

**COST COMPARISON OF SELECTED
METRO MANILA HOSPITALS**

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TABLE OF CONTENTS

I.	Introduction	1
II.	Methodology	2
III.	Results	3
	A. Case Mix	3
	B. Cost per Case	6
Annex 1	Case Mix Proportions, 30 Metro Manila Hospitals, 1987	9
	2 Case Mix by Hospital Size and Ownership	13
	3 Results of Analysis of Variance	14
	4 Case Mix Proportions: Four Disease Categories	15
	5 Hospital Size, Utilization and Cost per Case, 13 Government Hospitals	16
	5a Percentages of Admission (Case Mix), Various Disease Categories, 13 Government Hospitals	17
	References	18

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I. INTRODUCTION

The continuing rise in hospital costs is a worldwide phenomenon. Developing nations are more affected because of their growing balance of payments deficits. In the Philippines, the demand for hospital services does not abate. Concomitantly, there is an increase in the utilization of drugs, supplies, equipment and others. Since 95 percent of the hospital materials used are produced abroad, this further adds to the country's export payments. Moreover, hospital labor and maintenance costs have gone up. Yet the paying capacity of the people has not improved significantly. As a result, some hospitals have reduced occupancy, suffer from low revenues and face closure.

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Hospitals have to be efficient (i.e., maximize the provision of services and minimize costs). Private hospitals are assumed to be more efficient than government hospitals. Is this true for Metro Manila hospitals? If differences exist, to what factors are they attributable?

Cost studies are necessary to compare hospital efficiency. The Philippine Hospital Association made a survey in 1986 to determine the cost per case. While the analysis is yet to be completed, cost comparisons may not be appropriate since case mix (the relative proportions of the types of cases treated in the hospital) differences were not considered.

During the last two decades, many hospital cost studies have been done in developed countries. One of these was the study of Carson W. Bays on cost comparisons of for-profit and nonprofit hospitals in 1977. Bays found out that in general, for-profit hospitals are significantly less costly than nonprofit hospitals after differences in case mix were made.

The following study aims to determine the efficiency by cost comparisons. Specifically, its objectives are the following:

- (1) to determine the total cost per case; and
- (2) to find out the various factors affecting cost differences.

II. METHODOLOGY

Following Bays' methodology, the case mix proportions of 30 randomly-selected hospitals were determined. This entailed getting the list of all the diagnoses of the hospital in-patients for 1987. The diagnoses were classified into the categories using the International Classification of Diseases of the World Health Organization (1977). The case mix proportion of a particular disease category was arrived at by dividing the total number of diseases in the category by the total number of cases admitted in the hospital.

All of the hospitals with similar case mix would be included in the actual cost study. The hospital costs (e.g., personnel wages and salaries, medical and surgical supplies, utilities, repair and maintenance) were gathered. Hospital data such as the number of beds available, average daily census, average length of stay and source of payment were also collected. The cost function would be estimated using the following equation:

$$C = f (M, S, T, U, O)$$

where

- C = total cost per case (included both hospital cost and professional fees)
- M = mix of cases treated (5 combinations of disease categories are included as will be explained below)
- S = hospital size (number of beds available)
- T = source of payment (service, Medicare or self-pay)
- U = rate of utilization or the number of cases per bed per year (average daily census/average number of beds available per year X 365/average length of stay)
- O = hospital ownership (government or private)

The resulting coefficient estimates would be analyzed to account for differences in the cost per case of the hospitals.

III. RESULTS

A. Case Mix

Of the 32 randomly-selected hospitals (16 government and 16 private) in Metro Manila, the administrators/directors of six hospitals (all private) refused to take part in the study, most of them invoking their policy of the confidentiality of their records. These hospitals were replaced by four other hospitals. All government hospitals cooperated. One had to be changed because the records were incomplete and disorganized. A total of 30 hospitals (16 government and 14 private) were finally included.

