Multisite Experimental Cost Study of Intensive Psychiatric Community Care

by Robert Rosenheck, Michael Neale, Philip Leaf, Robert Milstein, and Linda Frisman

Abstract

A 2-year experimental cost study of 10 Intensive Psychiatric Community Care (IPCC) programs was conducted at Department of Veterans Affairs (VA) medical centers in the Northeast. High hospital users were randomly assigned to either IPCC (n = 454) or standard VA care (n = 419) at four neuropsychiatric (NP) and six general medical and surgical (GMS) hospitals. National computerized data were used to track all VA health care service usage and costs for 2 years following program entry. At 9 of the 10 sites, IPCC treatment resulted in reduced inpatient service usage. Overall, for IPCC patients compared with control patients, average inpatient usage was 89 days (33%) less while average cost per patient (for IPCC inpatient, and outpatient services) was $15,556 (20%) less. Additionally, costs for IPCC patients compared with control patients were $33,295 (29%) less at NP sites but were $6,273 (15%) greater at GMS sites. At both NP and GMS sites, costs were lower for IPCC patients in two subgroups: veterans over age 45 and veterans with high levels of inpatient service use before program entry. No interaction was noted between the impact of IPCC on costs and other clinical or sociodemographic characteristics. Similarly, no linear relationship was observed between the intensity of IPCC services and the impact of IPCC on VA costs, although the two sites that did not fully implement the IPCC program had the poorest results. With these sites excluded, the total cost of care for IPCC patients at GMS sites was $579 (3%) more per year than that for the control patients.


Over the past 25 years, a central goal of programs for the severely and chronically mentally ill has been the implementation of cost-efficient and clinically effective community-based treatment that reduces hospital usage and clinical symptoms while improving community adjustment and quality of life. A number of experimental studies have shown that assertive community treatment (ACT) and/or intensive case management programs can achieve these clinical objectives, and that cost savings can be achieved by reductions in other health care expenses and increases in vocational productivity (Stein and Test 1980; Weisbrod et al. 1980; Houlit and Reynolds 1984; Mulder 1985; Wasylenki et al. 1985; Kiesler and Sibulkin 1987; Bond et al. 1989).

Other studies, however, have found case management to be associated either with no change or with increased service usage and costs (Franklin et al. 1987; Curtis et al. 1992; Rossler et al. 1992). A comprehensive review of published literature on ACT programs reports that although such programs often reduce psychiatric inpatient use, they do not always reduce symptoms or improve community adjustment (Olfson 1990). Doubts have also been voiced about the generalizability of previous studies in support of ACT programs because they were well-funded.

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research/demonstration projects executed by ideologically committed leaders in the field. Although these studies can demonstrate the efficacy of programs under optimal circumstances, their relevance for the planning of mental health services under more ordinary conditions is uncertain (Bachrach 1980).

Thus, given the inconsistency in research findings, the substantial cost of intensive community care programs, and the continued pressure to disseminate innovative programs throughout public health care systems, there is a need to identify clinical settings and patient subgroups in which intensive community-based mental health programs are consistently cost-effective. More specifically, information is needed to determine whether these programs should be targeted at a broad range of patients or at specific subgroups, such as the most severely disabled or the highest service users. Such information is especially important to public mental health systems such as the Department of Veterans Affairs (VA), which, with limited and often declining resources, treat large numbers of severely ill and disabled patients.

In 1987, on the basis of published research and consultation with national leaders concerning the care of the severely mentally ill, the regional director for the Northeast region of the VA initiated a clinical demonstration project of Intensive Psychiatric Community Care (IPCC). It appeared that impending Gramm-Rudman Federal deficit reduction legislation would substantially decrease the VA’s health care budget. As a result, there was administrative interest in determining whether intensive case management teams, given responsibility for the care of a limited number of the most severely recidivist VA patients, could (1) significantly reduce these patients' reliance on inpatient treatment, thereby shifting their care to community locations; and (2) justify the transfer of current inpatient resources to fund intensive community care teams.

This article presents data from a 2-year experimental design evaluation that assessed the impact of IPCC on VA health service use and related VA health care costs. Although public policymakers must use full social cost analyses to guide their decisionmaking, analyses of costs to specific agencies are also useful. Indeed, most decisions about implementing high-intensity programs are made by administrators whose principal concern is the impact of such programs on their own institution or organization. Data on this aspect of the program are comprehensive and complete. The specific impact of IPCC on VA costs is thus an area of special interest.

This study focused particular attention on (1) monitoring program implementation at each site; (2) comparing treatment available to the control patients across sites; and (3) assessing differences in the effectiveness of IPCC with patients hospitalized at the time of program entry at two different types of VA medical centers: neuropsychiatric hospitals (NP sites) and general medical and surgical hospitals (GMS sites). Typically located in suburban or rural settings, NP sites are large facilities that traditionally provide long-term care to severely disabled patients; such hospitals are similar in background and recent history to State mental hospitals. GMS sites are located in urban centers and are closely affiliated with medical schools. They provide shorter term, crisis-oriented inpatient care akin to that offered in academic and community general hospitals. The differential impact of IPCC with age and diagnostic subgroups was also examined, along with differences in the impact of IPCC programs providing services at different levels of intensity.

