

Application of Concentration Ratios to Analyze the Phenomenon of “Next-Door” Pharmacy in Taiwan

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ABSTRACT

Background: In Taiwan, a policy of separation of prescribing and dispensing practices of practitioners at Western medical and dental clinics was implemented on an incremental basis in 1997. The purpose of this policy was to promote pharmacists' autonomy and increase the transparency and safety of prescribing medications. To avoid profit loss from no longer being able to dispense prescription medications, some clinics opened pharmacies located under the same roof as the clinic (“next-door” pharmacies) or hired an on-site pharmacist. This practice might compromise pharmacists' professional autonomy and patients' benefit in pharmaceutical care.

Objective: The aim of the current study was to clarify the relationship between practicing pharmacies and clinics that resulted from contracts between pharmacies and the Bureau of National Health Insurance from 1996 to 2004.

Methods: The National Health Research Institutes database in Taiwan supplied the complete claims data sets of practicing pharmacies from 1997 to 2004. The prescribing source of every dispensed prescription was used to calculate the 1-firm concentration ratio (CR-1) (ie, the proportion of prescriptions issued by the largest prescribing clinic/hospital in the total number of dispensed prescriptions of a pharmacy in each year). Similar processing was applied to the clinics. We identified each clinic's largest cooperating pharmacy and compared their CR-1s. Pharmacies that dispensed >900 prescriptions/mo during the study period were considered *thriving*. Pharmacies with a CR-1 ≥ 0.99 and whose largest cooperating clinic had a CR-1 ≥ 0.99 were considered to have a close business relationship, possibly indicating a next-door pharmacy.

Results: The total number of prescriptions dispensed at all pharmacies in the database grew from 226,901 in 1996 to 59,785,039 in 2004, and the number of pharmacies, from 481 to 3529. An increas-

ing number of pharmacies had a higher CR-1 after 1999. We found that most prescriptions could be dispensed at only 1 pharmacy during the study period. In 2004, 1429 clinics had >900 prescriptions/mo dispensed externally and a CR-1 ≥ 0.99 . They had released 75.8% of all prescriptions to be dispensed at practicing pharmacies; 811 of these clinics had a cooperating pharmacy with a CR-1 ≥ 0.99 .

Conclusions: In this data analysis in Taiwan, most prescriptions from practitioners at Western medical and dental clinics could be dispensed at only 1 pharmacy during the study period, suggesting that pharmacists' professional autonomy and the patients' benefit in pharmaceutical care might be compromised in Taiwan. (*Clin Ther.* 2006;28:1225–1230) Copyright © 2006 Excerpta Medica, Inc.

Key words: drug prescriptions, health services research, national health programs, pharmacies, professional autonomy, Taiwan.

INTRODUCTION

Physicians' and pharmacists' right to dispense prescription medications is a historical and legal issue worldwide.^{1–3} In Taiwan, until 1997, practitioners at Western medical and dental clinics, especially those practicing independently, prescribed medications, and the nurses at the clinics typically dispensed them. In 1995, National Health Insurance (NHI) was established to cover the health care costs of nearly the entire population of Taiwan (22,134,270 beneficiaries at the end of 2004).⁴ In 1997, to promote the dispensation of prescription medications by practicing pharmacies,

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the government implemented, stepwise from metropolitan to rural areas, a policy in which clinic staff could no longer fill prescriptions. The purpose of this policy was to promote pharmacists' autonomy and increase the transparency and safety of prescribing medications. To retain profit (ie, the difference between the purchase price and the price approved by the NHI) from dispensing drugs, physicians and dentists obtained the right to add a pharmacist to their clinics' staff (analogous to the situation in hospitals).⁵ To further promote dispensing at practicing pharmacies, the NHI also modified the reimbursement schedule. The service fees charged by these on-site pharmacists were lower than those charged by external practicing pharmacists. Practitioners who chose not to hire a pharmacist were compensated with a consultation fee for each prescription dispensed externally at a practicing pharmacy. The difference amounted to US \$1.50/prescription—more than one fourth of the consultation fee in Taiwan.^{5,6}

