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Population, Housing and the Availability of Medical and Health Services in an Industrializing Chinese Community

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POPULATION, HOUSING AND THE AVAILABILITY
OF MEDICAL & HEALTH SERVICES IN AN
INDUSTRIALIZING CHINESE COMMUNITY

Centre Paper

By

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ABSTRACT

The relationships of the availability of medical and health services to the size of population and the quality of residential housing are examined in the present study of 11 administrative sub-istricts of a newly developed industrial community, named Kwun Tong, of Hong Kong. Three kinds of medical and health services are considered; they are the modern Western health care units, the traditional Chinese health care units, and the drugstores.

We found that these three types of service units are unevenly distributed among various regions, and that their spatial distributions are positively interrelated. Furthermore, the availability of various types of medical and health services is found to be positively associated with the population size and the residential-housing quality. Relatively, the availability of the Chinese health care units and of the drugstores are more likely than that of the Western health care units to be dependent upon the population size, while the availability of the Western health care units is more likely than that of the other types to be dependent on the quality of residential housing.

Since in Kwun Tong the distributions of population size and housing are to a large extent planned while there has been no comprehensive planning about the distribution of health services, our findings may shed some light on the general issue concerning the impact of the partial planning in the development of a new industrial and urban community. Moreover, the findings may add to our understanding of the differences and interrelations between the modern Western and the traditional Chinese medical sectors in a modernizing Chinese society.

POPULATION, HOUSING, AND THE AVAILABILITY OF MEDICAL &

HEALTH SERVICES IN AN INDUSTRIALIZING CHINESE COMMUNITY [*]

A striking fact in many modernizing nations is the development of new industrial and urban centres. A remote region is rapidly transformed into a highly populated area with industry as the economic base. For instance, Jurong in Singapore, Tsun Wan and Kwun Tong in Hong Kong have been developed into large industrial satellite towns during the last few decades.

These new industrial and urban centres are mostly developed with "partial" planning. In other words, changes in some segments of the community are planned or deliberately brought about, while the growth of other segments is unplanned. For example, the industrial landuse pattern, residential housing, and subsequent population size may be planned to a great extent, while there may not be any systematic and deliberate planning about health, education, recreation, and welfare services. This kind of social development can be labelled as partially planned change. Then, an important question arises: What is the influence of partial planning in the development of a new industrial and urban community?[1]

[1] For discussions on the various issues concerning the planning of change, see Bennis, Benne, and Chin (1969).

Human society has been conceptualized by many sociologists as a
social system, of which various parts or components are directly or indirectly
interrelated to some degree in a dynamic and self-regulating fashion.[2] Because
of the mutual dependency among components, the system achieves a kind of
"whole" with some degree of integration. Any change or alternation in one
component may thus generate inconsistencies or tensions inside the system.
In order to have the tensions managed or reduced, the system has to make
adaptive changes in other component parts.

On the basis of the above reasoning, we can postulate that if changes
in some segments of an industrial and urban community are deliberately planned,
then changes in other segments will "automatically" follow. This general
postulate concerning the effects of partially planned change will be illustrated
in the present study of some selected segments of a newly developed satellite
town, named Kwun Tong, of Hong Kong.

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[2] For discussions on some of the major conceptions of human society as a
social system, see Parsons (1951), Homans (1950), Moore (1963), and
Buckley (1967). Although they have made different propositions about
the system dynamics, the essential ideas are similar.

THE COMMUNITY OF KWUN TONG

Kwun Tong is located in the eastern coast of Kowloon Peninsula, Hong Kong. It covers about 32 hundred acres. Geographically it has a somewhat distinct locality. It is separated from Hong Kong Island by a harbour and from other parts of Kowloon by hills. It has been a partially planned and newly developed industrial-urban complex in Hong Kong.
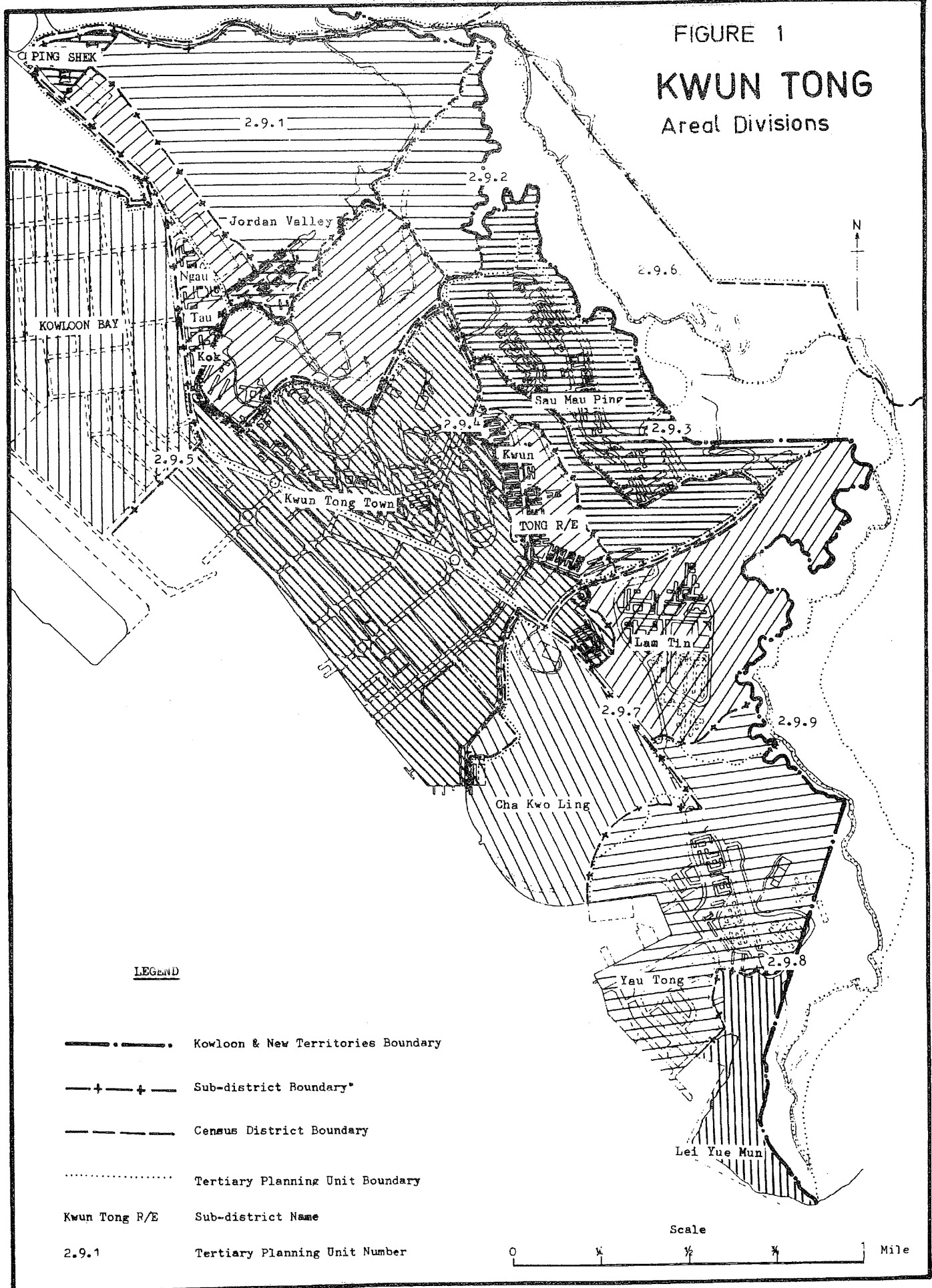
Before 1956, the district was considered a remote region of Hong Kong, consisting of a few scattered villages. Over the past 17 years, it has been designated by Government to be developed into a large industrial and residential town. The industrial and residential landuse patterns are largely predetermined, and the subsequent population growth is to a large extent anticipated.