This study is unique among experimentally designed evaluations of community-based psychiatric care in that it involves (1) multiple sites of two distinct types; (2) treatment within a single public health care system in which similar administrative procedures are used at all sites; (3) a complete accounting of within-system costs for all study participants; (4) an empirical comparison of both experimental and control treatments across sites; (5) implementation under routine circumstances, as would be the case in dissemination across a large public health care system; and (6) a sufficiently large sample to consider the impact of the intervention on age and diagnostic subgroups.

**Methods**

**Program Planning.** Conceptualization of the IPCC program was based on a comprehensive review of the literature and on consultation with an expert in the Wisconsin ACT model. Ten IPCC programs were selected for study after competitive review of proposals from 22 VA hospitals in the Northeast. Proposals were first reviewed by a panel of VA professionals. The final selections were then reviewed, modified, and approved by a panel of three national experts in community-based mental health treatment. Consulta-
Clinical Programs. Proposals selected were for programs designed to operate under four core principles:

1. Intensity. Patients were to be seen as often as clinically indicated, and caseloads were to be low (7–15 patients per clinician) to facilitate frequent contact.

2. Flexibility and community orientation. Clinicians were urged to see patients wherever maximal clinical leverage could be obtained and were encouraged to provide most of the contacts in community settings. Special emphasis was placed on involving natural support systems in treatment (family members, landlords, employers, etc.).

3. Rehabilitation focus. Clinical contacts were to emphasize a broad range of rehabilitation services, including training in practical problem solving, crisis resolution, and adaptive skill building in natural settings. The focus of the interventions was to be on linkage with—and optimal usage of—both community and clinical resources, emphasizing in situ development of community living skills.

4. Continuity of care. IPCC teams were to be a “fixed point of continuing responsibility” (Test 1979, p. 18), assertively maintaining contact with even the most reluctant patients. If a patient moved away, for example, contact was to be maintained, even over long distances, by telephone.

The IPCC programs were integrated interdisciplinary teams implemented under the direction of social workers and nurses, and operating under the joint supervision of the chief of psychiatry and the chiefs of selected other professional services at the sponsoring VA medical center. Most of the team members were master’s-level social workers and nurses, and each team was staffed with a part-time psychiatrist. Teams met to review cases at least weekly (in some instances daily) and were available by phone after hours and on weekends to other VA clinicians (i.e., emergency room and inpatient staff members) and, through them, to patients, when necessary.

Program implementation was monitored using both weekly logs, on which all clinical contacts were recorded, and semiannual structured clinical process summaries, which were completed on each case. These data allowed program implementation to be evaluated at each site with respect to (1) the frequency and intensity of clinical contacts (number of weeks with any contact, contacts per week, and minutes per contact); (2) the location of contacts (percentage of clinical time taking place in community settings); (3) the types of services provided to each patient (percentage of patients receiving one or more of several types of rehabilitation service listed on the semiannual summaries); and (4) the duration of involvement (percentage of patients who terminated before completing 2 years of treatment).

To maximize consistency and quality in implementing IPCC treatment at all sites, monthly telephone conference calls involving all program clinicians; two programwide training conferences; 30 site visits by the central management/evaluation team; and frequent telephone contact with program managers were used.

Eligibility and Program Entry. Veterans were eligible for the experiment if they (1) were currently hospitalized on a VA psychiatric inpatient unit, (2) had a primary psychiatric diagnosis other than substance abuse or organic brain disorder, and (3) met site-specific criteria for high recent psychiatric inpatient utilization. Although some patients had been hospitalized at both NP and GMS hospitals, site-type assignment for analytic purposes was based on the hospital to which they were admitted when they consented to participate in this study. Utilization criteria from program entry had to be site specific because patterns of usage differed considerably between NP and GMS sites. At NP sites in this study, for example, the average number of bed days of care per year for nonsubstance abuse psychiatric patients discharged in 1988 \((n = 2,942)\) was 82 days, and 16 percent of patients were hospitalized for 150 or more days (an average of 105 patients per facility). In contrast, the average number of bed days of care per year for patients at GMS sites \((n = 3,753)\) was 25 days, and only 4 percent of patients were
hospitalized for 150 or more days during the year (an average of 14 patients per facility).

Therefore, entry criteria were stricter at NP facilities. Patients had to have 180 days of hospitalization during the previous year, or four or more admissions (excluding the current episode) during the previous year. At GMS sites, on the other hand, entry criteria were either 40 or more days of psychiatric hospitalization or two previous admissions. After providing written informed consent and completing a standardized baseline assessment interview, subjects were randomly assigned, by the coin flip of an independent randomizer, to either IPCC or standard VA treatment (STD-VA). After assignment to treatment condition, those receiving IPCC were introduced to their clinicians, who were encouraged to begin working on plans for community reentry as quickly as possible.

Measurement of Service Use. The major clinical outcome of interest in this report is hospital and nursing home service use. VA health service utilization data were derived from the VA's national computerized workload monitoring systems: the patient treatment file for completed episodes of inpatient treatment, the extended file for completed episodes of nursing home and domiciliary treatment, and the outpatient file for outpatient treatment. The VA census file and a supplementary survey conducted for this study were used to identify usage among veterans who were hospitalized but not discharged at the end of the study. These data bases are carefully compiled since they are used by the VA for resource allocation, and together they document health care services delivered at all VA medical centers nationwide. Data on VA medical care usage are therefore available on all participants. Although coding errors and failures to input data are likely to occur to some (unfortunately unknown) degree, errors are assumed to occur at the same rate for IPCC and control subjects.

