSPITAL OPERATING EXPENSE | |
|---|---|---|---|---|
| | PER CAPITA[1] | AS % OF T. H. INCOME[2] | PER CAPITA[1] | AS % OF T. H. INCOME[2] |
| 1939 | $ 3.10 | 0.9% | $ 5.35 | 1.6% |
| 1940 | 3.47 | 1.0 | 5.55 | 1.6 |
| 1941 | 3.91 | 0.9 | 5.99 | 1.4 |
| 1942 | 4.28 | 0.7 | 6.62 | 1.1 |
| 1943 | 5.28 | 0.7 | 7.43 | 1.0 |
| 1944 | 6.28 | 0.8 | 8.64 | 1.1 |
| 1945 | 7.49 | 0.9 | 10.04 | 1.2 |
| 1946 | 8.64 | 1.1 | 12.11 | 1.5 |
| 1947 | 11.80 | 1.3 | 15.38 | 1.7 |
| 1947–48[3] | 11.98 | 1.4 | 16.00 | 1.8 |

[1]Estimated total T. H. hospital operating income or operating expense divided by T. H. population on July 1st.
[2]Estimated total T. H. hospital operating income or operating expense divided by total taxable income from compensation and dividends.
[3]Population as of January 1, 1948. Taxable income for this 12-month period assumed to equal $470.8 millions (average for the two years 1947 and 1948).
*Sources:* Tables 7, 18 and 19.

Table 22
ESTIMATED TOTAL AND PER CAPITA HOSPITAL INCOME AND EXPENSE
BY CIVIL DIVISION
TERRITORY OF HAWAII
1947–48

| AREA | JAN. 1, 1948 POPULATION | OPERATING INCOME | | OPERATING EXPENSE | |
|---|---|---|---|---|---|
| | | TOTAL (IN THOUSANDS) | PER CAPITA | TOTAL (IN THOUSANDS) | PER CAPITA |
| Territory of Hawaii | 532,990 | $6,384 | $11.98 | $8,527 | $16.00 |
| City and County of Honolulu | 365,961 | 4,724 | 12.91 | 5,454 | 14.90 |
| City of Honolulu | 273,021 | 4,252 | 15.57 | 4,673 | 17.12 |
| Rural Oahu[1] | 92,940 | 472 | 5.08 | 781 | 8.40 |
| Hawaii County | 74,281 | 817 | 11.00 | 1,440 | 19.39 |
| Maui and Kalawao Counties | 56,904 | 501 | 8.80 | 1,253 | 22.02 |
| Kauai County | 35,844 | 342 | 9.54 | 380 | 10.60 |

[1]City and County of Honolulu exclusive of the City of Honolulu.
*Source:* Questionnaires returned by the hospitals; R. G. Nebelung and R. C. Schmitt, *Hawaii's Hospitals: Past, Present and Future,* Table 52b; *Annual Report of the Board of Health, T. H., 1948,* p. 42. It was assumed that hospitals not reporting had the same operating income and cost per patient day as those hospitals in the same ownership category that did return questionnaires.

Table 23

OPERATING INCOME, OPERATING EXPENSE, PERSONNEL AND PAYROLL DATA

ALL HOSPITALS

TERRITORY OF HAWAII

1939–1948

| YEAR | OPERATING INCOME | | OPERATING EXPENSE | | PERSONNEL (YEARLY AVERAGES)[1] | | | | WAGES AND SALARIES[2] | | SUPPLIES & MISCELLANEOUS PER OCCUPIED BED[3] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PER 100 OCCUPIED BEDS | | | | | | |
| | PER PATIENT DAY | PER ADMISSION | PER PATIENT DAY | PER ADMISSION | TOTAL | PROFESSIONAL | NON-PROFESSIONAL | % PROFESSIONAL | PER WORKER[1] | PER OCCUPIED BED | |
| 1939 | $ 3.57 | $33.04 | $ 5.18 | $ 47.91 | 128 | [4] | [4] | [3] | $ 774 | $ 987 | $ 903 |
| 1940 | 3.96 | 34.12 | 5.24 | 45.13 | 130 | [4] | [4] | [3] | 752 | 974 | 943 |
| 1941 | 4.09 | 39.18 | 5.56 | 53.27 | 121 | [4] | [4] | [3] | 865 | 1,049 | 979 |
| 1942 | 4.94 | 42.00 | 6.83 | 58.01 | 136 | [4] | [4] | [3] | 980 | 1,332 | 1,161 |
| 1943 | 5.75 | 49.02 | 7.61 | 64.86 | 132 | [4] | [4] | [3] | 1,221 | 1,610 | 1,166 |
| 1944 | 7.20 | 58.55 | 9.22 | 75.04 | 144 | [4] | [4] | [3] | 1,438 | 2,065 | 1,310 |
| 1945 | 7.89 | 66.49 | 10.00 | 84.33 | 140 | [4] | [4] | [3] | 1,577 | 2,210 | 1,441 |
| 1946 | 8.51 | 71.26 | 11.27 | 94.39 | 141 | [4] | [4] | [3] | 1,787 | 2,513 | 1,602 |
| 1947 | 11.73 | 92.07 | 15.15 | 118.95 | 154 | 57 | 97 | 37 | 2,368 | 3,646 | 1,884 |
| 1947–48 | 12.77 | 98.39 | 16.94 | 130.52 | 164 | 64 | 100 | 39 | 2,355 | 3,862 | 2,333 |

[1]Excluding owners of proprietary hospitals, their wives, and student nurses (but including unpaid members of religious orders).

[2]Estimated average annual income for all workers covered by unemployment compensation in Hawaii was $2248 in 1945, $2350 in 1946, $2634 in 1947, and $2686 in 1947–1948 (calculated on basis of 52 weeks pay from averages reported by Clarence L. Hodge, ed., *Hawaii Facts and Figures* for 1945–1946, p. 26, 1946–1947, p. 26 and 1948, p. 25).

[3]Cost of all operating items other than wages and salaries.

[4]Not available.

*Source:* Calculated from questionnaires returned by the hospitals.



Table 24

OPERATING INCOME, OPERATING EXPENSE, PERSONNEL AND PAYROLL DATA

GOVERNMENT HOSPITALS

TERRITORY OF HAWAII

1939–1948

| YEAR | OPERATING INCOME | | OPERATING EXPENSE | | PERSONNEL (YEARLY AVERAGES) | | | | WAGES AND SALARIES | | SUPPLIES & MISCELLANEOUS PER OCCUPIED BED[2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PER 100 OCCUPIED BEDS[1] | | | | | | |
| | PER PATIENT DAY | PER ADMISSION | PER PATIENT DAY | PER ADMISSION | TOTAL | PROFESSIONAL | NON-PROFESSIONAL | % PROFESSIONAL | PER WORKER | PER OCCUPIED BED | |
| 1939 | $1.15 | $13.36 | $ 3.24 | $ 37.66 | 106 | 25 | 82 | 23 | $ 560 | $ 596 | $ 587 |
| 1940 | 1.48 | 14.24 | 3.58 | 34.39 | 116 | 27 | 89 | 23 | 529 | 615 | 697 |
| 1941 | 2.03 | 29.86 | 4.23 | 62.12 | 107 | 31 | 77 | 29 | 758 | 814 | 728 |
| 1942 | 2.85 | 32.11 | 7.18 | 80.75 | 144 | 41 | 102 | 29 | 941 | 1,353 | 1,266 |
| 1943 | 3.95 | 38.41 | 8.02 | 78.02 | 126 | 31 | 95 | 25 | 1,421 | 1,797 | 1,130 |
| 1944 | 6.10 | 55.32 | 10.46 | 94.85 | 140 | 26 | 113 | 19 | 1,959 | 2,736 | 1,093 |
| 1945 | 6.59 | 58.48 | 11.60 | 102.98 | 149 | 33 | 117 | 22 | 1,867 | 2,790 | 1,444 |
| 1946 | 6.47 | 61.00 | 11.85 | 111.80 | 138 | 36 | 102 | 26 | 2,244 | 3,100 | 1,227 |
| 1947 | 6.62 | 58.06 | 14.23 | 124.76 | 142 | 38 | 104 | 27 | 2,538 | 3,618 | 1,575 |
| 1947–48 | 6.64 | 58.40 | 14.26 | 125.38 | 142 | 38 | 104 | 27 | 2,564 | 3,638 | 1,577 |

[1]Rounded, hence may not add exactly to indicated totals.

[2]Cost of all operating items other than wages and salaries.

*Source:* Calculated from questionnaires returned by the hospitals.

Table 25

OPERATING INCOME, OPERATING EXPENSE, PERSONNEL AND PAYROLL DATA
NON-PROFIT VOLUNTARY HOSPITALS
TERRITORY OF HAWAII
1939–1948

| YEAR | OPERATING INCOME | | OPERATING EXPENSE | | PERSONNEL (YEARLY AVERAGES) PER 100 OCCUPIED BEDS[1] | | | | WAGES AND SALARIES | | SUPPLIES & MISCELLANEOUS PER OCCUPIED BED[2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PER PATIENT DAY | PER ADMISSION | PER PATIENT DAY | PER ADMISSION | TOTAL | PROFESSIONAL | NON-PROFESSIONAL | % PROFESSIONAL[2] | PER WORKER | PER OCCUPIED BED | |
| 1939 | $ 5.49 | $ 47.04 | $ 6.00 | $ 51.42 | 154 | 72 | 82 | 47 | $ 729 | $1,124 | $1,067 |
| 1940 | 5.48 | 45.20 | 5.65 | 46.58 | 146 | 69 | 76 | 48 | 710 | 1,035 | 1,034 |
| 1941 | 6.21 | 52.71 | 6.06 | 51.44 | 136 | 61 | 75 | 45 | 830 | 1,125 | 1.086 |
| 1942 | 6.59 | 52.74 | 6.67 | 53.41 | 138 | 65 | 74 | 47 | 964 | 1,334 | 1,100 |
| 1943 | 7.65 | 61.91 | 7.73 | 62.57 | 138 | 62 | 76 | 45 | 1,180 | 1,627 | 1,193 |
| 1944 | 9.04 | 70.64 | 9.34 | 73.03 | 149 | 67 | 82 | 45 | 1,365 | 2,029 | 1,390 |
| 1945 | 9.60 | 79.24 | 10.09 | 83.26 | 143 | 63 | 80 | 44 | 1,552 | 2,219 | 1,463 |
| 1946 | 10.45 | 86.06 | 11.31 | 93.10 | 145 | 62 | 83 | 43 | 1,650 | 2,392 | 1,735 |
| 1947[4] | 14.43 | 108.79 | 15.27 | 115.12 | 164 | 71 | 93 | 43 | 2,229 | 3,661 | 1,914 |
| 1947–48 | 16.46 | 119.76 | 18.28 | 133.00 | 183 | 83 | 99 | 46 | 2,198 | 4,013 | 2,677 |

[1]Rounded, hence may not add exactly to indicated totals. Excludes student nurses.
[2]Excluding student nurses.
[3]Cost of all operating items other than wages and salaries.
[4]The abrupt increase in payroll ratios during 1947 is largely a result of the action of the largest hospital in this category in discontinuing perquisites, with attendant increases in wages and salaries.
*Source:* Calculated from questionnaires returned by the hospitals.



Table 26

OPERATING INCOME, OPERATING EXPENSE, PERSONNEL AND PAYROLL DATA
PLANTATION HOSPITALS
TERRITORY OF HAWAII
1939–1948

| YEAR | OPERATING INCOME | | OPERATING EXPENSE | | PERSONNEL (YEARLY AVERAGES) PER 100 OCCUPIED BEDS[1] | | | | WAGES AND SALARIES | | SUPPLIES & MISCELLANEOUS PER OCCUPIED BED[2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PER PATIENT DAY | PER ADMISSION | PER PATIENT DAY | PER ADMISSION | TOTAL | PROFESSIONAL | NON-PROFESSIONAL | % PROFESSIONAL | PER WORKER | PER OCCUPIED BED | |
| 1939 | $0.94 | $ 9.18 | $ 4.58 | $ 44.98 | 85 | [3] | [3] | [3] | $1,089 | $ 929 | $ 745 |
| 1940 | 1.05 | 9.77 | 5.00 | 46.44 | 93 | [3] | [3] | [3] | 1,081 | 1,003 | 827 |
| 1941 | 1.00 | 9.16 | 5.74 | 52.61 | 100 | [3] | [3] | [3] | 1,114 | 1,119 | 977 |
| 1942 | 1.61 | 13.32 | 7.05 | 58.35 | 121 | [3] | [3] | [3] | 1,085 | 1,316 | 1,255 |
| 1943 | 2.14 | 18.93 | 7.17 | 63.31 | 122 | [3] | [3] | [3] | 1,202 | 1,461 | 1,154 |
| 1944 | 2.30 | 19.46 | 8.03 | 68.03 | 133 | [3] | [3] | [3] | 1,268 | 1,685 | 1,255 |
| 1945 | 2.68 | 23.42 | 8.77 | 76.49 | 129 | [3] | [3] | [3] | 1,436 | 1,854 | 1,345 |
| 1946 | 3.15 | 25.27 | 10.96 | 88.07 | 128 | [3] | [3] | [3] | 1,966 | 2,526 | 1,475 |
| 1947 | 7.92 | 64.68 | 15.81 | 129.18 | 138 | 36 | 101 | 26 | 2,759 | 3,797 | 1,973 |
| 1947–48 | 7.93 | 64.94 | 15.93 | 130.41 | 138 | 36 | 101 | 26 | 2,782 | 3,830 | 1,986 |

[1]Rounded, hence may not add exactly to indicated totals.
[2]Cost of all operating items other than wages and salaries.
[3]Not available.
*Source:* Calculated from questionnaires returned by the hospitals and plantations.

