Jack Zwanziger
Dana B. Mukamel
Indridi Indridason

Use of Resident-Origin Data to Define Nursing Home Market Boundaries

Previous studies of nursing home markets have assumed that a nursing home's market is coincident with the boundaries of the county in which it is located. We test this assumption by using the zip code of residence for Medicare beneficiaries admitted into a nursing home in New York state in the periods 1992–93 and 1996–97. We find that nursing homes located in urban areas have markets that are a fraction of the size of the county in which they are located. We calculate the Herfindahl-Hirschman Index (HHI) to measure the competitiveness of each nursing home's market. This shows that nursing home markets tend to be more concentrated than those that result from assuming countywide markets. These results suggest that studies of nursing home markets should not use counties as markets.

Any economic analysis of nursing home behavior is at least partially dependent on properly characterizing the markets in which nursing homes operate. Unfortunately, it has been difficult to obtain the data required to specify nursing home markets, and, as a result, previous analyses have depended on convenient proxies, most often the county in which a nursing home is located. Despite the arbitrary nature of such market definitions, and the resulting measurement errors, such studies have found that market factors matter. For example, cost differentials between for-profit and nonprofit nursing homes have been shown to exist in markets with low competition and to diminish in more competitive markets (Tuckman and Chang 1988). Studies have shown that choices about which levels of quality of care to offer and Medicaid reimbursement's effect on them depend on competition (Zinn 1994) and existence of excess demand conditions (Nyman 1989). It is difficult, however, to know how much weight to place upon the results of such studies given the likelihood of systematic errors made in measuring the competitiveness of nursing home markets. This concern calls into question the results of many economically oriented studies of nursing home behavior that assume that county boundaries define nursing markets (Scanlon 1980; Zinn 1994; Gertler 1992; Davis and Freeman 1994; Nyman 1993).

The assumption that nursing home markets correspond to county boundaries is motivated by the minimal migration of residents across county lines to be admitted to a nursing home. For example, Gertler (1992) found that 75% of the residents of New York state nursing homes had previously resided in that county. However,

Jack Zwanziger, Ph.D., is a professor; Dana B. Mukamel, Ph.D., is an associate professor; and Indridi Indridason, Ph.D., is a former research assistant, all in the Department of Community and Preventive Medicine, University of Rochester School of Medicine and Dentistry. Support for this research came from the National Institute on Aging (grant no. R01 AG15965). Address correspondence to Prof. Zwanziger at Department of Community and Preventive Medicine, University of Rochester Medical Center, 601 Elmwood Ave., Box 644, Rochester, NY 14642.

evidence of minimal county border crossing only indicates that nursing home markets tend to be as large as, or smaller than, counties. The choice of counties as market boundaries becomes even more tenuous given the fact that nursing home residents often base their choice of a nursing home on the facility's proximity to family and friends, or on its religious affiliation (Institute of Medicine 1986; U.S. Senate 1976). Finally, there is some empirical evidence that nursing home markets are smaller than counties. Nyman (1989) estimated a residual price elasticity of demand ranging between -1.7 and -2.3 in markets in Wisconsin. Mukamel and Spector (2002) estimated price elasticities of about -3.5 for nursing homes in New York state. Both of these studies found that nursing homes can set prices significantly above marginal costs, even in counties with a large number of facilities. These results suggest that nursing home markets actually may be much less competitive than county-based markets would imply and that, in fact, nursing home markets are more localized than counties.

In this paper, we investigate the issue of appropriate market definition by defining nursing home markets based on the observed patterns of admissions into nursing homes using origin data at the zip-code level. We then compare these market boundaries with those based on nursing home administrators' views of the geographic extent of their markets and others based on county boundaries. We also compare a measure of market competition, the Herfindahl-Hirschman Index (HHI), based on each of these definitions.

How Are Markets Defined?

Economists agree on how markets should be defined conceptually—markets are the geographic area in which prices are determined—but there has been substantial disagreement as to the best *empirical* method of delineating markets. There are two basic approaches: one with a focus on prices, and the other with a focus on "shipment" of the good or service from suppliers to customers. The price-based approach defines markets by examining changes in prices and price differentials over time. Advocates of this approach argue that two locations where a good's price movements are coordinated are part of the same market. For example, if price chang-

es at one location tend to take place at roughly the same time as corresponding changes at another, then the two locations are in the same market.

