

Equity in the Delivery of Health Care in Thailand

By

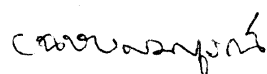
Supasit Pannarunothai ^a and Clas Rehnberg ^b

^a Faculty of Medicine, Naresuan University, Phitsanulok 65000, Thailand

^b Stockholm School of Economics, Stockholm, Sweden

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1. Introduction

The Thai national health objectives have never been pronounced in equity objective as observed in the new 1997 constitution. It is mentioned in the constitution, Act 52 that “.. all Thai citizens have equal right to use good quality health care, and the poor have right to use health services at government health facility free of charge as to be mentioned in the organic laws ...”. And in Act 81, “the government must provide and promote the people’s health through good quality and efficient health care to all”. These statements are philosophical rather than operational objectives because the targets to achieve have never been set out. Therefore, there is a need to measure inequity to help set the national health objective and monitor the situation as mention in the constitution.

The index to measure equity must portray these characteristics (van Doorslaer et al 1997). First, the index has to stratify population by income to reflect socio-economic dimension in health inequity. Secondly, the index must reflect experiences of the entire population. Thirdly, the index must be sensitive to changes in the distribution of population across socio-economic groups. These requirements lead to the need to use concentration index to measure inequity patterns. Furthermore, concentration index satisfies three basic requirements: it relates to relative index of inequality, it has more visual appeal, and it is calculated from a concentration curve (van Doorslaer et al 1997).

Concentration index has been used to measure inequity in health care financing in Thailand using the socioeconomic surveys (SES) of 1986 and 1992 (Rehnberg and Pannarunothai 1998). Kakwani index was calculated by subtracting concentration index of taxation with concentration index of income distribution to reflect progressivity or regressivity of health care finance. The results of Kakwani index call for the second phase of research which focus on developing indices for health care delivery.

The objective of this study is to investigate to what extent health care is distributed according to need, rather than according to ability to pay. Detailed objectives can be elaborated as follows:

- To measure equality of health care utilisation for equal need.
- To measure equality of health utilisation with respect to geographical areas and socioeconomic variables.

2. The Thai health care system

This chapter briefly explains health care delivery system in Thailand, **especially during 1986 and 1991** because we use data from that period to calculate inequity indices. Health seeking behaviour will be described first and then followed by description of health care providers.

Health seeking behaviour

The health care system in Thailand has been described as pluralistic. People seek care from both formal and informal health sectors, and from public and private health facilities. Table 2.1 shows health seeking behaviours of the Thai people over a 20 year period based on various surveys. A trend can be observed, though caution must be made for different data definitions of different surveys, that traditional medicine stayed at an endemic level of 5%, drug stores reduced the share while private sector expanded (Pannarunothai 1996). Unfortunately, health seeking behaviours from the 1985 survey were quite different from others, thus, difficult to compare.

Table 2.1 Health seeking behaviours by various surveys

Health facilities	1970	1979	1985 IPSR		1991 NSO	
	MOPH	MOPH	All	Urban	All	Urban
Do nothing	2.7	4.2	-	-	15.9	17.9
Traditional medicine	7.7	6.3	2.4	1.1	5.7	4.7
Drug store	51.4	42.3	28.6	13.6	38.3	36.9
Health centre	4.4	16.8	14.7	0.7	14.8	2.7
Government hospital	11.1	10.0	32.5	41.2	12.9	13.1
Private clinic and hospital	22.7	20.4	21.8	38.3	12.4	24.7

Note: MOPH - Ministry of Public Health

IPSR - Institute for Population and Social Research, Mahidol University

NSO - National Statistical Office

Supply of the health care system

Important factors influencing the patterns of health seeking behaviour were both income and the supply of health care. From 1986 to 1990 by the NSO SES, household income had increased (a 36% rise per year by current price), then people spent more on health services in private health sectors (a 30% rise per year by current price). The increases of income and spending for private health were much larger for people in urban area than in rural area. So we can see a sharp increase in private hospital beds as compared to the growth of public hospital beds during this period (see table 2.2). The average annual growth of private hospital beds increased from 10% during 1978 to 1987 to 14% during 1987 to 1992. This increase occurred in other big cities (a 21% increase per year) faster than in Bangkok (an 11% increase per year). The average annual growth for private clinics all over the country was about 16% during 1987 to 1992.

Table 2.2 The growth of hospital beds in public and private hospitals

	All beds	Hospital		Private hosp beds	
		Public	Private	Bangkok	Others
1978	57,542	52,014	5,528	3,041	2,487
1987	87,905	77,580	10,325	5,935	4,390
	(5.86)	(5.46)	(9.64)	(10.57)	(8.50)
1992	103,712	85,920	17,792	9,074	8,898
	(3.60)	(2.15)	(14.46)	(10.58)	(20.54)

Numbers in () are the average % annual growth

Distribution of health resources has always been a big problem. Hospital beds are usually concentrated in Bangkok, the beds to population ratio in 1993 was 4.1 beds for 1,000 population, four times higher than the ratio of the northeast (see table 2.3). The concentration of private hospital beds in Bangkok was higher than the concentration of public hospital beds in any other regions.