The patient treatment file classifies all VA beds into 20-bed sections, which we collapsed into four categories (psychiatric, medical, surgical, and intermediate medical). Outpatient VA services are classified in the outpatient file by 119 unique "stop codes," which have been collapsed into four psychiatric categories (individual psychiatric treatment, group psychiatric treatment, day hospital, and substance abuse treatment) and four nonpsychiatric categories (medical-surgical clinic, admissions-emergency room, laboratory services, and ancillary medical services) for this analysis. Psychiatric outpatient treatment includes treatment provided by other professionals (e.g., psychologists, nurses, and social workers) in mental health clinics. Unfortunately, prescribed medications are not coded in the outpatient file.

Measurement of VA Health Care Costs. Total VA health care costs for each patient were determined by multiplying the units of service consumed by the site-specific average cost per unit of service. Unit costs for each of the four types of inpatient care, for domiciliary and nursing home care, and for each of the eight types of non-IPCC outpatient care were estimated for each medical center using the VA's standardized national Cost Distribution Report (CDR). The CDR is a facility-by-facility ac-

accounting record that identifies total expenditures and unit costs associated with VA inpatient and outpatient health care services. Using accounting procedures standardized across the entire VA system, the CDR identifies and distributes to each major type of health care service both direct health care costs (for personnel services and supplies) and indirect costs (for administration, building maintenance, engineering service, equipment depreciation, etc.). However, data on the duration of visits, the number of clinicians involved in each outpatient visit, and the intensity of inpatient services are not available from VA data bases, so the precision of these cost estimates is limited.

Because it was a demonstration program, site-specific expenditures for the IPCC program itself were not uniformly recorded on the CDR. IPCC costs were therefore estimated through separate procedures specifically designed to ensure that methods for measuring IPCC costs were the same as those used to measure standard costs. Included were all direct costs for program personnel, supplies, and equipment, and the proportion of indirect costs for services used for IPCC (administration, building management, engineering, etc.) that were provided by the sponsoring medical center. IPCC workload data from the final 18 months of the trial were used to compute the average cost of program care per patient and per visit at each site. Methods used to estimate IPCC costs are described in detail elsewhere (Rosenheck et al., in press).

Two methods, also detailed elsewhere (Rosenheck et al. 1994) were used to estimate the opportunity cost of capital. One method used local medical office rents,
and the other was based on estimates of the replacement cost of hospital buildings and land. Overall, the two methods for measuring capital cost yielded similar average values across facilities.

Analyses. Analysis of covariance (ANCOVA) was used to compare utilization and costs for IPCC and STD-VA groups, for each type of service for the entire 2-year period after program entry, for each of the two facility types. Data from GMS and NP sites were analyzed separately because different entry criteria were used for each site type. In each analysis, unmeasured site differences were statistically controlled using N-1 dummy-coded site indicators.

Factorial ANCOVA was then used to examine the differential impact of IPCC on various patient subgroups. These analyses tested the statistical significance of the interaction of treatment condition (IPCC vs. STD-VA) with six other factors in relation to VA health care costs. The six factors are (1) age (45 years old or less vs. all others); (2) psychotic clinical diagnosis (schizophrenia, schizoafffective, and manic-depressive vs. all others); (3) comorbid substance abuse (also determined by clinical diagnosis); (4) marital status (ever married vs. never married); (5) preentry days above the median for that site type (88 days at GMS sites, 412 days at NP sites); and (6) receipt of VA compensation payments. Because cost and usage data were highly skewed, all statistical analyses were conducted on logarithmically transformed variables.

Comparison of Non-IPCC Treatment Across Sites. In a multisite study, differences across sites or site types in the quality of care available to “control” patients may influence the relative effectiveness of IPCC treatment. For example, in a facility that offers outpatient treatment characterized by high intensity and continuity, the addition of IPCC treatment might not result in substantial additional cost reduction or clinical improvement. To assess differences in the general level of psychiatric care offered at the sites participating in the study, measures were obtained for (1) the intensity and continuity of outpatient psychiatric care, (2) re-admission rates after discharge, and (3) staffing levels in inpatient programs. Fiscal year 1988 outpatient files were used, first, to determine the intensity of outpatient services delivered at each facility, as measured by the average number of contacts per psychiatric outpatient. Next, continuity of care was assessed by determining the number of psychiatric outpatient services received by schizophrenia patients during the year following a discharge from inpatient care. Readmission rates during the 15 days after discharge, another indicator of successful transition to the community, were also compared. Finally, the staff-to-patient ratio on general psychiatric inpatient units in each facility was examined using administrative data gathered through a special survey.

Results

Sample Characteristics. Table 1 presents baseline data for patients from NP and GMS sites. Compared with patients from GMS sites (n = 528), those from NP sites (n = 345) were older and more likely to be white, had poorer social-vocational adjustment, and had greater hospital utilization. Patients at NP sites were also more likely to carry a clinical diagnosis of schizophrenia or other psychoses, and were less likely to have comorbid substance abuse diagnoses (i.e., to be dually diagnosed). Veterans at both site types were severely ill and highly service dependent.