Table 27

OPERATING INCOME, OPERATING EXPENSE, PERSONNEL AND PAYROLL DATA

PROPRIETARY HOSPITALS[1]

TERRITORY OF HAWAII

1939–1948

| YEAR | OPERATING INCOME | | OPERATING EXPENSE[2] | | PERSONNEL (YEARLY AVERAGES)[3] | | | | WAGES AND SALARIES[2] | | SUPPLIES & MISCELLANEOUS PER OCCUPIED BED[4] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PER 100 OCCUPIED BEDS | | | | | | |
| | PER PATIENT DAY | PER ADMISSION | PER PATIENT DAY | PER ADMISSION | TOTAL | PROFESSIONAL | NON-PROFESSIONAL | % PROFESSIONAL | PER WORKER | PER OCCUPIED BED | |
| 1945 | $ 8.32 | $72.84 | $6.04 | $52.86 | 80 | 13 | 67 | 17 | $934 | $626 | $1,578 |
| 1946 | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- |
| 1947 | 12.34 | 95.58 | 9.67 | 74.93 | 121 | 22 | 100 | 18 | 805 | 761 | 2,769 |

[1]All were small hospitals (6 to 33 beds) owned by Japanese physicians and intended for Japanese patients. Sample for 1946 and years prior to 1945 was inadequate (fewer than 3 hospitals).

[2]Excluding compensation for owner and his family. The mean average annual return to owners of proprietary hospitals over a period of years has been surprisingly low; one averaged $14,874 net annual income, and the other three in the sample absorbed average annual net losses of $39, $80 and $3730. Hence, instead of making money from their hospitals, three of the proprietors had to apply some of the income from their medical practices toward hospital expenses.

[3]Includes owner and his wife. Data rounded, hence may not add exactly to indicated totals.

[4]Cost of all operating items other than wages and salaries.

*Source:* Calculated from questionnaires returned by the hospitals.



Table 28

OPERATING COST PER PATIENT DAY BY TYPE OF HOSPITAL OWNERSHIP

TERRITORY OF HAWAII

1939, 1943, AND 1947–48

| OPERATING COST PER PATIENT DAY | ALL HOSPITALS | | | GOVERNMENTAL | | | NON-PROFIT VOLUNTARY | | | PLANTATION | | | PROPRIETARY[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1939 | 1943 | 1947–48 | 1939 | 1943 | 1947–48 | 1939 | 1943 | 1947–48 | 1939 | 1943 | 1947–48 | 1947–48 |
| Total | 39 | 40 | 39 | 5 | 6 | 6 | 7 | 7 | 9 | 24 | 22 | 18 | 6 |
| Under $3.00 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| $3.00– 5.99 | 13 | 4 | 0 | 3 | 1 | 0 | 2 | 1 | 0 | 8 | 2 | 0 | 0 |
| 6.00– 8.99 | 6 | 16 | 1 | 0 | 4 | 0 | 3 | 4 | 0 | 3 | 8 | 0 | 1 |
| 9.00–11.99 | 0 | 2 | 7 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 5 | 1 |
| 12.00–14.99 | 0 | 1 | 9 | 0 | 0 | 4 | 0 | 0 | 2 | 0 | 1 | 2 | 1 |
| 15.00–17.99 | 0 | 0 | 7 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 4 | 0 |
| 18.00–20.99 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 |
| 21.00–23.99 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| $24.00 and over | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 |
| Not reported | 19 | 14 | 5 | 2 | 1 | 0 | 2 | 1 | 0 | 13 | 9 | 3 | 2 |
| Median hospital | $4.76 | $7.14 | $14.57 | $3.61 | $7.47 | $13.79 | $6.70 | $7.10 | $16.69 | $5.02 | $7.17 | $15.04 | $8.57 |

[1]Insufficient sample for earlier years.

*Source:* Questionnaires returned by the hospitals and Table 8.

Table 29

MEAN AVERAGE COST PER PATIENT DAY AND ESTIMATED STANDARD DEVIATION BY TYPE OF HOSPITAL OWNERSHIP TERRITORY OF HAWAII 1939, 1943, AND 1947–1948

| YEAR | ALL HOSPITALS | GOVERNMENTAL | NON-PROFIT VOLUNTARY | PLANTATION | PROPRIETARY |
|---|---|---|---|---|---|
| *Mean average cost and estimated standard deviation*[1] | | | | | |
| 1939 | $5.18 ± 1.35 | $3.24 ± 0.40 | $6.00 ± 1.12 | $4.58 ± 1.30 | [2] |
| 1943 | 7.61 ± 1.85 | 8.02 ± 0.89 | 7.73 ± 1.35 | 7.17 ± 2.60 | [2] |
| 1947–48 | 16.94 ± 4.23 | 14.26 ± 1.71 | 18.28 ± 3.02 | 15.93 ± 5.80 | $9.67 ± 5.00 |
| *One σ range (68.27% of patient days)*[3] | | | | | |
| 1939 | $3.83— 6.53 | $2.84— 3.64 | $4.88— 7.12 | $3.28— 5.88 | [2] |
| 1943 | 5.76— 9.46 | 7.13— 8.91 | 6.38— 9.08 | 4.57— 9.77 | [2] |
| 1947–48 | 12.71—21.17 | 12.55—15.97 | 15.26—21.30 | 10.13—21.73 | $4.67—14.67 |
| *Two σ range (95.45% of patient days)*[4] | | | | | |
| 1939 | $2.48— 7.88 | $2.44— 4.04 | $3.76— 8.24 | $1.98— 7.18 | [2] |
| 1943 | 3.91—11.31 | 6.24— 9.80 | 5.03—10.43 | 1.97—12.37 | [2] |
| 1947–48 | 8.48—25.40 | 10.84—17.68 | 12.24—24.32 | 4.33—27.53 | $0.00—19.67 |
| *Three σ range (99.73% of patient days)*[5] | | | | | |
| 1939 | $1.13— 9.23 | $2.04— 4.44 | $2.64— 9.36 | $0.68— 8.48 | [2] |
| 1943 | 2.06—13.16 | 5.35—10.69 | 3.68—11.78 | 0.00—14.97 | [2] |
| 1947–48 | 4.25—29.63 | 9.13—19.39 | 9.22—27.34 | 0.00—33.33 | $0.00—24.67 |

[1]Estimated standard deviation ($\sigma$) of all hospitals of each category in the Territory, as calculated from the formula $\sigma = \sqrt{\frac{\Sigma X^2}{N-1}}$ where $\Sigma X^2$ is the sum of the squared deviations of each hospital (weighted by average census) in the sample from the sample mean (X), and N is the total average census of the sample.

[2]Unrepresentative sample.

[3]$X \pm 1\sigma$. About 68 per cent of the patient days cost an amount lying between the indicated values.

[4]$X \pm 2\sigma$. About 95½ per cent of the patient days lay between the indicated values.

[5]$X \pm 3\sigma$. About 99.7 per cent of the patient days cost amounts lying between the indicated values.

*Source:* Calculated from questionnaires submitted by the hospitals.

Table 30

RELIABILITY OF SAMPLE MEANS, COST PER PATIENT DAY BY TYPE OF HOSPITAL OWNERSHIP TERRITORY OF HAWAII 1939, 1943, AND 1947–1948

| YEAR | ALL HOSPITALS | GOVERNMENTAL | NON-PROFIT VOLUNTARY | PLANTATION | PROPRIETARY |
|---|---|---|---|---|---|
| *Mean average cost and standard error*[1] | | | | | |
| 1939 | $5.18 ± 0.19 | $3.24 ± 0.16 | $6.00 ± 0.21 | $4.58 ± 0.30 | [2] |
| 1943 | 7.61 ± 0.16 | 8.02 ± 0.09 | 7.73 ± 0.17 | 7.17 ± 0.47 | [2] |
| 1947–48 | 16.94 ± 0.13 | 14.26 ± 0.00[3] | 18.28 ± 0.00[3] | 15.93 ± 0.50 | $9.67 ± 1.09 |
| *One $\sigma_x$ range (limits of accuracy 68.27% of the time)*[4] | | | | | |
| 1939 | $4.99— 5.37 | $3.08— 3.40 | $5.79— 6.21 | $4.28— 4.88 | [2] |
| 1943 | 7.45— 7.77 | 7.93— 8.11 | 7.56— 7.90 | 6.70— 7.64 | [2] |
| 1947–48 | 16.81—17.07 | 14.26[3] | 18.28[3] | 15.43—16.43 | $8.58—10.76 |
| *Two $\sigma_x$ range (limits of accuracy 95.45% of the time)*[5] | | | | | |
| 1939 | $4.80— 5.56 | $2.92— 3.56 | $5.58— 6.42 | $3.98— 5.18 | [2] |
| 1943 | 7.29— 7.93 | 7.84— 8.20 | 7.39— 8.07 | 6.23— 8.11 | [2] |
| 1947–48 | 16.68—17.20 | 14.26[3] | 18.28[3] | 14.93—16.93 | $7.49—11.85 |
| *Three $\sigma_x$ range (limits of accuracy 99.73% of the time)*[6] | | | | | |
| 1939 | $4.61— 5.75 | $2.76— 3.72 | $5.37— 6.63 | $3.68— 5.48 | [2] |
| 1943 | 7.13— 8.09 | 7.75— 8.29 | 7.22— 8.24 | 5.76— 8.58 | [2] |
| 1947–48 | 16.55—17.33 | 14.26[3] | 18.28[3] | 14.43—17.43 | $6.40—12.94 |

[1]Standard error of the mean ($\sigma_x$), calculated from the formula $\sigma_x = \frac{\sigma}{\sqrt{H}} \sqrt{1 - \frac{n}{N}}$ in which $\sigma$ is the estimated standard deviation of all hospitals of the category in question in the Territory (see Table 29), H is the number of hospitals in the sample, n is the number of patient days in the sample, and N is the number of patient days in the hospital population. The computations for the all hospitals column assumed an unstratified sample, thereby producing a very conservative (high) value for $\sigma_x$; use of the formula for stratified samples would have given considerably lower standard error values.

[2]Unrepresentative sample ($\sigma$ and $\sigma_x$ require a random sample).

[3]Since this figure represents a 100 per cent sample ($^x\sqrt{1-n/N} = 0$, in the first footnote), $\sigma_x$ is zero, and the indicated average is the only possible one; *i.e.*, there can be no difference in average cost computed by using another sample of like size.

[4]$X \pm 1\ \sigma_x$, when X is the sample mean. Additional samples of equal size will give average costs per patient day lying between the indicated limits about 68 per cent of the time.

[5]$X \pm 2\ \sigma_x$. Additional samples of equal size will give average costs per patient day lying between the indicated limits over 95 per cent of the time.

[6]$X \pm 3\ \sigma_x$. Additional samples of equal size will give average costs per patient day lying between the indicated limits about 99.7 per cent of the time.

*Source:* Calculated from questionnaires returned by the hospitals.

Table 31
SOURCES OF INCOME
BY HOSPITAL OWNERSHIP
TERRITORY OF HAWAII
1947–1948[1]

| SOURCE | ALL HOSPITALS[2] | GOVERNMENTAL[3] | NON-PROFIT VOLUNTARY[4] | PLANTATION[5] | PROPRIETARY[6] |
|---|---|---|---|---|---|
| Total[7] | $8,606,845 | $1,152,942 | $5,215,445 | $2,136,098 | $102,360 |
| Patients | 73.7% | 46.5% | 88.7% | 48.1% | 100.0% |
| Government | 10.4 | 50.0 | 5.5 | 0.1 | 0 |
| Investments | 1.6 | 0 | 2.6 | 0 | 0 |
| Gifts | 0.5 | 0.1 | 0.7 | 0 | 0 |
| Other sources | 13.8 | 3.4 | 2.5 | 51.8 | 0 |

[1]All data except column totals expressed as percentages. For 12-month period ending no later than December 31, 1948.
[2]Based on 34 (of 39) hospitals. About 97 per cent of estimated total patient days were reported by the sample.
[3]Complete enumeration (six hospitals). Amount for government estimated by subtracting gross reported (non-governmental) income from gross expenses.
[4]Complete enumeration (nine hospitals).
[5]Based on 15 (of 18) hospitals. About 89 per cent of the estimated total plantation patient days were reported by the sample. "Other sources" consisted of the amount supplied by the plantations to cover deficits (51.0 per cent—estimated by subtracting reported gross income from reported gross expenses) and meals served to employees (0.8 per cent).
[6]Based on 4 (of 6) hospitals. About 81 per cent of estimated total proprietary hospital patient days were reported by the sample. Most owners of hospitals in this group occasionally have had to transfer profits from their medical practices to their hospitals, in order to cover deficits, but these sums are not listed in the table.
[7]Estimated total, in dollars.
*Source:* Calculated from questionnaires returned by the hospitals.

Table 32
PERCENTAGE DISTRIBUTION OF OPERATING EXPENSES
GENERAL AND ALLIED HOSPITALS
TERRITORY OF HAWAII
1939–1948

| | WAGES AND SALARIES | | | | | SUPPLIES AND MISCELLANEOUS[1] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| YEAR | ALL HOSPITALS | GOVT. | NON-PROFIT VOL. | PLANT. | PROP.[2] | ALL HOSPITALS | GOVT. | NON-PROFIT VOL. | PLANT. | PROP. |
| 1939 | 52% | 50% | 51% | 56% | [3] | 48% | 50% | 49% | 44% | [3] |
| 1940 | 51 | 47 | 50 | 55 | [3] | 49 | 53 | 50 | 45 | [3] |
| 1941 | 52 | 53 | 51 | 53 | [3] | 48 | 47 | 49 | 47 | [3] |
| 1942 | 53 | 52 | 55 | 51 | [3] | 47 | 48 | 45 | 49 | [3] |
| 1943 | 58 | 61 | 58 | 56 | [3] | 42 | 39 | 42 | 44 | [3] |
| 1944 | 61 | 71 | 59 | 57 | [3] | 39 | 29 | 41 | 43 | [3] |
| 1945 | 61 | 66 | 60 | 58 | 28% | 39 | 34 | 40 | 42 | 72% |
| 1946 | 61 | 72 | 58 | 63 | [3] | 39 | 28 | 42 | 37 | [3] |
| 1947 | 66 | 70 | 66 | 66 | 22 | 34 | 30 | 34 | 34 | 78 |
| 1947–48 | 62 | 70 | 60 | 66 | 22 | 38 | 30 | 40 | 34 | 78 |

[1]All operating items except wages and salaries.
[2]No allowance is made for compensation of either the owner or his wife.
[3]Inadequate sample.
*Source:* Calculated from questionnaires returned by the hospitals.