Table 2.3 Hospital beds per 1,000 population by region in 1993

<i>Region</i>	<i>Public</i>	<i>Private</i>	<i>Total</i>
Bangkok	2.4	1.7	4.1
Central	1.6	0.4	2.1
North	1.3	0.2	1.5
Northeast	0.9	0.1	1.0
South	1.5	0.2	1.7

Source: Ministry of Public Health

3. Equity in the delivery of health care

This section discusses the methods used to measure equity in the delivery of health care. It starts with measuring health status, to take account of the needs for health care, and followed by health utilisation. Health status will be used as a measure of health need to judge for inequality in health care utilisation for equal need. In other words, vertical equity is first considered, as people's health status may not be equally distributed amongst different income level. Measuring health status also allows for considering horizontal equity when comparing utilisation after standardising for equal health status or equal needs. Data manipulation techniques are discussed in details because of the lack of income data in the national Health and Welfare surveys (HWS).

The Health and Welfare survey

The HWS is the survey on health status and health service delivery conducted once every 5 years by the National Statistical Office (NSO). The survey has been established since 1974 as demanded by public and private organisations. The 1986 survey asked the household member's state of well-being in terms of physical health (disability), acute illness, injury; and health service utilisation in terms of consultation to any kinds of health services (public and private) and hospitalisation. This survey interviewed 19,323 households, 3,780 in Bangkok and 4,068 in other municipal areas (NSO 1988).

The 1991 survey had almost the same information to evaluate people's health status and health service delivery, except some dissimilarities in details discussed later in this chapter. This year, it covered 27,780 households, of which 5,040 were in Bangkok and 5,880 in other municipal areas (NSO 1993).

Methods

This section describes methods used for measuring vertical and horizontal equity in this study. The author aware that there are better methods developed recently by van Doorslaer and Wagstaff (1997), but not applied here, because of time lag period.

Vertical equity

Few literature has pursued to measure vertical equity in the delivery of health care (Cullis and West 1979). It is difficult to judge how much unequal treatments should be given to different groups who need health care unequally. Culyer (1989) pointed out that some severely ill patients may need fewer medical treatments than the marginally ill because treatments made little improvement to the former, while preventive medical care could improve the latter's future health. However, this study pursues vertical equity at a simplest form, whether ill health is distributed equally amongst the poor and the rich.

Concentration indices for self-assessed acute illness, chronic illness, disability, will be calculated to reflect equality patterns. Figure 3.1 plots the cumulative proportion of the population ranked by household income against the accumulative proportion of ill health.

The concentration index, C_{ill} , is calculated as the area of how far the curve deviates from the diagonal (equality) line. The formula to calculate is as follows:

$$C_{ill} = 1 - (2/n^2 H) * (h_1 + 2h_2 + 3h_3 + \dots + nh_n) + 1/n$$

n = number of individuals

h = individual's health state: 0 means good health, 1 means ill

H = average health state

Cumulative
% of illness

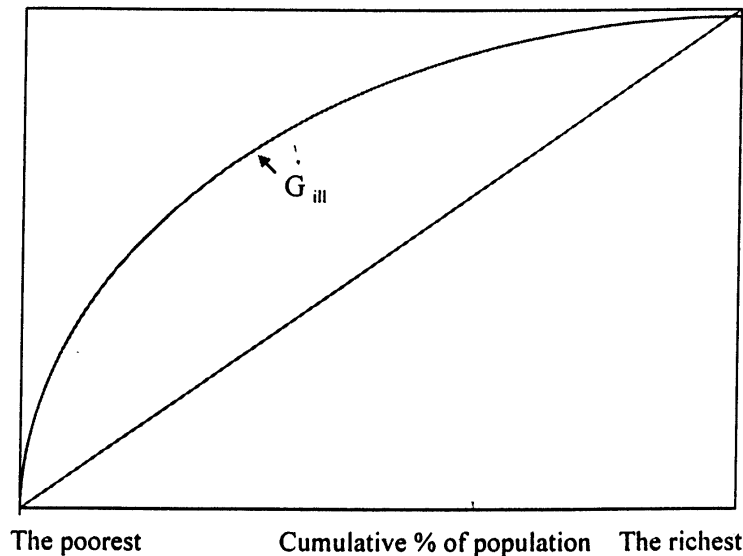


Figure 3.1 Concentration curve of ill health

The value of C_{ill} varies from +1 to -1. The value of negative sign (regressive to income) means that the area is above the diagonal line, if it is positive (progressive to income) the area is below the diagonal line. If the index is 0, it may be that the curve and the diagonal line coincide, or the areas above and under the diagonal line are equal. If concentration index for ill health is negative, it means that the poor are proportionately sicker than the rich. So the condition favours the rich.

Horizontal equity

The concept of horizontal equity in health care delivery has been widely operationalised across the European countries van Doorslaer, Wagstaff and Rutten (1993). This concept tries to avoid the trap found in the vertical equity. Assumptions are made that within the same group classified as chronically sick need more medical treatments than those who care acutely sick. However in the analysis, the groups classified as having the same need should have the same treatment concentration regardless of 'ability to pay', geographical areas, or other socioeconomic variables.

Two indices of equity of health delivery for equal need will be calculated for the whole country and also for subgroups of population, e.g. rural-urban disparity, socioeconomic

groups. This part of the study will complement the first phase of equity in health care financing, where it has been proved that health consumption has been regressive to income (Rehnberg and Pannarunothai 1998).

The first index is to measure the horizontal equity of health delivery developed by Le Grand:

$$(1) \quad HI_{LG} = C_{exp} - C_{ill}$$

where HI_{LG} is a Le Grand type index of horizontal equity¹

C_{exp} is a consumption concentration index, this report will later called it

The concentration index for consumption of health care²

C_{ill} is an illness concentration index

The concentration index for consumption is estimated from

- quantifying the use of health services (different levels of health care) for each group of households.
- estimating the total consumptions by multiplying the frequency of uses with price or average cost for each level of care³.