The "shipment" approach (Elzinga and Hogarty 1973) contends that while prices are at the conceptual core of markets, empirical problems—particularly in the availability of "true" price data (including the effects of discounts, financing, and shipping costs)—argue in favor of using more readily available "shipment data" to define market areas. Proponents of this view argue that if an area is self-contained both in the production and consumption of a good, it is likely to be self-contained in price formation as well. This approach is clearly vulnerable from a theoretical perspective, because it does not account for the possibility that shipment patterns may shift in the face of changes in relative prices. This objection is exemplified in the following stylized situation: if two suppliers of an identical good (including identical prices) are in two separate locations, then customers will use the closest provider to minimize transportation costs. From a shipment perspective, this situation would appear as two completely self-contained monopoly markets. In fact, an increase in prices by one of the providers quickly would reveal the absence of monopoly pricing power as their distant customers would shift over to the other provider.

This argument, while logically sound, is primarily applicable to the markets for commodity goods where there is a single choice dimension: price. In the case of differentiated goods, customers tend to have diverse preferences and more complex choice processes; the resulting shipment patterns tend to be more stable in the face of price changes. In the context of health care services, "shipments" would be patients traveling from their places of residence to the location where the required services are provided, for example, physicians' offices, hospitals, and nursing homes. Health care services tend to be highly differentiated, with provider location a key attribute, since patients view travel distance as a crucial factor in their choice of provider. With but few exceptions, the markets for health care services tend to be highly localized as patients strongly prefer to choose a provider that is close to their homes.

A substantial body of literature has been de-

voted to developing and applying several different approaches to defining market areas for the health care sector, with a primary focus on hospitals (see Morrisey, Sloan, and Valvona 1988 for a review of the approaches used to define hospital market). Underlying these approaches is the fact that even for hospital markets the factor that is most influential in the choice of hospital is the distance the patient must travel (Luft et al. 1990; Burns and Wholey 1991). As a result, hospital markets tend to be local. These conclusions are likely to be true for nursing home markets as well, but there have been no empirical studies to date to test these assumptions.

Methods

We adapted to the nursing home industry the method that defines hospital markets using patient origin data (see Zwanziger and Melnick 1988 for a description). There were enough important similarities between hospital and nursing home services to lead us to expect that the patient origin approach would be fruitful. In both cases, proximity to family, friends, and a primary care physician tends to be an important factor in the choice of provider. Religious and cultural values also may play a role. There are also important differences. Patients admitted to a hospital generally expect to return to their homes. Such expectations generally may be absent for residents of nursing homes. The long lengths of stay characteristic of most nursing homes imply a small number of residents will tend to be admitted to a nursing home in any give year. This "sparseness" may make it more difficult to delineate stable market boundaries. Finally, there tend to be hospital discharge data sets available that identify the zip code in which the patient resides. There are no comparable nursing home data. As a result, we had to develop a more complex approach to define nursing home markets.

Creating the Data Set

Defining resident-origin markets. We used data from New York state nursing homes to conduct the study for a variety of reasons. New York is a large state with a nursing home industry that is correspondingly large, diverse and dispersed throughout the state. Further, New York itself is highly diverse, with some counties having extremely high population densities and others having low ones; this variability provides an opportunity to compare alternative approaches to defining nursing home markets in different environments. Finally, New York has provided researchers with access to detailed and audited nursing home data sets over an extended period of time.

The data used for this study came primarily from two data sets. The first is the New York Patient Review Instruments (PRIs) from 1991 to 1997. The PRI data is a patient-level data set with information about all nursing home residents in New York state, including their admission date and an identifier for the nursing facility to which they were admitted. An initial analysis showed that the majority of nursing home residents change their zip code during their first year in the nursing home. Since the zip code of residence for nursing home residents is generally that of the nursing home itself, to apply a resident origin approach we had to locate the zip code of residence in the year prior to a person's admission into a nursing home. To create the data set, we first extracted each individual's earliest admission to a nursing home from the PRI data. We identified the residents first admitted in 1992 and linked these individual residents to the 1991 Medicare Enrollment File to identify their zip code of residence prior to their admission into the nursing home. Similarly for 1993, 1996, and 1997 admissions, we linked the PRI data to 1992, 1995, and 1996 Medicare enrollment files respectively. We merged the relevant extract from the PRI data with the Medicare data using the Social Security number as the individual identifier. We succeeded in matching 85% of the observations from the two data sets; we found that there were no systematic biases in comparing the matched and unmatched residents by facility characteristics, such as geographic location, size, and ownership. The merged file had data regarding both the location of the nursing home and that of the prior residence of the residents admitted that year.