After being pooled by site type, IPCC and control groups were compared, to test the success of the randomization procedure. Although no significant differences were noted between IPCC and control groups for demographic (age, race, sex) or clinical-diagnostic features, a significant difference in inpatient days before program entry was found among NP sites. This difference was attributable to one NP site (NP-3 on tables 4 and 5) at which the experimental group had fewer inpatient hospital days than the control group. To compensate for the imbalance at this site, a conservative three-step adjustment was made.\(^1\) The adjusted values were used in all sub-

\(^1\)First, a regression coefficient was calculated for the control patients, reflecting the relationship between number of inpatient days before program entry (“before days”) and number of hospital days after program entry (“after days”). Second, the number of “deficit before days” was determined for each experimental patient at that particular site by subtracting that patient’s actual “before” days from the mean “before” days of the control group at that site. Finally, the number of deficit days was multiplied by the regression coefficient, and the product was added to the number of “after program entry” days for that patient. This adjustment was made separately for each type of inpatient care (psychiatric, medical, etc.) and for inpatient costs at the site involved.
Table 1. Baseline data comparing veterans from NP and GMS sites

<table>
<thead>
<tr>
<th></th>
<th>NP (n = 345)</th>
<th>GMS (n = 528)</th>
<th>(\chi^2) (df = 1)</th>
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<tbody>
<tr>
<td>Age (mean)</td>
<td>53</td>
<td>44</td>
<td>10.2</td>
<td></td>
</tr>
<tr>
<td>&gt; 45 years old (%)</td>
<td>68</td>
<td>35</td>
<td>90.1^1</td>
<td></td>
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<tr>
<td>Nonwhite (%)</td>
<td>13</td>
<td>25</td>
<td>17.7^1</td>
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<td>Never married (%)</td>
<td>70</td>
<td>44</td>
<td>55.8^1</td>
<td></td>
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<tr>
<td>Working full or part time (%)</td>
<td>4</td>
<td>25</td>
<td>64.2^1</td>
<td></td>
</tr>
<tr>
<td>VA compensation (%)</td>
<td>53</td>
<td>57</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>Preentry hospital days (2 yr)</td>
<td>452</td>
<td>123</td>
<td>25.0^1</td>
<td></td>
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<tr>
<td>Median preentry hospital days</td>
<td>412</td>
<td>88</td>
<td></td>
<td></td>
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<tr>
<td>Primary clinical diagnosis (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schizophrenia</td>
<td>68</td>
<td>39</td>
<td>65.5^1</td>
<td></td>
</tr>
<tr>
<td>Other psychoses</td>
<td>10</td>
<td>13</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Bipolar disorder</td>
<td>6</td>
<td>13</td>
<td>10.2^1</td>
<td></td>
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<tr>
<td>Depression</td>
<td>4</td>
<td>10</td>
<td>9.7^2</td>
<td></td>
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<tr>
<td>Alcohol/drug abuse</td>
<td>8</td>
<td>7</td>
<td>0.3</td>
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<tr>
<td>Personality disorder</td>
<td>0</td>
<td>8</td>
<td>27.1^1</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>10</td>
<td>9.7^2</td>
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</tr>
<tr>
<td>Dually diagnosed</td>
<td>23</td>
<td>30</td>
<td>4.9^3</td>
<td></td>
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</tbody>
</table>

Note.—NP = neuropsychiatric hospital; GMS = general medical and surgical hospital; VA = Department of Veterans Affairs.

^1p < 0.001.
^2p < 0.01.
^3p < 0.05.

sequent calculations. The results they yielded did not differ substantially from those obtained with unadjusted values. Although complete retrospective correction is not possible, this procedure allows a conservative approximation of results as if the randomization had yielded equal groups. Adjusted values were used in all subsequent analyses.

Program Implementation. Table 2 presents selected program implementation data for each IPCC team. Caseloads averaged 13.2 patients per clinician across all sites, and, on average, IPCC patients had face-to-face clinical contacts with their IPCC clinicians during 60 of the 104 weeks (58%) of the study. In weeks in which they were seen by the IPCC team, patients averaged 1.9 contacts per week and nearly 41 minutes per contact. Altogether, 64 percent of face-to-face clinical contact time took place in community settings; 78 percent of patients were receiving at least one type of rehabilitative service after 1 year (the midpoint of the study), and only slightly fewer (75%) were receiving such services after 2 years (table 2). Only 12 percent of IPCC patients terminated before the study period was over.

Although, considered as a whole, the IPCC program was implemented as planned, there were important differences among sites. Two sites had larger caseloads per clinician than expected (NP-4 and GMS-5); three sites saw patients less often than once every 2 weeks on average (NP-1, GMS-2, and GMS-5); and one of the sites with a very high caseload level (GMS-5) provided virtually no community-based contact or rehabilitation services. This site, in effect, developed a low-intensity patient tracking program rather than IPCC services. The vast majority of sites had low termination rates over the 2-year period; at one site (GMS-1), however, 25 percent of patients terminated before the 2-year study period was over, and at another (NP-1), 18 percent terminated.

Service Utilization. Hospital utilization among IPCC clients was lower than it was among control patients at 9 of the 10 sites involved in the study, and across all sites, average inpatient utilization among IPCC veterans was 33 percent less than that among control subjects (184 days for IPCC vs. 274 for STD-VA). At NP sites, IPCC treatment was associated with a 35-percent reduction in mean inpatient days (296 days for IPCC vs. 454 for STD-VA) (F = 23.97; df = 4,340; p < 0.0001) (table 3). At GMS sites, hospital usage among IPCC patients declined by 7 percent (109 days for IPCC vs. 117 days for STD-VA, although this difference was not statistically significant. Considering results from individual sites (table 4), relative reductions in hospital use among IPCC patients were apparent at all four NP sites and at five of the six GMS sites. At one GMS site (GMS-2), however, IPCC patients had 52 percent more hospital days than the STD-VA group.