Presently, the district is sub-divided into 11 administrative subdistricts; namely, Ping Shek (PS), Jordan Valley (JV), Kowloon Bay (KB), Ngau Tau Kok (NTK), Kwun Tong Resettlement Estates (KTR), Kwun Tong Town Area (KTT), Sau Mau Ping (SMP), Cha Kwo Ling (CKL), Lam Tin (LT), Yau Tong (YT), and Lyemun (LYM). Figure 1 and 2 show the location and the landuse pattern of these regions in 1971.[3]

There are now 2000 and some industrial undertakings in the community, most of which are designated by Government to be concentrated in the southern part of KTT. The subdistrict of KTT has also become the centre of commercial activities.

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[3] These graphs were prepared by Y.K. Chan, Social Research Centre. For a discussion on the boundary of Kwun Tong and the way it is subdivided in this study, see Appendix A.

FIGURE 1

KWUN TONG
Areal Divisions

PING SHEK

2.9.1

Jordan Valley

2.9.2

Ngau

2.9.6

Tau

KOWLOON BAY

Kok

Sau Mau Ping

2.9.4

2.9.3

Kwun

Kwun Tong Town

2.9.5

TONG R/E

Lam Tin

2.9.7

2.9.9

Cha Kwo Ling

2.9.8

LEGEND

Yau Tong
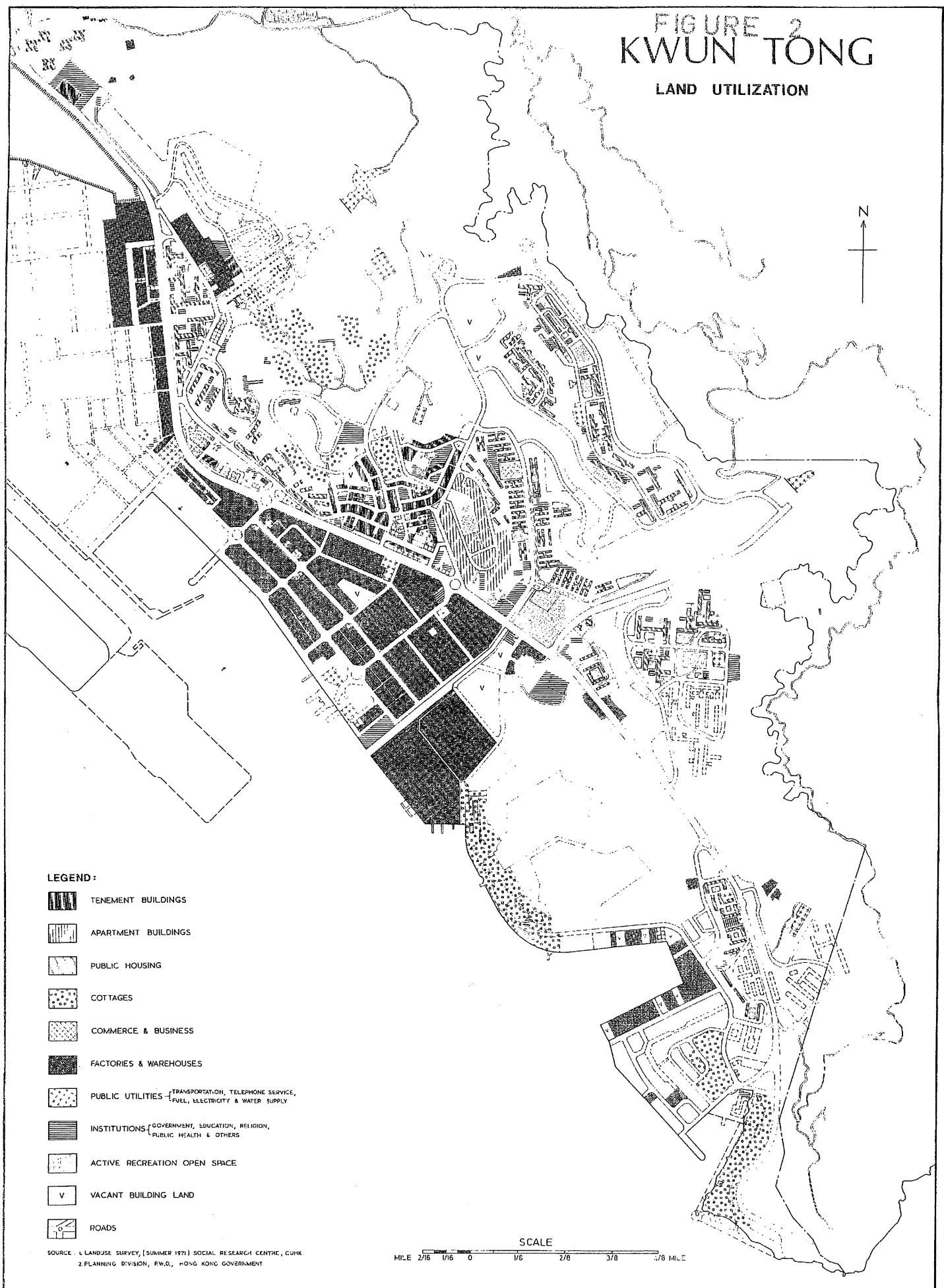
Kowloon & New Territories Boundary

Sub-district Boundary*

Census District Boundary

Tertiary Planning Unit Boundary

Lei Yue Mun

Kwun Tong R/E   Sub-district Name

2.9.1   Tertiary Planning Unit Number

Scale

0   ¼   ½   ¾   Mile

* Division used by the SRC's Kwun Tong Study

FIGURE 2
KWUN TONG
LAND UTILIZATION

N

LEGEND:

▦	TENEMENT BUILDINGS
▦	APARTMENT BUILDINGS
▢	PUBLIC HOUSING
▦	COTTAGES
▦	COMMERCE & BUSINESS
■	FACTORIES & WAREHOUSES
▦	PUBLIC UTILITIES ┤TRANSPORTATION, TELEPHONE SERVICE, FUEL, ELECTRICITY & WATER SUPPLY
▤	INSTITUTIONS ┤GOVERNMENT, EDUCATION, RELIGION, PUBLIC HEALTH & OTHERS
▢	ACTIVE RECREATION OPEN SPACE
V	VACANT BUILDING LAND
▦	ROADS
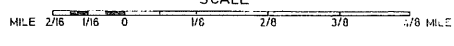
SOURCE : 1. LANDUSE SURVEY, (SUMMER 1971) SOCIAL RESEARCH CENTRE, CUHK.
2. PLANNING DIVISION, P.W.D., HONG KONG GOVERNMENT

SCALE

MILE 2/16 1/16 0   1/8   2/8   3/8   4/8 MILE

Let us turn to the housing situation. A number of cottages and squatters are spread out over hill slopes and reclaimed land in the district, while almost all of the private apartment buildings are located in KTT. Government and the public agencies, however, have built a large number of low-cost housing and resettlement estates. The resettlement estates are mostly in SMP, LT, KTR, NTK, and JV; while the low-cost housing estates are largely in KTT, NTK, and PS.

