health facilities. It will not diminish the force of Jarvis' law which has a strong influence on first admissions from low-poverty towns (table 5).

Summary

Jarvis' law has a marked effect on first admissions to Connecticut State hospitals. It applies to all age groups, to nonwhites (in lesser degree) as well to whites, and to the functional psychoses as well to the less-severe disorders. It is not an artifact due to the confounding effect of poverty or urbanization. It tends to be more pronounced among large towns than among small ones; in particular, the proximal rates tend to be much higher for towns of 10,000 or more people. Thus, Jarvis' law has a vital bearing on the planning of service in smaller, more numerous facilities in large population centers.

Role of Alternative Psychiatric Service in Connecticut

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THIS PAPER is concerned with whether Jarvis' law in Connecticut is explained by the location of alternative psychiatric service, that is, service other than treatment or aftercare in the State hospital system.

Method

First admission rates were analyzed for the period July 1, 1959 through June 30, 1963. Alternative psychiatric service was counted as of a date as close as possible to the midpoint of the 4-year period. Psychiatric beds in general hospitals were enumerated as of July 1, 1961. Numbers of beds in private hospitals were obtained from the 1961 directory of the American Hospital Association (*16*). Data on psychiatrists (per 100,000) were taken from the Connecticut Department of Mental Health list of licensed psychiatrists and neuropsychiatrists compiled in March 1961. Those specializing in neurology alone were excluded; but nondiplomates who described themselves as specializing in neuropsychiatry were included.

Staff psychiatrists at State hospitals or training schools for the retarded were counted as providing care one-fifth time—they were assumed to have 8 hours a week for private patients or for supervision of outpatients (not aftercare). Full-time faculty members of the Yale University Department of Psychiatry were assumed to have 20 hours a week for community work and private practice—they were counted as providing care one-half time. Out-of-State psychiatrists who maintained a Connecticut license were also counted one-half. These crude adjustments may have overstated the availability of psychiatrists to private patients and community agencies, especially in institutional towns. This is offset somewhat, in the same towns, by the contribution of young physicians in training who were not listed by the State if they were unlicensed.

Man-hours of professional service were obtained from the 1961 "Directory of Outpatient Psychiatric Clinics," compiled by the National Association for Mental Health and the National Institute of Mental Health. Staff psychiatrists, psychologists, and social workers were included as well as psychiatrists and internists who volunteered their services and trainees. Clinics restricted to children or to aftercare of State hospital patients were not counted.

Population bases were official State estimates (by town) as of July 1961, with institutional populations added in accordance with the 1960 U.S. census.

Planning Regions of Connecticut

Alternative service could not be quantified within State hospital zones, because it was not equally accessible to all zone residents. Instead, service was enumerated in the 13 planning regions of the State—the same regions, with minor alterations, which were used in planning comprehensive mental health services (*17*). The regions had been defined by the Connecticut Development Commission on the basis of economic structure, social integration, traffic flow, and service utilization (*18*).

In July 1961 no outpatient services were provided in the two northern rural corners of the State, the Northwestern Planning Region (bordering on Massachusetts and New York) and the

Northeastern Planning Region (on the Massachusetts and Rhode Island lines). There was also no outpatient service in the Meriden-Wallingford Planning Region (a clinic was opened in the city of Meriden later in 1961), a small industrial complex north of New Haven and west of Connecticut Valley Hospital. These three regions were served only by private psychiatrists.

Comprehensive services (including general hospital beds) were located in the Southwestern Planning Region, near New York City, in the South Central Planning Region served by the Yale-New Haven Medical Center, and in the Capitol Planning Region, the large north-central area surrounding Hartford. The remaining planning regions fell between the low-service group and those with comprehensive service; most were served by clinics only. There were no facilities for part-time hospitalization in Connecticut prior to 1964.

Table 6 shows the 13 planning regions ranked by average distance from the State hospital. Miles were measured from each township in the region to the State hospital district in which the town is located. The average for each region was weighted by population size of the component towns.

A marked negative correlation was seen between average weighted mileage and age-adjusted first admission rates for whites aged 15–64. The coefficient of correlation (Spearman) was -0.863 ($P < .001$). There was no parallel correlation with the number of psychiatrists per 100,000 or the number of clinic man-hours per week per 100,000. With regard to psychiatric beds in general hospitals, all were located in planning regions that were more than average distance (26 miles) from a State hospital. This suggests that these beds may have contributed to the relatively low rates in outlying zones. The most remote region, Capitol, was the best supplied with service in general hospitals (83 beds in three facilities, one a municipal hospital); it was also the planning region with the lowest age-adjusted first admission rate.