If the concentration index for consumption (C_{exp}) is positive (progressive to income), it means that the rich utilise health care at a higher rate than the poor.

If the concentration index for illness (C_{ill}) is positive (progressive to income), it means that the rich fall ill at a higher rate than the poor.

And if concentration index of health care consumption is larger than the index of illness, the horizontal index for health care delivery (HI_{LG}) will be positive (progressive to income), it means that the rich utilise health care at a higher rate than the poor.

¹ The requirement that persons in equal need will be treated equally.

² Consumption of health care is more understandable than expenditure, because expenditure conveys the sense that who pays for the care consumed.

³ The average costs used in this study adapted from Pannarunothai and Mills (1998) as follows:

Health facilities	Charge (baht)
Drug store	45
Outpatient services at	
Mobile clinic	80
Health centre	80
Municipal clinic	120
Public hospital	349
Private clinic	167
Private hospital	575
Others	100
Inpatient services per day at	
Public hospital	450
Private hospital	1,397

The second index is calculated by standardisation methods, of which there are 2 techniques:

$$(2.1) \quad HI_{WVP} = C_{exp}' \text{ (van Doorslaer, Wagstaff and Rutten 1993)}$$

where HI_{WVP} is a standardised index of horizontal equity
 C_{exp}' is the standardised consumption concentration index

$$(2.2) \quad HI_{WV} = C_M - C_N \text{ (van Doorslaer and Wagstaff 1997)}$$

where HI_{WV} is a standardised index of horizontal equity
 C_M is concentration index for medical care
 C_N is the indirect standardisation concentration index for need, or expected medical care consumption

interpretation of the index + inequity favouring the rich
 - inequity favouring the poor
 0 proportionality is the same, regardless of income.

The difference between the two indices (Le Grand's approach and the standardised approach) is that HI_{WVP} , or HI_{WV} takes account of the differences in age-sex structure of each subgroup of population and severity of illnesses which intervene illness experiences, uses of services and consumption. In this study, we present both Le Grand and the standardised approaches.

Data

In studying equity of health care delivery, it is inevitable that the data from the NSO SES be linked to the NSO Health and Welfare Survey (HWS). This study explored the use of link variables between SES 1986 and HWS 1986, and SES 1992 and HWS 1991 (the SES is only available on the even year while the HWS is available every 5 years). The SES 1992 was selected to match with the HWS 1991 because in the first phase of equity study, we compared equity in health care financing between 1986 and 1992. The possible variables to be used are listed in table 3.1. Education and occupational groups of household heads existed in both surveys, but not the socioeconomic class. In occupational groups, the two surveys used different coding systems. The 1986 HWS used one-digit coding, while 1991 HWS used 2-digit, but the SES used 3-digit. A conversion table between these two codes had to be mapped before we could link the 2 surveys.

Table 3.1 Data variables in the health and welfare and socioeconomic surveys

	HWS 1986	SES 1986	HWS 1991	SES 1992
Household head	Education	Education	Education	Education
Household head	Occupation (1)	Occupation (3)	Occupation (2)	Occupation (3)
Household head	-	Socioeconomic class	-	Socioeconomic class

The number in () is the digit codes used in the surveys.

Variables on health status and uses of health services

There were variations in the questions asked in the HWS of 1986 and 1991. There were more acute conditions in 1991 than in 1986 because in 1991, each individual could report up to 3 acute conditions during the past two weeks. Furthermore, each individual could up to three chronic conditions in 1991, while there was no question on chronic condition in 1986. The biggest mistake in 1991 was that there were no questions related to hospitalisation (see table 3.2).

Table 3.2 Questions asked in the health and welfare surveys in 1986 and 1991

<i>Data items</i>	<i>HWS 1986</i>	<i>HWS 1991</i>
Acute illness	<ul style="list-style-type: none">• Questions asked on experiences within the past 2 weeks, only one condition/illness was allowed.• Number of days absent from work.• Use of health services, (this question was set rather later after asking on injuries).	<ul style="list-style-type: none">• Three entries are allowed for each individual.• Number of days absent from work are linked to each acute illness.• Use of health services were asked by two questions: the first day of seeking care and the last treatment used.
Injury/accident	<ul style="list-style-type: none">• Not specify the period of asking, presumed two weeks.• One entry for type of injuries and the cause.• One question on where treated for injury and another on why used self-treatment.	<ul style="list-style-type: none">• Injuries within 2 weeks were asked. Three entries are allowed of type of injuries and place of accident.• No questions on use of health services.
Chronic condition	<ul style="list-style-type: none">• No questions asked.	<ul style="list-style-type: none">• Three entries were allowed for taking chronic conditions.• The second question asked how did they know of that condition.• What was the most common mode of treatment.
Hospitalisation	<ul style="list-style-type: none">• Three questions were asked: whether being hospitalised, where and how long.	<ul style="list-style-type: none">• No questions asked.
Disability	<ul style="list-style-type: none">• Two conditions of disabilities could be noted, with the causes and diseases.	<ul style="list-style-type: none">• Three conditions of disabilities were allowed, with the causes of each condition.• If the disable did not work, a question was asked on why.
Use of herbal medicine	Several questions were asked: <ul style="list-style-type: none">• whether they used any herbs as medicine,• for what conditions,• how much they cost, and• what the results were.	<ul style="list-style-type: none">• No specific questions asked on herbal medicine.• Questions asked on use of general drugs within 2 weeks, and the purposes.• No costs were estimated.