Use of VA outpatient services was greater among IPCC patients
than among control patients at NP sites, but was quite similar for both groups at GMS sites (table 3). Since hospitalized veterans use no VA outpatient services while they are VA inpatients, the lesser outpatient use among STD-VA patients at the NP sites is assumed to reflect their much greater level of inpatient use.

### VA Health Care Costs

Across all sites, the average cost per patient (for IPCC, inpatient, and outpatient services) was $15,556 (20%) lower than that for controls. Table 3 reports analyses of average costs of VA health services used by study participants at NP and GMS sites. The average total cost of inpatient and outpatient VA treatment (i.e., not including the cost of the IPCC intervention itself) was lower among IPCC patients than among STD-VA patients at both site types. At NP sites, the difference was $41,126, or 36 percent ($F = 22.96; df = 4,340; p < 0.0001); at GMS sites, it was only $1,035, or 3 percent (not significant). With IPCC costs taken into consideration, reductions in VA costs associated with IPCC treatment were greater than the additional cost of the experimental treatment at NP sites but not at GMS sites. Average total VA health care costs for IPCC patients were $33,295 (29%) less than those for STD-VA patients at NP sites ($F = 10.17; df = 4,340; p = 0.0016) but were $6,273 (15%) greater at GMS sites ($F = 16.36; df = 6,521; p < 0.0001). Table 5 compares total VA health care costs per patient at each site, highlighting the consistency of differences between NP and GMS sites, with the exception of one NP site.

#### Table 2. Implementation of IPCC by site type and by site

<table>
<thead>
<tr>
<th>Staff/patient ratio</th>
<th>Contact, %</th>
<th>Contact per, n</th>
<th>Weeks in contact, n</th>
<th>Minutes per contact, n</th>
<th>Minutes in community, %</th>
<th>Minutes in community, n</th>
<th>Those receiving rehabilitation services, %</th>
<th>Those terminated at 2 years, %</th>
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<tr>
<td>IPCC</td>
<td></td>
<td></td>
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<td>n</td>
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<tr>
<td>NP-1</td>
<td>454</td>
<td>13.2</td>
<td>27</td>
<td>1.9</td>
<td>40.5</td>
<td>64.3</td>
<td>19.7</td>
<td>74.8</td>
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<td>NP-2</td>
<td>50</td>
<td>10.1</td>
<td>5</td>
<td>0.9</td>
<td>30.5</td>
<td>71.1</td>
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<td>GMS sites</td>
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<td>5.4</td>
<td>14</td>
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<td>35.7</td>
<td>89.8</td>
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<td>8.8</td>
<td>15</td>
<td>1.3</td>
<td>37.9</td>
<td>83.5</td>
<td>3.9</td>
<td>75.2</td>
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<td>GMS-3</td>
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<td>1.3</td>
<td>46.8</td>
<td>77.8</td>
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<td>21</td>
<td>1.0</td>
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<td>83.5</td>
<td>2.3</td>
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<td>GMS-5</td>
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<td>1.1</td>
<td>37.7</td>
<td>83.5</td>
<td>2.3</td>
<td>75.2</td>
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<td>GMS-6</td>
<td>271</td>
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<td>65</td>
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<td>66.3</td>
<td>78.7</td>
<td>1.8</td>
<td>75.2</td>
</tr>
</tbody>
</table>

Note—IPCC = intensive psychiatric community care; NP = neurosurgical hospital; GMS = general medical and surgical hospital.

*Out of 104 weeks of the 2-year study.

Weeks with contact only.
Table 3. Two-year VA service utilization and costs: IPCC versus STD-VA treatment at NP and GMS sites, means ± standard deviations (SD)