Since the annual number of admissions into each nursing home was relatively small, we combined the data for the years 1992–93 and 1996–97. To check the stability of the geographic pattern of admissions across years, we correlated the number of admissions to a nursing

home from a given zip code area for 1996 and 1997. The correlation in the number of admissions was .83 when weighted by the number of admissions to the nursing home in each year, suggesting stability over time and justifying aggregation over each two-year time period.

We used the zip code areas from which a nursing home drew residents as the basis for defining its market. Since the number of admissions per zip code area tended to be small—25% of zip code areas had fewer than four admissions over the 1996–97 period—a specific zip code area could appear to be a part of the nursing home's market because of one unusual admission. To restrict a nursing home's market to those zip code areas in its "core" market, we examined a more robust method of defining a nursing home's market. The approach we selected was to rank zip code areas in decreasing order for each nursing home, with the zip code area accounting for the largest number of admissions into that nursing home ranked first, and the zip code area with the smallest number ranked last. We then defined the "core" market for the nursing home to be all the zip code areas that cumulatively accounted for 70% of its admissions.

Nursing home markets as defined by nursing home administrators. We surveyed all nursing homes licensed to operate in New York state in 1998. The survey was directed at nursing home administrators and was designed to elicit their views on competition in their markets (see Spector and Mukamel 2001 for details). The analyses that we report here are based on the following request: "Please list the zip codes that constitute your core service areas." Of the 669 nursing homes surveyed, 415 (62%) responded to the survey and 332 (50%) responded to this request. Since we had the PRI data for both respondents and nonrespondents, we were able to compare them along several critical dimensions. They were similar in terms of the annual number of admissions (106 and 104, respectively), the average number of zip code areas providing admissions (33 for both), and the average number of zip codes in the core market providing 70% of admissions (10 and 11, respectively). These comparisons suggest that responder and nonresponder nursing homes were remarkably similar in terms of the characteristics of their markets.

Comparing the Sizes of Admission-Based Nursing Home Markets to Counties

We performed three analyses to assess the degree to which the markets based on resident-origin admission data differ from those that use the counties in which the nursing homes are located. First, we measured the proportion of the nursing home's overall core (70%) market outside the county in which the nursing home is located (the "home" county). Second, we measured the proportion of the home county accounted for by that portion of the core market that falls within it. Finally, we calculated the ratio of the size of the core market to the size of the home county. To provide a uniform metric with which to compare geographic areas, we used the nursing home resident base, the population aged 75 and older (in 1990), as a denominator. For example, to compare the size of the nursing home's market to the county in which it is located (the third comparison), we totaled the elderly population in all the zip codes that were located in the nursing home's market (using the 70% definition described previously). We then divided that total by the elderly population in the county. Similarly, to find the proportion of border crossing, we calculated the proportion of elderly population in the nursing home's core market that is located in the portion of the market outside its county. Since rural and urban counties are likely to differ substantially in market size, we identified rural counties as those with a population density of less than 20 people per square mile in the 1990 census and presented their data separately. Forty-seven counties (out of a total of 62 counties in New York state) were classified as rural using this criterion.

Measuring Market Competition

To assess the implications of the differences in market definitions, we measured the competitiveness of each nursing home's market using the Herfindahl-Hirschman Index (HHI) based on each approach to defining nursing home markets (Herfindahl 1950; Hirschman 1945).