As a result of the planning in industrial landuse and housing, the community has had a fantastic growth of population. There are about half a million residents. They are mostly concentrated in KTT and NTK, and are largely residing in the public housings (both low-cost and resettlement estates). It is estimated that about half of the population are residing in KTT and NTK, and that about three-fourth of them are in the public housings.

In addition to the industrial and the population growth, the community of Kwun Tong has had increasing numbers of various kinds of medical and health services. There are, for instance, general and specialist services; private medical units and sponsored clinics; modern Western medical care and traditional Chinese medical practices. These services are wide-spread over various subdistricts. It is, however, noted that there has been no comprehensive and systematic planning in the medical and health segment of Kwun Tong. Then, what are the major social forces that determine the availability of various types of medical and health services in different subdistricts of the community?

As mentioned, changes in some segments of the community of Kwun Tong are deliberately planned. These planned changes may become important forces that produce changes in other segments. In the present study, we

propose to study the ways the development of medical and health services is dependent upon the planned changes in the community.

Of the various planned segments, we would like to focus on two: (1) the quality of residential housing, and (2) the population size in each subdistrict. Our units of study are therefore the aforementioned 11 administrative subdistricts in Kwun Tong. Our major hypothesis is: the spatial distribution of the medical and health services among various subdistricts of Kwun Tong is related to the quality of residential housing and to the size of population. But why do we assume that the housing quality and the population size would be related to the distribution of the medical and health services?

Service motivation and economic reward are important incentives for the establishment of medical and health service units in a free competitive society. Some health agencies --- particularly government and the voluntary clinics --- may be service-oriented. They are more concerned with providing services to medical need than with economic benefit. Other health agencies --- particularly private practitioner offices --- may place greater emphasis upon economic opportunities. Hence, medical and health workers usually move into particular regions if (1) there are strong demands for their services, and/or (2) they can receive a substantial amount of economic income.

Inhabitants in better housing generally have a higher standard of living and are better educated. They are then not only more alert to illness symtoms, but are also financially more able to afford the cost of seeking professional medical help. As a result, the better housing regions may provide more economic benefits to medical practitioners than the worse housing regions. Because of the differential potential for economic income, health workers may choose to concentrate in better housing areas.

Other things being equal, the larger the number of residents in a particular region, the larger would be the number of patients. Hence, more densely populated areas would have stronger demands for medical care than less populated areas. This differential demand for medical care indicates not only the differential opportunity for the realization of service motivation on the part of health workers, but also the differential potential for economic reward. As a consequence, health workers may become likely to practice in more densely populated areas, rather than less populated regions.

We can therefore hypothesize that the better the quality of residential housing and the larger the population size, the greater would be the numbers of different kinds of medical and health services in particular regions of the Kwun Tong community. Before we empirically examine and elaborate this hypothesis, let us briefly describe the distribution of the population size and the quality of residential housing in various subdistricts of Kwun Tong.

POPULATION AND HOUSING

According to the crude results of the 1971 census conducted by the Department of Statistics and Census, Hong Kong Government, the district of Kwun Tong had a total population of 446,830 residents. Table 1 shows the distribution of these residents in different subdistricts and in different types of residential housing.

According to the proportion of residents, the various subdistricts can be ranked from the largest to the least as follows:

KTT = 22.48%

NTK = 21.10%

SMP = 18.27%

LT = 11.65%

KTR = 9.97%

YT = 5.34%

PS = 5.11%

JV = 3.96%

CKL = 0.93%

LYM = 0.70%

KB = 0.49%

Obviously KTT and NTK have the largest proportions of residents. Together, they account for almost half of the total population of Kwun Tong. Conversely, KB, LYM, and CKL have the least proportions, none of which exceeds one percent of the total population.

It seems that the 11 subdistricts can be lumped into four clusters:
(I) KTT, NTK, and SMP; (II) LT, and KTR; (III) YT, PS, and JV; and (IV) CKL,
LYM, and KB. In terms of population size, the between-cluster differences are
greater than the within-cluster differences.

According to the type of housing, 52.92% of the total population of
Kwun Tong are residing in resettlement estates; 19.49% in low-cost housing
estates; 12.87% in private apartment buildings; 9.37% in cottages and squatters;
and only 0.35% in industrial buildings. Obviously the public housing scheme
has played an essential role in the development of Kwun Tong. 77.4% of the
total population are living in low-cost and resettlement estates.

To consider the housing situation in various subdistricts, we find
that (1) residents in KTT are largely living in private apartment buildings
and low-cost housings; (2) residents in NTK are largely in resettlement
estates and then in low-cost housings; (3) PS is primarily a low-cost housing
area; (4) KB, LYM, and CKL are filled with cottages and squatters; and (5)
almost all residents in KTR, SMP, JV, LT, and YT are living in resettlement
estates.

It seems to be valid to assume that in terms of the quality of
residential housing, private apartment buildings are the best, followed in
sequence by low-cost housings, resettlement estates, and cottages or squatter
huts.[4]

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[4] Industrial buildings are not considered. The reasons are two: (1) The
primary purpose of these buildings is for manufacturing, rather than
residence, and (2) we find very few residents in this type of housing.

They can be scored from high to low as follows: private apartment building = 4, low-cost housing = 3, resettlement estate = 2, and cottage = 1. This provides a measurement of the level of residential-housing quality in different subdistricts. The index of residential-housing quality in a particular subdistrict is formulated as below:

$$\text{Index (of a particular subdistrict)} = \frac{\sum_{i=1}^{4} (P_i \times H_i)}{P}$$

where, i = housing types;

H_i = the score value of a particular housing type;

P_i = the number of residents living in a particular housing type;

P = the total number of residents in the subdistrict.

In other words, the housing quality in a particular subdistrict is indicated by the proportion of the residents living in different types of residential housings.

The index values are estimated on the basis of the data in Table 1 as follows:

$$KTT = 3.49$$
$$PS = 3.0$$
$$NTK = 2.09$$
$$KTR = SMP = 2.0$$
$$LT = 1.99$$
$$JV = 1.87$$
$$YT = 1.72$$
$$CKL = LYM = KB = 1.0$$

Generally speaking, the quality of housing in KTT is the best, while those in CKL, LYM, and KB are the worst.

Table 1. No. of Residents by Sub-district and Type of Land use in Kwun Tong, 1971.

Type of Housing** / Sub-district	Resettlement Estate	Low Cost Housing Estate	Private Apartment & Building	Cottage Area*	Industrial Zone	Total
PS	——	22,819	——	——	——	22,819
JV	15,443	——	——	2,244	——	17,687
KB	——	——	——	2,138	68	2,026
NTK	48,683	24,501	1,405	19,191	333	94,293
KTR	44,528	——	——	——	——	44,528
KTT	——	39,776	56,098	3,492	1,072	100,438
SMP	81,300	——	——	344	——	81,644
CKL	——	——	——	4,153	——	4,153
LT	51,437	——	——	623	——	52,060
YT	17,243	——	——	6,551	73	23,867
LYM	——	——	——	3,135	——	3,135
Total	258,814	87,096	57,503	41,871	1,546	446,830

* Including squatter, resite area, & resettlement area.