So the total illness and total consumption/utilisation for 1986 and 1991 cannot be directly compared. Illness and the use of ambulatory care in 1986 include data items on acute illness, injury and may or may not include herbal medicine. While in 1991, they include chronic condition but not the use of herbal medicine. The missing data on hospitalisation in 1991 had to be estimated from a logistic regression from another study which focused on people in an urban area (Pannarunothai and Mills 1997). The equation looks like this:

$$\text{Probability (hospitalisation)} = \frac{1}{1 + e^{-Z}}$$

where Z is the linear combination of

$$Z = 0.0008 \text{ Age} - 0.0365 \text{ Sex} + 0.1436 \text{ QHin1} - 0.0477 \text{ QHin2} - 0.0503 \text{ QHin3} + 0.230 \text{ QHin4} - 0.2929 \text{ Ed} - 0.9607 \text{ Tcover0} + 0.8684 \text{ Acute} + 1.1609 \text{ Chronic} + 0.7426 \text{ Disable} - 2.1982$$

Assumptions

Assumptions to be made: due to the lack of income data in the HWS, assumptions have to be made to rank individuals and households. Families with the same ranks of socioeconomic groups (based on education, occupation and age of household heads and region and area of the house) will have the same level of income based on the SES.

Reliability of data: any household surveys tend to report lower income level in each household. Representativeness of sample (refusal and replacement) may be a problem. However, in general, the same method has been implemented and large samples are interviewed. There are a set of questions to ask for acute illness within the past two weeks, chronic conditions and disabilities. This contributes to the strengths of the existing surveys.

Validity of data: due to large scale survey, the tool used to collect data has to be standardised so that it interprets the same for interviewers, interviewees and field supervisor. Conducting own survey needs a huge investment to ensure data validity.

4

Variables	Description	Value
Age	Age	Real value
Sex	Sex	0 = female, 1 = male
Ed	Education of individual	0 = no education and primary, 1 = higher
QHIn1	Income quintile 1	0 = others, 1 = quintile 1
QHIn2	Income quintile 2	0 = others, 1 = quintile 2
QHIn3	Income quintile 3	0 = others, 1 = quintile 3
QHIn4	Income quintile 4	0 = others, 1 = quintile 4
Tcover0	Type of health benefit	0 = Others, 1 = not covered
Acute	Acute illness	0 = none, 1 = ever had illness within the past 2 weeks
Chronic	Chronic illness	0 = none, 1 = with one or more chronic illnesses
Disable	Disability	0 = none, 1 = with one or more disabilities

Because this study used the existing data set, then checks for representativeness of data had to be made against other official statistical publications or other pieces of research that relied on their own household surveys. Parameters for comparison are: age, sex, education, number of children in the family, income, taxation, consumption on goods and indirect taxes, etc.

Standardisation

Because age and sex are strong confounding factors of health status, health care delivery and health consumption, so standardisation of the concentration index for age and sex is necessary to allow us compare like with like. There were two methods of standardisation: direct and indirect. Direct method was done by grouping the population into 5 age groups (0-4, 5-14, 15-44, 45-59 and 60+), and each age group into male and female. Average experiences (on ill health, use and consumption) of each age-sex group were used to estimate expected events for each age-sex group of each decile.

Indirect standardisation employed regression analysis to estimate the expected experiences for each individual. In van Doorslaer, Wagstaff and Rutten (1993), they used 2 step-estimation on probability of consumption (probit model) and the size of consumption (ordinary least square) to standardise consumption. In their recent study, van Doorslaer and Wagstaff (1997) run a regression of medical care utilisation on a set of need indicator variables to estimate need-expected utilisation.

4. Results

This chapter presents the calculations of concentration indices (CI) as discussed in chapter 3. The results show some degrees of vertical and horizontal inequities comparing the situation in 1986 and 1991. The chapter starts with clarification on representativeness of the data and the manipulation of socio-economic ranking.

Representativeness of data

To verify the representativeness of data, the two surveys (SES and HWS) were checked for important socio-economic variables of household head; ie. education and occupational groups. Tables in annex show that household heads of the two surveys were predominated with the primary education and farmers, for 1986 and 1991/92. After fulfilling the assumption, the next important step was to add income variable to the HWS, using household income from the SES.

Adding income ranks to the HWS

Instead of using a regression model from the SES to predict household income of the HWS, the authors inclined to rank households by income ranks (not by absolute values of income) because more than 25% of the samples shared the same education and occupational groups. The steps used were listed as follows:

- Categorise households in the SES in to small groups by education level and occupational group. The 1986 SES provided 635 small groups, and the 1992 SES provided 752 groups by 2-digit education and 2-digit occupational coding.
- Calculate the average income for each group in the SES.
- Rank the households by income in the SES.
- Give the ranks to the HWS for households with the same education and occupational groups as the SES.
- Randomly allocate households within the same income ranks of the HWS to have new rankings. This step is to make household with the same income ranks redistribute at random, and it is useful especially for households with primary education and farmers.

Vertical Inequity

Inequity in health

Concentration indices to measure equity in health are reported in table 4.1. In 1986, about 6% of the population reported acute illness, the concentration index was -0.06 (regressive to income), which meant that there was inequity favouring the rich (see figure 4.1). The inequity in health measuring against acute illness was higher for 1991 because the index was -0.15⁵. If number of days ill was used instead of acute

⁵ In 1991, the prevalence of self-reported acute illness was as high as 23% because it used looser definition of being ill. Then, we selected only acute illness with at least one day of absenteeism to be comparable with the 1986 HWS, which reduced the prevalence rate to only 7% of the population.

illness, inequity still favoured the rich in 1986 (-0.09), and higher in 1991 (-0.19), though number of day ill per person was less in 1991 (0.55 day in 1991 but 0.81 in 1986). The same pattern is true when inequity for disability was measured, but not for injury, because inequity for injury in 1991 favoured the poor (0.02).