Many of the hospitals did not have diseases indices. The research assistants who collected the data had to copy the diagnoses from the admission/discharge books. In a few hospitals, the diagnoses had to be taken from the individual medical records. It took nine months to cover all of the 30 hospitals.

The diseases were classified into the 18 categories of the International Classification of Diseases. As done by Bays, a 19th category was added: normal births (separated from category XI - complications of pregnancy, childbirth and the puerperium). The case mix proportions were computed and the results are shown in Annex 1. The hospitals are identified as H1 to H30. The first 16 hospitals are government; the last 14 are private.

Annex 2 shows the case mix proportions according to the hospital size and ownership. The hospitals were arbitrarily classified, as far as the size was concerned, into three categories: 25 - 99; 100 - 299; and 300 and up.

In infectious and parasitic diseases (I), as the size of the hospital increased, the case mix proportion decreased. This was true for both government and private hospitals. Ideally, this should be the case since most of the diseases under this category are quite easy to manage and do not need sophisticated resources.

The opposite was true for neoplasms (II) except in the 300 and up category of the private hospitals. These are more difficult to manage and require more resources.

The proportion of endocrine, nutritional and metabolic diseases (III) diminished as the size of government hospitals grew. The inverse was the case among the private hospitals. Perhaps, there were more nutritional deficiencies (e.g., kwashiorkor, marasmus) in the smaller government hospitals than in the larger ones. Among the private hospitals, maybe there were more endocrine and metabolic disorders (e.g., diabetes mellitus, thyroid diseases, gout) than nutritional deficiencies. If so, those cases usually need higher levels of technology which are found in bigger hospitals.

There was a direct relationship between the hospital size and the proportion of mental disorders (V) among the private hospitals. This may be related to the availability of specialists (i.e., psychiatrists). They tend to stay in larger hospitals.

In both government and private hospitals, the proportion of diseases of the nervous system and sense organs (VI) increased as the hospital size grew. Most of these diseases require high technology resources including manpower.

Similar to the mental disorders, it was only in private hospitals that the proportion of diseases of the circulatory system (VII); complications of childbirth, pregnancy and the puerperium (XI); and certain conditions occurring during the perinatal period (XV) increased with an expansion in hospital size.

The proportion of diseases of the digestive system (IX) and congenital anomalies (XIV) exhibited a direct relationship with hospital size in both government and private hospitals.

No generalizations could be made for the following disease categories: diseases of blood and blood-forming organs (IV); diseases of the respiratory system (VIII); diseases of the genito-urinary system (X); diseases of the skin and subcutaneous tissues (XII); diseases of the musculoskeletal system and connective tissues (XIII); symptoms, signs and ill-defined

conditions (XVI); injury and poisoning (XVII); special services (XVIII); and births (XIX).

In so far as the case mix proportions and hospital size are concerned, the following disease categories comprised 60-70 percent of the total admissions:

(1) For 25-99 beds and among government hospitals - infectious and parasitic diseases; diseases of the circulatory system; diseases of the respiratory system; and births. In private hospitals, it was the same except that diseases of the circulatory system was replaced by complications of pregnancy, childbirth and the puerperium.

(2) For 100-299 beds in government hospitals - infectious and parasitic diseases; diseases of the respiratory system; complications of pregnancy, childbirth and the puerperium; and births. All of these were also true among private hospitals with the addition of diseases of the circulatory system and diseases of the genito-urinary system.

(3) For 300 beds and up and among government hospitals - infectious and parasitic diseases; diseases of the circulatory system; diseases of the respiratory system; injury and poisoning; and births. In private hospitals, these were infectious and parasitic diseases; disease of the circulatory system; diseases of the respiratory system; diseases of the digestive system; disease of the genito-urinary system; and complications of pregnancy, childbirth and the puerperium.