The picture is not appreciably altered when psychiatric beds outside of general hospitals are considered. With the exception of a small facility in the Connecticut River Planning Region, all private beds were located in the three regions which had general hospital beds. If they were included, the Southwestern Planning Region rather than Capitol would have the highest number of beds per 1,000—but the difference is inconsequential.

Table 6. Age-adjusted first admission rates (whites, aged 15–64 years) per 10,000 to Connecticut State hospitals, July 1, 1959–June 30, 1963, and alternative psychiatric services as of July 1, 1961: State planning regions ranked by average distance from patient's residence to the hospital

Planning regions	Miles [1]	Number	Age-adjusted rate	Psychiatrists (per 100,000)	Outpatient department man-hours [2]	General hospital beds (per 1,000)
Housatonic Valley	10.2	536	25.1	15.0	109.4	----
Southeastern	12.6	1,070	24.9	5.8	48.9	----
Connecticut River	13.5	489	21.6	13.3	176.9	----
Meriden-Wallingford	13.5	358	18.1	3.8	----	----
Greater Bridgeport	16.8	1,236	18.7	6.3	141.6	----
Ansonia-Derby	16.8	230	15.9	1.6	109.9	----
New Britain-Bristol	19.2	642	14.1	2.1	34.6	----
Central Naugatuck	24.1	711	15.4	4.5	68.3	----
South Central	26.7	1,406	16.2	21.8	372.7	0.06
Northeastern	27.1	352	14.1	1.3	----	----
Southwestern	29.2	1,075	16.1	18.9	157.0	.01
Northwestern	37.0	241	13.4	5.2	----	----
Capitol	39.8	1,478	11.3	15.1	164.7	.14
Total	25.6	9,824	16.2	11.5	146.6	.04

[1] Average distance from patient's residence to State hospital weighted by population size of component towns.
[2] Per week per 100,000.

Table 7. Age-adjusted first admission rates (whites, aged 15–64 years) per 10,000 to Connecticut alternative psychiatric service available [1] and distance from

Service	0–9 miles		10–19 miles		20–29 miles		30–39 miles	
	Number	Age-adjusted rate	Number	Age-adjusted rate	Number	Age-adjusted rate	Number	Age-adjusted rate
No service			45	26.7	63	17.3	144	17.1
Limited service:								
Private psychiatrist only			726	20.9	378	17.3	337	15.5
Outpatient service only; no inpatient service	760	26.4	317	14.0	892	16.1	18	6.7
Private beds and outpatient service	292	21.0	1,342	20.8	269	12.5		
Comprehensive service: [3]								
Hartford service area			346	12.7	41	9.2	873	13.9
New Haven service area			206	15.0	1,172	17.1	165	12.9
Stamford-Greenwich service area					397	16.8	561	16.1
Total	1,052	24.6	2,982	18.1	3,212	16.1	2,098	14.6

[1] Service within a 10-mile radius, including service across State boundaries, as of July 1, 1961.
[2] Not computed.
[3] Psychiatric beds in at least 1 general hospital and other services.

The 183 psychiatric beds in the Veterans' Administration Hospital in West Haven could not be added to the South Central Planning Region because they served the entire State. In Hartford the Connecticut Department of Mental Health operated a 50-bed facility for alcoholics; this service also was open to all State residents and might be considered part of the State hospital system. Since, in fact, roughly one-half of its admissions were from the Capitol Planning Region, the facility for alcoholics might legitimately be assigned to community service there. This would slightly increase the advantage (in beds per 1,000) of Capitol over the South Central Planning Region.

The location of inpatient services in regions more than 26 miles from a State hospital is not sufficient to account for the entire range of Jarvis' law among the regions. Above all, these services do not explain the large differences in rate among regions less than 26 miles distant. It cannot even be said with certainty that their presence contributed to lower rates in outlying zones, or to what degree.