Table 33
DISTRIBUTION OF OPERATING EXPENSES
BY HOSPITAL OWNERSHIP
TERRITORY OF HAWAII
1947–1948[1]

| DESCRIPTION | TOTAL HOSPITALS[2] | GOVERNMENTAL[3] | NON-PROFIT VOLUNTARY[4] | PLANTATION[5] | PROPRIETARY[6] |
|---|---|---|---|---|---|
| Total[7] | $8,527,117 | $1,152,462 | $5,237,147 | $2,057,274 | $80,234 |
| Professional services[8] | 51.4% | 52.8% | 52.3% | 46.9% | [6] |
| Dietary | 17.0 | 19.5 | 16.7 | 15.8 | [6] |
| House and property[9] | 16.0 | 20.0 | 15.9 | 12.8 | [6] |
| Administration | 9.3 | 7.4 | 9.0 | 12.3 | [6] |
| Outpatient service[10] | 2.2 | 0 | 0.8 | 9.7 | [6] |
| Replacements or depreciation of equipment[10] | 1.2 | 0.3 | 1.3 | 1.4 | [6] |
| Other | 2.9 | 0 | 4.0 | 1.1 | [6] |

[1]All data except column totals expressed as percentages. For a 12-month period ending no later than December 31, 1948.
[2]Based on 25 (of 39) hospitals. Institutions reporting had about 89.3 per cent of total estimated operating costs.
[3]Based on 5 (of 6) hospitals. Institutions reporting had about 95.3 per cent of estimated total governmental hospital operating costs.
[4]Complete enumeration for the nine hospitals in this group.
[5]Based on 10 (of 18) hospitals. Institutions reporting had about 61.9 per cent of the estimated total plantation hospital operating costs.
[6]Only one hospital (of 6) submitted an adequate cost breakdown; this one reporting institution accounted for about 6.5 per cent of the total estimated proprietary hospital operating costs. Because of the inadequacy of the sample, no percentage distribution was made. The total estimated operating cost for hospitals in this category does not include compensation for either owners of the hospitals or their wives.
[7]Estimated totals, in dollars.
[8]Includes cost of medical, surgical and nursing service, pharmacy and drugs, x-ray, radium and laboratory.
[9]Includes laundry, fuel, light, power and maintenance of building and grounds.
[10]Not reported by many institutions, which included these costs under other items.
*Source:* Calculated from questionnaires returned by the hospitals.

Table 34
OPERATING INCOME, OPERATING EXPENSE, PERSONNEL AND PAYROLL DATA
HOSPITALS OF LESS THAN 35 BEDS
TERRITORY OF HAWAII
1939–1948

| YEAR | OPERATING INCOME[1] | | OPERATING EXPENSE | | PERSONNEL (YEARLY AVERAGES) PER 100 OCCUPIED BEDS[3] | | | | WAGES & SALARIES[2] | | SUPPLIES & MISC. PER OCC. BED |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PER PATIENT DAY | PER ADMISSION | PER PATIENT DAY | PER ADMISSION | TOTAL | PROFES-SIONAL | NON-PROFES-SIONAL | % PROFES-SIONAL | PER WORKER | PER OCCUPIED BED | |
| 1939 | $1.19 | $ 9.08 | $ 5.25 | $ 40.17 | 116 | 37 | 79 | 32 | $ 993 | $1,141 | $ 774 |
| 1940 | 1.04 | 8.73 | 5.59 | 47.08 | 120 | 35 | 85 | 29 | 999 | 1,186 | 859 |
| 1941 | 1.21 | 10.16 | 6.99 | 58.71 | 132 | 40 | 93 | 30 | 1,126 | 1,476 | 1,076 |
| 1942 | 1.82 | 14.90 | 8.08 | 66.12 | 134 | 41 | 93 | 30 | 1,222 | 1,623 | 1,326 |
| 1943 | 2.04 | 16.93 | 8.19 | 67.91 | 133 | 41 | 93 | 31 | 1,388 | 1,799 | 1,190 |
| 1944 | 2.47 | 18.95 | 8.69 | 66.55 | 136 | 41 | 95 | 30 | 1,481 | 1,965 | 1,214 |
| 1945 | 4.04 | 31.19 | 8.60 | 66.40 | 122 | 34 | 88 | 28 | 1,493 | 1,775 | 1,366 |
| 1946 | 3.69 | 26.03 | 11.49 | 80.98 | 147 | 39 | 109 | 26 | 1,819 | 2,642 | 1,551 |
| 1947 | 7.58 | 56.78 | 14.22 | 106.55 | 143 | 37 | 106 | 26 | 2,202 | 3,040 | 2,149 |
| 1947–48 | 7.72 | 58.32 | 14.58 | 110.22 | 146 | 38 | 108 | 26 | 2,196 | 3,114 | 2,212 |

[1]The fluctuations between 1944 and 1947 (inclusive) can be attributed in large measure to variations in the magnitude of the sample during those years (see Table 17). In addition, many of the hospitals in this size category were operated by plantations, which abolished the perquisite system during the period.

[2]Excluding owners of proprietary hospitals and their wives.

[3]Rounded, hence may not add exactly to indicated totals.

*Source:* Calculated from questionnaires returned by the hospitals.



Table 35
OPERATING INCOME, OPERATING EXPENSE, PERSONNEL AND PAYROLL DATA
HOSPITALS OF 35–99 BEDS
TERRITORY OF HAWAII
1939–1948

| YEAR | OPERATING INCOME[1] | | OPERATING EXPENSE | | PERSONNEL (YEARLY AVERAGES) PER 100 OCCUPIED BEDS[2] | | | | WAGES & SALARIES | | SUPPLIES & MISC. PER OCC. BED |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PER PATIENT DAY | PER ADMISSION | PER PATIENT DAY | PER ADMISSION | TOTAL | PROFES-SIONAL | NON-PROFES-SIONAL | % PROFES-SIONAL | PER WORKER | PER OCCUPIED BED | |
| 1939 | $1.82 | $18.82 | $ 4.02 | $ 41.62 | 97 | [3] | [3] | [3] | $ 786 | $ 764 | $ 703 |
| 1940[4] | 2.46 | 21.41 | 4.30 | 37.35 | 112 | [3] | [3] | [3] | 708 | 793 | 779 |
| 1941 | 2.10 | 21.01 | 4.56 | 45.64 | 98 | [3] | [3] | [3] | 872 | 854 | 811 |
| 1942[4] | 3.82 | 29.81 | 6.17 | 48.12 | 130 | [3] | [3] | [3] | 859 | 1,120 | 1,132 |
| 1943 | 3.33 | 28.94 | 6.42 | 55.87 | 121 | [3] | [3] | [3] | 1,077 | 1,305 | 1,038 |
| 1944 | 5.16 | 41.93 | 8.29 | 67.30 | 144 | [3] | [3] | [3] | 1,197 | 1,726 | 1,309 |
| 1945 | 5.75 | 47.10 | 10.38 | 84.98 | 163 | [3] | [3] | [3] | 1,314 | 2,138 | 1,649 |
| 1946 | 4.70 | 39.44 | 10.69 | 89.69 | 135 | [3] | [3] | [3] | 1,854 | 2,507 | 1,396 |
| 1947 | 8.41 | 65.51 | 14.76 | 114.95 | 144 | 38 | 106 | 27 | 2,456 | 3,540 | 1,847 |
| 1947–48 | 8.58 | 64.90 | 15.31 | 115.76 | 149 | 41 | 108 | 27 | 2,480 | 3,693 | 1,898 |

[1]The decline in 1946 can be attributed to the exclusion of a Honolulu institution which in 1944 and 1945 greatly influenced the ratios in the intermediate (35–99 bed) group, but thereafter fell in the 100 bed and over category. The rise in 1947 resulted from a significant revision of plantation policy regarding charges for hospitalization.

[2]Excluding student nurses.

[3]Not available.

[4]Data for 1940 and 1942 are influenced by the presence of a church-operated hospital with a large staff consisting in part of members of a religious order. The ratio of total workers is thus made somewhat higher, the payroll ratios somewhat lower, than would otherwise be the case.

*Source:* Calculated from questionnaires returned by the hospitals.

Table 36

OPERATING INCOME, OPERATING EXPENSE, PERSONNEL AND PAYROLL DATA
HOSPITALS OF 100 BEDS OR MORE
TERRITORY OF HAWAII
1939–1948

| YEAR | OPERATING INCOME | | OPERATING EXPENSE | | PERSONNEL (YEARLY AVERAGES) PER 100 OCCUPIED BEDS[1] | | | | WAGES & SALARIES | | SUPPLIES & MISC. PER OCC. BED |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PER PATIENT DAY | PER ADMISSION | PER PATIENT DAY | PER ADMISSION | TOTAL | PROFES-SIONAL | NON-PROFES-SIONAL | % PROFES-SIONAL | PER WORKER[2] | PER OCCUPIED BED | |
| 1939 | $ 5.88 | $ 52.25 | $ 6.25 | $ 55.48 | 160 | 75 | 84 | 47 | $ 723 | $1,153 | $1,127 |
| 1940 | 6.09 | 52.30 | 6.11 | 52.41 | 150 | 71 | 79 | 47 | 742 | 1,110 | 1,125 |
| 1941 | 5.99 | 46.82 | 6.12 | 57.96 | 138 | 59 | 78 | 43 | 828 | 1,139 | 1,093 |
| 1942 | 6.00 | 54.34 | 7.11 | 64.32 | 140 | 58 | 82 | 41 | 1,026 | 1,435 | 1,159 |
| 1943 | 7.30 | 61.77 | 8.17 | 69.12 | 137 | 57 | 81 | 41 | 1,274 | 1,751 | 1,231 |
| 1944 | 8.79 | 72.15 | 9.79 | 80.30 | 144 | 59 | 85 | 41 | 1,569 | 2,262 | 1,320 |
| 1945 | 9.30 | 80.48 | 10.03 | 86.80 | 134 | 59 | 74 | 44 | 1,722 | 2,298 | 1,364 |
| 1946 | 10.24 | 87.18 | 11.45 | 97.50 | 142 | 60 | 82 | 42 | 1,762 | 2,503 | 1,676 |
| 1947 | 14.01 | 111.12 | 15.48 | 122.79 | 161 | 70 | 91 | 44 | 2,345 | 3,780 | 1,870 |
| 1947–48 | 15.76 | 123.05 | 18.16 | 141.78 | 175 | 80 | 95 | 46 | 2,315 | 4,058 | 2,588 |

[1]Rounded, hence may not add exactly to indicated totals. Excludes student nurses.
[2]Excluding student nurses.
*Source:* Calculated from questionnaires returned by the hospitals.

Table 37
DISTRIBUTION OF OPERATING EXPENSES
BY HOSPITAL BED COMPLEMENT
TERRITORY OF HAWAII
1947–1948[1]

| DESCRIPTION | TOTAL HOSPITALS[2] | UNDER 35 BEDS[3] | 35–99 BEDS[4] | 100 BEDS AND OVER[5] |
|---|---|---|---|---|
| Total[6] | $8,527,117 | $657,910 | $2,595,163 | $5,274,044 |
| Professional services[7] | 51.4% | 38.7% | 48.9% | 53.4% |
| Dietary | 17.0 | 16.0 | 18.6 | 16.5 |
| House and property[8] | 16.0 | 19.0 | 15.0 | 16.1 |
| Administration | 9.3 | 18.1 | 9.2 | 8.6 |
| Outpatient service[9] | 2.2 | 5.1 | 5.4 | 0.8 |
| Replacements or depreciation of equipment[9] | 1.2 | 2.2 | 1.3 | 1.0 |
| Other | 2.9 | 0.9 | 1.6 | 3.6 |

[1]All data except column totals expressed as percentages. For a 12-month period ending no later than December 31, 1948.
[2]Based on 25 (of 39) hospitals. The sample covers 89.3 per cent of estimated operating costs.
[3]Based on 8 (of 17) hospitals. Five of the eight were plantation hospitals. Institutions accounting for about 64.7 per cent of the estimated total small hospital operating costs are included.
[4]Based on 11 (of 16) hospitals. Institutions accounting for about 73.8 per cent of the estimated total intermediate hospital operating costs are included.
[5]Complete sample (six hospitals).
[6]Estimated total, in dollars.
[7]Includes cost of medical, surgical and nursing service, pharmacy and drugs, x-ray, radium and laboratory.
[8]Includes laundry, fuel, light, power and maintenance of building and grounds.
[9]Not reported by many institutions, which included these costs under other items.
*Source:* Calculated from questionnaires returned by the hospitals.

Table 38
HOSPITAL INCOME AND EXPENSE
BY LOCATION AND TYPE OF OWNERSHIP
TERRITORY OF HAWAII
1947–1948

| TYPE OF OWNERSHIP | NO. OF HOSPITALS REPORTING[1] | AVERAGE BED COMPLEMENT | OPERATING INCOME | | OPERATING EXPENSE | | INCOME RELATIVE TO EXPENSE[2] |
|---|---|---|---|---|---|---|---|
| | | | PER PATIENT DAY | PER ADMISSION | PER PATIENT DAY | PER ADMISSION | |
| TERRITORY OF HAWAII | 34 | 60 | $12.77 | $98.39 | $16.94 | $130.52 | 75.4 |
| *City of Honolulu* | | | | | | | |
| Total (all non-profit voluntary) | 5 | 185 | 17.20 | 128.85 | 18.90 | 141.61 | 91.0 |
| *Rural Oahu*[3] | | | | | | | |
| Total | 6 | 44 | 10.00 | 64.03 | 16.81 | 107.62 | 59.5 |
| Non-profit voluntary | 2 | 50 | 11.08 | 62.70 | 14.52 | 82.14 | 76.3 |
| Plantation | 4 | 40 | 9.27 | 65.16 | 18.36 | 129.13 | 50.5 |
| *Hawaii County* | | | | | | | |
| Total | 12 | 41 | 6.92 | 67.87 | 13.11 | 128.63 | 52.8 |
| Governmental | 3 | 92 | 7.22 | 72.65 | 14.19 | 142.80 | 50.9 |
| Plantation | 5 | 32 | 5.22 | 51.92 | 11.83 | 117.76 | 44.1 |
| Proprietary | 4 | 16 | 12.34 | 95.58 | 10.23 | 79.26 | 120.6 |
| *Maui and Kalawao Counties* | | | | | | | |
| Total | 9 | 49 | 6.56 | 47.73 | 16.38 | 119.27 | 40.0 |
| Governmental | 3 | 43 | 5.41 | 37.20 | 14.41 | 99.00 | 37.6 |
| Non-profit voluntary | 1 | [4] | [4] | [4] | [4] | [4] | [4] |
| Plantation | 5 | 57 | 6.54 | 52.76 | 17.33 | 139.76 | 37.7 |
| *Kauai County* | | | | | | | |
| Total | 2 | 65 | 12.73 | 100.09 | 14.13 | 111.15 | 90.0 |
| Non-profit voluntary | 1 | [4] | [4] | [4] | [4] | [4] | [4] |
| Plantation | 1 | [4] | [4] | [4] | [4] | [4] | [4] |

[1]Five hospitals failed to submit data: in rural Oahu, one proprietary hospital; in Hawaii County, three plantation hospitals and one proprietary hospital.
[2]Operating income as a percentage of operating expense. Profit is indicated by values over 100, loss by values under 100.
[3]City and County of Honolulu exclusive of the City of Honolulu.
[4]Omitted to avoid disclosing data for individual hospitals.
*Source:* Calculated from questionnaires returned by the hospitals.