In general, as the hospital increased in size, the more varied was the case mix. This was more evident among the private hospitals. Consistently appearing in all hospital sizes and types of ownership were infectious and parasitic diseases and diseases of the respiratory system. These were followed by births; complications of pregnancy, childbirth and the puerperium; and diseases of the respiratory system.

Each of the following disease categories had consisted at least 10 percent of the total admissions: infectious and parasitic diseases (in 24 hospitals or 80% of them); diseases of the respiratory system (25 or 83% of hospitals); complications of pregnancy, childbirth and the puerperium (12 or 40% of hospitals); and births (17 or 57% of hospitals). The case mix proportions in these categories were subjected to analysis of variance to determine differences between government and private hospitals. Annex 3 shows the results: there are no similarities in the case mix of government and private hospitals.

Another way of finding out if similarities in case mix exist was by plotting the proportions in the four categories, depicted in Annex 4. If the hospitals would cluster together, it would indicate similarities. Only H15, a government hospital appeared

in all four clusters. H22 and H29, both private hospitals and H4 and H5, government hospitals clustered with H15 at I, VIII and XI. H21, a private hospital clustered with H15 at VIII, XI and XIX. Eight other hospitals (4 government: H1, H9, H10 and H13; 4 private: H18, H25, H27 and H30) clustered with H15 at two disease categories in varying combinations.

Despite the differences in the case mix, it was decided to proceed to the next phase. The differences would be taken care of when the cost functions would be estimated, case mix being one of the components.

B. Cost per Case

The total cost per case was determined by dividing the hospital expenses by the number of patients or cases treated. Only the cost per case of the 16 government and two private hospitals have been finished. What will be included here are 13 government hospitals. The rest of the hospitals had incomplete cost data (H7, H12 and H13).

Annex 5 shows the resulting data for the different variables used in the cost function (i.e., hospital size, utilization, case mix and cost per case). Infectious and parasitic diseases (I) and diseases of the respiratory system (VIII) were chosen together as X_3 because they constituted almost one-third of the total admissions in government hospitals. They probably cost less to manage.

Complications of pregnancy, childbirth and the puerperium (XI) and births (XIX) were selected as X_4 for being related (in the original WHO classification, they are placed in one category) and they comprised 28 percent of the total admissions in government hospitals.

Neoplasms (II) and diseases of the nervous system and sense organs (VI) were designated as X_5 . They are probably the more expensive diseases to manage. About five percent of the total admissions belonged to this group.

Diseases of the circulatory and digestive systems (VII and IX) were lumped as X_6 . They were the third largest group of disease categories accounting for 16 percent of the total admissions.

Diseases of the skin and subcutaneous tissues (XII), and the musculoskeletal system and connective tissues were grouped as X_7 . They represented those disease categories with few admissions. They were just one percent of the total admissions.

The source of payment as a variable was excluded because the data obtained were incomplete. Only four hospitals had this type of data available. Hospital ownership, government or

private, would be considered later when cost data from the other 12 private hospitals are collected.

Multiple regression analysis was applied to derive the cost function with total cost per case as the dependent variable and the following as independent variables:

- X_1 = hospital size
- X_2 = utilization
- X_3 = % of patients admitted with infectious and parasitic diseases, and diseases of the respiratory system
- X_4 = % of patients admitted with complications of pregnancy, childbirth and the puerperium, and births
- X_5 = % of patients admitted with neoplasms and diseases of the nervous system and sense organs
- X_6 = % of patients admitted with diseases of the circulatory and digestive systems
- X_7 = % of patients admitted with diseases of the skin and subcutaneous tissues, and the musculoskeletal and connective tissues

The resulting regression equation was of the form:

$$Y = -7026.63 + 3.26 X_1 + 13.47 X_2 + 112.40 X_3 \\ + 23.05 X_4 + 397.91 X_5 + 62.12 X_6 \\ + 573.80 X_7$$

The analysis of variance done to test for the statistical significance of the resulting cost function had an F-value of 12.89 which is highly significant ($p = .0062$). The coefficient of determination (R^2) was equivalent to 94.75 percent implying that the seven predictors of total cost per case considered in this study account for a considerable proportion in its variability.

