British Journal of Psychiatry (1995), **167**, 331-342

The Maine and Vermont Three-Decade Studies of Serious Mental Illness
I. Matched Comparison of Cross-Sectional Outcome

MICHAEL J. DESISTO, COURTENAY M. HARDING, RODNEY V. MCCORMICK, TAKAMARU ASHIKAGA and GEORGE W. BROOKS

Background. This study compared long-term outcome of serious mental illness in two states using a matched design to assess psychiatric rehabilitation programmes; Vermont subjects participated in a model psychiatric rehabilitation programme, while the Maine group received more traditional care.

Method. Maine and Vermont subjects ($n=269$) were matched by age, sex, diagnosis, and chronicity. Demographic, illness, and life history information were abstracted from hospital records by clinicians blind to outcome. DSM-III criteria were applied retrospectively. Outcome was assessed by clinicians blind to history.

Results. Vermont subjects alive at follow-up ($n=180$) were more productive ($P<0.0009$), had fewer symptoms ($P<0.002$), better community adjustment ($P<0.001$) and global functioning ($P<0.0001$) than Maine subjects ($n=119$).

Conclusions. Outcome differences may be due to Vermont's model programme and a policy of allowing an earlier opportunity for community life.

Long-term studies of serious mental illness have provided a clearer understanding of the wide heterogeneity of outcome that is possible (Huber *et al*, 1975; Ciompi & Müller, 1976; Bleuler, 1978; Tsuang *et al*, 1979; Harding *et al*, 1987*a*,*b*). This appreciation has been especially helpful for schizophrenia, which, until recently, had been thought to be defined by a uniformly poor outcome (Kraepelin, 1902; American Psychiatric Association, 1980). However, comparing long-term studies is difficult owing to differences of method concerning, for example: diagnostic criteria, outcome definitions, instrumentation, strategies for missing and deceased subjects, protocols for collection of follow-up information, and treatment eras (Strauss & Carpenter, 1972; Angst, 1988; McGlashan, 1988).

To address some of the above issues, this paper compares the long-term outcome of matched groups from two recent long-term studies in the USA. The average length of follow-up for Vermont and Maine subjects was 32 years (Harding *et al*, 1987*a*,*b*) and 36 years, respectively. Identical protocols and instrumentation were used, along with reliability studies. The Vermont subjects participated in a model rehabilitation programme (Chittick *et al*, 1961), while the Maine group received traditional in-patient treatment and aftercare (DeSisto *et al*, 1991). A major aim of the study was to determine the effect of Vermont's rehabilitation programme. The study relied on a quasi-experimental design which used group matching and covariance procedures to control for the effect of policy and unmatched group differences.

Background to the study

The foundation for this work was established over 30 years ago. Before the policy of deinstitutionalisation, mental health centres, and entitlement programmes, Vermont's State Hospital and the Vocational Rehabilitation Division jointly initiated a pioneering rehabilitation programme (Chittick *et al*, 1961). The programme was comprehensive and eclectic (Harding *et al*, 1987*a*,*b*). Concepts from social psychiatry were integrated with those from medicine and vocational rehabilitation. All services were organised around the goal of self-sufficiency. New strategies were used in the hospital which included 'blurring of roles', intensified relationships, and new expectations for both patients and staff. Vocational rehabilitation provided new community residences, work options, and case management. Continuity of care across settings was assured as teams of hospital and vocational workers established halfway houses, found job openings, made job placements, and linked patients to natural supports in the community. The programme created a comprehensive system of care before the creation of community mental health centres and community support systems.

The early 1980s follow-up

In the early 1980s, Harding *et al* (1987*a*,*b*) assessed the long-term outcome of the Vermont cohort at an average of 32 years after first admission. Of the original 269 patients, 262 (97%) were traced. Outcome for the cohort was widely heterogeneous.