** PS = Ping Shek, JV = Jordan Valley, KB = Kowloon Bay, NTK = Ngau Tau Kok, KTR = Kwun Tong Resettlement, KTT = Kwun Tong Town, SMP = Sau Mau Ping, CKL = Cha Kwo Ling, LT = Lam Tin, YT = Yau Tong, LYM = Lyemun.

MEDICAL AND HEALTH SERVICES

A. Data-Collection

We conducted an enumeration survey of all the medical and health service units in the entire district of Kwun Tong in September 1971. There are two major sectors of medical services in the community; they are the traditional Chinese and the modern Western medical care. With regard to the modern Western medical services, we include the private medical practitioner offices, religious voluntary clinics (i.e., the general clinics sponsored by religious associations), secular voluntary clinics (i.e., the general clinics sponsored by non-religious and non-government agencies, such as Kai Fong, clan and district associations), government clinics, dental clinics, medical laboratories, maternity homes, and rehabilitation centres.[5] With regard to the traditional Chinese medical units, we include independent herbalist offices, herbalist offices inside drugstores, acupuncturist offices, bone-setter offices, and hemorrhoid specialist offices.[6] These modern Western and traditional Chinese medical and health service units are hereafter referred to as health care units.

Besides the aforementioned health care units, we also study the distribution of drugstores in Kwun Tong. There are three categories of drug-stores: (1) primarily selling Chinese medical herbs, (2) primarily selling modern Western medical drugs, and (3) selling both Chinese and Western medicine.

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[5] Family planning agencies, and the clinics in social welfare agencies, in schools, and in industrial firms are excluded.

[6] Some herbalists may also practice acupuncture or bone-setting. Such units are classified as herbalist offices in the present study.

In short, three major types of medical and health service units will be studied in the present paper; they are (1) the modern Western health care units, (2) the traditional Chinese health care units, and (3) the drugstores.

B. Findings

How many medical and health service units are there in Kwun Tong? Table 2 shows that as of 1971, there are totally 275 health care units and 182 drugstores. Of the 275 health care units, 37% are modern Western and 63% are traditional Chinese. In terms of sheer numbers, obviously there are more traditional Chinese than the modern Western health care units in the community.

The data concerning the spatial locations of the various medical and health units are plotted in Figure 3. Obviously most units tend to concentrate in a few areas. Let us separately analyze the availability of each type of units in various subdistricts.[7]

I. The Distribution of Traditional Chinese Health Care Units.

Table 2 shows that a great majority of the Chinese health care units are herbalist offices (62.6%). Next come the bone-setter offices (28.2%). There exist a small number of acupuncturist offices (6.9%) and of hemorrhoid specialist offices (2.3%)

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[7] For a detailed discussion of the distribution of Western-trained physicians and of Chinese herbalists, the reader is referred to the report "Spatial Distributions of Modern Western and Traditional Chinese Medical Practitioner in An Industrializing Chinese Town" by Rance P.L. Lee and Grace Y.C. Chiu of the Social Research Centre, The Chinese University of Hong Kong. It is noted that there were 111 Chinese herbalists, and 92 Western-trained physicians in Kwun Tong, 1971.

KWUN TONG

SPATIAL DISTRIBUTION OF MEDICAL
AND HEALTH ORGANIZATIONS

N
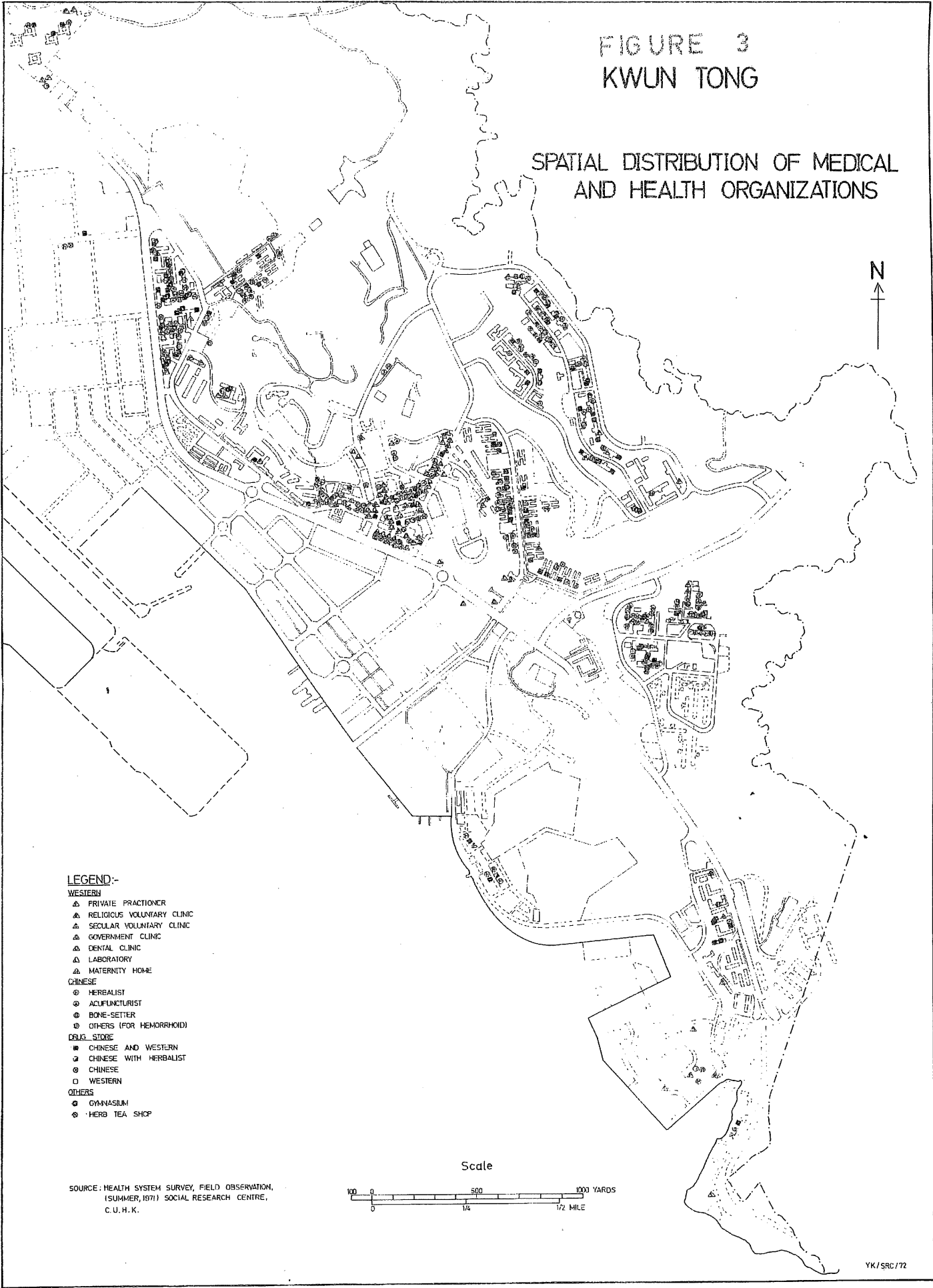
LEGEND:-

WESTERN
△ PRIVATE PRACTIONER
△ RELIGIOUS VOLUNTARY CLINIC
△ SECULAR VOLUNTARY CLINIC
△ GOVERNMENT CLINIC
△ DENTAL CLINIC
△ LABORATORY
△ MATERNITY HOME
CHINESE
⊛ HERBALIST
⊛ ACUPUNCTURIST
⊕ BONE-SETTER
⊕ OTHERS (FOR HEMORRHOID)
DRUG STORE
▣ CHINESE AND WESTERN
▣ CHINESE WITH HERBALIST
⊚ CHINESE
□ WESTERN
OTHERS
⊙ GYMNASIUM
⊗ HERB TEA SHOP

SOURCE: HEALTH SYSTEM SURVEY, FIELD OBSERVATION,
        (SUMMER, 1971) SOCIAL RESEARCH CENTRE,
        C.U.H.K.