Towns Classified by Type of Service

In the hope of reaching a more definitive conclusion, we attempted another method of assessing the influence of alternative service. We classified towns according to the kind of psychiatric service available (or lacking) within a 10-mile radius, including service across regional and State boundaries. Towns at one end of the scale had no psychiatric service within 10 miles. At the other end of the scale were the towns within 10 miles of a comprehensive service center; included in this group was the town of Enfield on the northern border and within the service area of Springfield, Mass. In between, on the service spectrum, were towns served only by private psychiatrists, or by outpatient service (and private psychiatrists) but no inpatient service, or by private beds (with outpatient service and private practitioners) but no beds in general hospitals.

Service could not be quantified, because the towns in each group were largely noncontiguous, and it was not feasible to apportion service across township boundaries. However, this method provided more precise classification for individual towns, especially border towns, than assignment to the larger planning regions.

A 10-mile radius was applied because many towns in Connecticut had only ambulatory service, which necessitated frequent visits to a psychiatrist or a clinic. A somewhat wider radius might have been used for inpatient service. However, a 10-mile radius involves more than

State hospitals, July 1, 1959–June 30, 1963, by patient's residence to the hospital

40–49 miles		50 or more miles		Total	
Number	Age-adjusted rate	Number	Age-adjusted rate	Number	Rate
4	[3]	45	8.9	301	15.2
85	11.1	21	13.2	1,547	17.6
----------		----------		1,987	18.1
----------		----------		1,903	19.0
246	7.7	----------		1,506	11.7
----------		----------		1,543	16.2
----------		----------		958	16.4
335	8.2	[4] 145	10.1	[4] 9,824	16.2

[4] Includes 79 admissions from Enfield, which was within 10 miles of comprehensive service in Springfield, Mass.; the age-adjusted rate was 10.3.

10 miles of travel—in some instances considerably more. Thus it would correspond to the second zone surrounding a State hospital, 10–19 miles. At least one psychiatric inpatient service in Connecticut drew most of its caseload from an area requiring 20 or fewer miles of travel. General hospitals in New Haven and Hartford drew more than 90 percent of their patients from areas less than 40 miles in diameter (*19*).

If Jarvis' law were an artifact resulting from the location of alternative service, we would expect it to disappear among towns which are homogeneously classified by service. This was not the case in Connecticut (table 7). Jarvis' law was very marked indeed in the group of towns without any service and clearly perceptible in the groups with limited service.

For towns with comprehensive service, the picture was more complex. New Haven service was represented in only three State hospital zones and Stamford-Greenwich service in only two zones. For both groups the overall age-adjusted rate was identical with the rate for the entire State. The Hartford service area was noteworthy both for its relatively low overall rate and for an atypical distribution among State hospital zones. The latter phenomenon was partly due to the fact that an appreciable proportion of admissions from this area were out-of-district admissions to Connecticut Valley Hospital from towns in the outer zones of the Norwich Hospital district. If adjustments were made for these admissions, the principal effect would be to reduce the rate in the fourth zone (30–39 miles) to about 12.5, and to increase it in the second and third zones to about 15 per 10,000 at 10–19 miles and to about 10 per 10,000 at 20–29 miles. In other words, Jarvis' law does not entirely disappear even within the gravitational field of comprehensive service in Hartford.

Probably of greater significance were the relatively low first admission rates to State hospitals from the Hartford service area. Its overall rate was not only much lower than rates for the other two high-service areas, it was also significantly lower than the rate for small rural towns without any service ($P<.001$).

When Hartford service area rates were compared, zone by zone, with rates in other service areas, the differences were greatest in the two zones closest to the State hospital; this remained true even when allowance was made for out-of-district admissions. This suggests that Hartford service deflected more patients from towns less than 30 miles from a State hospital than it did from more distant towns. Far from explaining Jarvis' law, the high service in Hartford (chiefly the more abundant supply of beds in general hospitals) partially counteracted Jarvis' law within its 10-mile sphere of influence and in its relatively large contribution to statewide rates. In the absence of this key service, Jarvis' law would be stronger, not weaker, in Connecticut.

Discussion

Unfortunately, it was not possible to control simultaneously for alternative service and for the significant demographic variables such as poverty and population density. This could not be done with the number of cases available for analysis, and demographic variables were considered separately. Hence it is necessary to inquire whether the persistence of Jarvis' law within the service groups was itself the result of confounding demographic variables.

Average population density, mean size of town, and the proportion of families who had incomes less than $3,000 in 1959 were tabulated

for each service group by distance from State hospital. The only group which showed an association was the no-service group, where first admission rates correlated positively with the percentage of poor families. The association was of borderline significance ($P=.05$). For this small group only, there may have been some interaction between distance and poverty. If it were possible to control for both factors, it is unlikely that Jarvis' law would disappear altogether, at least among the low-poverty towns (see preceding paper).