Of those interviewed, 55% were rated as having little or no social impairment, were asymptomatic, had close relationships, were employed or otherwise productive, and were living independently. Sixty-eight per cent were rated as functioning 'pretty well', defined as a score over 61 on the Global Assessment Scale (GAS; Endicott *et al*, 1976). These findings raised questions about whether the favourable outcome was due to the rehabilitation programme (Chittick *et al*, 1961), Vermont's rural environment (Zubin, 1985), or the characteristics of the Vermont sample (McGlashan, 1988, and corrected McGlashan, 1991).

A detailed historical comparison of the evolution of the Maine and Vermont mental health systems revealed that Maine did not develop a comprehensive rehabilitation programme that was linked to the depopulation of its hospital. Instead, Maine patients received more 'traditional care', in the form of modern drug treatment (beginning in 1955–56) and aftercare (provided first by hospital social workers and then by community mental health centres), with little or no involvement in vocational rehabilitation. Also, the development of alternative residences, such as community halfway houses, came 16 years after that in Vermont (DeSisto *et al*, 1991). Since the sociocultural composition of rural Maine and Vermont appeared similar, in order to explore outcome correlates, a cohort in rural Maine, matched to Vermont patients by age, sex, diagnosis, and length of hospital stay, was followed with the same protocol developed by Harding *et al* (1987*a*).

Method

Subjects

All of the over 8000 summary cards for Maine hospital admissions were screened to exclude patients born before 1890, those with organic, drug and alcohol disorders, those on criminal mandates, and those not admitted between 1956 and 1961. This period represented the treatment era during which persons were referred and discharged from the Vermont rehabilitation programme.

This strategy resulted in a pool of 1944 possible matches for the Vermont subjects. Exact matching by sex, diagnosis, and age was conducted, followed by closest matching on hospital stay (Table 1). In each group there were 125 men and 144 women, and 190 subjects had schizophrenia according to DSM–II criteria (American Psychiatric Association, 1968), 9 had schizoaffective disorder, 20 had affective disorders, and 50 had other disorders.

Field work

Vermont's protocols, instrumentation, and standardised procedures were used (Harding *et al*, 1987*a*). To assure comparability between states, a Vermont clinician field worker (PL) trained the two Maine field workers in the interview process. Two inter-rater reliability trials were conducted between the Maine clinicians (with 48 subjects) and between the two Maine clinicians and the Vermont clinician (with 20 subjects). The overall kappa (Fleiss, 1973) agreement for the Maine data set was 0.71, while the overall agreement between Maine and Vermont was 0.61.

The clinician field workers, blind to record information, conducted two interviews about one week apart in each subject's place of residence. The first interview involved an assessment of current functioning across outcome domains. The second interview involved a structured year-by-year documentation of domains in a life-chart format (Leighton & Leighton, 1949; Meyer, 1951; Harding *et al*, 1989). Relatives, friends, and carers of live and deceased subjects were also interviewed. Death certificates validated status. In order to obtain a more balanced view of the long-term course for the entire cohort, a surrogate instrument for deceased subjects was used to document the lives and levels of functioning until the time of death.

Table 1
Comparisons of matching variables

Variable	Mean	Standard deviation	Mean difference	*t* value	*P* value	No. of cases
Year of birth						
Maine	1918	10.74				
Vermont	1919	10.81	−0.08	−0.54	0.59	269
Time in hospital to January 1961 (months)						
Maine	88.69	68.47				
Vermont[1]	90.36	84.45	−1.67	0.58	0.56	267

1. Time in hospital for two Vermont cases (4 and 94) was not available at the time of this analysis.

Record review

Two Maine clinicians, blind to outcome, were trained by a Vermont clinician record reviewer (JF) to extract information for all admissions using Vermont protocols. Each record was reviewed independently, and then rated jointly to achieve a consensus between the clinicians. The reliability of the record review data for Maine was determined using two separate ratings, conducted six months apart, of the index admission and life history sections of the Hospital Record Review Form for 21 randomly selected cases. Kappas were 0.54 for index admission and 0.76 for the life history section.