<table>
<thead>
<tr>
<th></th>
<th>IPCC</th>
<th>STD-VA</th>
<th>Difference</th>
<th>IPCC</th>
<th>STD-VA</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 183</td>
<td>n = 162</td>
<td></td>
<td>n = 271</td>
<td>n = 257</td>
<td></td>
</tr>
<tr>
<td>Inpatient days (SD)</td>
<td>296 (259)</td>
<td>454 (281)</td>
<td>-158^1</td>
<td>109 (109)</td>
<td>117 (127)</td>
<td>-8</td>
</tr>
<tr>
<td>Psychiatric (SD)</td>
<td>214 (252)</td>
<td>280 (298)</td>
<td>-66^2</td>
<td>97 (99)</td>
<td>100 (110)</td>
<td>-2</td>
</tr>
<tr>
<td>Nonpsychiatric (SD)</td>
<td>67 (161)</td>
<td>136 (247)</td>
<td>-69</td>
<td>9 (99)</td>
<td>9 (110)</td>
<td>0</td>
</tr>
<tr>
<td>Nursing home (SD)</td>
<td>15 (77)</td>
<td>38 (146)</td>
<td>-23</td>
<td>3 (25)</td>
<td>8 (47)</td>
<td>-5</td>
</tr>
<tr>
<td>Outpatient stops (SD)</td>
<td>118 (184)</td>
<td>57 (134)</td>
<td>61^3</td>
<td>107 (136)</td>
<td>108 (143)</td>
<td>-1</td>
</tr>
<tr>
<td>Psychiatric (SD)</td>
<td>36 (86)</td>
<td>23 (64)</td>
<td>13^2</td>
<td>61 (93)</td>
<td>65 (107)</td>
<td>-4</td>
</tr>
<tr>
<td>Other (SD)</td>
<td>83 (116)</td>
<td>34 (81)</td>
<td>48^3</td>
<td>45 (68)</td>
<td>43 (56)</td>
<td>3</td>
</tr>
<tr>
<td>Inpatient costs (SD)</td>
<td>$68,486 ($71,245)</td>
<td>$111,543 ($90,054)</td>
<td>-$43,057^1</td>
<td>$33,163 ($36,725)</td>
<td>$33,727 ($37,297)</td>
<td>-$564</td>
</tr>
<tr>
<td>Outpatient costs (SD)</td>
<td>$4,170 ($6,849)</td>
<td>$2,240 ($5,194)</td>
<td>-$1,930^1</td>
<td>$6,876 ($11,380)</td>
<td>$7,347 ($12,107)</td>
<td>-$471</td>
</tr>
<tr>
<td>Non-IPCC VA cost (SD)</td>
<td>$72,656 ($69,702)</td>
<td>$113,783 ($88,530)</td>
<td>-$41,126^1</td>
<td>$40,039 ($38,701)</td>
<td>$41,074 ($39,338)</td>
<td>-$1,035</td>
</tr>
<tr>
<td>IPCC cost</td>
<td>$7,831</td>
<td>$7,831</td>
<td>0</td>
<td>$7,308</td>
<td>$7,308</td>
<td>0</td>
</tr>
<tr>
<td>VA total cost (SD)</td>
<td>$80,487 ($70,990)</td>
<td>$113,783 ($88,530)</td>
<td>-$33,295^3</td>
<td>$47,347 ($39,917)</td>
<td>$41,074 ($39,338)</td>
<td>-$6,273</td>
</tr>
</tbody>
</table>

Note.—VA = Department of Veterans Affairs; IPCC = intensive psychiatric community care; STD-VA = standard VA treatment; NP = neuropsychiatric hospital; GMS = general medical and surgical hospital. The p levels below represent significance of differences as determined by analysis of covariance.

^1p < 0.001.
^2p < 0.10.
^3p < 0.01.
Table 4. VA inpatient service use, by treatment condition and by site

<table>
<thead>
<tr>
<th>Sites</th>
<th>n</th>
<th>IPCC</th>
<th>STD–VA</th>
<th>Difference</th>
<th>% Difference from STD–VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>NP–1</td>
<td>50.43</td>
<td>521</td>
<td>581</td>
<td>–60</td>
<td>–10.4</td>
</tr>
<tr>
<td>NP–2</td>
<td>34.33</td>
<td>205</td>
<td>271</td>
<td>–66</td>
<td>–24.2</td>
</tr>
<tr>
<td>NP–3</td>
<td>40.31</td>
<td>201</td>
<td>308</td>
<td>–107</td>
<td>–34.9</td>
</tr>
<tr>
<td>NP–4</td>
<td>59.55</td>
<td>222</td>
<td>545</td>
<td>–323</td>
<td>–59.3</td>
</tr>
<tr>
<td>GMS–1</td>
<td>44.35</td>
<td>105</td>
<td>120</td>
<td>–16</td>
<td>–13.1</td>
</tr>
<tr>
<td>GMS–2</td>
<td>47.47</td>
<td>164</td>
<td>108</td>
<td>56</td>
<td>52.3</td>
</tr>
<tr>
<td>GMS–3</td>
<td>49.53</td>
<td>78</td>
<td>108</td>
<td>–30</td>
<td>–27.7</td>
</tr>
<tr>
<td>GMS–4</td>
<td>43.35</td>
<td>62</td>
<td>73</td>
<td>–11</td>
<td>–15.1</td>
</tr>
<tr>
<td>GMS–5</td>
<td>44.43</td>
<td>101</td>
<td>102</td>
<td>–1</td>
<td>–1.0</td>
</tr>
<tr>
<td>GMS–6</td>
<td>44.44</td>
<td>144</td>
<td>185</td>
<td>–41</td>
<td>–22.0</td>
</tr>
</tbody>
</table>

Note.—VA = Department of Veterans Affairs; IPCC = intensive psychiatric community care; STD–VA = standard VA treatment; GMS = general medical and surgical hospital; NP = neuropsychiatric hospital. Significance levels were determined by t tests using log transformed variables.

Percentages may not add to total because of independent rounding.

\(^1\)p < 0.001.

