**Best Practices**

**Population Density as a Factor in the Rehospitalization of Persons With Serious and Persistent Mental Illness**

John Husted, Ph.D.
Amber Jorgens, B.A.

*Editor’s Note:* The findings of the study reported in this column have implications for policy planners and administrators, not just clinicians. The variation in health care spending in the 50 states is enormous. Within that variability, where do best practices exist, and could population density be a factor that needs to be included in calculating health care costs? The authors stimulate thinking about this important issue.

In 1998, while completing a study of the effectiveness of day treatment for persons with serious and persistent mental illness in rural Minnesota, the first author was made aware of the significantly lower rates of rehospitalization in rural areas compared with rates in more populated areas. We decided to investigate the possibility that the type of community in which day treatment and community support programs are located could have an effect on the conceptual innovations, such as deinstitutionalization and normalization, that underlie the effectiveness of these treatments. In other words, the most effective clinical practices designed to reduce rehospitalization may vary with the type of community—rural versus urban—in which those practices take place, and a therapy or procedure that is quite effective in one location may have quite different results in another.

The study reported here yielded significant, if preliminary, data suggesting that population density may be an important factor in rehospitalization rates for the seriously and persistently mentally ill population. When mental health professionals plan placements for hospitalized patients ready for discharge or attempt to understand factors involved in high rehospitalization rates, they would be well served to keep population density in mind. Assimilating this information will clearly broaden our understanding of rehospitalization and contribute to our capacity to develop best practices for both managing the individual client and developing programs to avoid rehospitalization.

That high population density is associated with relapse has been suggested by Muijen and colleagues (1), who in explaining the very high rate of recidivism among clients of their day treatment program wrote, "South Southwark is a deprived area with a high psychiatric morbidity, yet it has few support services such as hostels, drop-in centres, or day hospitals for the mentally ill."

In the first eight months of the study, Muijen and colleagues found a rehospitalization rate of 83 percent in the experimental group, which received home-based care, and 100 percent for the control group, which received usual hospital care. Most outcome studies of persons with serious and persistent mental illness do not find such high rates of rehospitalization. However, even in the most effective community support programs, rates of rehospitalization lie within the parameters suggested by Dharwadka (2), who wrote, "Reviewers of studies of readmissions have concluded that within 6 months an estimated 30 to 40 percent of the patients return, within a year 40 to 50 percent return, and within 3 to 5 years 65 to 75 percent return... No treatment yielded a lower return rate than 20 to 30 percent."

The results of these studies contrasted sharply with data from the first author’s studies of rehospitalization among severely mentally ill individuals living in rural western Minnesota. One study measuring the effectiveness of day treatment examined rehospitalization rates over a three-year period for 40 seriously and persistently mentally ill individuals who had been referred to day treatment (3). The subjects had a similar number of past hospitalizations and similar lengths of stay. Those who finished day treatment or continued to be actively involved in the program were compared with those who dropped out against medical advice. The mean annual rate of rehospitalization among those who stayed in treatment was 5.3 percent, compared with 46.4 percent among those who dropped out.

These rehospitalization rates were compared with the rate for a control...
group from an even more rural county—one with a less dense population per square mile (3). The 39 individuals with serious and persistent mental illness in this group did not have day treatment. However, over a 36-month period, the mean number of rehospitalizations for the group was nine, with a cumulative mean total of 109 days. The annual rehospitalization rate among these more rural residents was 2.6 percent. These findings made it difficult to determine the effectiveness of day treatment once population density was considered.

In a ten-year longitudinal study that investigated the effectiveness of community support programs and covered the same rural area, the rate of rehospitalization for people in such programs was 4.7 percent per year (4). The researchers examined 59 patients’ hospitalization histories before program entry, going back as far as ten years for some patients. The annual rate of rehospitalization before program entry was 8.9 percent. Both these rates are well below state and national recidivism rates, and the studies leave unexplained population density as a possible contributor to the low rehospitalization rates.

In the study reported here, we assessed the average rate of rehospitalization among persons with serious and persistent mental illness in each county in Minnesota. We hypothesized that in each area the rehospitalization rate would correlate with the population density.

**Methods**

The population for each of Minnesota’s 87 counties was obtained from 1990 census data and divided by the number of square miles in the county. Counties were ranked in order of population density. Rehospitalization was defined as being readmitted within one year after discharge. The mean rehospitalization rate of persons with serious and persistent mental illness hospitalized in 1996 was obtained from the Minnesota Department of Human Services. (In Minnesota the definition of serious and persistent mental illness includes four diagnoses: schizophrenia, schizoaffective disorder, bipolar affective disorder, and borderline personality disorder; individuals without any of these diagnoses who have been hospitalized twice for mental illness in the past 24 months are also included in the definition.) Pearson’s r was used to test for a possible correlation between each county’s population density and the rehospitalization rate.