As a result, an increasing number of pharmacies come under contract with the Bureau of National Health Insurance (BNHI). Although the law in Taiwan dictates that pharmacies must be managed by a pharmacist, they need not be owned by one. Thus, allegedly, some practicing physicians established ownership of pharmacies located under the same roof as their clinics, but with a separate entrance, allowing the clinic to collect both the consultation fee and the profit from dispensing drugs. This phenomenon, which came to be known as "next-door" pharmacy, became the subject of many disputes.⁶ To resolve these disputes, the BNHI and the associations of physicians and pharmacists took measures (eg, curtailing compensation for consultation and dispensing) that came into effect in 2006.⁷

The aim of the current study was to clarify the relationship between practicing pharmacies and clinics that resulted from contracts between pharmacies and the BNHI from 1996 to 2004.

MATERIALS AND METHODS

Data Collection

Prescriptions

NHI claims data from all practicing pharmacies in Taiwan are managed on the database⁸ of the National Health Research Institutes (NHRI) (Miaoli, Taiwan). The NHRI periodically releases data sets to researchers; however, due to a time lag between up-to-date claims and archived data sets, in June 2006, only data from

claims filed through 2004 were available at the time of this study. Thus, we obtained complete claims data sets of all practicing pharmacies contracted with the BNHI from 1997 to 2004. These data sets did not contain data from pharmacies in hospitals or clinics.

Each record contained data related to 1 dispensed prescription, including the identification numbers of the pharmacy, prescribing clinic or hospital, prescribing physician, and patient; and the date and sequence number of the clinic visit. Each field was routinely checked by the BNHI for data consistency with the prescription claims from the clinics. Some records also contained details concerning prescription medications dispensed at practicing pharmacies, but these records were not used in the present study.

Using these data, we (1) identified the source (prescribing clinic) of every prescription dispensed at practicing pharmacies; (2) determined the NHI's amount of prescriptions dispensed at these pharmacies; (3) analyzed the concentration of business of individual pharmacies using an economic index; and (4) analyzed data from records of prescriptions originating from clinics that had a large proportion of prescriptions dispensed externally.

Health Care Facilities

We used the registry for BNHI-contracted health care facilities, an electronic data file provided annually by the NHRI, to differentiate practicing clinics from hospitals (outpatient departments). Only data from facilities practicing Western medicine and dentistry, including home health care and community psychiatric rehabilitation programs, were analyzed. In addition, we directly calculated the number of visits to health care facilities in each year using the monthly claim summary for ambulatory care claims.

Statistical Analysis

For each pharmacy, we calculated the mean number of prescriptions dispensed per month in each year by dividing the number of prescriptions dispensed in each year by the number of months with pharmacy claims. Prescriptions were stratified by referring source (clinic or hospital).

Operating a next-door pharmacy involves expenses for rent and personnel, and it is profitable only if a certain number of prescriptions are sold; 900 prescriptions/mo is the threshold used by the BNHI and the medical profession in Taiwan to detect next-door pharmacies.⁷

Thus, pharmacies that dispensed >900 prescriptions/mo and clinics that had >900 prescriptions/mo dispensed externally at practicing pharmacies were defined as *thriving*; those with ≤ 900 prescriptions/mo were defined as *stagnant*.

To investigate the concentration of business at each thriving pharmacy, we adopted the *firm concentration ratio* (κ)—the economic index commonly used to measure market power.⁹ The κ was set at 1. We calculated the proportion of prescriptions that originated from each pharmacy's largest cooperating clinic in each year. The distribution of pharmacies by 1-firm concentration ratio (CR-1) was analyzed.

We calculated the distribution of thriving clinics. Similarly, to determine the proportion of prescriptions dispensed at each clinic's largest cooperating pharmacy in each year, we calculated the CR-1 of these clinics. Finally, to determine whether each clinic with a CR-1 ≥ 0.99 had a close business relationship with its largest cooperating pharmacy, we calculated the CR-1 of the pharmacy.

The initial calculation of data was undertaken using Perl version 5.8.7 (Perl software, <http://www.perl.com>). Some aggregate results were imported into an electronic database (Access 2000, Microsoft Corporation, Redmond, Washington) for further processing. A graphing program (SigmaPlot version 9.0, SYSTAT Software Inc., Point Richmond, California) was used to display the distribution of CR-1 of pharmacies with a box plot, in which the boundaries of a box represented the 25th and 75th percentiles; the line within

the box, the median; the lines outside the box, the 10th and 90th percentiles; and the additional dots, the 5th and 95th percentiles.

