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Gunnar Almgren
University of Washington

Miguel Ferguson
University of Texas, Austin

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GUNNAR ALMGREN

University of Washington
The School of Social Work

MIGUEL FERGUSON

University of Texas at Austin
School of Social Work

Abstract: Hospital closures occurred nationally with increasing frequency between 1970 and 1990. In particular, large urban areas experienced a dramatic number of closures. Of the 61 general hospitals operating in Chicago in 1970, 22 (36%) had closed by 1991. While a growing body of literature has examined the etiology and determinants of hospital closure over the last two decades, few empirical studies have focused on the neighborhood correlates of closure, and none have examined specific health outcomes associated with hospital failure. This study uses census and Chicago hospital closure data to compare and contrast different conceptual explanations of closure in an effort to identify neighborhood correlates and health outcomes associated with hospital failure. The authors find that hospital closures in Chicago diminished an already low hospital bed-to-population ratio and may have contributed to a deterioration of critical health status measures in disadvantaged African American neighborhoods.

Over the twenty year period from 1970 to 1990 more than a thousand hospitals closed their doors to the public nationwide (AHA, 1994; Dallek, 1983; Mullner, Byre, and Kubal, 1983). Although both urban and rural hospitals of all types shut down, many that closed were non-profit community hospitals located in poor urban areas populated primarily by racial minorities (Longo et al 1996; Whiteis 1992).

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Studies of hospital closure over the last fifteen years have identified a host of internal organizational and environmental characteristics associated with closure. In general, hospitals that closed were more likely to be small, offer fewer services, have lower occupancy rates, have higher proportions of Medicaid inpatients, and be independent, for-profit institutions. External characteristics associated with closure include high rates of competition for hospital and medical personnel resources, declines in metropolitan population, high rates of unemployment, low per capita income, and a high percentage of African American residents in the immediate hospital area (Longo et al 1996; Whiteis 1992; Longo and Chase, 1984; Hernandez and Kaluzny 1983; Sager 1983).

Not surprisingly, financial distress has been found to be the immediate cause of most hospital closures. However, financial variables and related internal organizational characteristics only provide an understanding of the proximate factors that lead to closure (Snail and Robinson, 1998; Wertheim and Lynn, 1993). Prior research and reason both suggest that, to the extent that a given hospital has existed to serve a defined geographic community, its financial status and adaptive capacities are largely influenced by externally determined structural factors prevalent within that community. Thus, as poverty becomes more concentrated within many urban neighborhoods and traditional forms of health insurance subsidy disappear in the face of price-based hospital competition, hospital viability may be more a matter of ecological context than of administrative organization and leadership (Williams, Hadley and Pettingill 1992; Rice 1987; McLafferty 1982).

Aside from the ecological correlates of hospital closure, another critical issue is the extent to which urban hospital closures represent an additional source of disproportionate health risk to the residents of economically distressed minority neighborhoods, as many studies contend (Whiteis 1998; Whiteis 1992; Rice 1987; Schatzkin 1985, 1984; Sager 1983 ; McLafferty 1982). While it appears logical that hospital closures within poor neighborhoods will ultimately contribute to negative health outcomes, in empirical terms this remains an unresolved question.

In this study we examine both the ecological correlates of hospital closure and the extent to which such closures have discernable health impacts in poor communities. We base our analysis on the city of Chicago because it is a large, racially and economically diverse central city that experienced a 36 percent decline in the number of hospitals operating between 1970 and 1990. We believe our attempt to model explicit theories linking ecological context to hospital closures and assess the evidence for detrimental health outcomes within economically distressed minority neighborhoods represents a unique and important contribution to the urban poverty literature.

THE LITERATURE ON ECOLOGICAL CORRELATES OF HOSPITAL CLOSURE

Hospital closures began to accelerate in the early 1980's in response to large private and public sector structural changes in the U.S. health care system generally aimed at controlling rising health care costs. These changes include the growth in prospective payment systems, the elimination of various cost-shifting mechanisms through which hospitals transferred losses accrued through charity care and bad debt to private health care insurance carriers, increased competition among hospitals for a limited pool of patients with adequate health insurance benefits, and continued demands for state of the art medical technology in the face of shrinking capital reserves. However, the literature on hospital closure tends to give a complex and sometimes contradictory picture of the proximate determinants of hospital closure. In general, it appears that there is often a strong relationship between the economic distress of a hospital's local population, the degree of local competition among hospitals for a limited share of paying inpatients, and the extent to which a hospital can isolate itself from an unfavorable local population base (e.g. as in the case of large regional medical centers).