DSM–III rediagnosis

Following the Vermont protocols, primary case records for the index hospital admission, from which all references to diagnosis were deleted, were used by blinded psychiatrists to assign DSM–III (APA, 1980) diagnoses to all Maine patients. Kappa inter-rater reliability for classification of cases as schizophrenia, schizoaffective disorder, affective disorder, or other for 40 randomly selected cases was 0.69 for Maine and 0.65 for Vermont. Kappa levels for classification of cases as schizophrenia or not schizophrenia were 0.69 for Maine and 0.78 for Vermont.

Reliability of individual variables

Of the 40 individual variables reported here, 10 (25%) showed very good inter-rater agreement (kappa range 0.81–1.00), 23 (58%) good agreement (kappa range 0.61–0.80), 5 (12%) moderate agreement (kappa range 0.41–0.60), and 2 (5%) only fair agreement (0.21–0.40). Variables showing moderate and fair agreement included: social ratings (frequency of social contacts, number of social relations, degree of interdependence in social relationships); symptom ratings (verifiable delusion or hallucination, symptoms in past month); the person's awareness of any abnormal involuntary movements; and the ratings of number of years the person was compliant with prescribed medication.

Construction, internal consistency, and reliability

Of the outcome scale battery of interview instruments – the Vermont Community Questionnaire–Cross-sectional (VCQ–C; Harding & Brooks, 1984; Harding *et al*, 1987*a*) – was used to assess current functioning. It was constructed by combining 15 established scales described in the literature. The items from these scales were organised across the domains of residence, work, finances, social functioning, social supports, weekly activities, self-care, use of treatment/social services, satisfaction, environmental stressors, competence, and psychopathology.

Outcome scales for self-care ('Do-for-self'), 'Work', 'Social functioning', and 'Symptoms' were constructed by adding items after dichotomisation. The Appendix summarises the items used to construct the scales. Cronbach's α coefficients (Cronbach, 1951) demonstrated good internal consistency, with values ranging from 0.74 to 0.89.

In addition to the constructed scales, the GAS was used as a measure of overall functioning, the Community Adjustment Scale (CAS; Harding & Brooks, 1986) was employed to assess adjustment to life in the community, and the Mini-Mental State Examination (MMSE; Folstein *et al*, 1975) was used to measure overall cognitive functioning.

The reliability of the GAS, CAS, and MMSE, and the constructed scales, was assessed using the intraclass correlation coefficient (ICC; Bartko, 1966). Coefficients between the one Vermont clinician interviewer who trained the Maine team and between each of the two Maine clinician interviewers for all the outcome scales (20 cases) ranged from 0.75 to 0.98 ($P<0.0001$).

Regression analysis (Pedhazur, 1982) was used to determine the contribution of differences in important unmatched variables and to make co-variance adjustments. The covariates used included the matching variables, variables listed in Table 3, and the interaction terms of the grouping variable (state) with each covariate. The scores for each covariate were standardised to z scores using the grand means for the combined samples. Since all covariates were transformed to z scores, the regression coefficient for the grouping variable, state, was the difference in the outcome variable adjusted to the grand mean of the covariate.

Results

Status of the cohorts at follow-up

Table 2 shows the status of the Vermont and Maine subjects at follow-up. Both cohorts showed attrition by death, more so in Maine because follow-up was seven years later.

The remainder of this report focuses on outcome comparisons of the subjects who were interviewed at follow-up. A separate paper will describe the trajectories for deceased subjects. However, the assumption that the most severely ill subjects died first, leaving a group better suited for recovery, was tested first by comparing the matching variables and co-variates of all 299 alive and all 191 deceased subjects.