Scale

100 0   500   1000 YARDS

0   1/4   1/2 MILE

YK/SRC/72

Table 2. Numbers of Chinese Health Care Units, Western Health Care Units, and Drugstores in various Subdistricts of Kwun Tong, 1971.

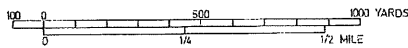| Chinese health care	Sub-districts*											Total N
	JV	KB	NTK	PS	KTT	KTR	SMP	LT	CKL	YT	LYM	
Herbalist office	7	0	32	2	16	15	14	16	3	4	0	109
Bone-setter office	3	0	7	0	11	4	9	12	1	1	1	49
Acupuncturist office	1	0	1	0	6	0	1	3	0	0	0	12
Hemorrhoid specialist office	0	0	0	0	2	2	0	0	0	0	0	4
Total N	11	0	40	2	35	21	24	31	4	5	1	174

Western health care

	JV	KB	NTK	PS	KTT	KTR	SMP	LT	CKL	YT	LYM	Total N
Private practitioner	1	0	7	2	25	0	5	1	1	1	0	43
Religious voluntary clinic	0	0	2	0	4	1	1	3	1	2	0	14
Secular voluntary clinic	0	0	2	0	2	0	0	1	0	0	2	7
Governmental clinic	0	0	0	0	1	0	0	0	0	0	0	1
Dental clinic	0	0	0	0	20	0	1	0	0	0	1	22
Rehabilitative centre	0	0	0	0	2	1	1	0	1	0	0	5
Maternity home	0	0	0	0	6	0	0	0	0	0	0	6
Laboratory	0	0	0	0	3	0	0	0	0	0	0	3
Total N	1	0	11	2	63	2	8	5	3	3	3	101

Drugstore

	JV	KB	NTK	PS	KTT	KTR	SMP	LT	CKL	YT	LYM	Total N
Chinese & Western	7	1	37	2	24	20	40	13	2	8	1	155
Chinese	0	0	0	0	2	6	6	9	1	1	1	26
Western	0	0	0	0	0	1	0	0	0	0	0	1
Total N	7	1	37	2	26	27	46	22	3	9	2	182

*
JV = Jordan Valley,
KB = Kowloon Bay,
NTK = Ngau Tau Kok,
PS = Ping Shek,
KTT = Kwun Tong Town Area,
KTR = Kwun Tong Resettlement Estates,

SMP = Sau Mau Ping,
LT = Lam Tin,
CKL = Cha Kwo Ling,
YT = Yau Tong,
LYM = Lyemun.

These Chinese health care units are largely concentrated in NTK (23.0%), KTT (20.1%), and LT (17.8%). These areas are also more likely than other subdistricts to have diverse kinds of Chinese medical services. Contrarily KB and LYM are disadvantaged regions in terms of the availability of Chinese medical services. KB has no Chinese health care units, while LYM has only one bone-setter office.

Several additional points should be noted: (1) besides the 2 deprived areas (KB and LYM), all subdistricts have more herbalist offices than other kinds of Chinese health care units; (2) most of the herbalist offices are located in NTK, followed by KTT, LT, KTR, and SMP; (3) bone-setter offices are largely in LT and KTT, followed by SMP and NTK; (4) KTT has the largest number of acupuncturist offices; and (5) hemorrhoid specialist offices are only located in KTT and KTR.

II. The Distribution of Modern Western Health Care Units.

Table 2 shows that most of the Western health care units in Kwun Tong are the private medical practitioner offices (42.6%). Other types of health care units are the general clinics sponsored by government or non-governmental agencies (21.8%), dental clinics (21.8%), maternity homes (5.9%), rehabilitative centres (4.9%), and laboratories (3%).

The private practitioners offices are mostly concentrated in KTT (58.1%), Quite a few of them are also in NTK (16.3%) and SMP (11.6%).

The sponsored clinics are concentrated mostly in KTT (31.8%), NTK (18.2%), and LT (18.2%). Among the sponsored clinics, 63.6% are sponsored by religious associations. It seems that religious associations have played a major role in the sphere of health services.

KTT also has more maternity homes, medical laboratories, dental clinics, and rehabilitative centres than other subdistricts of Kwun Tong.

Obviously KTT has the largest number of various kinds of Western health care units. In fact, 62.4% of all Western health care units are located there. KTT is, in effect, the "centre" of modern Western health care in Kwun Tong.

In terms of the sheer number of Western health care units, NTK (10.9%) is next to KTT. However, KB has no Western-scientific medical service, while JV has only one private practitioner office.

Comparing the Chinese and Western health care services, we find that in most subdistricts, the number of Chinese health care units is greater than that of Western units. KTT is the only exception, where Western units outnumber Chinese units.

Furthermore, there appears to be an unimodal distribution of Western health care units among the 11 subdistricts of Kwun Tong, as compared to the multi-modal distribution of Chinese health care units. As reported, Western units are largely concentrated in KTT, while Chinese units are spreading out over several subdistricts (particularly KTT, NTK, and LT). The standard deviation of the distribution of Western unit among the 11 subdistricts is 17.3, while that of Chinese units is 14.1. The locational distribution of Western units hence shows a greater degree of variation than that of the Chinese units. In other words, Chinese health care units are more evenly distributed among various subdistricts than Western units. Why?

As noted, there are more Chinese health care units than Western ones in Kwun Tong. The competition among Chinese units may then be higher than that among Western units. In order to minimize the competition among themselves,

the Chinese health care units tend to spread out in various areas. Furthermore, in our recent surveys of adult residents and of medical practitioners in Kwun Tong, we find that (1) most of the adult residents are much more likely to use the Western than the Chinese medical services, and (2) most of the Western-trained physicians and of the Chinese herbalists report that in general Western-trained physicians have more patients and more economic incomes than the Chinese medical practitioners. In order to get more patients and incomes, Chinese health care units then have to spread out. As a result, Chinese units become more evenly distributed than Western units among various regions.

To conclude our discussion on health care units, let us present the total number of both Western and Chinese units in each subdistrict. The numbers are as follows:

KTT = 98	YT = 8
NTK = 51	CKL = 7
LT = 36	IYM = 4
SMP = 32	PS = 4
KTR = 23	KB = 0
JV = 12	

Apparently KTT and NTK have the largest numbers of health care units. Together, they account for 54.2% of all the health care units in Kwun Tong.