Longo, Sohn and Shortell (1996), in their analysis of the hospital closures, mergers, and systems acquisitions that took place nationally from 1984–88, considered several theoretically important environmental variables related to hospital closure: physician and bed-to-population ratios, local per capita income and

rate of unemployment, population size and composition change, the regulatory environment, the census region and SMSA status. Their results found that all of the independent variables except the bed-to-population ratio and population change were significantly correlated with hospital closure.

Gardiner, Oswald, and Jahera (1996), included market share among financial and non-financial variables in a national sample of 500 closed and open acute care hospitals from 1986–89. They found that market share, measured as each hospital's proportion of county revenue, was a significant variable of closure for both proprietary and not-for-profit hospitals. Hospitals capturing a lower percentage of the county market share, regardless of ownership type (non-profit, private for-profit, or public), were more likely to close. Lynch and Ozcan (1994), Gifford and Mullner (1988), Mullner and McNeil (1986), and Sager (1983) also included measures of competition among hospitals in their studies. All but Lynch and Ozcan found market competition, measured as a high density of hospitals or hospital beds within a proximate area, to be significantly related to closure.

More specifically, Williams, Hadley and Pettengill (1992) and Longo and Chase (1984) found medical competition, measured as the ratio of physicians and/or surgical specialists to the surrounding population, to be significantly related to hospital failure. These results suggest that, to the extent that competition between hospitals and medical personnel can adequately be captured, hospitals (especially small hospitals that offer few services) are more likely to go out of business if their facilities or personnel are underutilized due to competition within the local area. As Williams, Hadley and Pettengill state, " . . . it appears that [hospital] closure represents the elimination of excess and low quality capacity by the market" (1992, p. 186).

A number of studies have included socio-economic and demographic variables in their analyses of hospital failure. In a study of rural-urban hospital closures that took place nationally between 1985–88, Lillie-Blanton et al (1992) found that a decline in population, an increase in unemployment, and low per capita income in a hospital's immediate area were all environmental factors significantly predictive of closure. Similarly, Williams, Hadley and Pettengill (1992) found that hospitals in less densely

crowded areas or with declining populations were at greater risk of closure.

In an analysis of neighborhood correlates of hospital failures in New York City, McLafferty (1982) used a mix of income, age, race and population variables in examining closures that occurred from 1970–81. Her study showed that closures of voluntary hospitals took place most frequently in disadvantaged neighborhoods with a high percentage of black residents, high levels of infant mortality, and high rates of population decline. Schatzkin (1984) also studied hospital closures in New York during the same time period and found that a high percentage of minority hospital area residents and a high non-white inpatient mix contributed to a greater risk of closure. Sager (1983) and Whiteis (1992) both found closure significantly related to a high percentage of blacks residing in the local hospital area, which in turn may reflect higher levels of unemployment, medicaid usage, and higher levels of uncompensated care.

While all of the above studies provide useful contributions to the literature on the environmental correlates of hospital closure, most research uses national survey data that provide little or no information with respect to racial and economic predictors of closure in the local hospital neighborhood. Scholars of race and poverty consistently find major distinctions between the economic structures of large, highly segregated metropolitan areas and more integrated cities (Massey and Denton, 1993; Jargowsky, 1997), thus challenging the conclusions of studies that pool the effects of poor neighborhoods across vastly different metropolitan environments. Because we consider hospital closures within the particular context of a highly segregated metropolitan area like Chicago, our analysis identifies most closely with and expands upon the ecological analyses undertaken in previous studies such as Schatzkin (1984), Sager (1983), and McLafferty (1982). However, we extend our analysis to include an examination of the relationship between hospital closures within poor neighborhoods and changes in community level health indicators.

DATA AND METHODS

The primary data source for hospital closure information in this study is the American Hospital Association's (AHA)

directories of health care institutions for the years 1971 and 1992 (AHA 1971, 1992). These directories include survey data collected from the previous years that contain information pertaining to the location, ownership, scope of services, and functions provided for each hospital in the Chicago metropolitan area. Since the AHA represents all types of hospitals, this list is inclusive of all hospitals providing even a modest scope of services to residents of Chicago. However, we excluded from our analysis hospitals that did not provide general medical/surgical care (e.g. hospitals that were devoted to oral surgery). Hospitals that were listed in the 1970 survey but not in the 1991 survey were presumed to have closed once we verified through street map and directory information that the hospital was not doing business under another name or affiliation. We also obtained a list of hospital closures from the Chicago Department of Public Health (City of Chicago Department of Public Health 1996), which corresponded closely to the findings we observed through a comparison of AHA directories. Because the AHA directories also list emergency department services, we were able to identify emergency department closures apart from hospital closures.