This investigation was concerned solely with psychiatric care. No consideration was given to other kinds of alternative service. In the more remote towns, the mentally ill may receive support from clergymen and general practitioners, alcoholics may be jailed more frequently, or family and friends may cope a little longer. In assessing the importance of Jarvis' law, it was necessary to confine attention to forms of care which were measurable and clearly relevant.

Community psychiatry was in its infancy in Connecticut during 1959–63. At that time it would not have been appropriate to classify all general practitioners and clergyman as ancillary psychiatric personnel, still less law enforcement officers.

Summary

Accessibility was a major determinant of first admission rates to Connecticut State hospitals in the early 1960's. Jarvis' law was not an artifact resulting from the distribution of alternative psychiatric service. When towns were classified by type of service available, the negative correlation of first admission rates with distance remained apparent in all service groups which were represented in more than two State hospital zones. In one group only, the no-service group, it may have been reinforced by a demographic variable.

In the planning regions a marked negative correlation was seen between average distance from the State hospital and first admission rate. This trend was independent of psychiatric manpower and outpatient service. Hartford's comprehensive service, with its relative abundance of general hospital beds, probably contributed to low admission rates in areas remote from a State hospital. However, the effect of Hartford service proved to be stronger in zones near a State hospital than in the more distant zones. Far from explaining Jarvis' law, or reinforcing it, Hartford service to some extent counteracted it.

When mental health centers are the chief sources of psychiatric care, Jarvis' law may be expected to exert a potent influence on the demand for first admissions. Its effect will be substantial when facilities are more numerous, less widely spaced, and located in large population centers; it should be considered in estimating needed capacity, if planning is to be realistic.

If Jarvis' law is as pronounced in total utilization rates as in admission rates, the need for service in mental health centers will greatly exceed estimates based on present-day average utilization.

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Tearsheet Requests

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Number of Ex-Smokers Increasing

An estimated 1.4 million people gave up cigarette smoking between August 1967 and August 1968, according to data from the Public Health Service's National Center for Health Statistics. This brings to 2.5 million the number who have joined the ranks of former cigarette smokers since June 1966. A former smoker is defined as one who had smoked at least 100 cigarettes in his entire life.

In 1968, former smokers represented 13.2 percent of the U.S. civilian, noninstitutional population 17 years of age and older, an overall increase of 15 percent over 1966. A steady increase in people who gave up cigarette smoking characterized every age and sex grouping, in both numbers and percentages.

These data on cigarette smoking status are from a survey conducted for the Center by the U.S. Bureau of the Census in 3 successive years—June 1966, August 1967, and August 1968. The survey was based on a nationwide sampling of households, with 35,000 households included in 1966, 52,500 households in 1967, and 50,000 in 1968.

The study shows that a larger proportion of men than women are former smokers, but the proportion is increasing faster among women. From 1966 to 1968 the proportion of former smokers among males increased by 12 percent and among females by 22 percent.

The study also indicates that the proportion of young people who have never smoked is increasing. In 1966, 48.3 percent of males aged 17–24 years had never smoked, compared with 50 percent in 1968. Among females in this age group, the percentages of those who never smoked are 62.2 for 1966 and 63.4 for 1968.

In 1968, an estimated 37.7 percent of the population smoked cigarettes, an overall decline of 5 percent from 1966. The decline in the proportion of smokers is greater among men than women, with the greatest decrease for both sexes at the youngest ages. There was no decline in smokers among men aged 65 and over, and a slight increase in the proportion of women in that age category who smoke cigarettes.

