
Hospital and Community Characteristics in Closures of Urban Hospitals, 1980—87

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Synopsis

Characteristics of 190 urban community hospitals that were closed during the period 1980-87 and characteristics of the communities that they served were analyzed and compared to a control group of 380 urban hospitals that remained open. A negative

association was found between hospital closure and four hospital characteristics: the presence of a cancer program approved by the American College of Surgeons, the combined characteristics of for-profit status and membership in a multi-institutional chain, the number of admissions, and the number of facilities and services offered. A positive association was found between hospital closure and the percentage of black residents in the community. These findings are discussed in the context of political and economic trends in health care and urban development. Implications for future research are noted, including managerial strategy for hospital administrators and the socioeconomic implications of hospital survival in declining urban communities.

COMMUNITY HOSPITAL CLOSURES have seriously affected the availability of health care in many neighborhoods that were already medically underserved. As financial pressures motivate many hospitals to restrict care to the poor and the uninsured, access to health care becomes increasingly critical for urban residents. Any reduction in available beds thus becomes an important health policy issue.

The American Hospital Association (AHA) has reported that there were 2,984 urban and 2,549 rural community hospitals in the country in 1988 (1). Of the 5,533 total hospitals, 353 closed in the period 1980-88, 190 of which (53.8 percent) were urban, meaning they were located within a Metropolitan Statistical Area (MSA) defined by the Bureau of the Census, and 163 were rural. The number of urban hospital closures was greater than the number of rural closures for most of the period, although the overall closure rate was similar among urban and rural institutions (table 1).

Most of the recent research on hospital closure has concentrated on rural hospitals (2a, 3, 4a), but the urban community hospital closure issue is magnified by the urban health crisis, especially among the poor. With between 24 and 37 percent of all persons nationwide other than the elderly being either uninsured or underinsured (5), major

social issues are contributing further to the breakdown of health care in the cities, such as the human immunodeficiency virus epidemic, violence, infant mortality and morbidity, drug abuse, and homelessness (6). Public hospitals, overburdened and underfunded, are increasingly unable to compensate for those private sector hospitals that no longer serve those unable to pay (7).

Urban Hospital Stress

Hospital closure may be seen as a function of two types of variables that determine a hospital's financial strength and its ability to deliver quality health care. Internal variables are a hospital's characteristics that reflect its ability to adapt to changes in the health care market, including technological innovation (8). External variables are characteristics of a hospital's environment, both local and macro-environmental, that put economic pressure on a hospital, forcing it either to adapt or suffer financial instability. External variables include socioeconomic stresses on a hospital, competition from financially and politically powerful competitors, policy decisions from the local to the national levels, and political and economic trends that affect the entire economy. Variables are listed in the first box.

Table 1. Closings of 190 urban and 163 rural community hospitals, United States, by year, 1980-87

Year	Hospitals				Beds				Total			
	Urban		Rural		Urban		Rural		Hospitals		Beds	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	190	100.0	163	100.0	15,877	100.0	7,002	100.0	353	100.0	22,879	100.0
1980	30	15.8	13	8.0	2,269	14.3	625	8.9	43	12.2	2,894	12.6
1981	16	8.4	11	6.7	1,920	12.1	378	5.4	27	7.6	2,298	10.0
1982	9	4.7	14	8.6	346	2.2	819	11.7	23	6.5	1,165	5.1
1983	18	9.5	7	4.3	1,586	10.0	440	6.3	25	7.1	2,026	8.9
1984	25	13.2	19	11.7	1,640	10.3	726	10.4	44	12.5	2,366	10.3
1985	29	15.3	21	12.9	2,447	15.4	736	10.5	50	14.2	3,183	13.9
1986	29	15.3	38	23.3	2,701	17.0	1,570	22.4	67	19.0	4,271	18.7
1987	34	17.9	40	24.5	2,968	18.7	1,708	24.4	74	21.0	4,676	20.4

NOTE: Percents may not total because of rounding. SOURCE: Reference 10.