RESULTS

According to the official statistics of the BNHI, the number of practicing clinics of Western medicine in Taiwan grew from 7581 in 1995 to 8793 at the end of 2004; the number of practicing dental clinics, from 4615 to 5776; and the number of practicing pharmacies, from 804 to 3898.⁴ Not every facility was established immediately after placing a contract.

Among the total 182,348,983 prescriptions processed in the current study, we were unable to identify an existing referring hospital/clinic for 193,243 (0.1%) prescriptions.

The dispensing at practicing pharmacies contracted with the BNHI in Taiwan grew rapidly in the period studied, from 226,901 prescriptions in 1996 to 59,785,039 in 2004 (Table I). Although nearly one third of ambulatory visits took place in the outpatient departments of hospitals, the majority of dispensed prescriptions at practicing pharmacies came from practicing clinics. On average, 28.3% of visits at clinics in 2004 resulted in 1 prescription being released and dispensed externally at a practicing pharmacy, in contrast to 1.1% of visits at hospitals.

From 1997 to 2004, the number of practicing pharmacies within the NHI grew from 481 to 3529 (Figure 1). Although the growth was attributed to the pharmacies with thriving business, the number of pharmacies

Table I. Trend of prescriptions dispensed at practicing pharmacies. Values are expressed in millions.

Year	Hospitals		Clinics		Total Dispensed Prescriptions
	Visits	Prescriptions Dispensed at External Pharmacies	Visits	Prescriptions Dispensed at External Pharmacies	
1996	74.7	0.01	171.5	0.2	0.2
1997	79.7	0.04	187.2	2.0	2.1
1998	86.0	0.1	197.4	5.2	5.3
1999	91.6	0.1	202.3	9.9	10.0
2000	92.2	0.2	195.3	12.3	12.5
2001	95.6	0.4	190.5	14.9	15.3
2002	98.8	0.6	190.3	30.5	31.2
2003	90.6	0.8	193.2	45.1	45.9
2004	99.5	1.1	207.0	58.7	59.9

with stagnant business remained relatively stable (1774 [50.3%] of all BNHI-contracted pharmacies in 2004).

Of the 481 established pharmacies operating in 1996, 321 still had NHI business in 2004, of which 56 were thriving in 2004, of which 7 had a CR-1 ≥ 0.99 in 2004.

In pharmacies that thrived during the study period, business tended to be more concentrated after 1999, except for a relatively small variation in 2002 (Figure 2). In 2004, 77.5% (1361/1755) of thriving pharmacies had a CR-1 ≥ 0.90 , and 59.4% (1042/1755) had a CR-1 ≥ 0.99 .

Throughout the study period, an increasing number of clinics released their prescriptions to practicing pharmacies. Among the clinics having >900 prescriptions/mo dispensed at external practicing pharmacies, many (1429/1655 [86.3%]) had a CR-1 ≥ 0.99 in 2004 (Table II). These 1429 clinics released a total of 45,299,500 prescriptions in 2004, corresponding to 75.8% of all 59,785,039 prescriptions dispensed at practicing pharmacies in that year. Among the 1429 thriving clinics with a CR-1 ≥ 0.99 in 2004, we found

that more than half (811) of their largest cooperating pharmacies had a CR-1 ≥ 0.99 .

DISCUSSION

Although the physicians in South Korea took radical actions, such as general strikes, against the legislated policy to separate prescribing and dispensing practices,¹⁰⁻¹² many practicing physicians in Taiwan seemed to circumvent the regulations by establishing ownership of a pharmacy adjacent to the clinic or hiring an on-site pharmacist. Although our study of sources of prescriptions dispensed at pharmacies in Taiwan did not directly prove the existence of next-door pharmacies, the results found that many pharmacies had a close relationship with a single clinic. The majority of prescriptions released from the clinics had to be filled at an external pharmacy. Based on the results of the present study, the policy of separating dispensing from prescribing in Taiwan did not fully succeed in promoting pharmacists' autonomy and increasing the transparency and safety of prescribing.