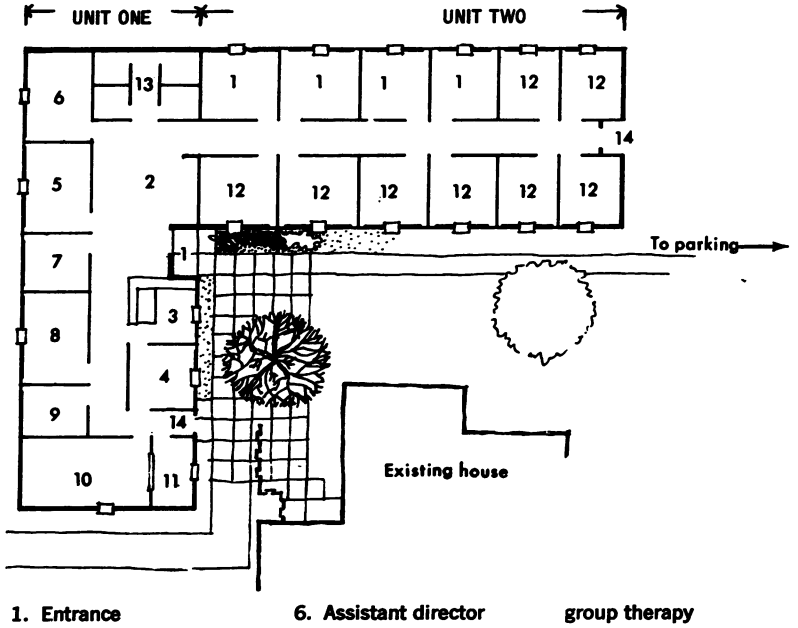
Program Notes

Movable Mental Health Center

A unique movable community mental health center opened this spring in Hays, Kans. Serving currently as the High Plains Mental Health Center, the structure can be separated into two satellite clinics for transport to isolated rural areas. The brainchild of Dr. John Cody, director of the center, and his coworkers, the facility is designed to meet the anticipated needs of 20 counties, comprising an area of 20,000 square miles in western Kansas.

The building was partially financed by a Federal grant administered by the National Institute of Mental Health, Health Services and Mental Health Administration.

It is constructed entirely of wood except for the concrete base on which it rests. Its two wings (70 feet by 27 and 65 feet by 27) form an L, as shown in the floor plan. Each wing is divided down its center by a corridor. When the building is moved, the floors and ceiling of the corridor are removed, and each wing is thus divided into two sections. Each of the resulting four sections can be transported on a flat-bed truck. If facilities are needed at two sites, two sections can be taken to one site and two to another for reassembly with a new corridor and new base. Each wing has its own electrical, heating, and air-conditioning systems.



1. Entrance
2. Waiting room
3. Receptionist
4. Business office
5. Director
6. Assistant director
7. Secretarial pool
8. Library
9. Kitchen
10. Conference and group therapy
11. Observation—office
12. Offices
13. Toilets
14. Exits

Seats for Nonsmokers

Pan American World Airways announced in January 1970 that it would provide a smoke-free refuge for nonsmoking passengers in the new Boeing 747 jetliners. The airline will voluntarily reserve 36 of the 304 economy class seats and 12 of the 58 first-class seats in the 747 for travelers requesting to be apart from smokers. In the economy class cabin, the airline will provide four rows of nine seats each for nonsmokers. TransWorld Airlines and American Airlines subsequently announced that they also planned to reserve spaces for nonsmokers in the 747.

Pan American World Airways planned to extend the plan of separate nonsmoker seats to its entire fleet by April 15, 1970; TransWorld Airlines expected to have such a plan effective for all its planes by June 1, 1970.

Lower Infant and Maternal Mortality

Deaths in 1968 of children under 1 year and of infants under 28 days were the lowest ever recorded in Pennsylvania. Maternal deaths also reached a new low. The number of infant deaths declined 3.4 percent, from 4,158 in 1967 to 4,015 in 1968. The resulting infant mortality rate was 21.6 deaths per 1,000 live births in 1968. There were 3,154 neonatal deaths (infants under 28 days). Thirty-three maternal deaths of residents resulted in a rate of just 1.8 per 10,000 births.

Fluoridation in Minnesota

More than 95 percent of residents of Minnesota whose drinking water comes from municipal supplies already receive (77 percent) or in the near future will receive (18 percent) the dental health benefits of fluoridation. A fluoridation law effective January 1, 1970, requires that all municipal water supplies in the State be fluoridated.

By the end of 1969, only two communities of 5,000 population or more had not submitted plans for fluoridation of their water supplies. Most of the 143 communities without fluoridation or approved plans for it have fewer than 1,000 residents. Moreover, the water supplies of these 143 communities serve only 4.3 percent of Minnesota residents who drink municipally supplied water.—*Minnesota's Health*, December 1969.

Items for this page: Health departments, health agencies, and others are invited to share their program successes with others by contributing items for brief mention on this page. Flag them for "Program Notes" and address as indicated in masthead.