Table 39
NON-OPERATING INCOME PER ADMISSION
BY TYPE OF HOSPITAL OWNERSHIP
TERRITORY OF HAWAII
1939–1948[1]

| YEAR | TOTAL | GOVERNMENTAL | NON-PROFIT VOLUNTARY | PLANTATION | PROPRIETARY |
|---|---|---|---|---|---|
| 1939 | $1.52 | $ 0 | $ 2.48 | $ 0 | $ [2] |
| 1940 | 1.72 | 0 | 2.56 | 0 | [2] |
| 1941 | 1.49 | 0 | 2.42 | 0 | [2] |
| 1942 | 2.28 | 0 | 3.44 | 0 | [2] |
| 1943 | 3.11 | 0 | 4.95 | 0.01 | [2] |
| 1944 | 4.17 | 0 | 6.34 | [3] | [2] |
| 1945 | 4.77 | 3.91 | 6.29 | [3] | 1.16 |
| 1946 | 5.99 | 3.80 | 8.11 | 0.03 | [2] |
| 1947[4] | 6.27 | 4.30 | 8.57 | 1.17 | 0 |
| 1947–48[4] | 8.74 | 4.30 | 12.68 | 1.17 | 0 |

[1]Excludes sums supplied to governmental hospitals by the counties and to plantation hospitals by the plantations to cover deficits. One non-profit voluntary hospital withheld data on gifts, investments and miscellaneous non-operating income for the period 1939–1947. In 1947–48 the inclusion of these additional data added 73c to the non-profit voluntary figure and 45c to the total figure.

[2]Inadequate sample.

[3]Less than $0.005.

[4]Plantation hospital income confined to one Maui hospital (not listed for years previous to 1947), which reported a large income from meals served to hospital employees.

*Source:* Calculated from questionnaires returned by the hospitals.

Table 40
NON-OPERATING EXPENSE PER ADMISSION[1]
BY TYPE OF HOSPITAL OWNERSHIP
TERRITORY OF HAWAII
1939–1948

| YEAR | TOTAL | GOVERNMENTAL | NON-PROFIT VOLUNTARY[2] | PLANTATION[3] | PROPRIETARY |
|---|---|---|---|---|---|
| 1939 | $0.24 | $ 0 | $ 0 | $0.76 | [4] |
| 1940 | 0.46 | 0 | 0.35 | 0.96 | [4] |
| 1941 | 0.44 | 0.08 | 0.44 | 0.59 | [4] |
| 1942 | 0.47 | 0.09 | 0.32 | 1.10 | [4] |
| 1943 | 0.43 | 0.07 | 0.53 | 0.33 | [4] |
| 1944 | 0.39 | 0.07 | 0.44 | 0.31 | [4] |
| 1945 | 0.68 | 0.06 | 0.77 | 0.52 | $4.08 |
| 1946 | 0.75 | 0.06 | 0.75 | 0.88 | [4] |
| 1947 | 1.56 | 0.05 | 0.76 | 4.48 | 8.72 |
| 1947–48 | 1.98 | 0.05 | 1.38 | 4.49 | 8.72 |

[1]Excludes depreciation on buildings.

[2]High cost for 1947–48 largely a result of a sudden increase for one large Honolulu hospital.

[3]More than 77 per cent of total plantation hospital non-operating expenses in 1947 and 1947–48 were recorded by two institutions, one on Maui (not listed for earlier years) and one on Oahu (which recorded a sudden increase).

[4]Inadequate sample.

*Source:* Calculated from questionnaires returned by the hospitals.

Table 41

NON-OPERATING INCOME AND EXPENSE RELATIVE TO TOTAL INCOME AND EXPENSE BY TYPE OF HOSPITAL OWNERSHIP TERRITORY OF HAWAII 1939–1948

| YEAR | INCOME[1] TOTAL[3] | GOVT. | NON-PROF. VOL.[3] | PLAN.[4] | PROP. | EXPENSE[2] TOTAL | GOVT. | NON-PROF. VOL. | PLAN.[5] | PROP. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1939 | 4.4 | 0 | 5.0 | 0 | [6] | 0.5 | 0 | 0 | 1.7 | [6] |
| 1940 | 4.8 | 0 | 5.4 | 0 | [6] | 1.0 | 0 | 0.7 | 2.1 | [6] |
| 1941 | 3.7 | 0 | 4.4 | 0 | [6] | 0.8 | 0.1 | 0.9 | 1.1 | [6] |
| 1942 | 5.2 | 0 | 6.5 | 0 | [6] | 0.8 | 0.1 | 0.6 | 1.9 | [6] |
| 1943 | 6.0 | 0 | 7.4 | 0.1 | [6] | 0.6 | 0.1 | 0.8 | 0.5 | [6] |
| 1944 | 6.7 | 0 | 8.2 | [7] | [6] | 0.5 | 0.1 | 0.6 | 0.5 | [6] |
| 1945 | 6.7 | 6.3 | 7.3 | [7] | 1.6 | 0.8 | 0.1 | 0.9 | 0.7 | 7.7 |
| 1946 | 7.8 | 5.9 | 8.6 | 0.1 | [6] | 0.8 | 0.1 | 0.8 | 1.0 | [6] |
| 1947 | 6.4 | 6.9 | 7.3 | 1.8 | 0 | 1.3 | [7] | 0.7 | 3.5 | 11.6 |
| 1947–48 | 8.2 | 6.9 | 9.6 | 1.8 | 0 | 1.5 | [7] | 1.0 | 3.4 | 11.6 |

[1]Non-operating income as a percentage of total (operating plus non-operating) income. Sums supplied by counties and plantations to cover deficits are not included.

[2]Non-operating expense (exclusive of depreciation on buildings) as a percentage of total (operating plus non-operating) expense.

[3]One hospital did not report income from gifts and investments for years before 1947–48. Exclusion of these sources for 1947–48 as well produces the following figures: total income, 7.8 per cent; non-profit voluntary income, 9.1 per cent.

[4]All non-operating income for 1947 and 1947–48 reported by one Maui hospital, not listed in former years.

[5]Over 77 per cent of the 1947 and 1947–48 ratios were reported by one Maui hospital not previously listed and one Oahu hospital which reported a sudden increase.

[6]Inadequate sample.

[7]Less than 0.05 per cent.

*Source:* Calculated from questionnaires returned by the hospitals.

Table 42

DEPRECIATION ON HOSPITAL BUILDINGS RELATIVE TO OPERATING EXPENSE BY TYPE OF OWNERSHIP TERRITORY OF HAWAII 1939 AND 1947–1948

| DEPRECIATION PERCENTAGE[1] | TOTAL 1939 | TOTAL 1947–48 | GOVERNMENTAL 1939 | GOVERNMENTAL 1947–48 | NON-PROFIT VOLUNTARY 1939 | NON-PROFIT VOLUNTARY 1947–48 | PLANTATION 1939 | PLANTATION 1947–48 | PROPRIETARY 1939 | PROPRIETARY 1947–48 |
|---|---|---|---|---|---|---|---|---|---|---|
| Total | 39 | 39 | 5 | 6 | 7 | 9 | 24 | 18 | 3 | 6 |
| 0 | 9 | 14 | 3 | 5 | 3 | 2 | 3 | 6 | 0 | 1 |
| 0.1–0.9 | 1 | 5 | 0 | 1 | 0 | 0 | 1 | 4 | 0 | 0 |
| 1.0–1.9 | 0 | 5 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 1 |
| 2.0–2.9 | 1 | 2 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 |
| 3.0–3.9 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 4.0–4.9 | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 5.0–5.9 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 6.0–6.9 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 7.0–7.9 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 8.0–8.9 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 9 and over | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Pay rent | 0 | 3 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 |
| Not reported | 23 | 5 | 2 | 0 | 1 | 0 | 18 | 3 | 2 | 2 |
| Median[2] | 0 | 0.4 | 0 | 0 | 1.7 | 1.6 | 0.1 | 0.4 | [3] | 1.7 |
| Median[4] | 4.8 | 1.7 | .. | [3] | 4.8 | 2.3 | 2.5 | 1.1 | [3] | [3] |

[1]Depreciation assumed by hospital as a percentage of operating expense.

[2]Among all hospitals reporting amount of depreciation.

[3]Not calculated where base is under 3.

[4]Among all hospitals reporting depreciation of 0.1% or more.

*Source:* Questionnaires returned by the hospitals and Table 8.

Table 43

BAD DEBTS (LESS RECOVERIES) RELATIVE TO OPERATING INCOME
CIVILIAN GENERAL AND ALLIED SPECIAL HOSPITALS
BY OWNERSHIP
TERRITORY OF HAWAII
1947–1948

| PERCENTAGE OF BAD DEBTS[1] | TOTAL | GOVERNMENTAL | NON-PROFIT VOLUNTARY | PLANTATION | PROPRIETARY |
|---|---|---|---|---|---|
| Total | 39 | 6 | 9 | 18 | 6 |
| 0–1.9[2] | 13 | 0 | 5 | 8 | 0 |
| 2–3.9 | 3 | 0 | 0 | 2 | 1 |
| 4–5.9 | 5 | 3 | 1 | 0 | 1 |
| 6–7.9 | 1 | 0 | 1 | 0 | 0 |
| 8–9.9 | 0 | 0 | 0 | 0 | 0 |
| 10–11.9 | 3 | 0 | 1 | 0 | 2 |
| 12–13.9 | 1 | 0 | 1 | 0 | 0 |
| 14 & over | 2 | 2 | 0 | 0 | 0 |
| Not reported | 11 | 1 | 0 | 8 | 2 |
| Median[3] | 2.6 | 5.2 | 1.9 | 0.6 | 7.2 |

[1]Bad debts (less recoveries) expressed as a percentage of operating income.
[2]Includes one "negligible."
[3]Of all hospitals reporting bad debts.
*Source:* Questionnaires returned by the hospitals.

Table 44

BAD DEBTS (LESS RECOVERIES) RELATIVE TO OPERATING INCOME FOR SELECTED HOSPITALS
BY OWNERSHIP
TERRITORY OF HAWAII
1939–1948

| YEAR | GOVERNMENTAL | | | NON-PROFIT VOLUNTARY | | | PLANTATION | | |
|---|---|---|---|---|---|---|---|---|---|
| | AVERAGE BED COMPLEMENT[1] | TOTAL AVERAGE CENSUS[2] | PCT.[3] | AVERAGE BED COMPLEMENT[1] | TOTAL AVERAGE CENSUS[4] | PCT.[3] | AVERAGE BED COMPLEMENT[1] | TOTAL AVERAGE CENSUS[5] | PCT.[3] |
| 1939 | [6] | [6] | [6] | 160 | 317 | 3.4 | [6] | [6] | [6] |
| 1940 | [6] | [6] | [6] | 140 | 416 | 3.0 | [6] | [6] | [6] |
| 1941 | [6] | [6] | [6] | 166 | 398 | 2.8 | 65 | 80 | 0.7 |
| 1942 | [6] | [6] | [6] | 148 | 468 | 2.6 | 59 | 64 | 3.5 |
| 1943 | [6] | [6] | [6] | 152 | 497 | 2.4 | 72 | 72 | 2.1 |
| 1944 | 150 | 59 | 7.0 | 152 | 512 | 1.7 | 58 | 59 | 4.3 |
| 1945 | 66 | 64 | 2.4 | 182 | 559 | 1.3 | 58 | 61 | 2.0 |
| 1946 | 66 | 72 | 6.5 | 196 | 618 | 2.3 | 58 | 71 | 3.3 |
| 1947 | 66 | 73 | 4.3 | 202 | 596 | 2.0 | 58 | 72 | 0.7 |
| 1947–48 | [6] | [6] | [6] | 198 | 545 | 2.8 | [6] | [6] | [6] |

[1]For hospitals in bad debt sample only. Sample consisted of those hospitals submitting bad debt data for four years or more. For average bed complement of all hospitals, see Table 8.
[2]A 32 per cent sample of the governmental hospital patient days in 1944, a 33 per cent sample in 1947.
[3]Bad debts (less recoveries) as a percentage of operating income.
[4]Sample of 63 per cent in 1939, 70 per cent in 1947–48.
[5]Sample of 16 per cent in 1941, 20 per cent in 1947.
[6]Inadequate sample or data not available.
*Source:* Questionnaires returned by Malulani, Kohala, The Queen's, St. Francis, Kauikeolani Children's, G. N. Wilcox Memorial, Pioneer Mill Company and Oahu Sugar Company Hospitals.

Table 45

COSTS OF NURSING EDUCATION AT THREE SCHOOLS OF NURSING
HONOLULU
1946–1948

| ITEM | 1946 | 1947[1] | 1948 |
|---|---|---|---|
| Number of student nurses | 253 | 298 | 355 |
| *Expenses* | | | |
| School of nursing | $ 52,478 | $ 68,576 | $104,149 |
| Salaries | 35,768 | 47,743 | 75,769 |
| Supplies and other | 16,710 | 20,833 | 28,380 |
| Maintenance[2] | 174,570 | 179,280 | 266,250 |
| Allowance to students[3] | 6,466 | 7,795 | 11,640 |
| Other expenses[3] | 79 | 14,063 | 15,119 |
| Total | $233,593 | $269,714 | $397,158 |
| *Income* | | | |
| Student fees | $ 21,739 | $ 9,897 | $ 18,298 |
| Value of students' services[4] | 167,223 | 182,866 | 260,712 |
| Total | $188,962 | $192,763 | $279,010 |
| *Net cost of nursing education* | | | |
| Excluding value of students' services | $211,854 | $259,817 | $378,860 |
| Including value of students' services | 44,631 | 76,951 | 118,148 |
| *Cost per student* | | | |
| Total | $ 923 | $ 1,083 | $ 1,119 |
| Net (excluding value of students' services) | 837 | 1,043 | 1,067 |
| Net (including value of students' services) | 176 | 309 | 333 |
| *Cost per patient day* | | | |
| Total | $ 1.05 | $ 1.79 | $ 2.03 |
| Net (excluding value of students' services) | 0.95 | 1.72 | 1.94 |
| Net (including value of students' services) | 0.20 | 0.51 | 0.60 |

[1]One hospital reported for only the 6-month period ending June 30, 1947 (and for a fiscal year in 1948). To adjust for this fact, costs per student are calculated on the basis of 249 student nurses.