In the present study, we found an increase in the number of practicing pharmacies within the NHI

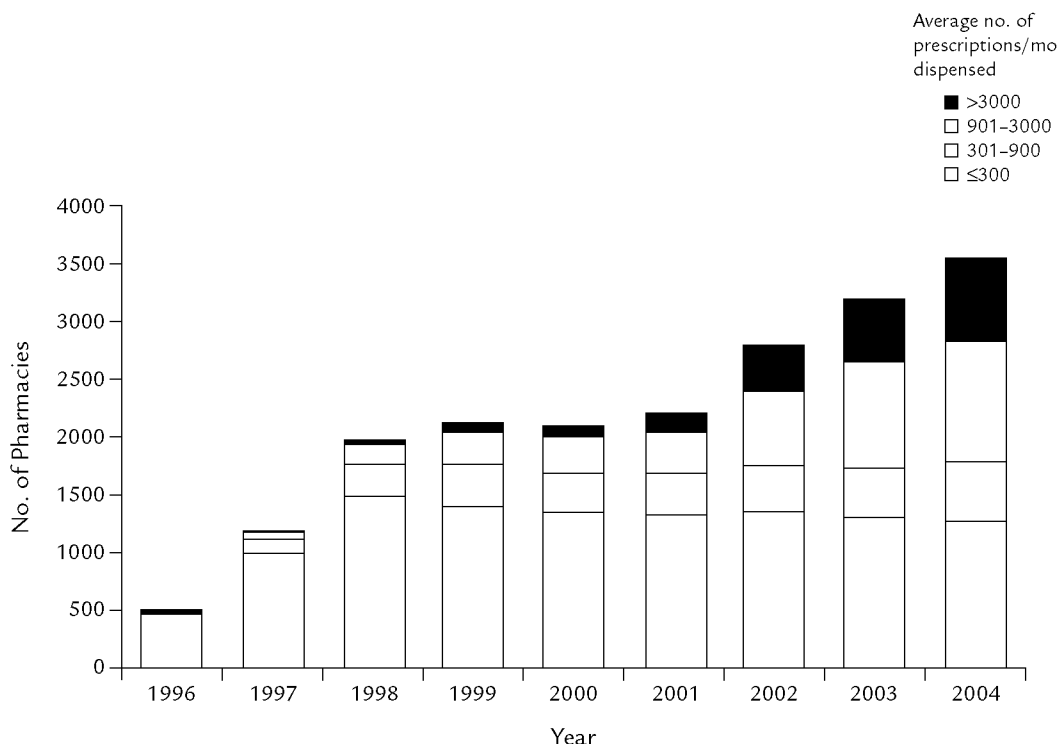


Figure 1. Distribution of the pharmacies by average number of dispensed prescriptions per month.