III. The Distribution of Drugstores

From Table 2, we find that a great majority of the 182 drugstores in Kwun Tong are mixed-type (85.2%), i.e., selling both the Chinese herbs and the Western drugs. Very few drugstores would primarily sell either the Western or the Chinese medical drugs.

Drugstores are mostly concentrated in SMP (25.3%) and NTK (20.3%). A number of them are also in KTR (14.8%), KTT (14.3%), and LT (12.1%). PS, KB, LYM, and CKL have no drugstore or very few.

IV. Convergence of Medical and Health Services

We have separately described the locational patterns of the Western health care units, the Chinese health care units, and the drugstores in Kwun Tong. A new question then arises: Do they tend to concentrate in particular regions or subdistricts? In other words, to what extent are the spatial distributions of these three types of medical and health services associated with each other?

For the sake of parsimony we will here-after focus on the total number of the traditional Chinese health care units, of the modern Western health care units, and of the drugstores. The statistical model of Product-moment correlation is used to measure the strength of association. It is underscored that (1) this model measures the linear relationship between two variables, and hence cannot discover any curvilinear or nonlinear relationship; and (2) the squared value of the correlation coefficient (ranging from -1 to +1) can be interpreted as the amount, or the percentage, of variations commonly shared by the two variables under study.

The intercorrelations among the Chinese health care units (C), the Western health care units (W), and the drugstores (D) are as follows:

$$r(CW) = .55$$
$$r(CD) = .85$$
$$r(WD) = .33$$

All associations are strong and positive. Hence, the greater the number of a particular type of medical & health service unit in a subdistrict, the greater would also be the numbers of other types. There exists a significant pattern of spatial convergence among the various kinds of medical and health services in Kwun Tong. Why is there such a strong convergence? As we shall report in the forthcoming pages, it may be due to the fact that the spatial distributions of these three types of service units are dependent on some common factors, such as the population size and the residential-housing quality.

Relatively the distribution of the Chinese health care units and that of the drugstores have the strongest association. They commonly share 72% of the total variations. The reason may be that a substantial number of herbalist offices are located inside the drugstores. We, in fact, find that 57 out of the 109 herbalsit offices are inside the drugstores. This pattern of affiliation between herbalists and drugstores has been quite prevalent in the Chinese medical sector of Hong Kong.

Conversely the distribution of the Western health care units and that of the drugstores share the least amount of common variance, which is 11%. Why? Most of the Western health care units have their own dispensaries. They seldom refer patients to the drugstores. As a result, the spatial distribution of the drugstores would be little affected by that of the Western health care units.

POPULATION, HOUSING, AND HEALTH SERVICES

Previous analyses show that the population size, the residential-housing quality, and the health services are unevenly distributed among the 11 subdistricts of Kwun Tong. In this section, we attempt to examine the question: how is the distribution of the medical and health services related to the population size and the residential-housing quality? As mentioned, we will hereafter focus on the total number of the traditional Chinese health care units, of the modern Western health care units, and of the drugstores.

The first question to be examined should be: how is the population size associated with the availability of each type of medical and health service units in different subdistricts? The Product-moment correlation coefficients are as follows:

$$r(PC) = .90$$
$$r(PW) = .65$$
$$r(PD) = .86$$

In other words, the variable of the subdistrict population size accounts for 81% of the variations in the distribution of Chinese health care units; 42% in that of Western health care units; and 74% in that of drugstores. The subdistrict population size is therefore positively and strongly associated with the distribution of each type of medical and health service units. Relatively, the Chinese health care units and the drugstores are more likely than the Western health care units to be dependent on the population size.

How is the residential-housing quality of the various subdistricts associated with the distribution of the medical and health services?[8] The

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[8] For specific data concerning the distribution of welfare/low-cost clinics in resettlement estates in Kwun Tong, see Appendix B.

correlation coefficients are as below:

$$r(HC) = .54$$

$$r(HW) = .68$$

$$r(HD) = .39$$

In other words, the index of the housing quality accounts for 29% of the total variations in the distribution of the Chinese health care units; 46% in that of the Western health care units; and 15% in that of the drugstores. We there -fore conclude that the housing quality is positively and strongly related to the distribution of various types of medical and health service units. In other words, the better the quality of the residential-housing in a particular subdistrict, the larger would be the number of the Chinese health care units, the Western health care units, and the drugstores. Relatively the Western health care units have the highest degree of dependency on the housing status, while the drugstores are least affected by the housing quality.

Since the distributions of the medical and health services are dependent on both the population size and the residential-housing quality, two important questions then arise: (1) How do the population size and the housing quality together account for the distributions of the health services? and (2) Which one is relatively more important in determining or predicting the distributions of the health services?

To answer the first question, i.e., to measure the strength of the relationship of each type of the medical and health service units to both the population size and the housing quality, we decide to use the multiple correlation analysis. It should be noted that (1) the value of the multiple correlation coefficient ranges from 0 to 1, indicating the strength of association, and (2) its squared value can be interpreted as the proportion

of the total variations in the criterion variable that can be accounted for by
the variations in all the predictor variables.

The coefficients of multiple correlation between both the population
size and the housing status (predictor variables) and each major type of the
medical and health service units (criterion variable) are as follows:

$$R(C.PH) = 0.90$$
$$R(W.PH) = 0.74$$
$$R(D.PH) = 0.87$$

In other words, the subdistrict population size and the housing quality together
can account for 81% of the total variations in the distribution of the Chinese
health care units; 55% in that of the Western health care units; and 76% in that
of the drugstores. Hence, if we simultaneously use both the population size and
the housing quality as predictors, we can explain a very substantial proportion
of variations in the distribution of each type of medical and health service
units. In other words, the larger the number of residents and the better the
housing quality in a particular subdistrict, the larger would be the numbers of
various kinds of medical and health services. Relatively speaking, the
distribution of the Western health care units is less dependent on both the
population size and the housing quality than that of the Chinese health care
units and of the drugstores.

To answer the second question, i.e., to assess the relative importance
between the population size and the housing quality, we can simply compare the
previously reported zero-order correlations of the population size and of the
housing quality to the three types of medical and health service units.
Obviously the distribution of the Chinese health care units and of the drug-
stores are much more dependent on the population size than on the housing quality.

The distribution of the Western health care units, however, is equally dependent on the population size and the housing qualtiy. In general, population size is a better predictor than housing quality with respect to the distributions of health services among various subdistricts of Kwun Tong.

Finally let us come to an important problem. The variations of population size and of residential-housing quality among various subdistricts are associated. We find that the association is strong and positive. The value of Product-moment correlation is .58, indicating that 34% of the total variations are commonly shared by the two factors. In other words, the better the quality of residential-housing, the more would be the residents in particular subdistricts. Since the population size and the housing quality tend to go together, would each of them have independent effects upon the distributions of the medical and health services? In other words, (1) if the housing quality is controlled or held constant (i.e., all subdistricts become the same in terms of the housing quality), would the population size remain to be associated with the distributions of health services? and (2) if the population size is held constant, would the housing quality be related to the distribution of health services?