[2]Assuming $690 annually per student in 1946, $720 in 1947, and $750 in 1948. These values are based on estimates provided by the several schools.

[3]Data for 1946 are approximate.

[4]Assuming an average of 40 per cent the actual working hours and 76.5 per cent the effectiveness of graduate nurses. Average graduate pay was conservatively assumed to have equaled $180 per month in 1946 and $200 thereafter. The "effectiveness percentage" (76.5) is that determined from a study of twelve hospitals by Blanche Pfefferkorn and Charles A. Rovetta, *Administrative Cost Analysis for Nursing Service and Nursing Education* (American Hospital Association and National League of Nursing Education, 1940), p. 29. The value of students' services, as based on the above assumptions, is thus obtained by multiplying the average graduate nurse's pay by .40 by .765 by the number of student nurses. Statistical analysis of the 12 hospitals studied by Pfefferkorn and Rovetta proves their sample to be adequate. The standard deviation of the population (estimated from this sample) is 7.7 per cent, and the standard error of the mean is 2.2 per cent. Thus, 2 times out of 3, a random sample of twelve hospitals would result in an average effectiveness percentage lying between 74.3 and 78.7 per cent; 95 times out of 100, between 72.1 and 80.9 per cent; and 99.7 times out of 100, between 69.8 and 83.2 per cent. It can therefore be assumed with safety that the true value is no lower than 70 per cent and no higher than 83 per cent. Although the unweighted median (76.5) was used rather than the mean, little difference was made, since the unweighted mean average was only slightly higher (77.3 per cent).

*Sources:* St. Francis, questionnaire response and *Biennial Report, 1945–1946;* The Queen's and Kuakini, interviews with hospital officials.

Table 46

RATIO OF OPERATING INCOME
TO OPERATING EXPENSE[1]
HOSPITALS BY OWNERSHIP
TERRITORY OF HAWAII
1939–1948

| YEAR | ALL HOSPITALS | GOVERNMENTAL | NON-PROFIT VOLUNTARY | PLANTATION | PROPRIETARY[2] |
|---|---|---|---|---|---|
| 1939 | 69 | 37 | 91 | 20 | [3] |
| 1940 | 76 | 41 | 97 | 21 | [3] |
| 1941 | 74 | 48 | 102 | 17 | [3] |
| 1942 | 72 | 40 | 99 | 23 | [3] |
| 1943 | 76 | 49 | 99 | 30 | 133 |
| 1944 | 78 | 58 | 97 | 29 | 123 |
| 1945 | 79 | 57 | 95 | 31 | 138 |
| 1946 | 76 | 55 | 92 | 29 | 136 |
| 1947 | 77 | 47 | 94 | 50 | 128 |
| 1947–48 | 75 | 47 | 90 | 50 | 128 |

[1]That is, the percentage of operating expense covered by operating income. Values under 100 indicate a loss for the year (*e.g.*, in 1939 governmental hospitals had an operating income only 37 per cent as great as their operating cost, hence lost 63 per cent). Values over 100 indicate a profit for the year (*e.g.*, in 1941 non-profit voluntary hospitals had an operating income equal to 102 per cent of their operating expense, hence showed a 2 per cent profit).

[2]Compensation of owner or his wife not listed as an operating expense.

[3]Inadequate sample.

*Source:* Calculated from questionnaires returned by the hospitals.

Table 47

CUMULATIVE OPERATING INCOME AND OPERATING EXPENSE
BY TYPE OF HOSPITAL OWNERSHIP
TERRITORY OF HAWAII
FOR THE DECADE 1939–1948[1]

| ITEM | TOTAL | GOVERNMENTAL | NON-PROFIT VOLUNTARY | PLANTATION | PROPRIETARY |
|---|---|---|---|---|---|
| *Estimated ten-year totals* | | | | | |
| Operating income | $33,084 | $ 3,344 | $24,935 | $ 4,251 | $554 |
| Operating expense | 46,287 | 6,764 | 26,359 | 12,715 | 449 |
| Profit (+) or loss (−) | −13,203 | −3,420 | −1,424 | −8,464 | +105 |
| *Estimated annual averages* | | | | | |
| Operating income | $ 3,308 | $ 334 | $ 2,494 | $ 425 | $ 55 |
| Operating expense | 4,629 | 676 | 2,636 | 1,272 | 45 |
| Profit (+) or loss (−) | −1,320 | —342 | −142 | −846 | +10 |
| *Income to expense ratios* | | | | | |
| Decade (weighted)[2] | 71 | 49 | 95 | 33 | 123 |
| Decade (unweighted)[3] | 75 | 48 | 96 | 30 | [4] |
| Median year | 76 | 48 | 96 | 29 | [4] |

[1]In thousands of dollars. The most recent available year, whether the same as 1947, overlapping 1947, or entirely 1948, was treated as a full year.
[2]Calculated from above data, thus giving emphasis to the later years, which were characterized by a greater dollar volume of business.
[3]Mean average of annual ratios.
[4]Inadequate sample.
*Source:* Tables 18 and 19.

Table 48

RATIO OF TOTAL INCOME TO TOTAL EXPENSE
BY TYPE OF HOSPITAL OWNERSHIP
TERRITORY OF HAWAII
1939–1948[1]

| YEAR | TOTAL | GOVERNMENTAL | NON-PROFIT VOLUNTARY | PLANTATION | PROPRIETARY |
|---|---|---|---|---|---|
| 1939 | 72 | 37 | 96 | 20 | [2] |
| 1940 | 79 | 42 | 102 | 21 | [2] |
| 1941 | 76 | 48 | 106 | 17 | [2] |
| 1942 | 76 | 40 | 105 | 22 | [2] |
| 1943 | 80 | 49 | 106 | 30 | [2] |
| 1944 | 83 | 58 | 105 | 28 | [2] |
| 1945 | 84 | 61 | 102 | 30 | 130 |
| 1946 | 81 | 58 | 100 | 28 | [2] |
| 1947 | 82 | 50 | 101 | 49 | 114 |
| 1947–48 | 81 | 50 | 99 | 49 | 114 |

[1]Total income as a percentage of total expense. Total income includes all operating and non-operating income exclusive of sums supplied by the counties and plantations to make up deficits of their respective hospitals. Total expense includes all operating and non-operating expense exclusive of depreciation on buildings. One non-profit voluntary hospital did not report data on several non-operating income items (gifts, investments, and miscellaneous) prior to 1947-1948; the 1947–48 non-profit voluntary figure would have been 98 per cent had this information been excluded for that year as well (no change would have occurred in the "total" column).
[2]Inadequate sample.
*Source:* Calculated from questionnaires returned by the hospitals.

Table 49
INCOME RELATIVE TO EXPENSE
BY TYPE OF HOSPITAL OWNERSHIP
TERRITORY OF HAWAII
1947–1948

| RATIO[1] | OPERATING INCOME RELATIVE TO OPERATING EXPENSE | | | | | TOTAL INCOME RELATIVE TO TOTAL EXPENSE[2] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | TOTAL | GOVT. | NON-PROF. VOL. | PLAN. | PROP. | TOTAL | GOVT. | NON-PROF. VOL. | PLAN. | PROP. |
| Total | 39 | 6 | 9 | 18 | 6 | 39 | 6 | 9 | 18 | 6 |
| Under 20 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |
| 20–29.9 | 2 | 2 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 |
| 30–39.9 | 2 | 1 | 0 | 1 | 0 | 3 | 1 | 0 | 2 | 0 |
| 40–49.9 | 9 | 2 | 0 | 7 | 0 | 10 | 2 | 0 | 7 | 1 |
| 50–59.9 | 5 | 1 | 0 | 4 | 0 | 3 | 0 | 0 | 3 | 0 |
| 60–69.9 | 2 | 0 | 0 | 1 | 1 | 2 | 1 | 0 | 1 | 0 |
| 70–79.9 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 80–89.9 | 3 | 0 | 2 | 1 | 0 | 2 | 0 | 0 | 1 | 1 |
| 90–99.9 | 4 | 0 | 4 | 0 | 0 | 8 | 0 | 6 | 0 | 1 |
| 100–109.9 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 0 |
| 110–119.9 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 120–129.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 130–139.9 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 140 and over | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Not reporting | 5 | 0 | 0 | 3 | 2 | 5 | 0 | 0 | 3 | 2 |
| Median | 54.0 | 36.4 | 89.3 | 49.6 | 124.6 | 51.1 | 36.4 | 98.6 | 48.6 | 92.4 |

[1]Income expressed as a percentage of expense.
[2]Operating plus non-operating items (excluding sums supplied by counties and plantations to make up deficits and depreciation on buildings).
*Source:* Calculated from questionnaires returned by the hospitals and Table 8.

Table 50
OPERATING INCOME RELATIVE TO OPERATING EXPENSE
NON-PROFIT VOLUNTARY HOSPITALS
TERRITORY OF HAWAII
1939–1948[1]

| RATIO[1] | NUMBER OF HOSPITALS BY YEAR | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1947–48 |
| Total | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 9 | 9 |
| Under 70 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| 70– 79 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 3 |
| 80– 89 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 2 |
| 90– 99 | 1 | 2 | 1 | 1 | 2 | 3 | 2 | 3 | 5 | 4 |
| 100–109 | 2 | 2 | 1 | 2 | 0 | 1 | 3 | 2 | 1 | 0 |
| 110–119 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| 120 and over | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Not reported | 2 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Median ratio | 91 | 98 | 98 | 98 | 94 | 94 | 94 | 97 | 95 | 89 |
| Mean ratio[2] | 91 | 97 | 102 | 99 | 99 | 97 | 95 | 92 | 94 | 90 |
| % below 100 | 60% | 67% | 60% | 50% | 67% | 71% | 62% | 62% | 89% | 100% |

[1]Operating income as a percentage of operating expense.
[2]Weighted (from Table 46).
*Source:* Calculated from questionnaires returned by the hospitals.

Table 51
INCOME RELATIVE TO EXPENSE
NON-PROFIT VOLUNTARY HOSPITALS
TERRITORY OF HAWAII
1939–1948

| YEAR | AMOUNT OF SUBSIDY[1] | RATIOS[2] | | |
|---|---|---|---|---|
| | | OPERATING INCOME TO OPERATING EXPENSE | TOTAL INCOME (EXCLUDING SUBSIDY) TO TOTAL EXPENSE (EXCLUDING DEPRECIATION) | TOTAL INCOME (INCLUDING SUBSIDY) TO TOTAL EXPENSE (EXCLUDING DEPRECIATION) |
| 1939 | $ 3,750 | 91 | 96 | 96 |
| 1940 | 7,500 | 97 | 101 | 102 |
| 1941 | 15,000 | 102 | 105 | 106 |
| 1942 | 22,500 | 99 | 104 | 105 |
| 1943 | 23,750 | 99 | 105 | 106 |
| 1944 | 25,000 | 97 | 104 | 105 |
| 1945 | 70,756 | 95 | 100 | 102 |
| 1946 | 116,512 | 92 | 97 | 100 |
| 1947 | 165,256 | 94 | 99 | 101 |
| 1947–48 | 214,000[3] | 90 | 95 | 99 |

[1]Adjusted to calendar year basis. General and allied special hospitals only. Excludes annual grant to Kapiolani Hospital to maintain "five free beds for indigent maternity patients" (S.L.H. 1937, Act 176).
[2]Income as a percentage of expense.
[3]Amount appropriated for 12-month period ending June 30, 1948.
*Source:* Calculated from questionnaires returned by the hospitals (see Tables 46 and 48).

Table 52
ESTIMATED TOTAL PROFIT AND LOSS
NON-PROFIT VOLUNTARY HOSPITALS
TERRITORY OF HAWAII
1939–1948[1]

| YEAR | OPERATING ITEMS ONLY | TOTAL INCOME AND EXPENSE[2] | |
|---|---|---|---|
| | | EXCLUDING SUBSIDY[3] | INCLUDING SUBSIDY[3] |
| 1939 | −$ 93.7 | −$ 44.4 | −$ 40.6 |
| 1940 | − 34.8 | + 13.5 | + 21.0 |
| 1941 | + 34.5 | + 73.5 | + 88.5 |
| 1942 | − 20.3 | + 50.7 | + 73.2 |
| 1943 | − 20.5 | + 93.0 | + 116.8 |
| 1944 | − 77.6 | + 89.3 | + 114.3 |
| 1945 | − 144.0 | + 0.1 | + 53.8 |
| 1946 | − 283.3 | − 103.7 | + 12.8 |
| 1947 | − 263.8 | − 70.7 | + 61.6 |
| 1947–48 | − 521.3 | − 285.3 | − 76.3 |

[1]In thousands of dollars. Estimated for all non-profit voluntary hospitals in Territory on basis of percentage of patient days in sample. (83 per cent in 1939, 94 per cent in 1940, 84 per cent in 1941, 91 per cent in 1942 and 1943, and 100 per cent thereafter—see Table 16.)
[2]But excluding depreciation on buildings. Several items of non-operating income were omitted by one hospital prior to 1947–48. Had these items been included, profits probably would have been increased (or losses decreased) by about $25,000 annually.
[3]"Subsidy" refers to the amounts appropriated to the non-profit voluntary general and allied special hospitals by the Territory, exclusive of the regular grant to Kapiolani Hospital for indigent patients (S.L.H. 1937, Act 176).
*Source:* Calculated from questionnaires returned by the hospitals.