Like Whiteis (1992), we defined each hospital's local area or ecological unit as the census tract containing the hospital as well as all contiguous census tracts. We recognize that such a geographic designation carries with it a great deal of ecological overlap, since some hospitals cluster in various parts of the city and compete with one another to glean profitable patients, attract capital investment, and avoid bad debt. Nevertheless, the use of aggregated census tracts allows us to use a variety of population, labor force, and housing characteristics that represent theoretically important distinctions in ecological context. In addition, we merged individual vital record information with census tract counts to estimate important local area health indicators that may be associated with hospital survival or closure.

Between 1970 and 1991, 36 percent (N=22) of the city's 61 general medical/surgical hospitals closed. Although a large number of hospital closures should have been predicted by such trends as central city population decline, decreased lengths of stay, prospective payment systems, the emergence of cost-based competition and the growth of outpatient surgery, the sheer number of

Table 1

Hospital Closures by Type and Size

Bed Size	*<200*			*201–300*			*301–400*			*>400*			*Total*		
	N	*Closed*	*% Closed*	*N*	*Closed*	*% Closed*	*N*	*Closed*	*% Closed*	*N*	*Closed*	*% Closed*	*N*	*Closed*	*% Closed*
Gov Non-Teach	1	0	0%	–	–	–	–	–	–	–	–	–	1	0	0
Gov Teach	–	–	–	–	–	–	–	–	–	2	0	0%	2	0	0
Non-Profit Non-Teach	23	14	61%	11	2	18%	8	2	25%	2	0	0%	44	18	41%
Non-Profit Teach	–	–	–	2	1	50%	1	0	0%	9	2	22%	12	3	25%
For-Profit Non-Teach[a]	2	1	50%	–	–	–	–	–	–	–	–	–	2	1	50%
Total	26	15	58%	13	3	23%	9	2	22%	13	2	15%	61	22	36%

[a]During the period analyzed, there were no for-profit teaching hospitals in Chicago. This subsequently changed with the acquisition of Michael Reese Hospital and Medical Center by Humana.

closures is still striking. Table 1 breaks down these closures by bed size, profit-status, and hospital teaching status (as defined by the Association of American Medical Colleges). Even a cursory examination of this data shows that closure is highly related to size: 15 of the 26 hospitals having less than 200 beds (58%) closed over this period. Teaching status is confounded with size, so it cannot be concluded from the data in Table 1 that a hospital's teaching status in and of itself mediates the likelihood of closure. However, because teaching hospitals are more likely to enjoy economic and political bases of support that are independent of surrounding neighborhood characteristics, it is likely that teaching status is a crucial protective factor related to hospital closure. Although government ownership also appears to be a protective factor while for-profit ownership appears to be a risk factor (Whiteis 1997), the number of hospitals in both these categories is quite small. In general, closures were largely distributed among small and modest sized hospitals that were both not-for-profit and non-teaching, that is, those hospitals that are most strongly inclined to serve a defined local area.

In order to permit the testing of theories linking neighborhood ecology to hospital closure, we used census data and vital records to construct eight predictors of hospital closure. We then fit the selected predictors within four theories linking hospital closure to neighborhood characteristics. The variables and their descriptive statistics are shown in Table 2. Most of the variables are estimated using 1980 data, which reflect the ecological characteristics of the local hospital areas at the midpoint of the observation period. The exceptions are a variable that measures the change in minority composition between 1970 and 1990, and a variable that measures the level of service sector employment in 1990. Each of the variables will be more fully explained in the discussion of theoretical models that follows.

ALTERNATIVE THEORIES LINKING NEIGHBORHOOD ECOLOGY TO RISK OF HOSPITAL CLOSURE

As previously mentioned, we frame our analysis within explicit theories which may help explain the complex linkages between neighborhood ecology, organizational characteristics, and

Table 2

Ecological Predictors of Hospital Closure[a]

	Mean	*SD*	*Min*	*Max*
Control Variable				
Bed Size *Log of Licensed Beds*[b]	310 (2.38)	312 (.29)	59 (1.77)	2263 (3.35)
Neighborhood Level Predictors				
Bed Ratio 1980 *Hospital Beds/Per Thousand Population*	36.0	62.6	2.7	337.7
Unemployment Rate 1980 *Civilian Unemployment Rate (per 1000)*	10.4	5.8	2.8	22.7
Average Life Expectancy 1980 *Male + Female Life Expectancy/2*	72.1	4.5	63.1	90.3
Percent Minority 1980 *Non-white and non-Hispanic/Total Pop.*	.48	.36	.01	1.00
Blight Factor 1980 *Factor Score for Abandoned Housing, Unemployment and Average Life Expectancy*	.00	1.00	−2.11	2.50
1970–90 Population Composition Change *Change in Percent Minority, 1970–90*	.21	.23	−.16	.91
1970–90 Population Size Change *1990 Population–1970 Population/1970 Population*	−.18	.22	−.60	.31
Proportion Service Occupation, 1990 *Proportion of 1990 Labor Force in Service Occupations*	.15	.05	.05	.27