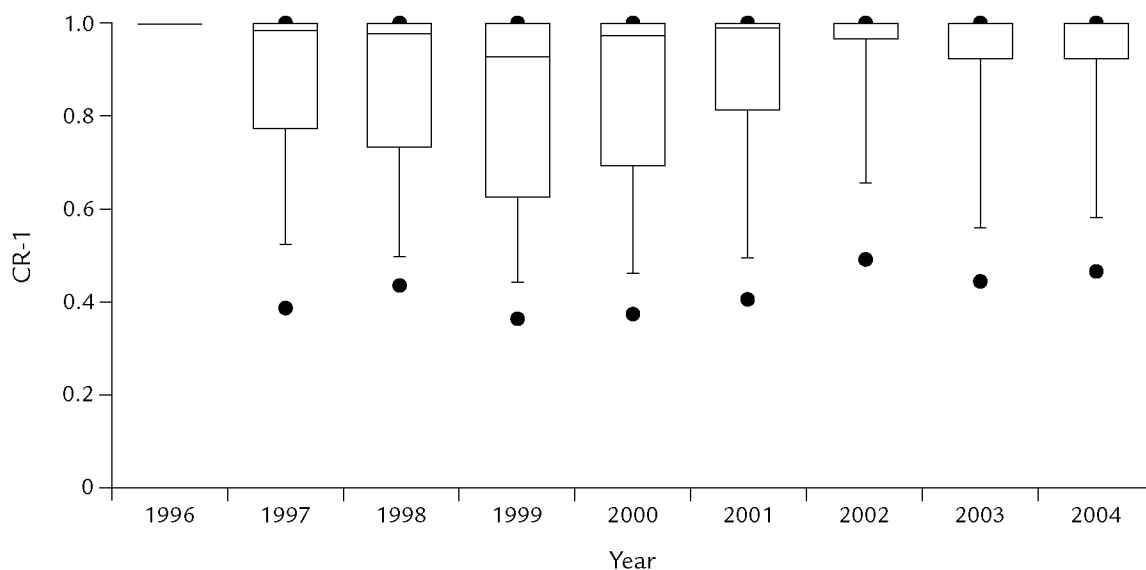


Figure 2. Distribution of the 1-firm concentration ratios (CR-1s) among thriving pharmacies (ie, those with >900 prescriptions/mo dispensed). Solid circles indicate the 5th and 95th percentiles. The 7 pharmacies in 1996 did not suffice for calculating the distribution.

Table II. Trend of thriving* clinics at practicing pharmacies.

Year	Total Clinics	Clinics with a CR-1 $\geq 0.99^\dagger$	Clinics with a CR-1 $\geq 0.99^\dagger$ and Cooperating Pharmacy with a CR-1 $\geq 0.99^\ddagger$
1996	9	6	6
1997	68	56	29
1998	195	152	73
1999	300	236	89
2000	349	287	127
2001	444	373	196
2002	980	871	597
2003	1396	1231	731
2004	1655	1429	811

CR-1 = 1-firm concentration ratio.

*>900 Prescriptions/mo dispensed at external pharmacies.

† Proportion of the largest dispensing pharmacy in the total released prescriptions of a clinic in 1 year.

‡ Proportion of the largest prescribing clinic/hospital in the total dispensed prescriptions of a pharmacy in 1 year.

in Taiwan. We also found the highly concentrated business of practicing pharmacies thriving after 1999. The extreme concentration of CR-1 in 2001 might have been due to the implementation of global budgeting for clinics practicing Western medicine in Taiwan in that year. With more constraints placed on physicians' reimbursements, the financial

incentive of establishing a next-door pharmacy became greater.

Even after the implementation of the policy of separation of prescribing and dispensing, the release of prescriptions from clinics to practicing pharmacies was not yet satisfactory to the society of pharmacists in Taiwan. Many clinics seemed to choose to hire an

on-site pharmacist rather than release the dispensing authority to an external pharmacy. Compensation paid to physicians from the BNHI for having prescriptions filled externally might not equal the potential profit from selling pharmaceuticals in the clinics.

It is likely that not all thriving pharmacies are owned by physicians. On the other hand, some thriving pharmacies with smaller CR-1s might be owned by a pharmacist or jointly owned by physicians in several neighboring clinics. Because the information about the ownership of a pharmacy is not available officially, the use of the CR-1 in this analysis was a limitation of the study.

To maintain anonymity, the NHRI database did not provide much information concerning individual health care providers, especially the addresses of the clinics. Even if the addresses of clinics and pharmacies were available, it would have been difficult to determine whether a pharmacy was a next-door pharmacy, for 2 reasons: (1) proximity to a clinic is important to the practice of a pharmacy; and (2) some small communities can afford only 1 clinic and 1 pharmacy.

Starting January 1, 2006, the BNHI in Taiwan curtailed the prescribing bonus of a clinic and the dispensing bonus of a pharmacy if the clinic was thriving and both the clinic and its largest cooperating pharmacy had a CR-1 ≥ 0.7 . The bonuses were paid out only if the managing pharmacist submitted a notarized affidavit indicating that he or she was the sole owner of the pharmacy.⁷ The effect of the newer regulation awaits observation.

The results of the present study seemed to show a quick adaptation by the Western medical profession in Taiwan to a new health policy. Discussions over the separation of drug prescribing and dispensing should not be limited to the conflicts of interest between physicians and pharmacists. The patient's benefit, especially the quality of pharmaceutical care, deserves foremost concern.

CONCLUSIONS

In this claims analysis in Taiwan, most prescriptions from practitioners at Western medical and dental clinics could be dispensed at only 1 pharmacy during the study period, suggesting that pharmacists' professional autonomy and the patients' benefit in pharmaceutical care might be compromised in Taiwan.

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