The extent and the nature of the relationship between total cost per case and the seven predictors considered can be determined by interpreting the regression coefficients derived. All of the seven independent variables are directly related to total cost per case. In the case of hospital size (X_1), every one bed increase brings about a \$3.76 rise in the total cost per case, all other variables being held constant.

A second part of the analysis was to determine which of the seven independent variables considered are the most important predictors of total cost per case. A stepwise regression analysis was done. The results indicate that only two variables are the most important predictors: X_3 and X_5 . The two variables account for 87.41 percent of the total variability in the total cost per case. The resulting regression equation was of the form:

$$Y = -4527.80 + 119.37 X_3 + 628.47 X_5$$

The above regression equation was highly significant with an F-value of 34.71 ($p = 0.0000$).

From the above results, it could be concluded that as far as the government hospitals are concerned, any increase in the hospital size, utilization and case mix proportions of the five groups of disease categories will cause a rise in the total cost per case.

Annex 1
CASE MIX PROPORTIONS, 30 METRO MANILA HOSPITALS,
1987

9

Disease Category	H1	H2	H3	H4	H5	H6	H7	H8
I. Infectious and Parasitic Diseases	0.1067	0.1312	0.2057	0.1767	0.1927	0.0449	0.3157	0.0411
II. Neoplasms	0.0446	0.0734	0.0064	0.0066	0.0237	0.0421	0.0049	0.0243
III. Endocrine, Nutritional and Metabolic Diseases	0.0132	0.0514	0.0149	0.0320	0.0156	0.0175	0.0367	0.0471
IV. Diseases of Blood and Blood Forming Organs	0.0114	0.0167	0.0021	0.0056	0.0040	0.0124	0.0035	0.0024
V. Mental Disorders	0.0020	0.0200	0.0043	0.0008	0.0020	0.0004	0.0071	0.0001
VI. Diseases of the Nervous System and Sense Organs	0.0256	0.0468	0.0085	0.0129	0.0296	0.0423	0.0020	0.0552
VII. Diseases of the Circulatory System	0.0083	0.2163	0.0618	0.0458	0.0514	0.1323	0.0565	0.0432
VIII. Diseases of the Respiratory System	0.1219	0.1574	0.3134	0.2064	0.1025	0.0692	0.1630	0.0720
IX. Diseases of the Digestive System	0.0730	0.0658	0.0704	0.0498	0.0654	0.1074	0.0424	0.0717
X. Diseases of the Genito-Urinary System	0.0267	0.0061	0.0554	0.0469	0.0412	0.0518	0.0190	0.0586
XI. Complications of Pregnancy, Childbirth and the Puerperium	0.1312	0.0094	0.0192	0.1262	0.1452	0.0839	0.0113	0.1707
XII. Diseases of the Skin and Subcutaneous Tissues	0.0057	0.0185	0.0320	0.0062	0.0088	0.0176	0.0070	0.0030
XIII. Diseases of the Musculo-Skeletal System and Connective Tissues	0.0009	0.0175	0.0021	0.0010	0.0042	0.0029	0.0021	0.0046
XIV. Congenital Anomalies	0.0021	0.0092	-	0.0014	0.0032	0.0050	0.0014	0.0001
XV. Certain Conditions Originating in the Perinatal Period	0.0205	0.0023	-	0.0076	0.0310	0.0020	0.0042	0.0144
XVI. Symptoms, Signs and Ill-defined Conditions	0.0137	0.0074	0.1151	0.0047	0.0207	0.0278	0.0120	0.0066
XVII. Injury and Poisoning	0.0410	0.0220	0.0005	0.0500	0.0644	0.0957	0.0325	0.0107
XVIII. Special Services	-	-	-	-	-	-	-	-
XIX. Births	0.2705	0.0477	-	0.2097	0.1047	0.2440	0.2754	0.3406