Table 4.1 Prevalence rates and health concentration indices for 1986 and 1991

	Rate	1986 CI	Rate	1991 CI
Acute	0.0641	-0.0573	0.0722	-0.1504
Days ill	0.8124	-0.0876	0.5493	-0.1882
Injury	0.0138	-0.0079	0.0283	0.0193
Disability	0.0076	-0.0626	0.0190	-0.1385
Chronic (1 only)	-	-	0.2746	-0.5134
Chronic (all)	-	-	0.3552	-0.0567
Days in hosp	0.4715	0.0312	-	-

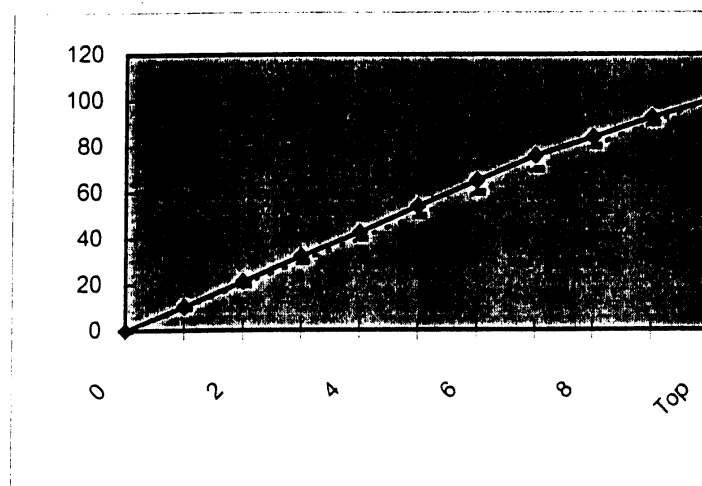


Figure 4.1 Lorenz curve for acute illness in 1986 (CI = -0.0573)

In 1991, the HWS asked questions on chronic illness and allowed an individual to report up to 3 chronic conditions. As high as 27% of the population reported at least 1 chronic condition. If we take all chronic conditions, the prevalence rate was 36%. The concentration index for one chronic condition (-0.51) favoured the rich more than the index for all chronic conditions (-0.06). This means that the rich were more likely to report more than one chronic conditions. However, if number of days admitted in the hospital was used as an indicator for health status⁶, there was inequity favouring the poor. It may be explained that the rich were more likely to be admitted more, or stay in hospital longer than the poor.

⁶ There was an evidence that hospitalisation was influenced by medical benefit (Pannarunothai and Mills 1997), but some may argue that patients cannot stay in the hospital longer if doctors do not agree.

Inequity in utilisation and consumption of health care

Using concentration index to estimate inequity of the use of health services in 1986, the results are reported in table 4.2. The indices for uses were almost all positive, except for the use at health centre, mobile unit, drug store and admission to public hospital. The results are plausible because the poor tended to use services from health centre, mobile unit, drug store and hospitalisation in public hospital more often than the rich. Services that favoured the rich were ambulatory care at public hospital (0.06), at private hospital (0.44), private clinic (0.35), municipal clinic (0.26), and admission to private hospital (0.27). The index for overall use of health services was 0.10 that means the overall use favoured the rich. In terms of consumption (i.e., expenses at all levels of care were summed up), the concentration index was also positive (0.08) for all consumption. That is, overall consumption favoured the rich in 1986. The index of consumption for ambulatory services favoured the rich (0.14) more than consumption for hospitalisation (0.07).

Table 4.2 Prevalence rates and concentration indices for uses in 1986
Rate 1986 CI

Use	0.3779	0.0988
Pub hosp	0.1606	0.0621
Priv hosp	0.0168	0.4364
Clinic	0.1070	0.3542
Hlth Centre	0.0808	-0.1989
Municipal	0.0002	0.2640
Mobile	0.0106	-0.1738
Drug	0.3709	-0.0737
Hosp	0.0470	0.0182
Pub	0.0412	-0.0168
Priv	0.0059	0.2688
Exp	360.4591	0.0822
Ambu (EXP)	91.0520	0.1382
Hosp (EXP)	252.7179	0.0724

Calculating concentration index for 1991 was problematic because of the changes of questionnaires as described above. Table 4.3 shows detailed concentration indices for the uses at different levels of health care for the first and second episodes of diseases within the last two weeks and for the first and second uses of each episode. It is acceptable that all levels of health care favoured the poor (with negative signs), except private sectors (clinic and hospital) favoured the rich (positive signs).