Table 5. Total per-patient VA health care costs (IPCC and STD–VA), by treatment condition and by site

<table>
<thead>
<tr>
<th>Sites</th>
<th>n</th>
<th>IPCC</th>
<th>STD–VA</th>
<th>Difference</th>
<th>% Difference from STD–VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>NP–1</td>
<td>50.43</td>
<td>$120,804</td>
<td>$113,594</td>
<td>$ 7,210</td>
<td>6.3</td>
</tr>
<tr>
<td>NP–2</td>
<td>34.33</td>
<td>65,086</td>
<td>74,211</td>
<td>(9,125)</td>
<td>–12.3</td>
</tr>
<tr>
<td>NP–3</td>
<td>40.31</td>
<td>57,936</td>
<td>66,052</td>
<td>(8,116)</td>
<td>–12.3</td>
</tr>
<tr>
<td>NP–4</td>
<td>59.55</td>
<td>71,292</td>
<td>165,144</td>
<td>(93,852)</td>
<td>–56.8(^2)</td>
</tr>
<tr>
<td>GMS–1</td>
<td>44.35</td>
<td>39,290</td>
<td>32,273</td>
<td>7,017</td>
<td>21.7</td>
</tr>
<tr>
<td>GMS–2</td>
<td>47.47</td>
<td>71,369</td>
<td>45,661</td>
<td>25,708</td>
<td>56.3(^2)</td>
</tr>
<tr>
<td>GMS–3</td>
<td>49.53</td>
<td>51,693</td>
<td>51,692</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>GMS–4</td>
<td>43.35</td>
<td>24,637</td>
<td>20,594</td>
<td>4,043</td>
<td>19.6</td>
</tr>
<tr>
<td>GMS–5</td>
<td>44.43</td>
<td>46,231</td>
<td>39,508</td>
<td>6,723</td>
<td>17.0</td>
</tr>
<tr>
<td>GMS–6</td>
<td>44.44</td>
<td>48,205</td>
<td>48,209</td>
<td>–4</td>
<td>–0.0</td>
</tr>
</tbody>
</table>

Note.—VA = Department of Veterans Affairs; IPCC = intensive psychiatric community care; STD–VA = standard VA treatment; GMS = general medical and surgical hospital; NP = neuropsychiatric hospital. Significance levels were determined by t tests using log transformed variables.

Percentages may not add to total shown because of independent rounding.

\(^1\)Percentages may not add to total because of independent rounding.

\(^2\)p < 0.001.

NP–3, and NP–4) did not have the lowest caseloads, see patients most intensively, spend most of their time in community settings, or have the lowest termination rates (table 2). It is notable, however, that GMS–2, the site with the lowest percentage of weeks with any contact (36%) and the second lowest percentage of contact time in community settings (43%), was also the least effective site. Further, GMS–5, the site that did not actually implement the IPCC program, had the smallest impact on inpatient utilization (–1 day; table 4).

Comparison of Non-IPCC Treatment and Staffing Across Sites.

Indices of the general level of outpatient psychiatric care did not differ notably between the two site types. Among all psychiatric outpatients treated at GMS sites in 1988 (n = 15,604), 17 percent had more than 12 visits during the year, compared with 23 percent of those treated at NP sites (n = 7,757). Among schizophrenia patients discharged during 1988, 72 percent of those at GMS sites received 12 or more psychiatric visits, compared with 68 percent of those at NP sites. Readmission rates within 15 days of discharge from inpatient psychiatric care were also similar at the two facilities: 12.9 percent of 3,753 discharges at GMS sites versus 10.5 percent of 2,942 discharges at NP sites. These small differences in measures of outpatient care and readmission suggest no major differences in aftercare services received by STD–VA patients at the two site types. However, inpatient staffing levels (i.e., staff-to-patient ratios) were 43 percent higher at GMS sites than at NP sites (1.14 staff/veteran vs. 0.80, respectively;
health care costs (Rosenheck et al. 1993). The
richer staffing at GMS sites may mean that inpatient units at those
hospitals may have routinely had more staff time to devote to dis-
charge planning.

Discussion

This clinical demonstration shows that intensive community-based
psychiatric care, implemented at multiple sites, reduces hospital and
nursing home usage at most sites and can be cost-efficient for the
agency sponsoring the initiative. The impact of the IPCC interven-
tion was greatest at long-term hos-
pitals, with older patients, and
with patients with higher levels
of preintervention inpatient service
usage. There did not appear to be
any significant difference in service
usage or cost impact among dif-
ferent diagnostic subgroups.

At three of the four long-term
care sites, cost savings by IPCC
patients were greater than the cost
of IPCC treatment by more than
$8,000 per patient over the 2
years, or by $4,000 per year. At
acute care sites, in contrast, al-
though hospital usage declined
somewhat, savings in inpatient
psychiatric costs fell short of IPCC
costs by an average of about
$6,000 per patient over the 2 years
of the study, or by $3,000 per
year. Patients at NP sites had far
greater average inpatient use than
patients at GMS facilities to begin
with, and almost twice the average
health care costs. In an earlier,
conceptual paper, we showed that
savings potentials are far greater
among patients with the highest
health care costs (Rosenheck et al.
1993); this simple fact may well
explain the difference in total cost
efficiency of IPCC at the two
types of medical centers. The fact
that IPCC had significantly greater
impact on veterans whose preentry
days were above the median at
both types of sites lends support
to this interpretation.

Other systematic differences be-
tween site types might also ac-
count for the divergence in pro-
gram impact on VA costs. For
example, there may have been
greater continuity between inpa-
tient treatment and STD–VA out-
patient care at urban GMS facili-
ties than at rural or suburban NP
sites. The absence of substantial
differences in intensity and con-
tinuity of outpatient care and in
readmission rates between site
types, however, suggests that dif-
fferences in the intensity of stand-
ard outpatient care do not account
for the observed results. Looked at
from another perspective, the dif-
f erent effect of the program
across site types might be under-
stood as reflecting more limited
resources devoted to community
placement at NP sites. Although
all the NP sites maintain commu-
nity residential care programs that
support veterans in the community
after discharge (Linn 1981), their
substantially lower inpatient staffing
levels may result in less inten-
sive efforts at community place-
ment for current inpatients. It is
possible that IPCC makes up for
this resource shortage.