To examine this problem of independent effects, we employ the statistical model of the partial correlation analysis. It should be noted that (1) the value of the partial correlation coefficient ranges from -1 to +1, indicating the strength and the direction of the association between two variables while controlling for others, and (2) its squared value can be interpreted as the proportion of the total variations commonly shared by the two variables after controlling for the remaining variables.

Controlling for the variable of the housing quality (H), the partial correlation coefficients between the population size (P) and the three types of medical and health services (C,W, and D) are as below:

$$r(PC.H) = 0.87$$

$$r(PW.H) = 0.43$$

$$r(PD.H) = 0.85$$

These coefficients show that if the housing quality is held constant, the factor of the population size would still account for 76% of the total variation in the distribution of Chinese health care units; 18% in that of Western health care units; and 72% in that of drugstores. The partial correlations are all strong and positive. To compare these partial correlations with the original zero-order correlations, we note that the relationships between the population size and the three types of medical and health service units are little affected by the housing quality. Hence we may assert that the population size has independent effects upon the availability of the various kinds of medical and health services in different subdistricts.

Controlling for the variable of the population size, the partial correlation coefficients between the housing status and each of the three types of medical and health services are as follows:

$$r(HC.P) = 0.06$$

$$r(HW.P) = 0.49$$

$$r(HD.P) = -0.27$$

If the variable of the population size is held constant, the factor of housing quality would merely account for 0.36% of the total variations in the distribution of the Chinese health care units; 24% of the Western health care units; and 7% of the drugstores.

The correlation between the housing quality and the Chinese health care units almost disappears if we partial out or control for the effects of the population size. It indicates that the relationship is, in effect, a

spurious one. It is primarily due to the variations of the population size in different subdistricts. Housing quality itself does not have independent effects upon the distribution of the Chinese health care units.

The partial correlation between the housing quality and the Western health care units is smaller than the original zero-order correlation, but remains strong and positive. In effect, the relationship is not significantly affected by the population size. Hence, housing status may have independent effects upon the availability of the Western health care units in different subdistricts.

As reported, the original zero-order correlation between the housing quality and the drugstores is weak and positive. The relationship becomes weaker if we control for the population size. It shows that the variable of the housing quality, in effect, has little influence on the distribution of drugstores in different subdistricts. However, the fact that the partial correlation becomes negative suggests that if the population size is held constant, then the better the housing quality, the less would be the number of drugstores. Nevertheless, the correlation is too weak for making any conclusive statement.

In short, the housing quality may have independent effects upon the distribution of Western health care units, but not upon other types of units. On the whole, it seems that the population size is more likely than the housing quality to have independent effects upon the distributions of various kinds of medical and health services. Why is the population size more powerful than the quality of residential housing? The reason may be that the better housing areas may have better economic potential but not necessarily more demands for medical care, while the more densely populated regions may generate more medical demands as well as more economic opportunities for the medical and health workers.

SUMMARY AND DISCUSSION

This report is based on a general question: What are the effects of planned changes in some segments of a newly developed industrial-urban community upon the changes in other segments? The quality of residential housing and the size of population in the 11 administrative subdistricts of the Kwun Tong community are largely planned, while the availability of the medical and health services are largely unplanned. It is hypothesized that the availability of medical and health service units is dependent on the quality of residential housing and the size of the population in different subdistricts of the community.

Three kinds of medical and health service units are studied; they are (1) the traditional Chinese health care units, including herbalist offices, acupuncturist offices, bone-setter offices, and hemorrhoid specialist offices, (2) the modern Western health care units, including private medical practitioner offices, the general clinics sponsored by government or non-governmental associations, dental clinics, medical laboratories, maternity homes, and rehabilitation centres, (3) the drugstores. Hence our units of study are the 11 administrative subdistricts of Kwun Tong, and the major variables under study are five: the population size (P), the quality of residential housing (H), the number of Chinese health care units (C), the number of Western health care units (W), and the number of drugstores (D). The zero-order correlations among these five variables can be diagrammed as below (straight lines with an arrow represent assumed causal directions; curves represent relations without assumed causal directions; and the numbers in parentheses are Product-moment correlation coefficients):
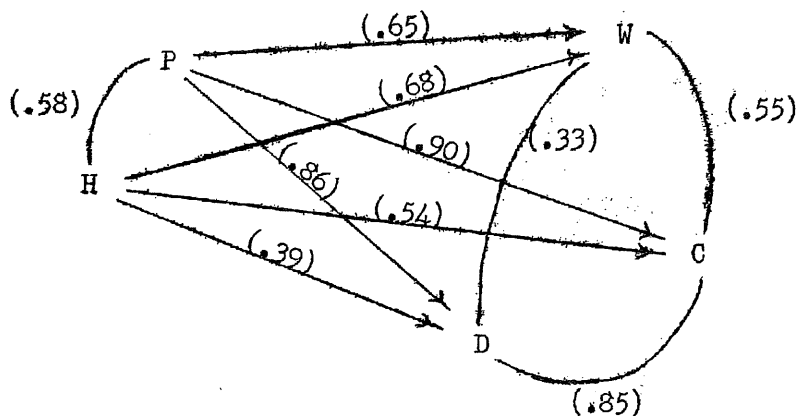
The major findings are summarized by the following statements:

1. There are more traditional Chinese than modern Western health care units in Hong Kong. The Chinese health care units are mostly herbalist offices, while the Western health care units are largely private medical practitioner offices. Furthermore, of the 182 drugstores, most are providing both the Chinese medical herbs and the Western medical drugs.

2. The three types of service units are unevenly distributed among the various subdistricts. Western health care units are more unevenly distributed than Chinese health care units. Nevertheless, it is noted that there exists a pattern of convergence with regard to the spatial distribution of the three types of medical and health service units.

3. Kwun Tong Town Area (KTT) has been the industrial and commercial centre of the Kwun Tong community. It has also become the "centre" of medical and health services. Our findings indicate that there are large numbers of various kinds of medical and health service units. For example, slightly over one half of all the Western health care units in Kwun Tong are located there. This fact deserves some interpretation.

It is our impression that accessibility to patients from various areas is a basic consideration for the establishment of a health unit. If a particular unit wants to maximize its sources of patients, it should be located in a site which is not only populated, but is also relatively easy for patients to come. Being the community centre, Kwun Tong Town Area has the largest population size among all subdistricts, and its location is most convenient for people in other areas to come. It is thus expected that very large numbers of various kinds of medical and health units would be located there.

4. The population size of various subdistricts ranges from 2 to 100 thousand. In general the larger the number of residents in particular subdistricts, the more would be the various types of health service units. Relatively the Chinese health care units and the drugstores are more likely than the Western health care units to be dependent on the population size.

5. Various subdistricts differ in terms of the quality of residential housing. In general the better the quality of residential housing in particular subdistricts, the more likely we would find various kinds of medical and health services. Relatively the availability of Western health care units is more likely than that of the other types to be dependent on the housing quality.

6. Considering the population size and the housing quality simultaneously, we find that the more the residents and the better the housing quality in particular subdistricts, the larger would be the numbers of various types of service units. Relatively the spatial distribution of the Western health care units is least affected by both the population size and the housing quality together.

7. Evaluating the relative importance between the population size and the housing quality, we note that generally speaking the population size is better than the housing quality in accounting for the spatial variations in the three

types of medical and health service units. To be specific, the distribution of
the Chinese health care units and of the drugstores are more dependent on the
population size than on the housing quality, while the distribution of Western
health care units is equally dependent on both factors.