Table 4.3 Prevalence rates and concentration indices for uses in 1991

	Prev 1st use, D1		Prev last use, D1		Prev 1st use, D2		Prev last use, D2	
All	0.1925	-0.0845	0.2128	-0.0811	0.0248	-0.1267	0.0273	-0.1244
Herb	0.0040	-0.1595	0.0049	-0.1920	0.0006	-0.0829	0.0007	-0.2601
Healer	0.0019	-0.2235	0.0024	-0.1943	0.0004	-0.1488	0.0004	-0.3014
VHV	0.0016	-0.3314	0.0017	-0.3223	0.0002	-0.2795	0.0002	-0.3015
Drug	0.0872	-0.1143	0.0876	-0.1013	0.0106	-0.1687	0.0110	-0.1784
Hlth Centre	0.0246	-0.3394	0.0283	-0.3486	0.0028	-0.3236	0.0030	-0.3126
Pub hosp	0.0341	-0.0521	0.0408	-0.0652	0.0049	-0.0449	0.0057	-0.0286
Priv sector	0.0349	0.1490	0.0422	0.1417	0.0040	0.0292	0.0049	0.0284
Others	0.0037	0.0469	0.0045	0.0265	0.0008	-0.0835	0.0009	-0.0513

Note: Prev = prevalence, D1 = disease 1, D2 = disease 2, VHV = village health volunteer

In terms of consumption, concentration index for consumption at ambulatory care, taking into account all three reported illness episodes, was -0.46, and favoured the poor (see table 4.4). If taking into account only the use of services for the first illness, the index was -0.45, and increased to -0.52 for the second disease, and -0.53 for the third. Increasing the cost of services for private sector (twice the previous cost as a sensitivity test) did not change much of the index (from -0.46 to -0.42). However, if hospitalisation was included in the analysis, by adding hospitalisation experience estimated from logistic regression to each individual (see the logistic model in chapter 3), the concentration index for consumption was much reduced to -0.16, still favoured the poor.

Table 4.4 Prevalence rates and concentration indices for consumption in 1991

	Prevalence	CI
Exp for ambu	42.7300	-0.4617
Exp 1st disease	37.1100	-0.4523
Exp 2 nd disease	4.7400	-0.5231
Exp 3 rd disease	0.8800	-0.5268
Exp Increase priv	55.0400	-0.4175
Exp for all incl. hosp.	579.6400	-0.1572

Note: Exp = consumption

Horizontal inequity by Le Grand approach

Horizontal equity indices by Le Grand approach are presented in table 4.5. The indices were all positive for 1986, but almost all negative for 1991 (except number of days ill and chronic illness). The indices were calculated by subtracting concentration index for consumption, C_{exp} , with the concentration index of health, C_{ill} (see dominance curves in figure 4.2 to highlight the areas above and under the diagonal lines for illness and health care consumption). Horizontal equity in 1986 show that inequity of health care consumption after accounting for ill-health favoured the rich. In 1991, the HI favoured the rich when accounting for number of days ill (0.03) and chronic condition (0.35); and favoured the poor for acute illness (-0.01), injury (-0.17), disability (-0.02) and all chronic conditions (-0.10).

Table 4.5 Horizontal equity index by Le Grand approach for 1986 and 1991

	1986 CI	1986 HI	1991 CI	1991 HI
Consumption	0.0822	-	-0.1572	-
Acute	-0.0573	0.1396	-0.1504	-0.0068
Day ill	-0.0876	0.1698	-0.1882	0.0310
Injury	-0.0079	0.0902	0.0193	-0.1765
Disability	-0.0626	0.1449	-0.1385	-0.0187
Chronic (l only)	-		-0.5134	0.3562
Chronic (all)	-		-0.0567	-0.1005
Days in hosp	0.0312	0.0510	-	

Horizontal equity indices by Le Grand approach increased for 1986. It means that after accounting for ill-health, the consumption for health became more inequitably favoured the rich. The indices for 1991 show the opposite directions. There are two possible explanations: whether the health system has changed to favour the poor, or the estimation of CI for consumption was not reliable.

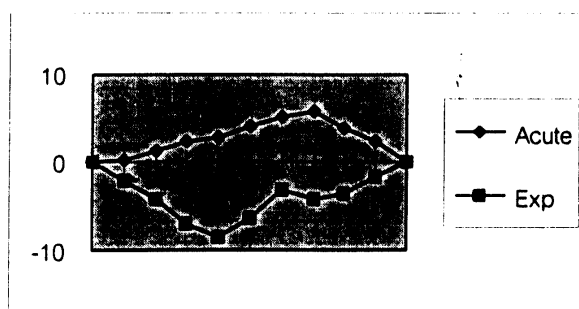


Figure 4.2 Dominance curve for horizontal inequity index by Le Grand approach (CI for Acute = -0.0573, CI for exp = 0.0822)

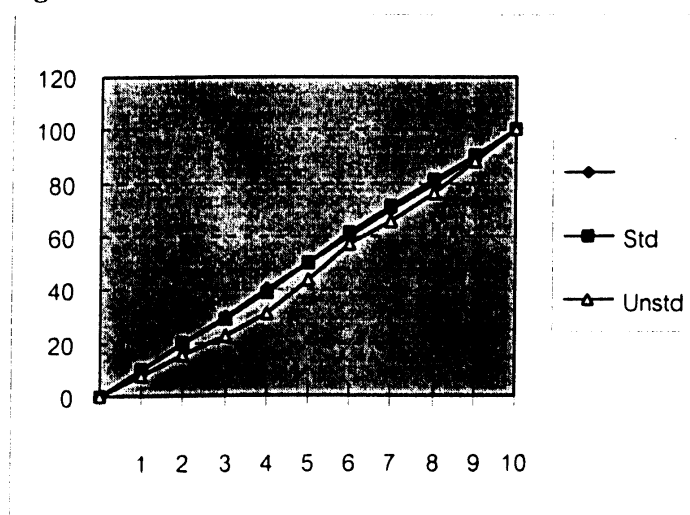
Horizontal inequity by standardisation of morbidity and delivery

Direct standardisation on health status, use and consumption made a lot of changes to the unstandardised concentration index. Standardisation is to remove confounding effects of age and sex on the index. The trends of 1986 observed from table 4.6 were as follows: inequity in health status favouring the rich was reduced, inequity of uses and consumption favouring the rich changed to favouring the poor. In terms of health status, it is confirmed that inequity favouring the rich existed. In terms of use by number of days in hospital, standardisation changed our perception that hospital care favouring the rich to favouring the poor. For overall use of health service, the standardised index was approaching zero (-0.00009), that means equity of use was almost there. However, in terms of consumption, the standardised index changed the perception to the same direction as number of days in hospital (see figures 4.3 and 4.4).