A nursing home's HHI is a summary measure of the average level of competition that the nursing home experienced over its entire market. The value of the inverse of the HHI (1/HHI) provides an intuitive sense of the competitive-

ness of the market. A market with N equal competitors has an HHI of $1/N$; hence, the inverse of the HHI (1/HHI) can be seen as a measure of the "effective" number of competitors in a market. The process used to calculate the resident origin-based HHI was similar to that used by Zwanziger and Melnick (1988) in analyzing hospital markets.

We first calculated the HHI for each zip code area in the state that had at least one admission during each two-year period:

$$HHIZIP_j = \Sigma_i(\text{market share of nursing home } i \text{ in zip code } j)^2.$$

Then we used HHI from these zip code areas to calculate the HHI for each nursing home, defined as the weighted average of the HHIs of each zip code from which a nursing home received residents.

$$HHINH_i = \Sigma_j[(adm_{ji}/tot\ adm_i)*HHIZIP_j],$$

where adm_{ji} is the number of admissions into nursing home i from zip code area j, and tot adm_i is the total number of admissions into nursing home i.

We used a similar approach to calculate the HHIs of nursing home markets defined by the administrators' responses to the survey. The HHI was calculated by using the zip codes identified in the survey as the market area and the weightings for each zip code were based on the resident-origin admission data. Finally, an HHI was calculated for counties; the measure of a nursing home's market share was the proportion of the nursing home beds in the county accounted for by that nursing home.

Results

One objective of our study was to compare markets defined using the zip code area in which nursing home residents lived prior to admission to markets defined by the county in which the nursing home was located. Hence, we needed to ensure that the county sizes in New York were more broadly representative of county sizes in other states. Using 1990 census data, we found that New York state counties had geographic areas and population densities similar to those in the Northeast (the New England and Mid-Atlantic census regions), with a median area of 659 square miles compared to 652 square miles in New England and 608 square miles in the Mid-

Table 1. New York state nursing home characteristics: RHCF data, 1991 and 1996

	1991		1996	
	Mean	Standard deviation	Mean	Standard deviation
Total admissions	90	102	136	152
Percent Medicare resident	4.6	5.5	9.5	6.4

Atlantic regions. The corresponding median population densities were 119, 126, and 159 people per square mile. Nationally, the median county area was similar, 626 square miles; not surprisingly, the median population density was far lower, 38 people per square mile.

Given the complex method used to identify admissions into nursing homes, we used the New York State Residential Health Care Facilities (RHCF) data set as an independent source of admission data. Nursing homes file the RHCF form annually with the New York State Department of Health and provide nursing home financial and utilization data. Table 1 contains summary nursing home data derived from the 1991 and 1996 RHCF data sets. It shows that the 626 nursing homes in NYS in 1991 had a mean of only 90 admissions. This reflects the fact that nearly all of the residents were receiving long-term care, custodial services and only a few were receiving short-term care, rehabilitative services. One measure of the proportion receiving short-term care is the percentage of residents for whom Medicare was the primary payer for nursing home services. This proportion grew somewhat during the study period, from 4.5% in 1991 to 9.5% in 1996. Possibly as a result, the 644 New York nursing homes had a larger number of admissions in 1996 (a mean of 136).

Table 2 shows the distribution of the more detailed characteristics of nursing home admissions based on the patient-level PRI data. Nursing homes tended to have their relatively small number of admissions distributed over a large number of zip code areas. The small number of admissions (mean of 104), when combined with a relatively large number of originating zip code

Table 2. Characteristics of nursing home markets: PRI data

	Mean	25% Quartile	50% Quartile	75% Quartile
Admissions per nursing home	103.91	52	81	128.5
Admissions per zip code	37.89	3	10	46
Number of zip codes from which a nursing home gets admissions	32.92	19	28	42
Number of zip codes from which a nursing home gets admission (70% core)	10.66	6	9	14
Number of nursing homes drawing admissions from a zip code	12.00	2	6	15
Number of nursing homes drawing admissions from a zip code (70% core)	4.72	2	3	6
Number of admissions from a zip code to a nursing home	3.16	1	1	3
Number of admissions from a zip code to a nursing home (70% core)	6.97	2	4	8

areas (mean of 33), resulted in generally sparse data.[1] However, there were a large number of zip code areas from which a nursing home received very few admissions. Seventy percent of admissions were from an average of 10.7 zip code areas, which was only one-third of the average total number of zip code areas from which nursing homes drew their residents. Similarly, on average, individuals from a zip code area were admitted to 12 different nursing homes, yet when looking only at those zip codes that constituted 70% of admissions the average number of different nursing homes drawing residents from a zip code area dropped to 4.7.