The 1996 service utilization tables of the Minnesota Public Mental Health System provided data by county on the total number of individuals receiving funding for case management, community support programs, day treatment, and hospitalization (5). We compared the seven most densely populated counties, which represent the Twin Cities (Minneapolis and St. Paul) plus Rochester, with the seven least densely populated counties, defined as those with the fewest people per square mile. The counties were compared on the mean annual hospitalization costs per person for clients with serious and persistent mental illness, the number of initial admissions a year for this group, and their average length of stay. The t test was used to assess differences between the two groups of seven counties.

**Results**

The Pearson r correlation between population density and rehospitalization was −.0217. Thus, on the basis of data from all 87 counties, the hypothesis that a direct correlation would be found between population density and the rehospitalization rate was not supported.

However, when the seven counties with the highest population density were compared with the seven with the lowest, several significant findings emerged. The more densely populated counties had a higher mean rate of initial hospital admissions (t=6.79, df=13, p<.05). The rural and urban counties also differed significantly in mean length of hospital stays among the rehospitalized patients. In the seven most densely populated counties, hospital stays averaged 90.57 days, compared with 57 days in the least populated counties (t=4.2, df=13, p<.05).

In addition, the mean cost per 10,000 population for hospitalizing persons with serious and persistent mental illness in the seven most densely populated counties was $79,869, compared with a cost of only $10,327 in the seven least densely populated counties.

**Discussion and conclusions**

The literature in the area of population density and rehospitalization is rather sparse and not at all conclusive. Preliminary findings from this study suggest that individuals living in rural areas tend to be rehospitalized less frequently. The reasons for the lower rehospitalization rate are not clear. It may be that mental hospitals are just not available or that rural people simply tolerate deviant behavior to a much larger degree than people in urban areas.

One clue may lie in the longer hospitalization time for patients in the seven urban counties. Although rural areas are not necessarily nurturing or friendly, people do become familiar with each other. In one of the counties in the community support program study, the group of seriously and persistently mentally ill individuals had the same program worker and the same clinical psychologist for 11 years (4). Clients in the other counties experienced no more than two changes in program workers over the past ten years. In such settings, both professionals and family members may notice changes in behavior more quickly so that interventions are undertaken earlier in the relapse process, thereby preventing rehospitalization or ensuring that hospital stays are shorter.

In the study reported here, three of the least densely populated counties have no stop lights or fast food restaurants. Moreover, some counties lack an interstate highway, making it difficult to travel outside the area. It is likely that individuals living in these counties rarely perceive anything new or different. To the extent that dysfunction or paranoid ideation is triggered by stimuli that are not understood, the familiarity and predictability in these rural areas may mean less frequent or less intense dysfunction.
The lack of a significant correlation between population density and rehospitalization rates for all 87 counties may be partly explained by the longer hospital stays in the seven most densely populated counties. These seven counties constitute well over half of the total population of Minnesota. Relatively long stays may simply mean that some individuals are not out in the community to be rehospitalized, which would lower their overall readmission rate.

Although the findings of our study are clearly preliminary, we feel that population density needs to be taken into account by mental health professionals who work with individuals with serious and persistent mental illness. Practitioners who do not take population density into account run the risk of misinterpreting or misunderstanding their clients’ tendency to decompensate and be rehospitalized. The findings also may give practitioners some clues about why some patients are rehospitalized frequently. If relapse among patients with schizophrenia is perceptual and cognitive in nature, then the type of environment a person lives in may be much more important than previously thought. Different types of antipsychotic medications may even work more effectively in rural areas.

As Scott and Dixon (6) pointed out, one of the difficulties in treating individuals with serious and persistent mental illness may be the lack of similarity between the stimuli that occur in treatment and those that occur in everyday living. In rural areas, where there is a relative absence of distracting stimuli in daily life, whatever happens in therapy may be assimilated more effectively. The similarity between the level of stimuli in treatment and in life would at least partly explain the very low rehospitalization rates we have found in previous studies of day treatment and community support programs (3,4). We are involved in a new research study of rural individuals who have stayed out of mental hospitals for three years to attempt to determine what factors they perceive as important to their success in independent living. It would be interesting to replicate this study in an urban area and compare the responses.

In conclusion, we are left wondering whether the policies of normalization and deinstitutionalization of the last quarter century have gone far enough. Effective community treatments are now in place in the more rural areas of the country. The practice of placing rural residents with serious and persistent mental illness in programs in areas of greater population density, even when those programs have highly specialized mental health professionals, may lead to cognitive and perceptual disruptions. Such placements may do more harm than good. At the very least, in making decisions about either the effectiveness of a particular therapy or the placement of a person with serious and persistent mental illness, mental health professionals need to take into account where the patient lives.

Failure to do so increases the possibility of making an incomplete if not an incorrect decision. Factoring population density into these decisions will promote best practices in working toward developing a milieu that minimizes the risk of rehospitalization.

References


3. Husted J: The effectiveness of day treatment with persistently mentally ill in rural areas. Disability and Rehabilitation, in press


The American Psychiatric Association (APA) is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians. The APA takes responsibility for the content, quality, and scientific integrity of this CME activity.

The APA designates this educational activity for up to 48 hours in category 1 credit towards the AMA Physician’s Recognition Award and for the CME requirement of the APA. Each physician should claim only those hours of credit that he/she actually spent in the educational activity.