Table 2
Status of the 269 Maine and 269 Vermont probands at follow-up

	Vermont		Maine	
	n	(%)	*n*	(%)
Interviewed	180	(66)[1]	119	(44)
Deceased; family and significant others interviewed	71	(26)	120	(45)
Alive; refused participation	11	(5)	14	(5)
Not located	7	(3)	16	(6)
Total	269	(100)	269	(100)

1. The data files used in the extensive analyses for this report include data for two Vermont subjects who completed the interviews but who then withdrew from participation in the study. The University of Vermont Institutional Review Board determined that since these persons were not identifiable in any way and had consented to be interviewed, but then withdrew, the data from the interviews could be used in these analyses without harm to the subjects.

There were no differences except that the deceased group was almost six years older ($t=-6.34$, $P<0.0001$) and had more subjects with DSM-III schizophrenia ($t=2.23$, $P<0.02$). An analysis of variance with age and diagnosis entered as covariates was then used to compare the GAS and the CAS scores by state (Maine, Vermont) and status (alive, deceased). There was no difference between the alive and deceased for the GAS ($F=0.130$, $P=0.718$) or the CAS ($F=0.319$, $P=0.573$). However, Vermont subjects had higher GAS ($F=67.64$, $P<0.0001$) and CAS scores ($F=44.67$, $P<0.0001$). There were no significant differences in the survival rates of the cohorts as measured by the Lee–Desu statistic (1.690, d.f. = 1, $P=0.194$).

Matching variables and covariate comparisons

Table 3 shows the comparisons for 119 Maine and 180 Vermont subjects interviewed at follow-up for the matching variables and other covariates. As expected, there were no significant differences between the cohorts in the matching variables, and in economic status rated at index admission. However, Vermont subjects were discharged three years earlier from the index hospital stay ($P=0.0001$), and were better educated than Maine subjects ($P=0.0001$). More Vermont subjects had a rural origin ($P=0.0001$), while more Maine subjects came from small cities. As a result, more fathers of Maine subjects were industrial workers. In addition, more Maine subjects had an acute onset of illness ($P=0.0003$). Finally, outcome data for the Vermont subjects were gathered seven years before the Maine data, so there was a significant seven-year difference in follow-up year ($P=0.0001$).

Table 3
Comparisons of matching variables and covariates from interviewed subjects

	Vermont (*n*=180)	Maine (*n*=119)	*t*-value	d.f.[1]	*P* value
Hospital stay (months)					
mean	87.7	78.6	1.06	296.0	0.29
s.d.	87.1	61.0			
Year of birth					
mean	1921	1922	−1.43	259.3	0.15
s.d.	10.3	9.9			
Sex[2]					
mean	1.51	1.54	−0.45	253.0	0.65
s.d.	0.50	0.50			
Diagnosis[3]					
mean	1.54	1.64	−1.73	259.0	0.09
s.d.	0.50	0.48			
Index year of discharge					
mean	1961	1964	−5.08	185.1	0.0001
s.d.	4.6	6.9			
Education[4]					
mean	1.84	1.34	4.89	269.2	0.0001
s.d.	0.91	0.83			
Urban/rural origin[5]					
mean	3.09	2.16	6.44	262.3	0.0001
s.d.	1.26	1.19			
Acute onset[6]					
mean	0.19	0.39	−3.72	215.5	0.0003
s.d.	0.40	0.49			
Interview year[7]					
mean	1981	1988	−156	303.0	0.0001
s.d.	0.46	0.32			
Father industrial worker[8]					
mean	0.15	0.32	−3.35	206.5	0.001
s.d.	0.36	0.47			
Economic status[9]					
mean	0.72	0.70	0.38	260.0	0.70
s.d.	0.48	0.46			

1. Fractional d.f. based upon unequal variance *t*-test.
2. 1 = male, 2 = female.
3. 1 = DSM-schizophrenia, 2 = not schizophrenia.
4. 0 = none, 1 = primary, 2 = secondary, 3 = post-secondary, 4 = college. Data not available for seven Vermont patients.
5. 1 = metropolitan, 2 = small urban, 3 = farm, 4 = village, 5 = isolated. Data not available for one Vermont subject.
6. 0 = no, 1 = yes.
7. Not used for matching 1-1 overlap.
8. 0 = no, 1 = yes.
9. 1 = low, 2 = middle, 3 = high. Data not available for two Vermont and one Maine subjects.