Table 53
EXPENSES, DEFICITS AND SUBSIDIES
BY HOSPITAL LOCATION
TERRITORY OF HAWAII
1947–1948

| ITEM | TOTAL HOSPITALS | METROPOLITAN HOSPITALS[1] | NON-METROPOLITAN HOSPITALS[2] |
|---|---|---|---|
| Operating expense (in thousands) | $5,238 | $4,673 | $565 |
| Total deficit before subsidy (in thousands) | $ 289 | $ 213 | $ 76 |
| As % of operating expense | 5.5% | 4.6% | 13.5% |
| Territorial subsidy (in thousands) | $ 214 | $ 137 | $ 77 |
| As % operating expense | 4.1% | 2.9% | 13.6% |

[1]The Queen's, St. Francis, Kuakini, Kapiolani and Kauikeolani Children's.
[2]Wilcox Memorial, Wahiawa, Southshore and Shingle Memorial.
*Source:* Questionnaires returned by the hospitals and Table 6.

Table 54

INTERCORRELATION OF FACTORS IN NON-PROFIT VOLUNTARY HOSPITAL FINANCES
TERRITORY OF HAWAII
1947–1948

a. *Bed, Census and Related Factors*

| CORRELATED ITEM | RHO VALUES | | | | | | |
|---|---|---|---|---|---|---|---|
| | BED COMPLEMENT | ADMISSIONS[1] | AVERAGE CENSUS[1] | % OCCUPANCY[1] | % EXCESS BEDS[2] | AVERAGE LENGTH OF STAY[1] | PROXIMITY TO CITY[3] |
| *Bed, census and related data* | | | | | | | |
| Bed complement | ------ | 1.00 | .98 | .83 | —.60 | .68 | .72 |
| Admissions[1] | 1.00 | ------ | .98 | .83 | —.60 | .68 | .72 |
| Average census[1] | .98 | .98 | ------ | .87 | —.63 | .73 | .78 |
| % occupancy[1] | .83 | .83 | .87 | ------ | —.92 | .53 | .62 |
| % excess beds[2] | —.60 | —.60 | —.63 | —.92 | ------ | —.23 | —.38 |
| Average length of stay[1] | .68 | .68 | .73 | .53 | —.23 | ------ | .73 |
| Proximity to city[3] | .72 | .72 | .78 | .62 | —.38 | .73 | ------ |
| *Personnel and payroll data* | | | | | | | |
| Total per 100 occupied beds[4] | .22 | .22 | .12 | .03 | .08 | —.27 | —.03 |
| Professional[4] | .40 | .40 | .43 | .48 | —.48 | —.13 | .38 |
| Non-professional[4] | .17 | .17 | .05 | —.05 | .83 | —.30 | —.13 |
| % professional[4] | .57 | .57 | .62 | .58 | —.32 | .43 | .62 |
| Average wage or salary[5] | .82 | .82 | .85 | .72 | —.62 | .43 | .67 |
| Payroll per occupied bed | .77 | .77 | .68 | .57 | —.49 | .25 | .28 |
| Payroll as % of operating expenses | —.02 | —.02 | —.03 | .12 | —.33 | —.08 | .07 |
| *Sources of income* | | | | | | | |
| Patients | .67 | .67 | .55 | .53 | —.40 | .35 | .23 |
| Government | —.78 | —.78 | —.72 | —.68 | .52 | —.52 | —.35 |
| Gifts | —.44 | —.44 | —.46 | —.28 | .24 | —.56 | —.64 |
| Investments | .62 | .62 | .60 | .38 | .05 | .75 | .78 |
| Other sources | —.07 | —.07 | —.15 | —.08 | —.03 | —.48 | —.70 |
| *Distribution of operating expenses* | | | | | | | |
| Administration | —.32 | —.32 | —.27 | —.23 | .13 | —.33 | .03 |
| Dietary | —.47 | —.47 | —.48 | —.60 | .63 | —.40 | —.65 |
| House and property[6] | —.55 | —.55 | —.63 | —.68 | .57 | —.75 | —.80 |
| Professional services[7] | .37 | .37 | .33 | .45 | —.55 | .15 | .35 |
| Outpatient services | .12 | .12 | .12 | .03 | .27 | —.02 | —.15 |
| *Income and expense* | | | | | | | |
| Total income | 1.00 | 1.00 | .98 | .83 | —.60 | .68 | .72 |
| Operating income | 1.00 | 1.00 | .98 | .83 | —.60 | .68 | .72 |
| Operating income per patient day | .67 | .67 | .55 | .40 | —.23 | .12 | .25 |
| Operating income per admission | .97 | .97 | .93 | .75 | —.47 | .70 | .70 |
| Total expense (except depreciation) | 1.00 | 1.00 | .98 | .83 | —.60 | .68 | .72 |
| Operating expense | 1.00 | 1.00 | .98 | .83 | —.60 | .68 | .72 |
| Operating expense per patient day | .52 | .52 | .42 | .25 | —.13 | —.08 | .12 |
| Operating expense per admission | .97 | .97 | .93 | .75 | —.47 | .70 | .70 |
| *Other ratios* | | | | | | | |
| Operating income to operating expense | .72 | .72 | .67 | .70 | —.53 | .43 | .55 |
| Depreciation to operating expense | —.08 | —.08 | —.18 | —.37 | .60 | —.15 | .02 |
| Bad debts to operating income | —.25 | —.25 | —.33 | —.28 | .12 | —.83 | —.57 |

[1]Excluding newborn.

[2]Bed complement divided by beds needed at 1947–48 census levels. Beds needed calculated by formula: Average census + $4\sqrt{\text{average census}}$. See C. Horace Hamilton, "Normal Occupancy Rate in the General Hospital," Hospitals, September 1946.)

[3]Mileage from heart of largest city on island.

[4]Including student nurses as non-professional workers.

[5]Excluding student nurses.

[6]Includes laundry, fuel, light, power, and maintenance of building and grounds.

[7]Includes cost of medical, surgical and nursing service, pharmacy and drugs, x-ray, radium and laboratory.

*Source:* Calculated from questionnaires returned by The Queen's, St. Francis, Kuakini, Kapiolani, Kauikeolani Children's, Wilcox Memorial, Wahiawa, Southshore, and Shingle Memorial Hospitals. These hospitals represent a 100 per cent sample of the universe from which they were drawn (the non-profit voluntary hospitals of the Territory in 1947–48) and hence the above intercorrelations have a standard error of zero. If these nine institutions are assumed to represent a random sample of all 4,475 short-term hospital in the United States, the standard error of the above rho values is found to be .35. That is, there is one chance in three that another random sample of nine hospitals would produce a correlation at least .35 more or less than the indicated value, and one chance in twenty that another random sample would result in a rho value at least .70 more or less than the indicated value. Hence, the intercorrelations of this table are based on too small (as well as biased) a sample to justify any generalized statement regarding hospitals outside Hawaii.

Table 54 (Continued)

INTERCORRELATION OF FACTORS IN NON-PROFIT VOLUNTARY HOSPITAL FINANCES
TERRITORY OF HAWAII
1947–1948

b. *Personnel and Payroll Data*

| CORRELATED ITEM | RHO VALUES | | | | | | |
|---|---|---|---|---|---|---|---|
| | PERSONNEL PER 100 OCCUPIED BEDS[4] | | | | | | |
| | TOTAL | PROFESSIONAL | NON-PROFESSIONAL | % PROFESSIONAL[4] | AV. WAGE OR SALARY[5] | PAYROLL PER OCCUPIED BED | PAYROLL AS % OF OPERATING EXPENSES |
| *Bed, census and related data* | | | | | | | |
| Bed complement | .22 | .40 | .17 | .57 | .82 | .77 | —.02 |
| Admissions[1] | .22 | .40 | .17 | .57 | .82 | .77 | —.02 |
| Average census[1] | .12 | .43 | .05 | .62 | .85 | .68 | —.03 |
| % occupancy[1] | .03 | .48 | —.05 | .58 | .72 | .57 | .12 |
| % excess beds[2] | .08 | —.48 | .83 | —.32 | —.62 | —.49 | —.33 |
| Average length of stay[3] | —.27 | —.13 | —.30 | .43 | .43 | .25 | —.08 |
| Proximity to city[3] | —.03 | .38 | —.13 | .62 | .67 | .28 | .07 |
| *Personnel and payroll data* | | | | | | | |
| Total per 100 occupied beds[4] | ..... | .47 | .98 | —.02 | —.03 | .48 | —.45 |
| Professional[4] | .47 | ..... | .33 | .65 | .55 | .45 | .03 |
| Non-professional[4] | .98 | .33 | ..... | —.15 | —.10 | .43 | —.48 |
| % professional[4] | —.02 | .65 | —.15 | ..... | .55 | .42 | .40 |
| Average wage or salary[5] | —.03 | .55 | —.10 | .55 | ..... | .62 | .13 |
| Payroll per occupied bed | .48 | .45 | .43 | .42 | .62 | ..... | .05 |
| Payroll as % of operating expenses | —.45 | .03 | —.48 | .40 | .13 | .05 | ..... |
| *Sources of income* | | | | | | | |
| Patients | .33 | —.05 | .38 | .10 | .27 | .57 | .10 |
| Government | —.13 | .03 | —.18 | —.13 | —.48 | —.52 | .02 |
| Gifts | .14 | —.11 | .24 | —.54 | —.34 | —.36 | —.28 |
| Investments | .10 | .03 | .07 | .40 | .42 | .42 | .28 |
| Other sources | .33 | .05 | .40 | —.32 | —.03 | .37 | —.25 |
| *Distribution of operating expenses* | | | | | | | |
| Administration | .23 | .32 | .13 | —.12 | —.10 | —.03 | —.18 |
| Dietary | .30 | —.15 | .37 | —.47 | —.45 | —.20 | —.68 |
| House and property[6] | .45 | —.07 | .52 | —.53 | —.47 | —.02 | —.33 |
| Professional services[7] | —.28 | —.05 | —.27 | .08 | .42 | .17 | .63 |
| Outpatient services | .60 | .33 | .60 | .00 | .02 | .25 | —.67 |
| *Income and expense* | | | | | | | |
| Total income | .22 | .40 | .17 | .57 | .82 | .77 | —.02 |
| Operating income | .22 | .40 | .17 | .57 | .82 | .77 | —.02 |
| Operating income per patient day | .82 | .42 | .80 | .18 | .38 | .85 | —.22 |
| Operating income per admission | .37 | .37 | .32 | .55 | .67 | .77 | —.12 |
| Total expense (except depreciation) | .22 | .40 | .17 | .57 | .82 | .77 | —.02 |
| Operating expense | .22 | .40 | .17 | .57 | .82 | .77 | —.02 |
| Operating expense per patient day | .85 | .55 | .82 | .17 | .38 | .83 | —.28 |
| Operating expense per admission | .37 | .37 | .32 | .55 | .67 | .77 | —.12 |
| *Other ratios* | | | | | | | |
| Operating income to operating expense | .35 | .33 | .32 | .52 | .35 | .45 | .17 |
| Depreciation to operating expense | .63 | —.05 | .67 | —.28 | —.25 | .15 | —.10 |
| Bad debts to operating income | .55 | .40 | .58 | —.20 | —.07 | .17 | —.07 |

[1]Excluding newborn.

[2]Bed complement divided by beds needed at 1947–48 census levels. Beds needed calculated by formula: Average census + $4\sqrt{\text{average census}}$. See C. Horace Hamilton, "Normal Occupancy Rate in the General Hospital," Hospitals, September 1946.)

[3]Mileage from heart of largest city on island.

[4]Including student nurses as non-professional workers.

[5]Excluding student nurses.

[6]Includes laundry, fuel, light, power, and maintenance of building and grounds.

[7]Includes cost of medical, surgical and nursing service, pharmacy and drugs, x-ray, radium and laboratory.

*Source:* Calculated from questionnaires returned by The Queen's, St. Francis, Kuakini, Kapiolani, Kauikeolani Children's, Wilcox Memorial, Wahiawa, Southshore, and Shingle Memorial Hospitals. These hospitals represent a 100 per cent sample of the universe from which they were drawn (the non-profit voluntary hospitals of the Territory in 1947–48) and hence the above intercorrelations have a standard error of zero. If these nine institutions are assumed to represent a random sample of all 4,475 short-term hospital in the United States, the standard error of the above rho values is found to be .35. That is, there is one chance in three that another random sample of nine hospitals would produce a correlation at least .35 more or less than the indicated value, and one chance in twenty that another random sample would result in a rho value at least .70 more or less than the indicated value. Hence, the intercorrelations of this table are based on too small (as well as biased) a sample to justify any generalized statement regarding hospitals outside Hawaii.