Comparison of Markets Defined on the Basis of Admission Data and the Nursing Home Survey

Table 3 shows similar information for the markets defined using the zip codes listed by nursing home administrators. Initially, it would appear that these zip codes were substantially different than those defined from resident origin analysis. As expected, the market areas identified by the nursing home administrators had fewer zip code areas than those defined using the PRI data (5.21 vs. 10.66) since many of the zip code areas in the latter were likely to be the source of only occasional residents. Unexpectedly, we found the converse as well, with more than 25% of the zip code areas identified by the nursing home administrators as the core market area having *no* admissions to the nursing home in the PRI data.

We compared the characteristics of zip code areas identified as being part of nursing homes' markets using the admission data and the administrators' survey results (Table 4). The data suggest that the zip codes that are in both the survey and the PRI data were the "core areas." On average, these zip codes had a much higher number of admissions than the zip code areas that were included in markets based on the PRI data, but were not listed by the nursing home in the survey. The correlation between a nursing home's HHI based on markets defined from resident-origin data and the nursing home administrators' subjective measure of the competitiveness of their market was high (.8903).

Table 3. Characteristics of nursing home markets: survey data

	Mean	25% Quartile	50% Quartile	75% Quartile
Admissions per nursing home	106.02	53	81	129
Admissions per zip code	14.08	0	4	16
Number of zip codes in nursing home market from survey	5.21	1	5	9

Table 4. A comparison of zip codes identified as part of the nursing home (NH) market in the survey and in PRI data

	Mean number of zip code areas in nursing home markets	Mean number of admissions in each zip code area within nursing home markets (based on PRI data)
Zip code in PRI only	8.37	5.77
Zip code in survey only	4.33	0
Zip code in both	3.44	15.29

Comparing Nursing Home Markets Based on Resident Origin to Counties

Figures 1–3 are intended to illuminate different aspects of the comparison of resident-origin markets to the county in which the nursing home is located. Figure 1 examines the proportion of a nursing home's core resident-origin market (70%) that is located outside its home county. The data show that very few nursing homes have 20% or more of their market—as measured by the total population aged 75 or older residing in each zip code area—outside its home county. These results support previous findings that few residents cross county lines in choosing a nursing home. The converse is not true, however. Figure 2 shows that these core markets tend to be much smaller than the home county, once again using as a metric the population aged 75 or more living in each zip code area. The median value of the percentage of the home county's elderly population in the nursing home's market was 37.5%; the inter-quartile range for this proportion was 20% to 55%. Nursing home markets typically account for only relatively small proportions of the counties in which the nursing homes are located.

Figure 3 examines the "absolute" size of core nursing home markets compared to that of their home counties. These data highlight the dramatic differences between nursing home markets in the rural and urban counties. On average, nursing homes in rural counties had markets similar in size to their counties as a whole. In contrast, urban nursing home markets tended to be much smaller than the counties in which they were located.

Comparing the Competitiveness of Markets Defined on the Basis of Patient Migration and County Boundaries

The elderly population residing in most zip code areas in New York state tend to have little choice in nursing homes (see Table 5). With an average HHI of .47, each zip code area sent their residents to the equivalent of two equal nursing homes (1/HHI = 2.1). However, this statistic provides a distorted perspective on the competitiveness of the typical nursing home's market. This distortion is due to the skewed admission data—14% of the zip code areas are "monopolies" with HHIs equal to one—which raised the average HHI substantially. Most highly concentrated zip code areas are very small. The HHI of a zip code area is negatively correlated with the number of admissions in the zip code area (−.46). Eighty-four percent of monopoly zip code areas had only one admission and 99% of these cases had five or less admissions. Since each nursing home's HHI is the weighted average of the HHIs of the zip code areas within its core (70%) market, zip codes with high HHIs tend to have few admissions, and therefore contribute little to the overall HHI. On average, the core nursing home market had an HHI of .15; this HHI is relatively competitive, equivalent to more than six equal competitors (1/HHI = 6.7). To provide some comparison, the U.S. Department of Justice antitrust merger guidelines use markets with an HHI greater than .18 as the definition of concentrated markets.