Table 2. Closings of 138 urban community hospitals in final sample, United States, by year, 1980-87

Year	Hospitals		Beds	
	Number	Percent	Number	Percent
Total	138	100.0	13,210	100.0
1980	18	13.0	1,655	12.5
1981	11	8.0	1,684	12.8
1982	7	5.0	308	2.3
1983	12	8.7	1,198	9.1
1984	20	14.5	1,387	10.5
1985	22	15.9	2,150	16.3
1986	20	14.5	2,269	17.2
1987	28	20.3	2,559	19.4

NOTE: Percents may not total because of rounding. SOURCE: Reference 10.

Internal hospital characteristics may be classified into two categories: the first is structural and managerial and the second is medical care. Community hospitals at risk tend to be small, for-profit, private institutions, locally owned and unaffiliated with multi-institutional chains (9a). In the period 1980-87, 98.42 percent of all urban hospitals that closed had fewer than 400 beds (10a), and a lower patient census, meaning excess capacity, than their competitors (11).

These structural and managerial problems relate directly to issues of medical care at stressed hospitals. Bad debt and poor credit rating (12) result in a lack of ability to diversify into new and specialized services; such diversification has been cited as a potential hospital survival strategy (13). A low overall number of facilities and services offered (2b) may limit an institution's ability to attract patients.

Eventually these structural, technological, and personnel limitations may result in deaccreditation

by the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO) or other associations whose approvals are important indicators of a hospital's quality and stability (14). JCAHO is a private organization that evaluates hospitals and other health care providers according to criteria of quality of care, staffing, physical plant safety, and other measures of quality.

Impacting significantly upon these variables are characteristics of the hospital's environment. Hospitals in poor neighborhoods with high percentages of minority and low-income residents have been found more vulnerable to closure than other hospitals (15a). A hospital that is perceived as serving a primarily minority clientele may have difficulty attracting insured patients (16). In such cases, it will be burdened with higher ratios of poor patients who require free care than will other hospitals.

On a macro-environmental level, low State Medicaid reimbursement rates and insufficient Medicare payments under the Prospective Payment System (PPS) have been cited as seriously affecting hospitals that depend on high percentages of Medicare and Medicaid patients (17). (Under Medicare's PPS, health care providers are paid according to predetermined rates, regardless of the actual costs incurred in providing care, and the rates are determined by the Diagnostic Related Group (DRG) system. DRGs are used to classify medical conditions according to expected length of stay, as well as other diagnostic, therapeutic, and demographic variables. Providers are paid according to the Medicare patient's DRG category. Currently, only inpatient care is included in PPS.) Because DRGs do not always adequately take severity of illness into account, poor patients, who may be sicker for longer periods of time than the norm,

can be especially expensive for hospitals (18).

Further stress on freestanding community hospitals has resulted from the growing dominance of proprietary health care firms. Hospitals owned by powerful multi-institutional chains are able to attract the more profitable healthy patients, leaving the community hospitals the less profitable patients, those less healthy and poorer or indigent (19, 20). In the face of such competition survival strategies, such as cutting back or eliminating free care and diverting indigent patients to the public hospitals, have been cited as seriously affecting health care access for poor patients, especially nonwhites (21).

Methods

Hospital closures during the years 1980-87 were examined using a case-control model to measure the impact of both internal hospital characteristics and socioeconomic characteristics of the affected communities.

Definition of terms. Independent variables included internal hospital characteristics and socioeconomic characteristics of the affected communities. A logistic regression model was used in analyzing the association between independent variables and closure.

Closure was defined as the permanent closing of a hospital facility or discontinuing inpatient medical care, acute or chronic. Hospital mergers and consolidations were not included (22). Community hospitals were defined as all non-Federal, short-term, general and other special hospitals, excluding hospital units of institutions, whose facilities and services were open to the public (23). Urban community hospitals were defined as all community hospitals located in a county designated as a MSA (24).

The dependent variable of whether a hospital closed or remained open during the period 1980-87 was a dichotomous variable. A hospital that closed was entered in the model as 1; one that remained open was entered as 0.