Annex 1 (cont'd)

Disease Category	H9	H10	H11	H12	H13	H14	H15	H16
I. Infectious and Parasitic Diseases	0.2657	0.2152	0.3475	0.2896	0.1789	0.1354	0.1673	0.0760
II. Neoplasms	0.0003	0.0200	0.0018	0.0397	0.0138	0.0084	0.0090	0.0377
III. Endocrine, Nutritional and Metabolic Diseases	0.1214	0.0287	0.0496	0.0425	0.0163	0.0603	0.0535	0.0222
IV. Diseases of Blood and Blood Forming Organs	0.0014	0.0136	0.0071	0.0085	0.0055	0.0291	0.0125	0.0054
V. Mental Disorders	0.0003	0.0077	0.0009	-	-	0.0002	-	0.0027
VI. Diseases of the Nervous System and Sense Organs	0.0036	0.0168	0.0106	0.0510	0.0525	0.0259	0.0073	0.0244
VII. Diseases of the Circulatory System	0.0089	0.1525	0.1454	0.2380	0.0943	0.0679	0.1117	0.0328
VIII. Diseases of the Respiratory System	0.1464	0.1596	0.0948	-	0.1762	0.1124	0.1544	0.1379
IX. Diseases of the Digestive System	0.0282	0.0740	0.0541	0.1161	0.1009	0.0563	0.0698	0.0001
X. Diseases of the Genito-Urinary System	0.0143	0.0737	0.0665	0.1303	0.0085	0.0491	0.0681	0.0410
XI. Complications of Pregnancy, Childbirth and the Puerperium	0.1400	0.0562	0.0319	-	0.0611	0.0948	0.1212	0.2414
XII. Diseases of the Skin and Subcutaneous Tissues	0.0036	0.0065	0.0106	0.0198	0.0169	0.0107	0.0026	0.0044
XIII. Diseases of the Musculo-Skeletal System and Connective Tissues	-	0.0029	0.0044	0.0178	0.0310	0.0006	0.0039	0.0038
XIV. Congenital Anomalies	-	0.0003	-	-	0.0022	0.0020	-	0.0070
XV. Certain Conditions Originating in the Perinatal Period	0.0064	0.0170	0.0044	-	0.0119	0.0084	0.0108	0.0204
XVI. Symptoms, Signs and Ill-defined Conditions	0.0018	0.0068	0.0035	0.0028	0.0003	0.0100	0.0155	0.0092
XVII. Injury and Poisoning	0.0107	0.0275	0.1170	0.1246	0.1333	0.0378	0.0669	0.1696
XVIII. Special Services	-	-	-	-	-	-	-	-
XIX. Births	0.2468	0.1202	0.0496	-	0.1072	0.2826	0.1255	0.0037

Annex 1 (cont'd)