In contrast, nursing home markets defined by county boundaries are approximately 20% more competitive than the value using resident-origin data shows—on average .1191 (1/HHI = 8.3). Even more important than the sheer difference in magnitude, county-based HHIs are poorly correlated with the resident-origin zip code level measure. To assess the bias introduced by using the county-based HHI instead of the actual one based on resident origin, we estimated a regression model with the resident-origin HHI as the dependent variable and the county-based HHI as the sole independent variable. The proportion of
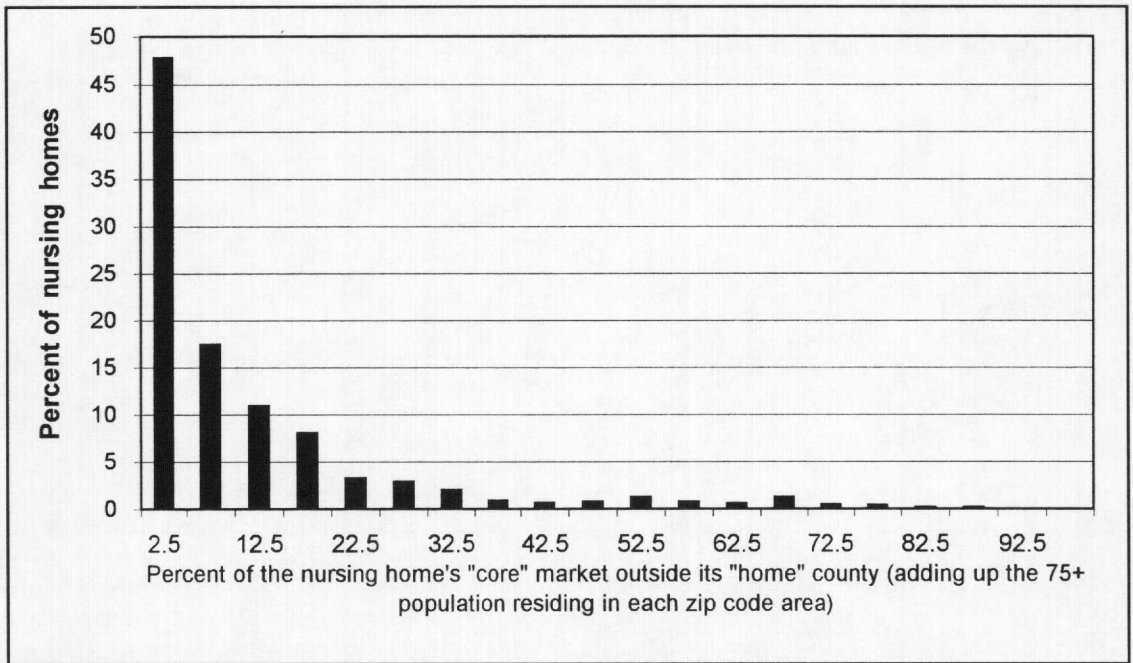
Figure 1. Percentage of market outside the "home" county

total variance in the resident-origin HHI "explained" by the model with county-level HHI and a constant was .51, suggesting that the use of the county-based HHI could introduce substantial bias into an analysis of nursing home behavior.

Stability of Nursing Home Zip Code Markets and HHIs from 1992–93 and 1996–97 PRI Data