Independent variables were grouped in two categories. Internal hospital characteristics were variables intrinsic to the hospital itself, for example, size, occupancy, facilities, and services available. Environmental variables were socioeconomic characteristics of the affected community, for example, race or ethnicity and economic level of the residents. A hospital's community was defined as the census tract in which the hospital was located, plus all adjacent census tracts (15b).

Hospital and Community Characteristics Affecting the Financial Strength of a Hospital and Its Risk of Closure

Hospital Characteristics

Structural and managerial

Financial: ownership and control, loss of Medicaid certification, debt, and poor credit rating
Occupancy and utilization: small hospital bed size, excess capacity (low census)
Personnel: inability to attract and hold physicians, poor morale, race and ethnicity
Physical plant: obsolete facilities, unsafe facilities

Medical care

Specialization of services
Number of facilities and services
Approvals and accreditations

Community Characteristics

Community level

Socioeconomic
Racial and ethnic
Marketplace competition; HMO market penetration, high market concentration

Macro-environmental level

Federal payment policy: low payment, prospective payment system
State health policy: low Medicaid reimbursement
Political economy of health care: growing dominance of proprietary health care firms

Sample selection and data collection. The sample included all 190 urban community hospitals that closed in the period 1980-87. Closure listings were obtained from the records of the AHA and verified through telephone calls to State hospital associations and health departments.

Because market share data were not available for all closed hospitals, the precedent of Mullner and coworkers (2c) was followed in defining the geographic area from which control hospitals were selected. For each closed hospital, controls were selected at random at a ratio of 2 to 1 from the county where the closed hospital was located. To control for the hospital's bed size, control hospitals were designated from the group of urban community hospitals having 400 or fewer beds in the same county. To maintain the 2-to-1 ratio throughout the study, 18 hospitals with fewer than 2 other urban community hospitals in the same county were eliminated from the final sample.

Internal hospital data were gathered from the

Community Socioeconomic Characteristics Selected for Initial Analysis of Closings of 190 Urban Community Hospitals, 1980-87¹

- POP801-POP8014: Total population, by tract, in the community, reported in the 1980 census
WHITE801-WHT8014: Number of whites in the community, by tract, reported in the 1980 census
BLACK801-BLK8014: Number of blacks in the community, by tract, reported in the 1980 census
PV75PT1-PV75PT14: Number of people in the community at or below 75 percent of the poverty level, by tract, reported in the 1980 census
PV125PT1-PV125P14: Number of people in the community at or below 125 percent of the poverty level, by tract, reported in the 1980 census
PV150PT1-PV150P14: Number of people in the community at or below 150 percent of the poverty level, by tract, reported in the 1980 census
PV200PT1-PV200P14: Number of people in the community at or below 200 percent of the poverty level, by tract, reported in the 1980 census
XINC801-XINC8014: Mean household income, by tract, reported in the 1980 census
MDINC801-MDIN8014: Median household income, by tract, reported in the 1980 census

¹ Reference 32.

'Small community hospitals, especially those serving the poor, are under unprecedented pressure from trends in the economy and the health care industry.'

annual AHA "Guide to the Health Care Field" for the years 1980-87 (23). Data were collected for the year in which the hospital closed; in the case of a nonreporting hospital, the most recent available data were used. Fifteen hospitals were not included for which no data were available for any of the years studied because of nonreporting.

Communities of closed hospitals were located using addresses reported by the AHA and street maps. The appropriate census tracts were identified using data recorded manually from the census block statistics for each MSA.

Data were gathered for all hospitals that could be located using maps. A total of 19 hospitals could not be located because, although located in MSA counties, they were too remote from urban-

ized areas for their communities to have been tracted in the 1980 census. Those hospitals were not included in the final sample.

Composite variables for hospitals' entire communities were created from the census tract data. The community socioeconomic characteristics initially selected from census data for analysis are shown in the second box. The third box shows the composite test variables created from them.

Comparisons between sample hospitals and those eliminated. For continuous variables, Student's t-test was used to determine whether the final sample differed significantly from the entire population of closed hospitals, in terms of variables included in the model. For dichotomous variables, a chi-square test was used. Hospitals included in the final sample were found to be larger ($P = 0.0001$) and with more facilities and services ($P = 0.0009$) than those dropped. There were no significant differences in the other variables.