[a]Neighborhood level predictors are the values for each hospital's neighborhood area, defined that hospital's census tract and all contiguous census tracts.
[b]Values in parentheses are values of the variable, log bed size. We use the log of bed size in our prediction models due to the highly skewed distribution of the hospital bed size variable.

hospital closure. We develop a series of models representing alternative theoretical explanations of hospital closures that appear implicated in much of the literature on the ecological correlates of hospital closure. Each of the models is tested through a series of logistic regressions, with separate regressions for non-teaching hospitals shown since hospital size and teaching status are confounded. We also employ hospital bed size (logged due to the skewed distribution of this variable) as a control variable in each model, since the evidence from Table 1 suggests that larger hospitals are disproportionately protected from the risks of hospital closure. We also speculate that bed size may reflect a legacy of disproportionate social investment in poor and minority neighborhoods, as suggested by Whiteis (1997).

The first model of hospital closure, the **Economic Model**, predicts hospital closure as a function of excess bed capacity relative to the economic resources of the local hospital area (Gifford and Mullner 1988; Mullner and McNeil 1986; and Sager 1983). We measure bed capacity as the number of hospital beds per thousand persons living within each hospital's contiguous neighborhood areas. Because employment is directly linked to the probability of health insurance, we use the civilian labor force unemployment rate as our measure of local area economic resources. The Economic Model also incorporates the effect of a shrinking population base, a factor that has been linked to hospital closures in other studies (Lillie-Blanton et al 1992; Williams, Hadley and Pettingill 1992; McLafferty 1982). Since the population of Chicago declined by 553,000 persons (or 17 percent of its population) between 1970 and 1990 (U.S. Census 1970; U.S. Census 1990), it is reasonable to speculate that differential levels of population loss by hospital neighborhood may be a powerful predictor of closure.

The second closure model, the **Public Health Model**, suggests that hospital closures reflect a rational process whereby resources are reduced where they are needed least. According to this model, hospital closures should occur in local areas characterized by excess bed capacity and a lower level of health care need. This model incorporates two variables, the ratio of hospital beds to the neighborhood population and neighborhood life expectancy. Since life expectancy is a function of population morbidity, we use the average of male and female life expectancies as our measure of

population health, adjusted to exclude the effect of violent deaths on life expectancy. We do this because violent deaths typically do not reflect the underlying health status of the victim.

In sum, both the Economic Model and the Public Health Model posit that hospitals close in response to a rational restructuring of health care resources that is indifferent to the racial composition of a neighborhood, except to the extent that race and socio-economic disadvantage are correlated.

The third model explicitly tests the proposition that race has a direct role in the likelihood of hospital closure. This model, which we term the **Urban Disinvestment Model**, stems from studies documenting hospital closures within poor and minority neighborhoods and the writings of Roderick Wallace (1993, 1990b, 1990c) and Deborah Wallace (1990a, 1990c). In essence, this model argues that hospitals close in response to the structural disintegration and abandonment that has occurred in neighborhoods with a segregated and politically powerless minority population (measured as the proportion of the population that is other than non-Hispanic white), a large share of deteriorated housing, endemic levels of unemployment, and short life-expectancy. Through principal components factor analysis, we verified that this dimension of local area ecology was well differentiated among the neighborhoods containing Chicago's hospitals, permitting us to derive a factor score for each local area representing "urban blight" (i.e. the convergent presence of deteriorated housing, endemic unemployment, and short life-expectancy).

The fourth and final model we test, the **Minority Succession Model**, is drawn from studies of hospital closure that suggest hospitals are more likely to close in neighborhoods undergoing large changes in ethnic and racial composition (Lillie-Blanton et al 1992, Whiteis 1992, Schatzkin 1984, Sager 1983). Such a model may be particularly relevant to a city like Chicago, where 23 of the 61 hospitals studied experienced at least a 30 percent increase in local area minority composition between 1970 and 1990. We also speculate that significant increases in minority composition may be associated with a higher likelihood of hospital closure because ethnic minorities are less likely to be employed in jobs that provide health care benefits, thereby decreasing the sources of revenue and increasing the uncompensated care burdens of

hospitals serving minority neighborhoods. Thus we include the proportion of the labor force employed in service sector occupations as a part of this model.