Disease Category	H17	H18	H19	H20	H21	H22	H23
I. Infectious and Parasitic Diseases	0.0599	0.3537	0.4747	0.3614	0.2116	0.1578	0.3885
II. Neoplasms	0.0060	0.0018	-	0.0008	0.0276	0.0498	0.0002
III. Endocrine, Nutritional and Metabolic Diseases	-	0.0092	0.0525	0.0069	0.0380	0.0592	0.0023
IV. Diseases of Blood and Blood Forming Organs	-	0.0222	-	0.0043	0.0049	0.0162	0.0009
V. Mental Disorders	-	-	-	0.0008	-	0.0059	0.0016
VI. Diseases of the Nervous System and Sense Organs	-	0.0037	-	0.0026	0.0116	0.0310	0.0059
VII. Diseases of the Circulatory System	0.1736	0.0537	0.0358	0.0240	0.0742	0.1043	0.0705
VIII. Diseases of the Respiratory System	0.2036	0.1944	0.3062	0.2532	0.1233	0.1217	0.3700
IX. Diseases of the Digestive System	0.1677	0.0500	0.1059	0.0566	0.0748	0.0792	0.0194
X. Diseases of the Genito-Urinary System	0.0179	0.0722	0.0240	0.0352	0.0003	0.0906	0.0720
XI. Complications of Pregnancy, Childbirth and the Puerperium	0.0958	0.1018	-	0.0618	0.1276	0.1009	0.0020
XII. Diseases of the Skin and Subcutaneous Tissues	-	0.0167	-	0.0249	0.0153	0.0131	0.0064
XIII. Diseases of the Musculo-Skeletal System and Connective Tissues	0.0240	-	-	0.0017	0.0018	0.0006	0.0016
XIV. Congenital Anomalies	-	-	-	-	0.0012	0.0043	0.0002
XV. Certain Conditions Originating in the Perinatal Period	0.0120	-	-	0.0043	0.0061	0.0051	-
XVI. Symptoms, Signs and Ill-defined Conditions	0.1497	0.0426	-	0.0043	0.0147	0.0239	0.0016
XVII. Injury and Poisoning	0.0419	0.0315	-	0.0103	0.0393	0.0351	0.0434
XVIII. Special Services	-	-	-	-	-	0.0013	-
XIX. Births	0.0479	0.0463	-	0.1468	0.1466	0.0038	0.0045

Annex 1 (cont'd)

Disease Category	H24	H25	H26	H27	H28	H29	H30
I. Infectious and Parasitic Diseases	0.2384	0.2783	0.2770	0.1641	0.0702	0.1604	0.0964
II. Neoplasms	0.0118	0.0090	0.0227	0.0220	0.1564	0.0316	0.0340
III. Endocrine, Nutritional and Metabolic Diseases	0.0594	0.0098	0.0210	0.0367	0.0265	0.0190	0.0416
IV. Diseases of Blood and Blood Forming Organs	0.0073	0.0069	0.0015	0.0159	0.1640	0.0075	0.0129
V. Mental Disorders	-	0.0020	0.0010	0.0172	0.0203	0.0004	0.0221
VI. Diseases of the Nervous System and Sense Organs	-	0.0053	0.0118	0.0199	0.0679	0.0178	0.0587
VII. Diseases of the Circulatory System	0.1064	0.0494	0.0785	0.0981	0.0859	0.0636	0.1489
VIII. Diseases of the Respiratory System	0.1709	0.2158	0.1800	0.1386	0.0640	0.1392	0.1275
IX. Diseases of the Digestive System	0.0609	0.0474	0.0574	0.0610	0.0815	0.0659	0.0697
X. Diseases of the Genito-Urinary System	0.0844	0.0637	0.0854	0.1180	0.0921	0.1078	0.0824
XI. Complications of Pregnancy, Childbirth and the Puerperium	0.0990	0.0899	0.0932	0.0927	0.0832	0.1206	0.1087
XII. Diseases of the Skin and Subcutaneous Tissues	0.0059	0.0057	0.0059	0.0125	0.0189	0.0035	0.0108
XIII. Diseases of the Musculo-Skeletal System and Connective Tissues	0.0125	-	0.0053	0.0220	0.0457	0.0071	0.0145
XIV. Congenital Anomalies	0.0015	-	0.0017	0.0093	0.0164	0.0027	0.0131
XV. Certain Conditions Originating in the Perinatal Period	0.0110	0.0053	0.0057	0.0104	-	0.0010	0.0251
XVI. Symptoms, Signs and Ill-defined Conditions	0.0161	0.0617	0.0147	0.0258	0.0225	0.0014	0.0256
XVII. Injury and Poisoning	0.0125	0.0143	0.0301	0.0491	0.1249	0.0241	0.0424
XVIII. Special Services	-	-	-	-	-	-	-
XIX. Births	0.1012	0.1352	0.1061	0.0785	0.0050	0.2259	0.0457