Despite the presence of a major metropolitan center in many MSA counties, large portions of the counties are essentially rural and not tracted by the census. The hospitals eliminated from the study were primarily the sole hospitals in nonurbanized areas, with characteristics similar to those of rural institutions. A rural hospital, unlike most urban hospitals, is often the sole hospital in its county (25). Rural hospitals that close tend to be smaller, with fewer facilities and services, than their urban counterparts (10b). Table 2 shows the final sample of 138 hospitals included in the study, by year and number of hospital beds.

Regression model. The fourth box shows the independent variables, a large number of which were analyzed because of the exploratory nature of the study. Associations between the variables and hospital closure were analyzed with logistic regression. The MLE chi-square, or Wald statistic (that is, the square of the ratio of the regression coefficient estimate to the standard error estimate), was used to test the significance of each variable (26).

Ownership. Three types of hospital ownership were defined by AHA. They are government-controlled, nongovernment not-for-profit (voluntary), and private for-profit (corporate). To determine whether ownership type was associated significantly with closure, independent of affiliation with a multi-institutional system, variables were put into the categories government-controlled (GOVCONT);

voluntary, member of a multi-institutional system (VOLSYS); voluntary, freestanding (VOLFREE); for-profit, member of a multi-institutional system (CORPSYS), and for-profit, freestanding (CORPFREE).

Because of multi-colinearity, all five ownership types could not be included in the regression model. Because an important issue is the survivability of the public health care sector in an era when private providers find it increasingly difficult to care for the poor and underserved, CORPFREE was eliminated so that the final model would control for for-profit status, system membership, and government control.

Community socioeconomic characteristics. The decision as to which environmental variables were to be included in the model was based on precedents from other studies and the known demographic realities of urban communities. Because Hispanic ethnicity, as defined by the census, is not discrete, but consists of persons counted as black, white, and other (27, 28), this variable was not included. The variable PTBLKTOT, percent black resident population in the hospital's community, was included.

The variable ADJTOT, adjusted median income in the base year, 1980, across all households in the community, was included. This variable was chosen over other economic indicators because it is the most inclusive, as defined by the census (29) and because the median is less sensitive to outliers than the mean and less likely to overreflect socioeconomic status.

Results

Table 3 shows the final model containing five significant variables. Four were negatively associated with closure: the presence of a cancer program approved by the American College of Surgeons (chi-square = 4.71; $P < 0.05$), for-profit ownership and membership in a multi-institutional system (chi-square = 4.37; $P < 0.05$), the number of admissions (chi-square = 4.04; $P < 0.05$), and the number of facilities and services offered (chi-square = 3.88; $P < 0.05$). One was positively associated with closure, the percentage of black residents in the community (chi-square = 7.13; $P < 0.008$).

Small community hospitals, especially those serving the poor, are under unprecedented pressure from trends in the economy and the health care industry. Based on these findings, it may be seen that hos-

Composite Community Socioeconomic Characteristics Created for Analysis of Closings of 190 Urban Community Hospitals, 1980-87

- PTWHTOT: Total percent white in the community
PTBLKTOT: Total percent black in the community¹
PTSPNTOT: Total percent Spanish in the community
FMPOVTOT: Percent of families in the community whose incomes were at or below poverty level
TOT75PV: Percent of people in the community whose incomes were at or below 75 percent of poverty level
TOT125PV: Percent of people in the community whose incomes were at or below 125 percent of the poverty level
TOT150PV: Percent of people in the community whose incomes were at or below 150 percent of the poverty level
TOT200PV: Percent of people whose incomes were at or below 200 percent of the poverty level
ADJTOT: Adjusted median household income in the community¹

¹ Variable included in final model.

pitals that are able to invest in expensive technology and offer a wide variety of facilities and services are at lower risk of closure. The findings also suggest that socioeconomic trends affecting urban neighborhoods have important implications for hospital survival and urban health care delivery.