Table 4.6 Unstandardised and standardised concentration indices for 1986

	1986 CI	Standardised
Acute	-0.0573	-0.0069
Day ill	-0.0876	-0.0052
Days in hosp	0.0312	-0.0035
Use	0.0988	-0.0001
Exp	0.0822	-0.0027

Figure 4.3 Lorenz curves for standardised and unstandardised health consumption



Direct standardisation for 1991 data is presented in table 4.7. Inequity favouring the rich was confirmed by standardisation for acute illness, number of days ill, chronic condition and consumption. Standardisation changed our perception for inequity of use which looked favouring the poor to favouring the rich (but not a high magnitude, 0.0004). Furthermore, having health benefit coverage, of which before standardisation favoured the rich, but after standardisation favoured the poor. This proved that standardisation to some extent was reliable, because a larger proportion of health benefit was for the low income.

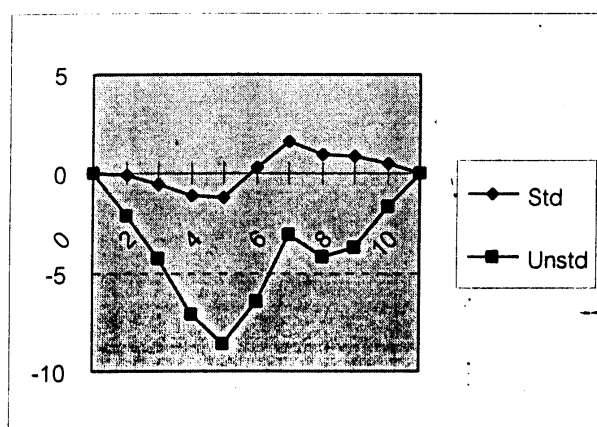


Figure 4.4 Dominance curve for standardised and unstandardised concentration index of health care consumption

Table 4.7 Unstandardised and standardised concentration indices for 1991

	CI	Standardised
Acute	-0.1504	-0.0148
Day ill	-0.1882	-0.0605
Chronic (1)	-0.5134	-0.0109
Use	-0.0811	0.0004
Exp	-0.4617	-0.0020
Exp incl. Hosp.	-0.1572	-0.0260
Hlth Benefit	0.0762	-0.0036

Inequity and geography

Rural-urban inequity

One of the purpose of analysing inequity is to find the way of correcting it. This section presents the concentration indices for the rural and urban areas. Table 4.8 shows that ill-health by acute illness was favouring the rich in urban and semi-urban areas, but not in rural area. The consumption of all health services favoured the poor in urban and semi-urban areas, but not in rural area. When taking account of acute

illness, the concentration indices for consumption by Le Grand approach favoured the rich in all three areas. The poor in the urban area were affected the least (HI 0.02).

Table 4.8 Concentration indices by urban and rural areas in 1986

	Urban		Semi-urban		Rural	
	Exp	Acute	Exp	Acute	Exp	Acute
CI	-0.0279	-0.0517	0.0716	-0.0296	0.1013	0.0359
HI	-	0.0238	-	0.1012	-	0.0654

Hospitalisation seems to play a major role in calculating total consumption. Table 4.9 shows the concentration indices for hospitalisation, in public and private hospitals by area. It can be concluded that hospital services only favoured the poor in urban area, especially the public hospital (CI -0.08).

Table 4.9 Concentration indices for hospitalisation by area

	Urban	Semi-urban	Rural
Hospitalisation	-0.0475	0.0220	0.0667
Public hospital	-0.0844	0.0134	0.0689
Private hospital	0.0780	0.1108	0.0296

Regional inequity

When we target for analysing inequity by region, the results are presented in table 4.10. The poor in all regions were disproportionately reported acute illness more than the rich. Health services in nearly all regions favours the rich, except for Bangkok, that favoured the poor (-0.02). Public hospitals in all regions also favoured the rich, except Bangkok, that favoured the poor (-0.09). Private hospitals in all regions favoured the rich.

Table 4.10 Concentration indices by region for 1986

Region	Acute	Exp	Hosp	Pub hosp	Priv hosp
North	-0.0236	0.0808	0.0381	0.0177	0.2194
Northeast	-0.0031	0.1267	0.0682	0.0622	0.2196
South	-0.0027	0.0654	0.0476	0.0195	0.2393
Central	-0.0241	0.0493	0.0126	0.0033	0.1749
Bangkok	-0.0776	-0.0225	-0.0452	-0.0858	0.0381

Gender and inequity

Table 4.11 compares concentration indices for male and female health status, use and consumption. The patterns are not different between male and female, except the indices for hospitalisation. Because the use of public hospital amongst male favoured the poor more than amongst female. The hospitalisation then favoured the poor in male, but favoured the rich in female. Whether this difference related to maternity is a question to explore further.