Outcome comparisons

Do-for-self

Younger and better-educated subjects, and subjects discharged earlier, did more for themselves at follow-up in both Maine and Vermont. There was no significant difference between the states in self-care, over and above these covariates ($t=-0.81$, $P=0.421$).

Table 4
Maine and Vermont independent sample covariance analysis[1]

	Outcome variables						
	Work	Do-for-self	Social functioning	Symptoms	CAS	MMSE	GAS
Adjusted comparisons 1=VT, 2=ME	−3.35 0.0009	−0.81 0.421	−1.43 0.153	−3.10 0.0021	−3.31 0.0011	0.89 0.37	−4.73 <0.0001
Covariates							
Diagnosis	-	-	2.12 0.035	-	3.12 0.002	2.21 0.028	-
Sex	-	-	2.53 0.012	-	-	-	-
Hospital stay	-	-	-	−2.45 0.015	−2.80 0.0055	4.69 <0.0001	−3.28 <0.0012
Year of birth	4.34 <0.0001	3.82 0.0002	4.44 <0.0001	-	-	−4.70 <0.0001	−1.68 0.094
Index year of discharge	−2.43 0.016	−6.58 <0.0001	−5.05 <0.0001	−5.59 <0.0001	−3.61 0.0004	-	−5.20 <0.0001
Education	2.38 0.018	2.33 0.021	2.18 0.030	-	2.12 0.035	−6.25 <0.0001	-
Urban/rural origin	-	-	-	-	-	-	-
Acute onset	-	-	-	-	−2.89 0.0041	-	−2.40 0.017
Father industrial worker	-	-	-	-	-	-	-
Economic status	-	-	-	-	-	-	-
Interaction terms							
State year of birth	-	-	-	-	-	-	2.35 0.020
State hospital stay	-	-	-	-	-	-	2.21 0.028
State index year of discharge	-	-	-	-	2.36 0.019	-	-
State acute onset	-	-	-	-	2.82 0.0052	-	2.35 0.020
Model statistics							
R^2	16.9%	23.8%	23.1%	22.2%	31.1%	37.5%	32.2%
Error d.f.	287	287	285	295	283	238	290
F	14.55	22.5	14.26	28.11	15.95	28.62	17.2
P	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

1. Maine and Vermont combined into one sample, covariates standardised to z scores, t values, and probabilities. The covariates and interaction terms are listed on the left and outcome variables are listed across the top. Model statistics are presented on the bottom. Final state comparisons are displayed in the first row.

Work

Younger and better-educated subjects and subjects discharged earlier in both states were doing more work at follow-up. However, there was still a 'state' effect over and above these covariates ($t=-3.35$, $P<0.0009$), with more Vermont subjects ($n=79$, 47%, compared with $n=31$, 26%, for Maine) working in some capacity at follow-up.

Social functioning

In both states, women, DSM–III non-schizophrenic subjects, younger subjects, better-educated subjects, and subjects discharged earlier received higher ratings of social functioning. There was no significant difference in social functioning between the states over and above these covariates ($t=-1.43$, $P=0.153$).

Symptoms

Subjects discharged earlier and those with a shorter hospital stay had fewer symptoms, regardless of state. There was still a significant difference between the states over and above these covariates, with Vermont subjects displaying fewer symptoms at follow-up ($t=-3.10$, $P<0.002$).

MMSE

Younger, better-educated subjects, those with a shorter hospital stay, and those with a DSM–III

diagnosis of schizophrenia from both states had better cognitive functioning. There was no significant difference in cognitive functioning between the states over and above these covariates ($t=0.89$, $P=0.37$).