8. Controlling for the housing quality, we find that the population size
is independently related to eahc type of medical and health service units.

9. Controlling for the population size, we note that housing quality is
independently associated with the Western health care units. However, it may
not have independent effects upon other types of health service units.

The central findings of this report are the strong and positive
relationships of the population size and the housing quality to the distributions
of various kinds of medical and health service units among various subdistricts
of Kwun Tong. These relationships have been interpreted in terms of service
motivation and economic incentive on the part of medical and health workers.
It is suggested that in better housings and more populated areas there would
be stronger demands for medical care and would thus generate more economic
opportunities for health workers.

Some implications and limitations of our findings should be noted.
First of all, the findings suggest that the various kinds of medical and health
services would be unevenly distributed among various regions of a newly
developed industrial and urban community. The distributions, however, are
significantly dependent upon the size of population and the quality of the
residential housing in particular regions. As mentioned, the population and
the housing segments of Kwun Tong have been substantially planned, while there
has been no comprehensive and systematic planning in the segment of medical and
health services. We may hence assert that the spatial distributions of medical

and health service units would "automatically" adjust to the planned distributions of the population size and the housing types. In a way, our findings illustrate the effects of the partial planning in the development of a new industrial and urban district.

The idea about the effects of the partial planning is, of course, more complex than what the present report can show. Other types of planning and their effects on other aspects of life have to be considered in future studies. Moreover, the present study is, in effect, a cross-sectional survey at one point in time. A longitudinal design is required if we want to understand the "overtime" effects of planned changes.

The positive relationship between the housing quality and the availability of Western health care units is found to be independent of the population size, but it is not the case for the positive relationship between the housing quality and the availability of Chinese health care units. These facts deserve some attention. Many town planners and health workers assume that the Western medicine is scientific and is thus more effective than the non-scientific approach of the traditional Chinese medical care. Our findings suggest that the residents in poor housing areas are less likely than those in better housing regions to be accessible to the Western-scientific medical and health services. As a result, the residents in poor housing areas may become relatively more deprived of adequate health care. In order to reduce the relative medical deprivation, health workers should attempt to increase the availability of the Western-scientific health services in poor housing areas.

Western medicine has played an essential role in the modernizing society of Hong Kong. But the forces of modernization have not yet been able to wipe out the prevalence of the traditional Chinese medicine. The fact that we find more Chinese than Western health care units in Kwun Tong shows the

wide-spread effect of Chinese medical practice. An important question then arises: how are these two medical sectors interrelated, as well as different, in the course of modernization? The present report can shed some light on this general issue by focusing on the ecological distribution of health service units.

As indicated, we find (1) that the availability of Western health care units and that of Chinese health care units in the various regions of an industrial-urban community are positively associated, but relatively Western units are more likely than Chinese units to be unevenly distributed in the various regions; and (2) that both the Chinese and the Western units are positively associated with the size of population and the quality of the residential housing in the various regions, but relatively the availability of Chinese units is more likely than that of Western units to be dependent on the population size while the availability of Western units is more likely than that of the Chinese units to be dependent on the housing quality.

Furthermore, the drugstore has become a spot where Western and Chinese medicine may be converged. In the present study, we find that drugstores are mostly providing both Western drugs and Chinese herbs. More important is that salesmen in drugstores may faciliate the mixed use of both types of medical drugs by recommending them to the buyers. It is noted that in our recent survey of 702 adult residents in Kwun Tong, we found quite a few of them frequently seeking medical advice from salesmen in drugstores.

Hence, our findings suggest that the modern Western and the traditional Chinese medical sectors in the modernizing society of Hong Kong are not entirely different or separated from each other. As illustrated by the present study of some ecological characteristics of the medical and health service units, they are in some ways similar and are interrelated.

APPENDIX A

THE BOUNDARY OF KWUN TONG

& ITS SUBDISTRICTS[*]

The boundary of the Kwun Tong District under study "approximates" that defined by the Government Secondary Planning Unit 2.9. We, however, excluded certain regions: the tertiary planning units (2.9.6) and (2.9.9), and also a part of the units (2.9.3), (2.9.4), (2.9.7) and (2.9.8). There are two major reasons for this decision. First, if the boundary between Kowloon and the New Territories is drawn, these excluded regions will belong to the New Territories rather than Kowloon. Second, (2.9.6) and the north-eastern part of (2.9.3) and of (2.9.4) are hill slopes with very few inhabitants.

Furthermore, the district of Kwun Tong in our study is subdivided into 11 subdistricts on the basis of several considerations, such as the geographical location, the landuse pattern, the land lot division lines, the land marks (e.g., roads, buildings, water courses, or hills), and our judge -ment of the residents' district-identification.

The subdistricts and their major physical components are as follows:
1. Ping Shek: Ping Shek Low Cost Housing Estate.
2. Jordan Valley: Jordan Valley Resettlement Estate, Jordan Valley Resettle -ment Factory, and Jordan Valley Resite/Class II Areas.
3. Ngau Tau Kok: Ngau Tau Kok Resettlement Estate, Ngau Tau Kok Government Low Cost Housing Estate, Ngau Tau Kok Resettlement Cottage Area (Fuk Wah Tsuen), Kai Tak Mansion, and Ngau Tau Kok Industrial Area.

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(4) <u>Kwun Tong Town Area</u>: The commercial and residential area around Yue Man

Square, Garden Estate, Wo Lok Low Cost Housing Estate, Kwun Tong Government

Low Cost Housing Estate, Ngok Yue Shan Class II Area, Hong Ning Road Class

II Area, and the industrial zone on the reclamation area between the water

front and Kwun Tong Road;

(5) <u>Kwun Tong Resettlement Area</u>: The Kwun Tong Resettlement Estate;

(6) <u>Sau Mau Ping</u>: Sau Mau Ping Resettlement Estate and the nearby scattered

cottages;

(7) <u>Lam Tin</u>: Lam Tin Resettlement Estate and the nearby scattered cottages;

(8) <u>Cha Kwo Ling</u>: Cha Kwo Ling Village, Sai Tso Wan Village, and Kwun Tong

Tsai Mining Lot;

(9) <u>Yau Tong</u>: Yau Tong Resettlement Estate, Yau Tong Village, Sam Ka Tsuen,

and Yau Tong Industrial Area along the water front;

(10) <u>Lyemun</u>: Lyemun Village, Ma Wan Village, Ma Pui Village, and Ling Nam New

Village;

(11) <u>Kowloon Bay</u>: Kowloon Bay Licensed/Resite Area, and the area with cottage

factories.

APPENDIX B.

WELFARE AND LOW COST MEDICAL CLINICS

IN RESETTLEMENT ESTATES

(AS ON 31st March, 1972)

| Estates | No. of Clinics | | Total | Ratio of Clinics to Population |
	Welfare	Low Cost		
Lam Tin	1	4	5	1:11,102
Jordan Valley	-	1	1	1:20,264
Kwun Tong	2	-	2	1:28,507
Ngau Tau Kok	1	5	6	1: 9,068
Sau Mau Ping	2	4	6	1:14,545
Yau Tong	3	-	3	1: 6,436

(Source: Hong Kong Annual Departmental Report by the
Commissioner for Resettlement, 1970-71.)

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