Annex 2
CASE MIX BY HOSPITAL SIZE AND OWNERSHIP

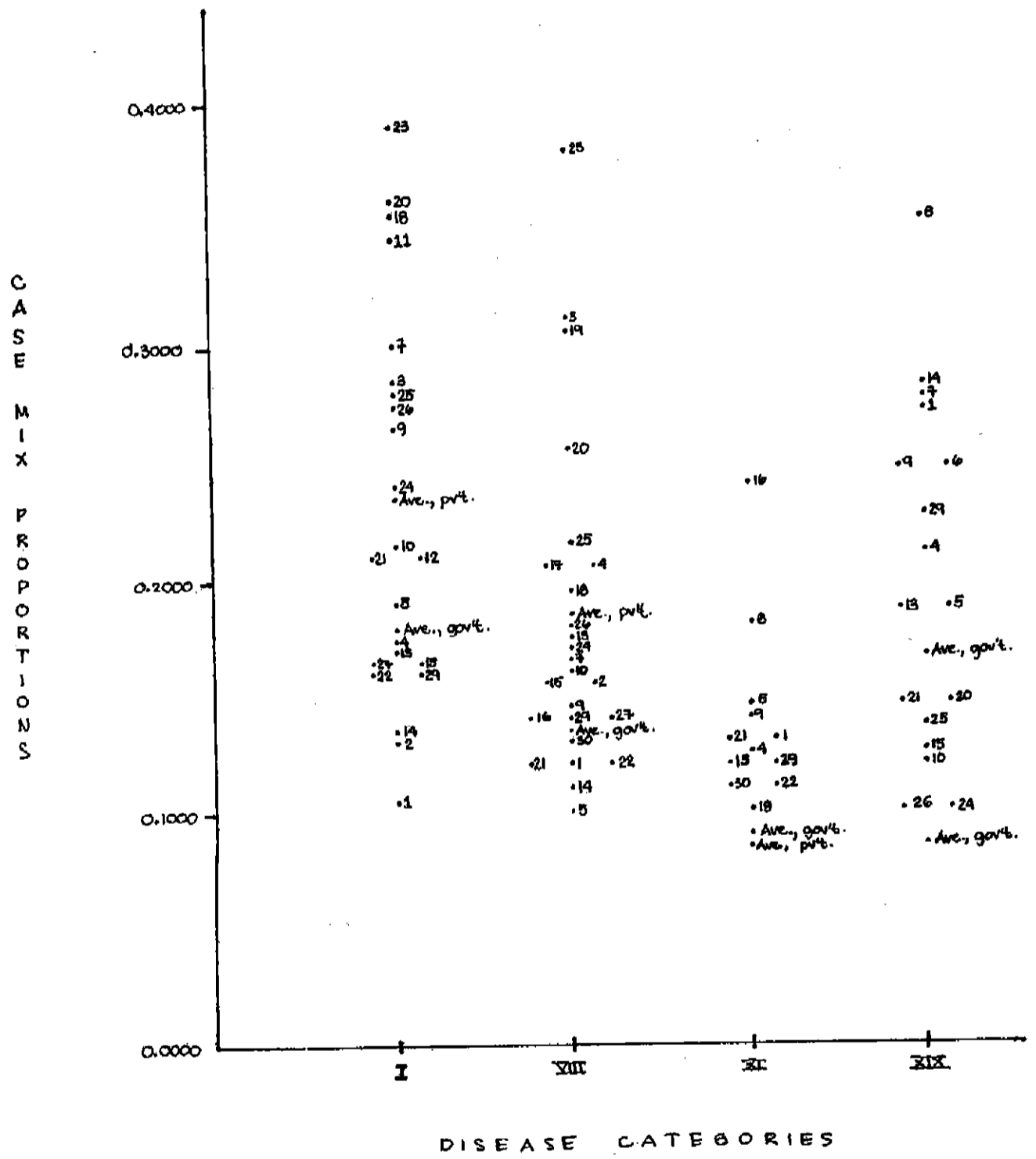
Category	25-99 beds		100-299 beds		300 beds & up	
	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.
I	0.2652	0.2702	0.1446	0.1659	0.1058	0.0964
II	0.0103	0.0082	0.0212	0.0565	0.0418	0.0340
III	0.0531	0.0179	0.0330	0.0325	0.0268	0.0416
IV	0.0058	0.0066	0.0112	0.0410	0.0100	0.0129
V	0.0021	0.0006	0.0021	0.0090	0.0060	0.0221
VI	0.0140	0.0042	0.0277	0.0297	0.0415	0.0587
VII	0.1037	0.0788	0.0748	0.0861	0.1189	0.1489
VIII	0.1455	0.2199	0.1293	0.1287	0.1352	0.1275
IX	0.0635	0.0681	0.0650	0.0692	0.0886	0.0697
X	0.0591	0.0609	0.0494	0.0988	0.0668	0.0824
XI	0.0539	0.0826	0.1220	0.0997	0.0990	0.1087
XII	0.0127	0.0107	0.0070	0.0108	0.0144	0.0108
XIII	0.0049	0.0059	0.0024	0.0177	0.0138	0.0145
XIV	0.0002	0.0004	0.0028	0.0069	0.0058	0.0131
XV	0.0043	0.0055	0.0168	0.0060	0.0094	0.0251
XVI	0.0251	0.0415	0.0131	0.0177	0.0132	0.0256
XVII	0.0600	0.0276	0.0415	0.0527	0.1052	0.0424
XVIII	-	-	-	0.0003	-	-
XIX	0.1162	0.0898	0.2360	0.0999	0.1406	0.0457