Cancer program. The negative association between urban hospital closure and the presence of a cancer program approved by the American College of Surgeons reflects previous findings that intensive, high-cost treatment services, while often a financial burden on hospitals, do not necessarily increase risk of closure. Mullner and coworkers found that the presence of an intensive care unit (ICU) was negatively associated with rural community hospital closure, despite the cost (4b).

Such services indicate a high degree of technology and specialization and may signify an institution's overall quality and financial viability. In a marketplace where hospitals compete both for quality staff and well-paying patients, these visible indices of quality become increasingly valuable.

For-profit ownership and freestanding status. An investor-owned hospital may be more sensitive to market pressures than a not-for-profit institution.

Table 3. Associations of hospital and community characteristics in closures of 138 urban hospitals, United States, 1980-87

Variable	Beta	Chi-square	P	R
Intercept	3.13959440	12.82	0.0003	...
Percent of black residents in community ¹	0.01348576	7.13	0.0076	0.097
Cancer program approved by ACS ²	-1.71672317	4.71	0.0301	-0.070
For-profit status and membership in multi-institutional system	-0.85982762	4.37	0.0367	-0.066
Number of admissions ²	-0.00021612	4.04	0.0444	-0.061
Number of facilities and services ²	-0.05541733	3.88	0.0488	-0.059
Approval for residency training	2.10271385	3.72	0.0538	0.056
For-profit status and nonmembership in multi-institutional system	0.56213365	3.17	0.0750	0.046
Accreditation by JCAHO	-0.63212485	2.64	0.1042	-0.034
Not-for-profit status and membership in multi-institutional system	-0.79650316	2.63	0.1047	-0.034
Adjusted total median income in community	-0.00003747	2.35	0.1254	-0.025
Certification for participation in Medicare	-0.72616258	2.14	0.1435	-0.016
Occupancy rate	-0.01060266	2.02	0.1557	-0.005
Accreditation or approval by AOA	-0.62621360	1.50	0.2213	0.000
Hospital bed size	0.00322678	0.89	0.3452	0.000
Blue Cross participation	-0.43493704	0.74	0.3882	0.000
Medical school affiliation	-0.74873372	0.42	0.5152	0.000
Government control	-0.27123700	0.33	0.5684	0.000

¹ Significant at P < 0.008.

² Significant at P < 0.05.

NOTE: Model chi-square = 132.27 with 17 DF. SOMER DYX = 0.849. JCAHO

= Joint Commission on the Accreditation of Healthcare Organizations. AOA = American Osteopathic Association.

'Hospitals that are members of financially powerful multi-institutional systems enjoy strong competitive advantages in attracting profitable patients, highly-trained personnel, and acquiring expensive technology.'

For-profit community hospitals, often under-capitalized, have tended historically to be at higher risk of closure than voluntary hospitals (9b). System membership would provide such an institution with valuable resources. These include managerial and economic resources, such as availability of credit and the financial ability to expand and adapt to market demands. Hospitals that are members of financially powerful multi-institutional systems enjoy strong competitive advantages in attracting profitable patients, highly trained personnel, and acquiring expensive technology. It is likely that systems initially select for membership those hospitals deemed most likely to succeed and bring profits.

Number of admissions. Number of admissions is a function of hospital size and patient length of stay. In the current health care market, the type of patients occupying beds and the rate at which patients can be treated and discharged have become

more important than the percentage of beds filled. PPS under Medicare and the similar pricing schemes of privately managed care models have created strong incentives for hospitals to minimize length of stay while maximizing patient volume (30).

Number of facilities and services offered. A large number of facilities and services is an indicator of a hospital's current level and scope of technology. In the competition for profitable patients, a hospital is at an advantage if it can offer a wide variety of services to compete with the burgeoning specialty care industry. Stressed community hospitals, operating under the burden of bad debt and poor credit, may be unable to make the financial commitment necessary to upgrade and diversify their range of facilities and services.

Percent black residents in the community. Although both racial and economic indicators were included in the model, the socioeconomic variable that proved significantly associated with closure for urban hospitals was the percentage of black population in the hospitals' communities.