Table 4.11 Concentration indices by sex in 1986

Sex	Acute	Exp	Hosp	Pub hosp	Priv hosp
Male	-0.0526	0.0793	-0.0053	-0.0432	0.2624
Female	-0.0613	0.0840	0.0324	-0.0013	-0.2703

4. Discussion and policy implications

Discussion

The ranking of socio-economic variables to place households from the HWS into deciles was possible, but many arguments arise. A large proportion of households (more than one quarter of total) were grouped as farmers with primary education by their household heads, these households would have the same income level which certainly were not true if income was asked. Furthermore, the group was too large to be put into one decile group, households were then randomised to get random rank and were put into subsequent deciles. Again this step faced with repeatability that the same households would not be placed in the same decile.

The concentration indices to measure equity of health delivery met the criteria that they reflect experiences of the entire population by socio-economic group. If the indices were sensitive to changes in the distribution of population by income group, the indices calculated here may not be reliable because the ranking of households into decile was doubtful as discussed above. Furthermore, in this study, we have not calculated 95% confidence intervals of the indices as shown in van Doorslaer and Wagstaff (1997), otherwise, we would be more confident about the indices.

Recent papers by van Doorslaer and Wagstaff (1997), and van Doorslaer et al (1997) present confidence intervals for concentration indices. It has been made possible because Kakwani et al (1997) computed variances from the complicated algebraic formulae. This method should be explored in further studies on equity.

Recent methods in standardisation of the indices as well as the analysis for vertical and horizontal equity (van Doorslaer and Wagstaff 1997 and Wagstaff and van Doorslaer 1998) will bring benefit to the study of equity in Thailand. Developing these skills will not put more burden to the national economy. On the contrary, if we can identify equity problems and can target for remedying them (as the part of geographical inequity), that will bring the country to the balanced social and economic development.

Consistency of questionnaires used in the surveys is also important when we want to compare the trends of changes. In 1991, many questions were introduced to reflect better pictures of illness and health utilisation. If only one condition was taken into consideration, the concentration index favoured the rich, but if all three conditions were taken into account, the index became less favoured the rich. This raises the questions rather than giving an answer to which analysis we should rely on.

Due to incompatibility of adjusting health status with the health care consumption in this study, because the questions asked in Thai surveys never reached the summative evaluation of respondents. There should be further research on the usefulness of asking 'self-assessed health' as practised in other countries (van Doorslaer et al 1993, Wagstaff and van Doorslaer 1998), whether it can reflect overall health status in the

past year in Thai context. If it is useful, this can be used as an indicator to monitor equity in health status in the future.

Policy implications

The problem of placing households into different economic ranking can be solved by asking some questions on household income in the HWS. If the concentration index to measure equity in health is convincing, the NSO responsible for the HWS and SES have to re-think for more effective way of making the two surveys more useful from the step of data collection, or just improving the HWS per se.

Potential uses of the concentration indices are more receptive to the Ministry of Public Health and the Budget Bureau. Health facilities in Bangkok, especially the public, provided equitable access to the poor in 1986, while public health facilities in the urban area did the same to the poor. The poor in rural area were the least advantaged. If this situation still exist, the country need a systematic planning and monitoring with this kind of indicator.

Conclusion

This research aims to explore feasibility of using data from the national household surveys on health and socioeconomic activities to calculate indices measuring equity of health care delivery. It has been proved that concentration indices for health status and utilisation, the unstandardised and standardised indices, could be used to measure the national health care objectives of ensuring equal utilisation for equal need.

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Annex

Representativeness of the samples

Table Education level of household head, HWS and SES 1986 surveys

HWS code	SES code	HWS	SES	% HWS	% SES
01	01	2,239	1,337	13.22	12.36
02	11	1,002	711	5.92	6.57
03	14	9,808	6,027	57.92	55.73
04	15	747	706	4.41	6.53
05	20	1,127	789	6.66	7.30
06	24	323	172	1.91	1.59
07	40	2	4	0.01	0.04
08	50	429	405	2.53	3.75
09	31	400	414	2.36	3.83
10	38	166	24	0.98	0.22
11	61	422	136	2.49	1.26
13	90	115	56	0.68	0.52
14	99	154	33	0.91	0.31
		16,934	10,814	100.00	100.00

Table Occupational group of household head, HWS and SES 1986 surveys

HWS code	HWS	SES	%HWS	%SES
0	679	480	4.01	4.44
1	704	144	4.15	1.33
2	507	271	2.99	2.51
3	1,943	1,181	11.46	10.92
4	6,374	4,417	37.60	40.85
5	24	18	0.14	0.17
6	763	42	4.50	0.39
7	1,272	1,763	7.50	16.30
8	721	33	4.25	0.31
9	3,963	2,465	23.38	22.79

	16,950	10,814	100.00	100.00
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Table Education level of household head, HWS 1991 and SES 1992 surveys

HWS code	HWS	SES	% HWS	% SES
0	2,359	1,250	9.95	9.29
14	13,892	7,509	58.62	55.82
17	1,719	1,298	7.25	9.65
2	2,560	1,556	10.80	11.57
3	1,000	927	4.22	6.89
4-5	684	446	2.89	3.32
6	412	-	1.74	-
7-9	780	436	3.29	3.24
X	293	29	1.24	0.22
	23,699	13,451	100	100

Table Occupational group of household head, HWS 1991 and SES 1992 surveys

HWS code	HWS	SES	% HWS	% SES
0	1,234	735	5.21	5.51
1	1,098	238	4.63	1.78
2	873	197	3.68	1.48
3	2,627	1,527	11.09	11.44
4	8,017	4,391	33.83	32.91
5	17	12	0.07	0.09
6	1,237	1,032	5.22	7.73
7	2,145	1,414	9.05	10.60
8	1,090	490	4.60	3.67
9	1,197	487	5.05	3.65
X	4,160	2,816	17.56	21.10
	23,695	13,339	100	100