Table 54 (Continued)

INTERCORRELATION OF FACTORS IN NON-PROFIT VOLUNTARY HOSPITAL FINANCES
TERRITORY OF HAWAII
1947–1948

c. *Sources of Income and Distribution of Expenses*

| CORRELATED ITEM | RHO VALUES | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | SOURCES OF INCOME | | | | | DISTRIBUTION OF OPERATING EXPENSES | | | | |
| | PATIENT | GOVERNMENT | GIFTS | INVESTMENTS | OTHER | ADMINISTRATION | DIETARY | HOUSE AND PROPERTY[6] | PROFESSIONAL SERVICES[7] | OUTPATIENT SERVICES |
| *Bed, census and related data* | | | | | | | | | | |
| Bed complement | .67 | —.78 | —.44 | .62 | —.07 | —.32 | —.47 | —.55 | .37 | .12 |
| Admissions[1] | .67 | —.78 | —.44 | .62 | —.07 | —.32 | —.47 | —.55 | .37 | .12 |
| Average census[1] | .55 | —.72 | —.46 | .60 | —.15 | —.27 | —.48 | —.63 | .33 | .12 |
| % occupancy[1] | .53 | —.68 | —.28 | .38 | —.08 | —.23 | —.60 | —.68 | .45 | .03 |
| % excess beds[2] | —.40 | .52 | .24 | .05 | —.03 | .13 | .63 | .57 | —.55 | .27 |
| Average length of stay[1] | .35 | —.52 | —.56 | .75 | —.48 | —.33 | —.40 | —.75 | .15 | —.02 |
| Proximity to city[3] | .23 | —.35 | —.64 | .78 | —.70 | .03 | —.65 | —.80 | .35 | —.15 |
| *Personnel and payroll data* | | | | | | | | | | |
| Total per 100 occupied beds[4] | .33 | —.13 | .14 | .10 | .33 | .23 | .30 | .45 | —.28 | .60 |
| Professional[4] | —.05 | .03 | —.11 | .03 | .05 | .32 | —.15 | —.07 | —.05 | .33 |
| Non-professional[4] | .38 | —.18 | .24 | .07 | .40 | .13 | .37 | .52 | —.27 | .60 |
| % professional[4] | .10 | —.13 | —.54 | .40 | —.32 | —.12 | —.47 | —.53 | .08 | .00 |
| Average wage or salary[5] | .27 | —.48 | —.34 | .42 | —.03 | —.10 | —.45 | —.47 | .42 | .02 |
| Payroll per occupied bed | .57 | —.52 | —.36 | .42 | .37 | —.03 | —.20 | —.02 | .17 | .25 |
| Payroll as % of operating expenses | .10 | .02 | —.28 | .28 | —.25 | —.18 | —.68 | —.33 | .63 | —.67 |
| *Sources of income* | | | | | | | | | | |
| Patients | ..... | —.92 | —.09 | .50 | .10 | —.60 | —.42 | —.30 | .55 | —.05 |
| Government | —.92 | ..... | .16 | —.22 | —.10 | .68 | .40 | .45 | —.55 | .15 |
| Gifts | —.09 | .16 | ..... | —.52 | .61 | —.09 | .62 | .59 | —.16 | .47 |
| Investments | .50 | —.22 | —.52 | ..... | —.45 | .08 | —.43 | —.42 | .48 | —.17 |
| Other sources | .10 | —.10 | .61 | —.45 | ..... | —.12 | .60 | .72 | —.28 | .60 |
| *Distribution of operating expenses* | | | | | | | | | | |
| Administration | —.60 | .68 | —.09 | .08 | —.12 | ..... | .13 | .28 | —.32 | .20 |
| Dietary | —.42 | .40 | .62 | —.43 | .60 | .13 | ..... | .82 | —.85 | .82 |
| House and property[6] | —.30 | .45 | .59 | —.42 | .72 | .28 | .82 | ..... | —.57 | .57 |
| Professional services[7] | .55 | —.55 | —.16 | .48 | —.28 | —.32 | —.85 | —.57 | ..... | —.65 |
| Outpatient services | —.05 | .15 | .47 | —.17 | .60 | .20 | .82 | .57 | —.65 | ..... |
| *Income and expense* | | | | | | | | | | |
| Total income | .67 | —.78 | —.44 | .62 | —.07 | —.32 | —.47 | —.55 | .37 | .12 |
| Operating income | .67 | —.78 | —.44 | .62 | —.07 | —.32 | —.47 | —.55 | .37 | .12 |
| Operating income per patient day | .68 | —.55 | —.18 | .42 | .30 | —.02 | —.07 | .12 | .10 | .37 |
| Operating income per admission | .70 | —.75 | —.48 | .67 | —.10 | —.28 | —.38 | —.48 | .23 | .20 |
| Total expense (except depreciation) | .67 | —.78 | —.44 | .62 | —.07 | —.32 | —.47 | —.55 | .37 | .12 |
| Operating expense | .67 | —.78 | —.44 | .62 | —.07 | —.32 | —.47 | —.55 | .37 | .12 |
| Operating expense per patient day | .40 | —.28 | —.09 | .23 | .45 | .20 | .15 | .35 | —.12 | .52 |
| Operating expense per admission | .70 | —.75 | —.48 | .67 | —.10 | —.28 | —.38 | —.48 | .23 | .20 |
| *Other ratios* | | | | | | | | | | |
| Operating income to operating expense | .82 | —.75 | —.26 | .53 | —.25 | —.47 | —.58 | —.57 | .47 | —.05 |
| Depreciation to operating expense | .22 | .22 | .06 | .47 | .00 | .42 | .22 | .47 | .02 | .17 |
| Bad debts to operating income | —.07 | .18 | .61 | —.45 | .70 | .12 | .47 | .77 | —.18 | .43 |

[1]Excluding newborn.

[2]Bed complement divided by beds needed at 1947–48 census levels. Beds needed calculated by formula: Average census + $4\sqrt{\text{average census}}$. See C. Horace Hamilton, "Normal Occupancy Rate in the General Hospital," *Hospitals*, September 1946.)

[3]Mileage from heart of largest city on island.

[4]Including student nurses as non-professional workers.

[5]Excluding student nurses.

[6]Includes laundry, fuel, light, power, and maintenance of building and grounds.

[7]Includes cost of medical, surgical and nursing service, pharmacy and drugs, x-ray, radium and laboratory.

*Source:* Calculated from questionnaires returned by The Queen's, St. Francis, Kuakini, Kapiolani, Kauikeolani Children's, Wilcox Memorial, Wahiawa, Southshore, and Shingle Memorial Hospitals. These hospitals represent a 100 per cent sample of the universe from which they were drawn (the non-profit voluntary hospitals of the Territory in 1947–48) and hence the above intercorrelations have a standard error of zero. If these nine institutions are assumed to represent a random sample of all 4,475 short-term hospital in the United States, the standard error of the above rho values is found to be .35. That is, there is one chance in three that another random sample of nine hospitals would produce a correlation at least .35 more or less than the indicated value, and one chance in twenty that another random sample would result in a rho value at least .70 more or less than the indicated value. Hence, the intercorrelations of this table are based on too small (as well as biased) a sample to justify any generalized statement regarding hospitals outside Hawaii.

Table 54 (Continued)

INTERCORRELATION OF FACTORS IN NON-PROFIT VOLUNTARY HOSPITAL FINANCES

TERRITORY OF HAWAII

1947–1948

d. *Income, Expense, and Other Ratios*

| CORRELATED ITEM | RHO VALUES | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | INCOME | | | | EXPENSE | | | | OTHER RATIOS | | |
| | | OPERATING | | | | OPERATING | | | | | |
| | TOTAL | TOTAL | PER PATIENT DAY | PER ADMISSION | TOTAL | TOTAL | PER PATIENT DAY | PER ADMISSION | OPERATING INCOME TO OPERATING EXPENSE | DEPRECIATION TO OPERATING EXPENSE | BAD DEBTS TO OPERATING INCOME |
| *Bed, census and related data* | | | | | | | | | | | |
| Bed complement | 1.00 | 1.00 | .67 | .97 | 1.00 | 1.00 | .52 | .97 | .72 | —.08 | —.25 |
| Admissions[1] | 1.00 | 1.00 | .67 | .97 | 1.00 | 1.00 | .52 | .97 | .72 | —.08 | —.25 |
| Average census[1] | .98 | .98 | .55 | .93 | .98 | .98 | .42 | .93 | .67 | —.18 | —.33 |
| % occupancy[1] | .83 | .83 | .40 | .75 | .83 | .83 | .25 | .75 | 70 | —.37 | —.28 |
| % excess beds[2] | —.60 | —.60 | —.23 | —.47 | —.60 | —.60 | —.13 | —.47 | —.53 | .60 | .12 |
| Average length of stay[1] | .68 | .68 | .12 | .70 | .68 | .68 | —.08 | .70 | .43 | —.15 | —.83 |
| Proximity to city[3] | .72 | .72 | .25 | .70 | .72 | .72 | .12 | .70 | .55 | .02 | —.57 |
| *Personnel and payroll data* | | | | | | | | | | | |
| Total per 100 occupied beds[4] | .22 | .22 | .82 | .37 | .22 | .22 | .85 | .37 | .35 | .63 | .55 |
| Professional[4] | .40 | .40 | .42 | .37 | .40 | .40 | .55 | .37 | .33 | —.05 | .40 |
| Non-professional[4] | .17 | .17 | .80 | .32 | .17 | .17 | .82 | .32 | .32 | .67 | .58 |
| % professional[4] | .57 | .57 | .18 | .55 | .57 | .57 | .17 | .55 | .52 | —.28 | —.20 |
| Average wage or salary[5] | .82 | .82 | .38 | .67 | .82 | .82 | .38 | .67 | .35 | —.25 | —.07 |
| Payroll per occupied bed | .77 | .77 | .85 | .77 | .77 | .77 | .83 | .77 | .45 | .15 | .17 |
| Payroll as % of operating expenses | —.02 | —.02 | —.22 | —.12 | —.02 | —.02 | —.28 | —.12 | .17 | —.10 | —.07 |
| *Sources of income* | | | | | | | | | | | |
| Patients | .67 | .67 | .68 | .70 | .67 | .67 | .40 | .70 | .82 | .22 | —.07 |
| Government | —.78 | —.78 | —.55 | —.75 | —.78 | —.78 | —.28 | —.75 | —.75 | .22 | .18 |
| Gifts | —.44 | —.44 | —.18 | —.48 | —.44 | —.44 | —.09 | —.48 | —.26 | .06 | .61 |
| Investments | .62 | .62 | .42 | .67 | .62 | .62 | .23 | .67 | .53 | .47 | —.45 |
| Other sources | —.07 | —.07 | .30 | —.10 | —.07 | —.07 | .45 | —.10 | —.25 | .00 | .70 |
| *Distribution of operating expenses* | | | | | | | | | | | |
| Administration | —.32 | —.32 | —.02 | —.28 | —.32 | —.32 | .20 | —.28 | —.47 | .42 | .12 |
| Dietary | —.47 | —.47 | —.07 | —.38 | —.47 | —.47 | .15 | —.38 | —.58 | .22 | .47 |
| House and property[6] | —.55 | —.55 | .12 | —.48 | —.55 | —.55 | .35 | —.48 | —.57 | .47 | .77 |
| Professional services[7] | .37 | .37 | .10 | .23 | .37 | .37 | —.12 | .23 | .47 | .02 | —.18 |
| Outpatient services | .12 | .12 | .37 | .20 | .12 | .12 | .52 | .20 | —.05 | .17 | .43 |
| *Income and expense* | | | | | | | | | | | |
| Total income | ..... | 1.00 | .67 | .97 | 1.00 | 1.00 | .52 | .97 | .72 | —.08 | —.25 |
| Operating income | 1.00 | ..... | .67 | .97 | 1.00 | 1.00 | .52 | .97 | .72 | —.08 | —.25 |
| Operating income per patient day | .67 | .67 | ..... | .80 | .67 | .67 | .93 | .80 | .58 | .48 | .30 |
| Operating income per admission | .97 | .97 | .80 | ..... | .97 | .97 | .58 | 1.00 | .77 | .07 | —.27 |
| Total expense (except depreciation) | 1.00 | 1.00 | .67 | .97 | ..... | 1.00 | .52 | .97 | .72 | —.08 | —.25 |
| Operating expense | 1.00 | 1.00 | .67 | .97 | 1.00 | ..... | .52 | .97 | .72 | —.08 | —.25 |
| Operating expense per patient day | .52 | .52 | .93 | .58 | .52 | .52 | ..... | .58 | .32 | .47 | .50 |
| Operating expense per admission | .97 | .97 | .80 | 1.00 | .97 | .97 | .58 | ..... | .77 | .07 | —.27 |
| *Other ratios* | | | | | | | | | | | |
| Operating income to operating expense | .72 | .72 | .58 | .77 | .72 | .72 | .32 | .77 | ..... | .08 | —.17 |
| Depreciation to operating expense | —.08 | —.08 | .48 | .07 | —.08 | —.08 | .47 | .07 | .08 | ..... | .28 |
| Bad debts to operating income | —.25 | —.25 | .30 | —.27 | —.25 | —.25 | .50 | —.27 | —.17 | .28 | ..... |

[1]Excluding newborn.

[2]Bed complement divided by beds needed at 1947–1948 census levels. Beds needed calculated by formula: Average census + $4\sqrt{\text{average census}}$. (See C. Horace Hamilton, "Normal Occupancy Rate in the General Hospital," *Hospitals*, September 1946.)

[3]Mileage from heart of largest city on island.

[4]Including student nurses as non-professional workers.

[5]Excluding student nurses.

[6]Includes laundry, fuel, light, power, and maintenance of building and grounds.

[7]Includes cost of medical, surgical and nursing service, pharmacy and drugs, x-ray, radium and laboratory.

*Source:* Calculated from questionnaires returned by The Queen's, St. Francis, Kuakini, Kapiolani, Kauikeolani Children's, Wilcox Memorial, Wahiawa, Southshore, and Shingle Memorial Hospitals. These hospitals represent a 100 per cent sample of the universe from which they were drawn (the non-profit voluntary hospitals of the Territory in 1947–48) and hence the above intercorrelations have a standard error of zero. If these nine institutions are assumed to represent a random sample of all 4,475 short-term hospitals in the United States, the standard error of the above rho values is found to be .35. That is, there is one chance in three that another random sample of nine hospitals would produce a correlation at least .35 more or less than the indicated value, and one chance in twenty that another random sample would result in a rho value at least .70 more or less than the indicated value. Hence, the intercorrelations of this table are based on too small (as well as biased) a sample to justify any generalized statement regarding hospitals outside Hawaii.