CAS

Better-educated subjects, non-DSM–III schizophrenic subjects, and subjects with a shorter hospital stay showed better community adjustment at follow-up. Overall, subjects discharged earlier had a better community adjustment, but this effect was stronger in Vermont than Maine (state by year of discharge interaction shows an ordinal relationship). Acute onset was associated with poorer community adjustment in Vermont and better community adjustment in Maine. There was still a significant difference in community adjustment between the states over and above these covariates ($t=-3.31$, $P<0.001$), with Vermont subjects displaying better adjustment at follow-up.

GAS

Subjects discharged earlier, regardless of state, had better global functioning. In Maine, but not in Vermont, younger subjects had better global functioning (state by year of birth and state by hospital-stay interactions). In Vermont, but not in Maine, subjects with a longer index hospital stay had worse global functioning. In Vermont, acute onset was once again associated with poorer global functioning, while in Maine, acute onset was associated with better global functioning (state by acute-onset interaction). However, there was a significant difference in global functioning between the states over and above these covariates ($t=-4.73$, $P<0.0001$). Of the Vermont subjects, 68% (114) were functioning at least 'pretty well' (GAS score >61) compared with 49% (58) for Maine.

Discussion

This study represents the first attempt to conduct a long-term outcome comparison between states using matched samples and the same protocols. Several elements of the method that are keys to interpreting any differences in outcome have been included, such as: sample definitions; operationally defined diagnostic criteria; multiple demographic, predictor, and outcome measures; blind ratings of illness and outcome factors; and reliability testing.

However, there are several caveats to consider: (a) a distinct bias toward long-stay patients; (b) reported moderate response to phenothiazines in Vermont and undetermined response in Maine; (c) both present-state and retrospective data elements in Maine and Vermont; (d) clinical referral of known 'back-ward' patients to the rehabilitation programme in Vermont; and (e) computer matching on only a few key variables in Maine. Also, a retrospective, but necessary, modern rediagnosis for both cohorts from clinical records was conducted.

Vermont subjects functioned significantly better at follow-up across all the domains studied, except cognitive functioning, which was the same. These initial differences were modulated when differences in unmatched subject variables and the major policy difference between the states, index year of discharge, were covaried. After adjustment for these differences, Vermont subjects still displayed greater productivity, better adjustment to the community, and better global functioning.

The regression models for the adjusted comparisons show that different combinations of subject variables were linked to specific outcome domains. For example, subjects with more education had better cognitive and social functioning and better work records. Subjects with more education and less time in hospital had better community adjustment. The goal of this study was not prediction of outcome but instead control of differences in subject variables to determine the effect of the Vermont programme on outcome. However, the data support the notion that predictors of outcome vary according to the outcome domain studied (McGlashan, 1986).

The analysis examined the relationship between the original matching variables – age, sex, diagnosis, and length of hospital stay – and the outcome domains studied. Younger subjects from both states had better cognitive functioning than older subjects. Also, in Maine but not in Vermont, younger subjects had better global functioning at follow-up. However, follow-up in Maine was seven years later than in Vermont. This allowed the effects of age on functioning to become more pronounced for Maine subjects. Women had better social functioning. This relationship between sex and social outcome has been found by other investigators (e.g. McGlashan & Bardenstein, 1990). Better-educated and non-schizophrenic subjects and those with less time in hospital showed better community adjustment. Non-schizophrenic subjects in both states displayed better social functioning at follow-up. The better cognitive functioning for subjects with a DSM–III diagnosis of schizophrenia is due to the inclusion of 23 subjects in each state with an organic diagnosis among the non-DSM–III schizophrenic group. These subjects had been removed in the data analysis for Vermont (Harding *et al*, 1987*a*,*b*). Finally, subjects from

both states with less time in hospital had fewer symptoms and better community adjustment at follow-up.

Given these findings, what was the effect of the Vermont rehabilitation programme on outcome? Can the case be made that the adjusted differences were the result of Vermont's model programme, the hallmarks of which were the early opportunity to adapt to living and working in the community and the long-term continuity of care?