Federal pressures and private business strategies alike have exacerbated the pressure on minority urban patients, as well as the hospitals that serve them. Federal funding cuts since the 1980s, designed to spur profits and encourage capital investment, have overwhelmingly affected the poor, espe-

cially minorities and women. Cuts included unemployment insurance, \$7 billion in the period 1982-85; the Aid to Families with Dependent Children Program, \$4 billion; food stamps, \$7 billion; child nutrition programs, about \$5 billion; and Medicaid, \$4 billion (31, 32).

During that period, deindustrialization of the economy took a huge toll in well-paying, blue-collar jobs, as corporations moved production facilities out of rust belt cities. In the period 1979-83, the country lost 2.6 million manufacturing jobs and gained 3.5 million jobs in the service sector (33, 34). Most of the new jobs were nonunion and low-paying and many were parttime (35).

Minorities and women are increasingly concentrated in service sector jobs, many of which do not provide health insurance (31a), and they are less likely than white males to receive unemployment insurance when they lose their jobs (36).

Without health insurance or financial resources to pay for their own care, many members of minorities have insufficient access to care for their everyday health needs, especially primary and preventive care. When they seek care, they are likely to be sicker and for longer periods than other patients. They are expensive for hospitals to treat and their numbers have increased as Federal and State funds to support the services have decreased.

The stresses and transformations affecting the economy have had a disproportionate effect on minorities and the poor. The findings of this study indicate that the hospitals that serve them may have been affected negatively as well. However, further research will be necessary to provide better understanding of the link between hospital closure and community racial composition. An important component of the research might be to investigate the association between hospital closure and employment patterns of different ethnic groups in the hospitals' communities. A multi-disciplinary approach, incorporating elements of urban planning and policy analysis as well as health services research methodology, would help such an investigation.

Summary

A wide variety of factors has increased financial pressure on hospitals since 1980. The factors include internal characteristics affecting hospitals' financial strength and competitiveness, local and national policies, and economic trends that put hospitals treating high percentages of medically indigent patients at increased risk of closure.

Independent Variables in Analysis of Closings of 190 Urban Community Hospitals, 1980-87

Hospital Characteristics

Structural and managerial

- BEDSIZE:** Number of beds, cribs, and pediatric bassinets regularly maintained (set up and staffed for use) in year of closure
- ADMISSNS:** Number of patients accepted for inpatient service in year of closure
- OCCUP:** Ratio of average daily census to the average number of beds (statistical beds) maintained during year of closure
- NUMFACS:** Number of facilities and services in year of closure
- GOVCONT:** Government controlled (yes, no)
- CORPSYS:** Investor-owned, for-profit, member of multi-institutional system (yes, no)
- CORPFREE:** Investor-owned, for-profit, freestanding (yes, no)
- VOLSYS:** Voluntary, not-for-profit, member of multi-institutional system (yes, no)
- VOLFREE:** Voluntary, not-for-profit, freestanding

Approvals and accreditations

- APPROV1:** Accreditation under one of the programs of JCAHO
- APPROV2:** Cancer program approved by ACS
- APPROV3:** Approval for residency training (includes internship)
- APPROV5:** Medical school affiliation
- APPROV8:** Member of COTH¹
- APPROV9:** Hospital contracting or participating in Blue Cross Plan, reported by Blue Cross
- APPROV10:** Certified for participation in the Medicare Program

Community Characteristics

- PTBLKTOT:** Total percent black in the community, 1980
- ADJTOT:** Adjusted median household income in the community, 1980

¹ Variable eliminated from final model owing to limited dispersion.

NOTE: Definitions are those of the American Hospital Association "Guide to the Health Care Field," reference 23. JCAHO = Joint Commission on the Accreditation of Healthcare Organizations. ACS = American College of Surgeons.

There are measures, such as diversifying services to attract a more lucrative case-mix, that managers may consider to buttress their institutions' financial health. However a hospital is not an isolated entity, but rather an open system operating in the context of local political and economic dynamics as well as national trends. Thus, larger issues, such as medical indigence, economic underdevelopment, links

between employment patterns and medical indigence, and the growing dominance of proprietary health care firms, must be addressed alongside managerial technique and financial strategy in the issue of hospital closure.

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