Annex 3
RESULTS OF ANALYSIS OF VARIANCE

<u>Disease Category</u>	<u>F value*</u>
I	5.65
VIII	39.58
XI	78
XIX	98

* - at 0.05 level with 1 and 28 df = 4.20

Annex 4
CASE MIX PROPORTIONS: FOUR DISEASE CATEGORIES



Annex 5
HOSPITAL SIZE, UTILIZATION AND COST PER CASE,
13 GOVERNMENT HOSPITALS

<u>Hospital</u>	<u>Size</u> (No. of Beds)	<u>Utilization</u> (Case/bed/year)	<u>Cost Per Case</u> (Pesos)
H1	250	64.65	1,745
H2	452	23.70	7,235
H3	50	21.19	3,376
H4	200	66.91	1,236
H5	150	55.62	1,231
H6	450	48.66	2,927
H8	250	30.76	1,436
H9	25	97.34	957
H10	115	33.37	1,906
H11	53	54.20	1,393
H14	250	50.43	1,056
H15	26	104.28	899
H16	300	56.41	1,475

Annex 5a
 PERCENTAGES OF ADMISSION (CASE MIX), VARIOUS DISEASE
 CATEGORIES, 13 GOVERNMENT HOSPITALS

<u>Hospital</u>	\bar{X}_3	\bar{X}_4	\bar{X}_5	\bar{X}_6	\bar{X}_7
H1	22.86	40.17	7.02	16.13	0.66
H2	28.86	5.71	12.02	28.21	3.6
H3	59.91	1.92	1.49	13.22	3.41
H4	38.31	33.59	1.95	9.56	0.72
H5	29.52	32.99	5.33	11.68	1.3
H6	11.41	32.79	8.44	23.97	2.05
H8	11.39	52.73	7.95	11.49	0.84
H9	41.21	38.68	.004	3.71	0.36
H10	37.48	17.64	3.06	22.65	0.94
H11	44.23	8.15	1.24	19.95	1.5
H14	24.78	37.74	3.43	12.42	1.13
H15	32.17	24.67	1.63	18.15	0.65
H16	21.39	32.51	6.21	11.29	0.82

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