While it is noteworthy that IPCC
was most effective with older pa-
tients and that NP facilities had
twice as many patients over age
45 as GMS hospitals (68% vs.
32%), the greater efficiency of
IPCC with older veterans accounts
for only part of its differential im-
pact across site types. Even among
the older veterans, savings at NP
facilities were 16 times greater
than those at GMS facilities. The
differential effectiveness of IPCC
by age group is, however, of in-
trinsic interest and is perhaps ex-
plained by a greater amenability of
older veterans to clinical directives
or a greater responsiveness to sup-
port. Older patients may be less
sensitive to the restrictions on their
personal autonomy that accompany
participation in intensive commu-
nity treatment. A study of deinstit-
tutionalization at Northampton
State Hospital in Massachusetts
also found older patients (those
over age 60) to be least vulnerable
for rehospitalization after commu-
nity placement (Geller et al. 1990).

Of particular note in this study
were the lack of cost savings asso-
ciated with IPCC at GMS sites and
the considerable variation in the
impact of IPCC at those sites. Al-
though IPCC patients used more
total health care resources than
control patients at GMS facilities,
at two sites this difference was
virtually zero while at another site
it exceeded $27,000 (GMS–2). It is
important to note that when data
from the two facilities that did not
fully implement the IPCC model
are excluded, the additional annual
health care associated with IPCC
treatment drops to $1,158 over 2
years, or only $579 per veteran
per year—3 percent more than for
the controls.

Linear relationships were not ob-
served between the frequency, du-
ration, or type of IPCC services
delivered at each site and their
impact on hospital usage or VA
health care costs. However, results
at the two GMS sites that showed
least conformity to the IPCC clini-
cal model were among the poor-
est. The one site that provided
intensive services, but did not pro-
vide them in community settings
(GMS–2) actually increased both
inpatient usage and cost by more
than 50 percent, while the site that
implemented a low-intensity model (GMS-5) had little impact at all on inpatient service usage and also showed a substantial increase in costs. Thus, while no simple dose-response relationship was observed between IPCC and cost reduction (perhaps because of the small number of sites), incomplete implementation of the program was associated with poor results.

One factor that probably limited the impact of the intervention at GMS sites overall was that IPCC teams did not have final decision-making authority to admit or discharge veterans from inpatient care. Although they had substantial clinical input into discharge decisions, their capacity to function as gatekeepers was somewhat limited even before their patients were discharged to the community. Our impression, in addition, is that critical factors outside of the program design significantly influenced program effectiveness at some sites. The IPCC team at GMS-2, for example, was given office space 20 miles away from where most of the patients lived, was located in a large city with a very tight housing market, and was unsuccessful in its efforts to hire a nurse clinical specialist. Such implementation barriers appeared to hamper severely the effectiveness of that particular IPCC program.

Three limitations of the present cost analysis must be noted. First, this study only concerns costs to the VA; data on non-VA service use and costs (and on VA pharmaceutical costs) were not included. In Weisbrod's well-known study of the original ACT program (1980), a comprehensive view of all social costs yielded quite different conclusions from those generated by the cost data from the sponsoring facility alone. The VA, however, is a far more comprehensive health care system than the mental health facilities studied by Weisbrod in Wisconsin, and supplementary data on non-VA health service use and costs (and on overall pharmaceutical use and costs) gathered from a subsample of patients in this study indicate that study participants obtained the vast majority of their health care from the VA, and that the central findings reported are not altered by inclusion of non-VA costs. These data will be reported in the future in a presentation of the full social costs of this initiative.

Second, data on symptom status, social adjustment, and quality of life are needed to estimate the clinical effectiveness of this treatment across facility types. Such data are available for only 70 percent of IPCC participants but will be essential to the final evaluation of the benefit of IPCC treatment.

Finally, an important feature, although not necessarily a weakness, of this study is that treatment was not standardized at all sites. As we have seen in this study, we cannot easily separate the impact of program design from the influence of idiosyncratic implementation conditions at each site. An important distinction has been drawn in recent years between the roles of "studies of efficacy" and "studies of effectiveness" in evaluating medical technologies (Salive et al. 1990). The central characteristic of efficacy studies is that they allow the impact of interventions to be evaluated under optimal conditions—that is, when they are implemented by highly skilled clinicians using comprehensive treatment protocols under expert supervision. In contrast, effectiveness studies, such as this one, are designed to further the evaluation of the impact of interventions whose potential value has already been demonstrated through efficacy studies; this is accomplished by assessing their impact under more routine clinical circumstances. This study, therefore, moves beyond efficacy studies and supports the conclusion that, under ordinary implementation conditions, hospital usage is reduced and savings associated with IPCC programs can equal the additional costs of such programs. This result is most likely at long-term psychiatric facilities, with high inpatient service users, with older patients, and when the program receives administrative support that ensures its full implementation. It will be important in the future to develop methods that ensure full implementation of the IPCC model, especially at GMS sites.

References


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