All of the above models were tested through two alternative logistic regression equations with closure as the (0,1) dependent variable. One set of prediction equations includes all hospitals (N=61) and the second set of prediction equations includes only non-teaching hospitals (n=47). We do this to account for the argument that teaching hospitals serve a market that extends well beyond (and often excludes to some extent) the local area population.

As shown in Table 3, it is clear that none of the multivariate theoretical models proposed serves as a good predictor of hospital closure when the effect of hospital size is excluded. In general, only bed size (measured as the log of the hospital size to account for the extremely skewed distribution of this variable) serves as a consistently robust predictor of hospital closure, and it is essentially unmodified by the inclusion of the theoretical variables. Population composition change is also weakly related to the likelihood of hospital closure among non-teaching hospitals, but in contrast to theory it appears to serve as a small protective factor rather than as a risk factor. We speculate that this effect represents a confounding relationship between population growth and population composition change, which in subsequent analyses (not shown here but available from the first author) proved to be the case. That is, the effect of population composition change dropped well below statistical significance when population growth was entered into the equation.

POPULATION COMPOSITION, HOSPITAL BED SIZE, AND RISK OF CLOSURE: RACIALLY SELECTIVE INVESTMENT AND DIVESTMENT

Based on the preceding analysis, it is apparent that if there are relationships between local area economic factors, racial composition, and hospital closure, they are mediated almost entirely through hospital bed size and other indicators of institutional investment associated with bed size. This finding would be consistent with the uneven development hypothesis of Whiteis (1997),

Table 3

Logit Model Coefficients for Ecological Predictors of Hospital Closure

	All Hospitals (N=61)		*Non-Teaching Hospitals (N=47)*	
Economic Model		S.E.		S.E.
Log Bed Size	−4.082**	1.479	−7.048**	.005
Unemployment Rate	−.046	.076	−.193	.125
Bed Ratio	.001	.007	.026	.029
Population Change	−2.3185	3.558	−5.874	3.297
−2 Log Likelihood	66.52		48.16	
Model Chi-Square	13.24**		15.26**	
Public Health Model				
Log Bed Size	−4.446***	1.506	−6.279***	2.234
Bed Ratio	.003	.007	.033	.026
Average E0	.072	.069	.103	.080
−2 Log Likelihood	66.82		51.33	
Model Chi-Square	12.94***		12.10**	
Urban Disinvestment Model				
Log Bed Size	−4.064**	1.426	−5.297**	1.996
Proportion Minority	1.033	1.271	.435	1.376
Blight Factor	−.369	.468	−.409	.509
−2 Log Likelihood	67.35		54.39	
Model Chi-Square	12.41***		9.03**	
Minority Succession Model				
Log Bed Size	−4.131**	1.502	−6.880**	2.414
Composition Change	−.924	1.351	−3.348*	1.724
Proportion Service Occ.	.011	6.065	−7.446	7.513
−2 Log Likelihood	67.62		49.88	
Model Chi-Square	12.14**		13.54***	

* p<.10, one-tailed
** p<.05, one-tailed
*** p<.01, one-tailed

which argues that the underdeveloped status of the health care resources of inner city neighborhoods is the outcome of broad public and corporate sector investment strategies serving capital accumulation and consolidation over racial and economic equity. According to this theory, hospital bed size is not so much an internal organizational variable as it is an ecological outcome driven by the racial and economic character of a hospital's surrounding neighborhood. If this is the case, at least for Chicago, hospital bed size and hospital closures should be directly correlated with economic distress, racial composition, and urban blight.

As shown in Table 4, our findings indicate that hospital bed size is negatively correlated with the local area unemployment rate, the proportion minority (proportion non-Hispanic white), the proportion African American, and urban blight. Were hospital size uncorrelated with these variables, it would suggest that health care investment, at least in terms of institutional resources, is unrelated to the racial and economic character of a neighborhood. Obviously, this is not the case. The findings indicate that

Table 4

Correlations of Hospital Bed Size, Neighborhood Social Characteristics, and Hospital Closures

	All Hospitals	*Non-Teaching*
N	61	47
	Log Beds	*Log Beds*
Unemployment Rate	−.32**	−.41**
Proportion Minority	−.22**	−.37**
Proportion African American	−.16	−.35**
Urban Blight Factor	−.32**	−.42**
Hospital Closure	−.40**	−.40**
E.R. Closure	−.17*	−.19*

Note: All neighborhood social characteristics are 1980 observations, the midpoint of the twenty year period analyzed.