The patterns of admissions were strikingly similar during the two periods, both in terms of the
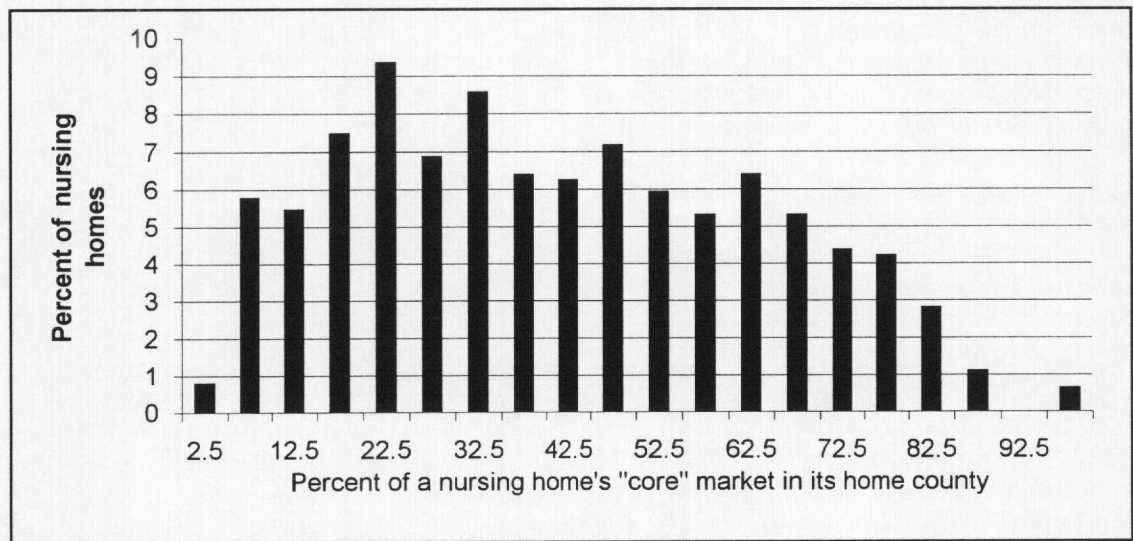

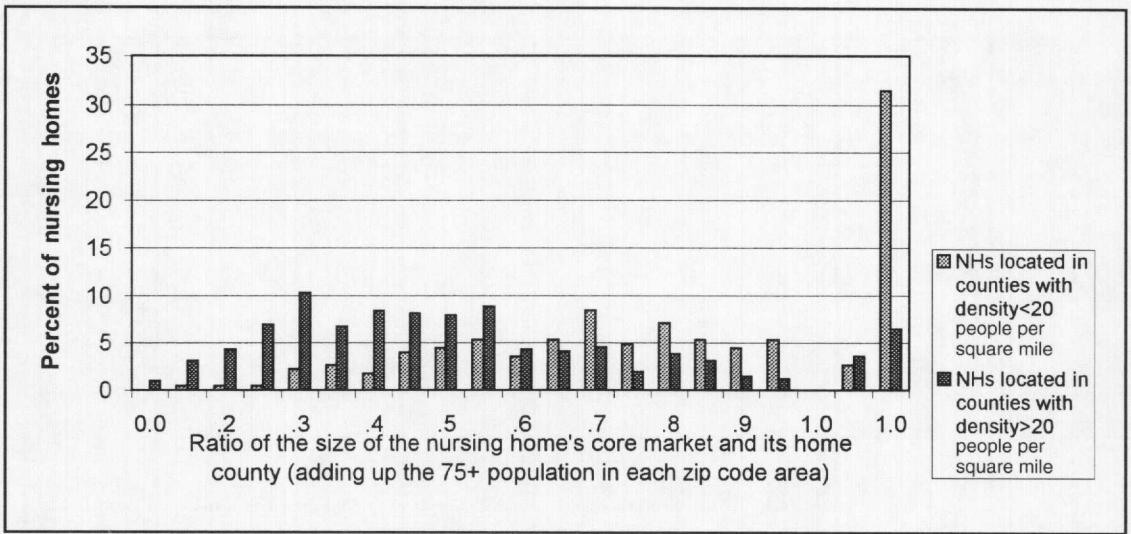**Figure 2. Percentage of "core" market inside the home county**

Figure 3. Comparison of the size of the core market to the size of the home market

zip codes included in each nursing home's market and the HHI value. On average, the change in HHI was close to zero (.02 and 0.00 for zip code area and nursing home HHIs, respectively) and was distributed fairly normally around the mean. The HHIs for the different periods were also highly correlated—for both zip code area HHIs and nursing home HHIs.

Discussion

This study demonstrates both the feasibility and value of using resident-origin data to delineate nursing home market areas. The greatest challenge raised by the data is sparseness—there are only a small number of admissions into a given nursing home from any given zip code area. Despite the instability that accompanies these small numbers, the market areas we defined using these data were stable even over an extended period of substantial change in the nursing home industry. The market areas identified by nursing home administrators and by resident-origin data were distinct but strongly overlapping.