First, Vermont subjects had fewer symptoms than Maine subjects at follow-up. The initial impetus for Vermont's model programme was the rehabilitation of a group of 'back-ward' patients who had made only a modest response to treatment with chlorpromazine (Brooks, 1956). In fact, 178 other patients had responded to the new drug therapy and were released – leaving behind the 269 members of the Vermont cohort. Thus, the Vermont sample was selected clinically, while the Maine sample was selected by computer matching, and thus the drug-responsiveness of subjects in Maine was not known beforehand. This sampling difference may have resulted in the difference in symptoms (Vermonter subjects less ill) 30 years later. However, the Maine cohort was also selected from the bottom third (longer-stay) of the hospital population. A controlled look at the question of early drug responsiveness on long-term course and outcome is a question for future studies.

Vermont subjects had a better work outcome. The major policy difference between the states, index year of discharge, was entered by the regression analysis as an adjuster for all domains except work and cognitive functioning. Are the robust differences in work outcome the result of the Vermont programme, with its emphasis on vocational rehabilitation and the opportunity to work? Are the differences the result of the selection of already good workers for rehabilitation in Vermont (erroneously suggested and corrected by McGlashan, 1991)? Was there a difference in the work ethic between the states, or the availability of jobs and other sociocultural factors? The evidence suggests that the differences in work outcome are not due to differences in sociocultural factors or work ethic between the states. More Vermont subjects came from family farms or small towns and more Maine subjects came from small cities and had fathers who were unskilled or semiskilled industrial workers. However, there was no significant statistical difference in the percentage of the samples that were ever employed before index admission (83% for Maine and 72% for Vermont). Unskilled industrial or service work accounted for most of the jobs in both states. Further, Vermont subjects worked more in agriculture and skilled clerical or craftsman jobs. Therefore, it does not appear that work ethic or opportunity can account for the differences in work outcome. It is possible that in Vermont patient selection was based partly on favourable industrial work in Vermont, but most literature does not support the notion that this form of work therapy has any effect on community work at follow-up (e.g. Kunce, 1970). Even if this were not the case, and although Maine subjects were not selected on the basis of hospital work performance, 82% of them were involved in hospital work, with 10% in highly skilled jobs. Perhaps the most convincing evidence against a subject-selection explanation for the observed differences in work outcome is that the difference is mainly the result of a difference in volunteer work and not paid work. The Vermont programme specifically targeted boarding home residents for volunteer work. This suggests that there may have been a greater effect of the programme on more poorly functioning patients.

To summarise, the results suggest that differences in outcome between the states were the result of several factors. However, even after covariance adjustments, Vermont subjects were more productive, had fewer symptoms, and displayed better overall functioning and community adjustment. While it is always possible that other, unknown differences contributed to the differences in outcome, it can be argued that the differences in outcome are likely to be attributable to the Vermont programme, since it provided an opportunity for community adaptation in the context of an array of residential, work, and social opportunities which were all managed to ensure continuity. The analysis of differences in the long-term course trajectories discussed in part II adds further support for this conclusion.

Appendix

Listing of outcome scale variables

Do-for-self. Get around on own; buy own groceries; cook for self; do own laundry; shop for clothes; housekeeping; manage own money; independence. Alpha = 0.89 for Maine and 0.85 for Vermont.

Work. Volunteer work; hours per week volunteer; hours per week for pay; employment status in past month; quantity of useful work in past year. Alpha = 0.84 for Maine and 0.74 for Vermont.

Social functioning. Interdependence in relationships; degree of social activity; quality of companionship; relations with children; relations with relatives; relations with friends; number of social relations; fullness of life. Alpha = 0.85 for Maine and 0.89 for Vermont.

Symptoms. Emotional withdrawal; conceptual disorganisation, guilt feelings; mannerisms/posturing;

grandiosity; depressed mood; hostility; hallucinatory behaviour; unusual thought content; blunted affect; disorientation; auditory hallucinations; rating of degree of psychopathology; valid/verifiable hallucinations or delusions; absence of symptoms in past month. Alpha = 0.76 for Maine and 0.81 for Vermont.