* $p<.10$ one-tailed

** $p<.01$ one-tailed

in Chicago, hospitals serving minority neighborhoods tend to be small. In fact, of the 17 small hospitals serving Chicago's African American neighborhoods in 1970 (defined here as those neighborhoods with at least 80% African American composition), only 6 still existed by 1990. Thus we conclude that Chicago's hospital closures reflect an important two-part historical process. First, racially selective health care investment increased the likelihood that hospitals serving minority communities would be small. Second, as noted, small hospitals are far more likely to close, thus leaving the hospitals serving minority neighborhoods more vulnerable to closure than the larger hospitals typical to majority white neighborhoods.

To further assess the impact of racially selective hospital closures on African American neighborhoods, we compare the hospital bed-to-population ratio of predominantly white areas of the city to the ratio for predominantly African American areas of the city for 1970 and 1990. To demarcate these areas in order to contrast real differences in neighborhood racial composition, a hospital bed was considered to be located in a white or African American part of the city if it was located in a community area that was at least 80 percent white or at least 80 percent African American. Chicago has 77 community areas, defined by the City of Chicago as clusters of census tracts that function as distinct local areas of the city. The ratios employed are simply the summed populations within each type of area divided by the total number of hospital beds located within each area. Reflecting asymmetrical patterns of past investment, in 1970 there were 21.96 hospital beds for every 1,000 persons living in majority white neighborhoods, but only 7.73 hospital beds for every 1,000 persons living in majority African American neighborhoods. By 1990, the racially selective nature of hospital closures had reduced the ratio in African American neighborhoods to 3.9 beds per thousand persons. The comparable figure for white neighborhoods in 1990 was 13.8 hospital beds per thousand persons. Although both white and African American areas of the city experienced a decline in the bed-to-population ratio over this period, the racially selective nature of hospital divestment clearly increased an already large racial disparity in hospital resources. Expressing this growth in racial disparity as a direct ratio per thousand residents, in 1970

majority white neighborhoods had 2.85 times the number of hospital beds available to them compared to majority African American neighborhoods. By 1990, the disparity ratio between the majority white and African American neighborhoods had increased to 3.53 beds per thousand residents.

HOSPITAL CLOSURES IN DISADVANTAGED NEIGHBORHOODS: HEALTH EFFECTS

To our knowledge, no previous study in the hospital closure literature has attempted to empirically document health effects stemming from hospital failure. In order to identify health effects that may be related to the closure of hospitals within disadvantaged neighborhoods, we contrast changes in the overall mortality levels among a small group of disadvantaged neighborhoods served by hospitals that varied with respect to local hospital survival or closure. Six disadvantaged neighborhoods were selected on the basis of their having the highest factor scores for urban blight. As explained previously, this variable measures the convergence of abandoned housing, high unemployment, and low average life expectancy (again, 1980 figures are used to approximate the risk period midpoint). All six neighborhoods had blight factor scores in excess of 1.28 standard deviations above the mean for all hospital neighborhoods, with an average blight factor score of 1.80. In essence, these areas represent some of the most disadvantaged neighborhoods in all of Chicago. In order to construct more reliable estimates of age-specific mortality (the main component of our health measure), we aggregated the six comparable neighborhood populations into two separate populations; in effect comparing poor neighborhoods where hospitals had closed to poor neighborhoods where the hospitals had remained open. In order to correlate hospital closures with health outcomes, the populations are compared on two widely used summary health measures at two time points: the 1980 and 1990 infant mortality rate (IMR) and the 1980 and 1990 average life-expectancy (L.E.). Both measures are based on machine readable individual birth and death records supplied by the Illinois Department of Public Health (IDPH, 1992), and U.S. Census estimates for 1980 and 1990 (U.S. Census: 1990, 1980). If hospital closures have a strong detrimental effect on neighborhood level health outcomes, we should

detect a deterioration in life-expectancy and an increase in infant mortality rates between 1980–90 among the poor neighborhood populations exposed to local hospital closure.

As shown in Table 5, both of the populations we compare have mortality rates well in excess of the national average across all racial groups, whether observed in 1980 or in 1990. It is also apparent that the populations differ with respect to their overall gains or losses in infant mortality and overall life-expectancy over the ten year period of observation. These differences, an increase in infant mortality and a decrease in life expectancy in poor neighborhoods where hospitals closed, are in the direction we would expect if in

Table 5

1980 and 1990 Infant Mortality Rates and Average Life-Expectancy by Hospital Survival Status