Table 55

HOSPITAL COSTS AND RELATED DATA GENERAL AND ALLIED SPECIAL HOSPITALS[1], UNITED STATES AND HAWAII, 1946 AND 1947

| AREA | 1946 ALL HOSPITALS | 1946 GOVERNMENTAL | 1946 NON-PROFIT VOLUNTARY | 1946 PLANTATION | 1946 PROPRIETARY | 1947 ALL HOSPITALS | 1947 GOVERNMENTAL | 1947 NON-PROFIT VOLUNTARY | 1947 PLANTATION | 1947 PROPRIETARY |
|---|---|---|---|---|---|---|---|---|---|---|
| *Number of hospitals* | | | | | | | | | | |
| United States | 4,444 | 785 | 2,583 | ..... | 1,076 | 4,475 | 764 | 2,641 | ..... | 1,070 |
| Territory of Hawaii | 42 | 6 | 8 | 20 | 8 | 39 | 6 | 9 | 18 | 6 |
| *Average bed complement* | | | | | | | | | | |
| United States | 106 | 170 | 117 | ..... | 36 | 104 | 157 | 116 | ..... | 35 |
| Territory of Hawaii | 58 | 67 | 146 | 38 | 13 | 61 | 67 | 131 | 39 | 14 |
| *Average percentage occupancy* | | | | | | | | | | |
| United States | 72% | 63% | 77% | ..... | 65% | 77% | 70% | 79% | ..... | 67% |
| Territory of Hawaii | 64 | 56 | 78 | 51% | 32 | 62 | 55 | 73 | 51 | 27 |
| *Average length of stay* | | | | | | | | | | |
| United States | 9.1 | 11.4 | 8.8 | ..... | 6.6 | 8.0 | 9.2 | 8.1 | ..... | 6.4 |
| Territory of Hawaii | 8.4 | 9.4 | 8.2 | 8.0 | 9.4 | 7.9 | 8.8 | 7.5 | 8.2 | 7.7 |
| *Total assets per thousand (in thousands)*[2] | | | | | | | | | | |
| United States | $ 524 | $ 782 | 615 | ..... | $ 119 | $ 768 | $ 801 | $1,021 | ..... | $ 121 |
| Territory of Hawaii | [3] | [3] | 348 | ..... | 52 | 389 | 329 | 503 | ..... | 116 |
| *Total assets per bed*[2] | | | | | | | | | | |
| United States | $4,925 | $4,608 | $5,277 | ..... | $3,291 | $7,456 | $5,265 | $8,782 | ..... | $3,420 |
| Territory of Hawaii | [3] | [3] | 4,776 | ..... | 1,750 | 5,709 | 4,502 | 6,802 | ..... | 2,439 |
| *Total expenditures per patient day* | | | | | | | | | | |
| United States | $ 9.39 | $ 7.39 | $ 10.04 | ..... | $ 10.13 | $ 11.09 | $ 8.91 | $ 11.78 | ..... | $ 11.83 |
| Territory of Hawaii | 11.36 | 11.86 | 11.40 | 11.07 | [3] | 15.15 | 14.23 | 15.27 | 15.81 | 9.67 |
| *Total expenditures per admission* | | | | | | | | | | |
| United States | $ 86 | $ 84 | $ 89 | ..... | $ 67 | $ 90 | $ 82 | $ 96 | ..... | $ 68 |
| Territory of Hawaii | 95 | 112 | 94 | $ 89 | [3] | 119 | 125 | 115 | 129 | 75 |
| *Payroll per patient day* | | | | | | | | | | |
| United States | $ 4.98 | $ 4.58 | $ 5.11 | ..... | $ 5.09 | $ 5.99 | $ 5.14 | $ 6.30 | ..... | $ 5.82 |
| Territory of Hawaii | 6.89 | 8.49 | 6.55 | $ 6.92 | [3] | 9.99 | 9.91 | 10.03 | $ 10.40 | 2.08 |
| *Payroll as % of total expenditures* | | | | | | | | | | |
| United States | 53% | 62% | 51% | ..... | 50% | 54% | 58% | 53% | ..... | 49% |
| Territory of Hawaii | 61 | 72 | 57 | 62% | [3] | 66 | 70 | 66 | 66 | 22 |
| *Average worker wage or salary* | | | | | | | | | | |
| United States | $1,226 | $1,295 | $1,194 | ..... | $1,358 | $1,437 | $1,438 | $1,429 | ..... | $1,520 |
| Territory of Hawaii | 1,787 | 2,244 | 1,650 | 1,966 | [3] | 2,368 | 2,538 | 2,229 | 2,759 | 805 |
| *Workers per 100 occupied beds* | | | | | | | | | | |
| United States | 148 | 129 | 156 | ..... | 137 | 151 | 126 | 161 | ..... | 139 |
| Territory of Hawaii | 141 | 138 | 145 | 128 | [3] | 154 | 142 | 164 | 138 | 121 |
| *Operating income per patient day* | | | | | | | | | | |
| United States | $ 7.75 | $ 4.12 | $ 8.76 | ..... | $ 10.67 | $ 9.71 | $ 6.19 | $ 10.70 | ..... | $ 11.94 |
| Territory of Hawaii | 8.51 | 6.47 | 10.45 | $ 3.15 | [3] | 11.73 | 6.62 | 14.43 | $ 7.92 | 12.34 |
| *Operating income per admission* | | | | | | | | | | |
| United States | $ 71 | $ 47 | $ 77 | ..... | $ 70 | $ 79 | $ 57 | $ 87 | ..... | $ 69 |
| Territory of Hawaii | 71 | 61 | 86 | $ 25 | [3] | 92 | 58 | 109 | $ 65 | 96 |
| *Total income per patient day* | | | | | | | | | | |
| United States | $ 9.74 | $ 7.22 | $ 10.48 | ..... | $ 11.40 | $ 11.37 | $ 9.05 | $ 12.05 | ..... | $ 12.62 |
| Territory of Hawaii[4] | 9.25 | 6.87 | 11.44 | $ 3.15 | [3] | 12.52 | 7.11 | 15.57 | $ 8.09 | 12.34 |
| *Ratio of total income to total expense (as %)* | | | | | | | | | | |
| United States | 104 | 98 | 104 | ..... | 113 | 102 | 102 | 102 | ..... | 107 |
| Territory of Hawaii[4] | 81 | 58 | 100 | 28 | [3] | 82 | 50 | 101 | 49 | 114 |
| *Annual cost per bed* | | | | | | | | | | |
| United States | $2,470 | $1,703 | $2,818 | ..... | $2,405 | $3,084 | $2,298 | $3,414 | ..... | $2,898 |
| Territory of Hawaii | 2,799 | 2,436 | 3,239 | $2,086 | [3] | 3,474 | 2,856 | 4,087 | $2,958 | 1,159 |
| *Annual admissions per 1000 population* | | | | | | | | | | |
| United States | 96.7 | 19.1 | 67.6 | ..... | 10.0 | 110.5 | 23.4 | 75.9 | ..... | 11.1 |
| Territory of Hawaii | 131.1 | 16.8 | 77.5 | 33.7 | 3.1 | 127.8 | 17.5 | 79.3 | 28.9 | 2.1 |
| *Annual per capita cost* | | | | | | | | | | |
| United States | $ 8.27 | $ 1.61 | $ 6.01 | ..... | $ 0.66 | $ 9.96 | $ 1.92 | $ 7.28 | ..... | $ 0.76 |
| Territory of Hawaii | 12.11 | 1.87 | 7.21 | $ 2.97 | [3] | 15.38 | 2.18 | 9.14 | $ 3.90 | 0.15 |

[1]Excluding hospitals operated by the Federal government. No plantation category given for the mainland in the source.
[2]Data for 1946 based on the value of the physical hospital plant only. Island data from *American Hospital Directory* source, which combined plantation hospitals with other groups.
[3]Inadequate or non-comparable sample.
[4]Excluding amounts provided by counties and plantations to make up deficits.
*Sources:* Mainland data based on *American Hospital Directory, 1947*, pp. C-2 and C-3, and *American Hospital Directory, 1948*, pp. C-2 and C-3. Data for Hawaii from questionnaires returned to Public Health Committee by hospitals. This source was used rather than the *American Hospital Directory* (which also supplied Island data—see p. C-19, both years) because the *Directory* combined plantation hospitals with other categories, thereby obscuring the true local picture. Furthermore, the 1946 Island tabulations in the *Directory* apparently included military hospitals, which greatly distorted both the total and governmental categories.

Table 56

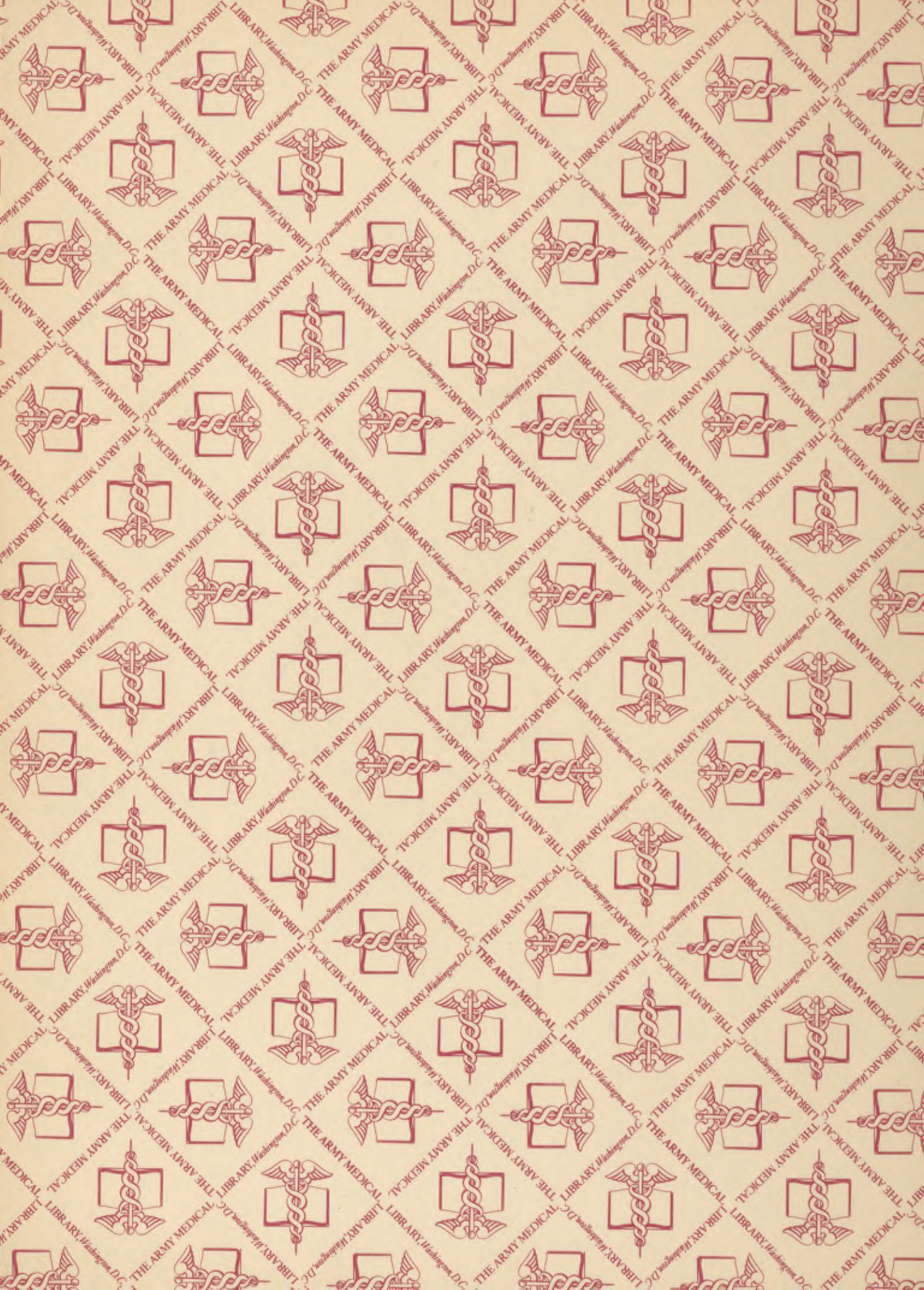
FINANCIAL AND PERSONNEL DATA
GENERAL AND ALLIED SPECIAL HOSPITALS[1]
UNITED STATES, PACIFIC COAST STATES, CALIFORNIA AND HAWAII, 1947

| AREA[2] | ALL HOSPITALS | GOVERN-MENTAL | NON-PROFIT VOLUNTARY | PLANTATION | PROPRIETARY |
|---|---|---|---|---|---|
| *Number of hospitals reporting* | | | | | |
| United States | 4,475 | 764 | 2,641 | ..... | 1,070 |
| Pacific Coast | 385 | 64 | 185 | ..... | 136 |
| California | 244 | 46 | 101 | ..... | 97 |
| Hawaii | 39 | 6 | 9 | 18 | 6 |
| *Average bed complement* | | | | | |
| United States | 104 | 157 | 116 | ..... | 35 |
| Pacific Coast | 114 | 250 | 125 | ..... | 36 |
| California | 129 | 311 | 134 | ..... | 37 |
| Hawaii | 61 | 67 | 131 | 39 | 14 |
| *Average percentage occupancy* | | | | | |
| United States | 76.9 | 70.2 | 79.4 | ..... | 67.0 |
| Pacific Coast | 78.6 | 74.8 | 82.3 | ..... | 73.8 |
| California | 79.3 | 76.0 | 83.7 | ..... | 75.8 |
| Hawaii | 62 | 55 | 73 | 51 | 27 |
| *Average length of stay* | | | | | |
| United States | 8.0 | 9.2 | 8.1 | ..... | 6.4 |
| Pacific Coast | 7.9 | 10.0 | 7.4 | ..... | 5.7 |
| California | 8.5 | 9.5 | 8.0 | ..... | 6.0 |
| Hawaii | 7.9 | 8.8 | 7.5 | 8.2 | 7.7 |
| *Total assets per bed* | | | | | |
| United States | $7,456 | $5,265 | $8,782 | ..... | $3,420 |
| Pacific Coast | 5,245 | 3,621 | 6,786 | ..... | 3,276 |
| California | 5,003 | 2,802 | 7,778 | ..... | 3,325 |
| Hawaii | 5,709 | 4,502 | 6,802 | ..... | 2,439 |
| *Total expenditures per patient day* | | | | | |
| United States | $11.09 | $ 8.91 | $11.78 | ..... | $11.83 |
| Pacific Coast | 13.70 | 9.54 | 16.07 | ..... | 14.99 |
| California | 12.94 | 9.18 | 18.62 | ..... | 15.41 |
| Hawaii | 15.15 | 14.23 | 15.27 | 15.81 | 9.67 |
| *Payroll as % of total expenses* | | | | | |
| United States | 54.0 | 57.7 | 53.5 | ..... | 49.2 |
| Pacific Coast | 61.2 | 70.5 | 58.5 | ..... | 56.4 |
| California | 63.3 | 70.4 | 58.6 | ..... | 57.6 |
| Hawaii | 66 | 70 | 66 | 66 | 22 |
| *Full-time personnel per 100 patients* | | | | | |
| United States | 151 | 126 | 161 | ..... | 139 |
| Pacific Coast | 156 | 128 | 175 | ..... | 152 |
| California | 161 | 126 | 195 | ..... | 162 |
| Hawaii | 154 | 142 | 164 | 138 | 121 |

[1]Federal hospitals excluded. The American Hospital Association classified plantation hospitals as either non-profit or proprietary.

[2]Pacific Coast states include California, Oregon and Washington.

*Source:* Mainland data (and Island data for assets per bed) from *American Hospital Directory, 1948* (American Hospital Association, 1948), pp. C-2, C-3, C-7, C-9, C-12 and C-19; Island data from questionnaires returned by the hospitals.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