One puzzling finding was the significant number of zip code areas that nursing home administrators identified as belonging to their markets but which had no admissions in the PRI data. Given the number of such cases, they were clearly not rare or accidental. Yet the vast majority of residents in nursing homes are Medicare beneficiaries. Possibly the areas identified represent administrators' anticipation of potential markets for entry and/or the pattern of admission for residents who are not Medicare beneficiaries and are systematically different from Medicare beneficiaries.

An issue not addressed by this study is the ownership patterns of nursing home facilities. New York state does not permit the corporate ownership of nursing homes, so for-profit nursing home chains do not own any nursing homes in the state. Although individuals can own more

Table 5. HHI calculated for nursing home markets defined on the basis of resident migration, survey, and county boundaries

Unit of analysis	Mean	25% Quartile	50% Quartile	75% Quartile
Zip code area (admissions—PRI data 70%)	.4685	.2222	.3750	.5555
Nursing home (admissions—PRI data 70%)	.1493	.0753	.1115	.1937
Nursing home (admissions—survey)	.2649	.1475	.2257	.3635
County (beds)	.1191	.0319	.0509	.1686

than one nursing home, the vast majority of nursing homes are free standing. In other states, where large nursing home systems control a substantial proportion of the total number of nursing homes, the method developed for this study should be modified (similar to that developed for hospital systems in Zwanziger and Mooney 2001). This modification to the HHI may show dramatic increases in the degree of concentration as a result of system ownership.

Our findings are important to both researchers and policymakers. Researchers must recognize that there are clear differences between the markets as defined by resident-origin data and county boundaries, which are the nursing home markets used in most studies. The limited empirical evidence currently available supports this finding as it suggests that nursing homes have more market power than county-based measures of competition would imply. For urban nursing homes—the ones where issues of competition are most relevant—county-based markets would tend to be far larger than ones based on resident origin. As a result, county-based measures would tend to grossly overstate the competitiveness of nursing home markets.

Resident-origin HHIs are quite different than county-based HHIs. In particular, the relatively low R^2 found in our simple regression model demonstrates that analyses based on county measures of competition are likely to suffer from severe measurement error for this critical variable. The market areas defined using the resident-origin approach are likely to provide a more accurate definition of nursing home markets and, therefore, should be used in all studies where the accurate delineation of nursing home markets and their market structure are important. Studies that investigate the effect of competition in nursing home markets on quality and cost of care, for example, are likely to be misleading if they rely on market definitions that do not reflect true market boundaries. Such studies, therefore, may inform policymakers incorrectly.

Our findings have several important policy implications. Nursing homes have two primary sources of revenue, Medicaid and residents' out-of-pocket payments (long-term care insurance is likely to increase slowly in the long run). Medicaid rates are established by the state, but nursing homes are generally free to set the rates for out-of-pocket residents, presumably based on local market conditions. It is important, therefore, to either ensure that nursing home markets are sufficiently competitive to ensure efficient pricing, or to develop a regulatory framework to prevent monopolistic practices. Antitrust enforcement is a key component of the first policy approach, and market definitions are central to antitrust enforcement. Merger guidelines specify HHI cutoffs that would trigger a more skeptical review of a merger application. If nursing home markets are based on market boundaries that are too widely extended, that would result in an overestimate of their true competitiveness and could result in allowing mergers to proceed that result in excessively concentrated markets. Similarly, market definitions are an important aspect of Certificate of Need (CON) regulations. These depend on market definitions to determine the population base for the "need" calculation. If markets are inaccurately defined, CON approval may lead to placement of nursing home beds in the "wrong" geographic areas, to shortages of beds in other areas, or to a denial of a license for a nursing home in an area of need. Understanding nursing home behavior will become increasingly important with the rapid growth in the elderly population. Such analyses depend on a correct characterization of nursing home markets.

Notes

1 The number of admissions we identified using Medicare data is entirely consistent with the number of admissions reported by nursing homes in the RHCF data; it is clear that our procedure succeeded in identifying the vast majority of admissions.

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