Panel 1 Changes in Infant Mortality Rates			
	1980 IMR	*1990 IMR*	*Change*
Poor Neighborhoods Where Hospitals Survived	27.78	24.14	−3.64
Poor Neighborhoods Where Hospitals Closed	18.48	23.42	4.94
Panel 2 Changes in Life-Expectancy			
	1980 L.E.	*1990 L.E.*	*Change*
Poor Neighborhoods Where Hospitals Survived	64.14	64.31	0.17
Poor Neighborhoods Where Hospitals Closed	64.14	63.31	−.83

Note: In order to compare differences in mortality levels between poor neighborhoods where hospitals closed and poor neighborhoods where the hospital survived, the population and mortality statistics from the 3 most disadvantaged neighborhoods of each type (hospital closed and hospital survived) were pooled. This created a larger population base within each type of neighborhood from which to estimate infant mortality rates and overall life-expectancies. Infant mortality rates are expressed as deaths per thousand live births.

fact hospital closures in poor neighborhoods have an observable detrimental effect on health outcomes. Although differences in changes in overall life-expectancy are modest, the differences in infant mortality rate changes between the population exposed to hospital closure and the population located within the area of a surviving hospital are quite extreme (an absolute difference in the IMR changes between 1980 and 1990 of 8.58 deaths per thousand).

There are three alternative explanations to these findings, all of them viable. The first is that the differences observed between the two populations compared, as dramatic as they are, reflect random processes that have no relationship to changes in the local health care infrastructure. The second possibility is that the relationship observed between hospital closure and relative deterioration in population mortality is spurious, perhaps reflective of some unobserved dynamic in the general process of neighborhood deterioration. The third possibility is that hospital closures have indeed had some independent detrimental effects on health outcomes. Nothing in the data at hand will sort this out, although all of the documented changes in life expectancy and infant mortality rates are in a direction consistent with both of the latter explanations.

CONCLUSION

We considered several theories on urban hospital closures, including some focused primarily on competitive efficiency, and others that place more emphasis on racial selection. At least in the case of Chicago's hospital closures, the evidence is far more consistent with both historical and contemporary processes of racial selection. While this analysis does not sort out the causal pathways, there is initial evidence to suggest that the deterioration of health outcomes among the urban poor is part and parcel of a larger process of continued racial segregation, concentration of poverty, and a withering of the health care service infrastructure within poor neighborhoods (Fountain, 1989; Peirce, 1990).

As noted, research to date has focused on the correlates and determinants of hospital closure, with little emphasis placed on the impact of hospital failure on critical health outcomes among local area residents. However, residents of affected neighborhoods have certainly not been ambivalent about the consequences

of hospital closure on the physical, emotional, and economic well-being of their communities (Hardy, 1989; Higgins, 1988). In Chicago, many activists and concerned neighborhood residents view the trend of hospital closures (especially those that occurred in the inner-city) as having instigated a crisis in both routine and emergency care services for primarily poor, minority residents. Moreover, they contend that inner-city hospital closures eliminate both stable sources of employment and irreplaceable symbols of community investment. Those affected by the closure phenomena have thus vigorously opposed hospital closings and the insensitivity of municipal officials who offered little in the way of relief or accommodation. In accord with such concerns, we find that hospital closures (expressed as the relative decline in the number of hospital beds per thousand persons) disproportionately reduce the hospital resources available to residents of African American neighborhoods and extend further the legacy of racial disadvantage in the distribution of institutional health care resources. It should also be recognized that, unlike the more economically advantaged white neighborhoods of the city, disappearing hospital beds and emergency departments in African American neighborhoods are not likely to be substituted by private sector alternatives such as urgent care and ambulatory surgery clinics. We therefore conclude that inner city hospital closures should not continue to be dismissed as a somewhat regrettable and impersonal by-product of changes in the health care system infrastructure, but rather should be viewed as a deleterious extension of racial disenfranchisement.

REFERENCES

American Hospital Association. (1971). *AHA Guide to the Health Care Field.* American Hospital Association, Chicago.

American Hospital Association. (1992). *AHA Guide to the Health Care Field.* American Hospital Association, Chicago.

American Hospital Association. Hospital Closures 1980–1993: A statistical profile. Unpublished report prepared by the Health Care Information Resources Group, March 1994.

Dallek, G. (1983). The loss of hospitals serving the poor. *Health Services Research, 18*(4), 594–597.

Fountain, J. W. (1989). Closing of Health Care Center Called 'Tragedy' for West Side's Poor. *Chicago Tribune.* Chicago.

Gardiner, L. R., Oswald, S. L., & Jahera, J. S. (1996). Prediction of Hospital Failure: A post PPS analysis. *Hospital and Health Services Administration, 41*(Winter), 441–460.

Gifford, B. D., & Mullner, R. M. (1988). Modeling hospital closure relative to organizational theory: The applicability of ecology theory's environmental determinism and adaptation perspectives. *Social Science in Medicine, 27*(11), 1287–1294.

Hardy, T. (1989). Dunne Foes Say County Needs Action On Health, Discrimination. *Chicago Tribune*. Chicago.

Hernandez, S. R., & Kaluzny, A. D. (1983). Hospital closure: A review of current and proposed research. *Health Services Research, 18*(3), 419–436.

Higgins, L. C. (1988). Another Chicago hospital shuts its doors. *Medical World News*.

Illinois Department of Public Health. List of closed hospitals 1970–1990. Unpublished report, October 26, 1996.

Jargowsky, P. A. (1997). *Poverty and Place: Ghettos, Barrios, and the American City*. New York, Russell Sage Foundation.

Lillie-Blanton, M. et al (1992). Rural and urban hospital closures, 1985–1988: Operating and environmental characteristics that affect risk. *Inquiry, 29*(Fall), 332–344.

Longo, D. R., & Chase, G. A. (1984). Structural determinants of hospital closure. *Medical Care, 22*(5), 388–402.

Longo, D. R., Sohn, M. W., & Shortell, S. M. (1996). The etiology and determinants of hospital closure. *Journal of Health Care Finance, 22*(3), 34–48.

Lynch, J. R., & Ozcan, Y. A. (1994). Hospital closure: An efficiency analysis. *Hospital and Health Services Administration, 39*(Summer), 205–220.

Massey, D. S. and N. A. Denton (1993). *American Apartheid: Segregation and the Making of the American Underclass*. Cambridge, Mass., Harvard University Press.

Peirce, N. R. (1990). Any RX for Sick Hospitals? *Nation's Cities Weekly*. April 2nd.

McLafferty, S. (1982). Neighborhood characteristics. *Social Science in Medicine, 16*, 1667–1674.

Mullner, R., Byre, C. S., & Kubal, J. D. (1983). Hospital closure in the United States, 1976–1980: A descriptive overview. *Health Services Research, 18*(3), 437–450.

Mullner, R. M., & McNeil, D. (1986). Rural and urban hospital closures: A comparison. *Health Affairs, 5*(Fall), 131–141.

Rice, M. F. (1987). Inner-city hospital closures/relocations: Race, income status, and legal issues. *Social Science in Medicine, 24*(11), 889–896.

Sager, A. (1983). Why urban voluntary hospitals close. *Health Services Research, 18*(3), 451–475.

Schatzkin, A. (1984). The relationship of inpatient racial composition and hospital closure in New York city. *Medical Care, 22*(5), 379–387.

Schatzkin, A. (1985). Variation in inpatient racial composition among acute-care hospitals in New York state. *Social Science in Medicine, 20*(4), 371–379.

Snail, T. S., & Robinson, J. C. (1998). Organization diversification in the American hospital. *Annual Review of Public Health, 19*, 417–453.

U.S. Bureau of the Census. 1980 Census of Population and Housing. Fourth Count Data.

U.S. Bureau of the Census. 1990 Census of Population and Housing. Summary Tape File 3A.

Wallace, D. (1990a). Roots of increased health care inequality in New York. *Social Science in Medicine, 31*(11), 1219–1227.

Wallace, R. (1990b). Urban desertification, public health and public order: "Planned shrinkage", violent death, substance abuse and AIDS in the Bronx. *Social Science in Medicine, 31*(7), 801–813.

Wallace, R. (1993). Social disintegration and the spread of AIDS - II: Meltdown of sociogeographic structure in urban minority neighborhoods. *Social Science in Medicine, 37*(7), 887–896.

Wallace, R., & Wallace, D. (1990c). Origins of public health collapse in New York city: The dynamics of planned shrinkage, contagious urban decay and social disintegration. *Bulletin of the New York Academy of Medicine, 66*(5), 391–434.

Wertheim, P., & Lynn, M. L. (1993). Development of a prediction model for hospital closure using financial accounting data. *Decision Sciences, 24*(3), 529–547.

Whiteis, D. G. (1992). Hospital and community characteristics in closures of urban hospitals, 1980–87. *Public Health Reports, 107*(4), 409–416.

Whiteis, D. G. (1997). Unhealthy cities: Corporate medicine, community economic underdevelopment, and public health. *International Journal of Health Services, 27*(2), 227–242.

Whiteis, D. G. (1998). Third world medicine in first world cities: Capital accumulation, uneven development and public health. *Social Science and Medicine, 47*(6), 795–808.

Williams, D., Hadley, J., & Pettengill, J. (1992). Profits, community role, and hospital closure: An urban and rural analysis. *Medical Care, 30*(2), 174–187.