

Randomized Controlled Trial of Integrated (Managed) Care Pathway for Stroke Rehabilitation

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Background and Purpose—Integrated Care Pathway (ICP) is an organized, goal-defined, and time-managed plan that has the potential of facilitating timely interdisciplinary coordination, improving discharge planning, and reducing length of hospital stay.

Methods—An ICP for stroke rehabilitation based on evidence of best practice, professional standards, and existing infrastructure was developed. Its effectiveness was tested in 152 stroke patients undergoing rehabilitation who were randomized to receive ICP care coordinated by an experienced nurse (n=76) or conventional multidisciplinary care (n=76).

Results—The age, sex, premorbid functional ability, and stroke characteristics of the 2 groups were comparable. There were no differences in mortality rates (10 [13%] versus 6 [8%]), institutionalization (10 [13%] versus 16 [21%]), or length of hospital stay (50 ± 19 versus 45 ± 23 days) between patients receiving ICP or multidisciplinary care. Patients receiving conventional multidisciplinary care improved significantly faster between 4 and 12 weeks (median change in Barthel Activities of Daily Living Index 6 versus 2; $P < 0.01$) and had higher Quality of Life scores at 12 weeks (65 versus 59; $P = 0.07$) and 6 months (72 versus 63; $P < 0.005$). There were no significant differences in the mean duration of physiotherapy (42.8 ± 41.2 versus 39.4 ± 36.4 hours) or occupational therapy (8.5 ± 7.5 versus 8.0 ± 7.5 hours) received between the 2 groups.

Conclusions—ICP management offered no benefit over conventional multidisciplinary care on a stroke rehabilitation unit. Functional recovery was faster and Quality of Life outcomes better in patients receiving conventional multidisciplinary care. (*Stroke*. 2000;31:1929-1934.)

Key Words: effectiveness ■ hospitalization ■ integrated care pathways ■ rehabilitation ■ stroke

Current literature consists of several well-designed studies that strongly support the establishment of comprehensive, well-organized, and patient-centered services for stroke patients.¹⁻³ Much of the proven effectiveness of stroke rehabilitation units has been attributed to interdisciplinary teamwork,⁴ but there may be scope for further gains on these units by adopting strategies that avoid unnecessary delays and reduce the length of inpatient rehabilitation required by stroke patients.⁵⁻⁷

The objective of improved effectiveness may be achieved by adoption of the Integrated Care Pathway (ICP) technique, which facilitates the coordination of complex interdisciplinary processes.⁸ The implementation of ICP is often overseen by a healthcare professional designated as the “case manager,” who uses the care pathway as the template for provision of appropriate care.⁹ This professional is typically an experienced nurse who is empowered to initiate investigations, request referrals, and prescribe medication within the constraints of the pathway without the need for prior medical consultation.¹⁰ ICPs have been piloted successfully in acute and rehabilitation settings and shown to be particularly effective in reducing hospital length of stay and

costs in intensive care, management of chronic disorders, and acute stroke care in several nonrandomized studies of differing designs.^{6,7,11-14}

Some reports suggest that the complex multidisciplinary nature of stroke rehabilitation may be particularly suitable for ICP management.^{6,7,9} An ICP provides a time-defined template to organize several related therapeutic activities in parallel at each stage of the rehabilitation process, thus reducing the time needed to undertake these activities. Because the length of hospital stay (rather than investigations, medical care, or therapy input) is the major determinant of costs in stroke rehabilitation,^{13,15} a reduction in the duration of inpatient rehabilitation while achieving comparable functional outcome will enhance the efficiency of the rehabilitation process. This hypothesis has not been investigated with use of a randomized controlled design.

The objective of this prospective, randomized, controlled trial was to evaluate the effectiveness of ICP-based management in reducing the length of hospital stay without affecting functional outcome in stroke patients undergoing specialist rehabilitation.

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Subjects and Methods

The study was undertaken in acute stroke patients within 2 weeks of ictus. Patients were eligible for inclusion if they had persistent motor, sensory, vision, speech, perceptual, or cognitive impairment resulting in limitation of personal activities for daily living and required inpatient rehabilitation. Patients with mild deficits who did not require inpatient rehabilitation were excluded from the study. Patients were also excluded if they had severe premorbid physical or cognitive disability. Informed consent was obtained from patients; assent was obtained from the next of kin in patients unable to give consent.

Design, Sample Size, and Randomization

A prospective, open, randomized design was used with 2 parallel groups followed for 6 months. The primary outcome measure was the hospital length of stay, because this has been the main objective of implementing ICP management in service settings.^{6,13,14} The estimated mean length of stay on the unit was 53 (SD 17) days⁷; ICP methodology was expected to reduce this by 7 days (15%) to be clinically relevant. A sample size of 136 (68 in each group) was required for the study to have 80% power to detect this difference at the 5% significance level. This sample size also had 80% power to detect a 3-point difference in the Barthel Index, 20% relative difference in Quality of Life scores, and 20% relative difference in the combined end point of death and institutionalization at the 5% significance level.

Patients were randomized before transfer to the stroke rehabilitation unit when they were medically and neurologically stable. The responsible physician called the randomization office, which confirmed eligibility and allocated consecutive patients to intervention or control group on the basis of a computer-generated list of random numbers. Block randomization was used in groups of 10 because of practical reasons of bed availability and to guard against imbalance caused by time trends over the duration of the study.¹⁶

Interventions

The study was carried out on a stroke rehabilitation unit, which consisted of 2 separate bed areas managed by separate teams of nurses. Although both areas had a well-developed multidisciplinary approach to patient care, the 2 teams worked independent of each other, with separate team meetings. The ICP was introduced in one area where all patients using this methodology were treated and the other was used as the control setting with conventional multidisciplinary care.

Integrated Care Pathway

The ICP (Appendix) was developed by the stroke multidisciplinary team consisting of a physician, nurses, physiotherapists, occupational therapists, speech therapists, and a social worker, all with expertise in stroke management. An extensive review of available literature was undertaken with the MEDLINE, CINAHL, Nursing, and Health Services databases. Information was also collected on ICP projects that were not published but were known to members of the multidisciplinary team. This information was collated with local data and experience to be relevant to local service requirements.

Each professional group listed therapeutic activities necessary for ensuring best practice in rehabilitation and discharge planning. Specific activities were grouped according to stage and predicted patient needs at a given time. The overall goals of the rehabilitation program were determined by stroke severity, number and degree of impairments, expected outcome, premorbid functional status, and patient/caregiver attributes or needs. Key short-term goals for each therapeutic intervention and the time estimated to achieve these were defined in advance. A senior nurse with experience in acute care, rehabilitation, and management was appointed to implement ICP management. This was necessary to prevent existing staff seeing ICP implementation as an "add-on" work commitment, which could compromise its effectiveness.

The study was preceded by multidisciplinary training sessions on the philosophy, operational aspects, and expected gains of the

integrated pathway. The ICP was piloted for a 3-month period in the study area to achieve staff competence with the new methodology, resolve operational problems, and reduce practice bias in the study.

Conventional Care

Conventional care was provided by means of the multidisciplinary model of care. Patients were assessed comprehensively, and an individualized rehabilitation program was designed by members of the multidisciplinary team. In contrast to the ICP method, in which therapeutic activities, short-term goals, and the time taken to achieve these goals were defined in advance, these aspects were discussed in weekly multidisciplinary meetings and determined on the basis of patients' progress. The multidisciplinary process of care and documentation was reviewed, and a 3-month period of strict implementation of all aspects of multidisciplinary care was undertaken to exclude bias caused by the placebo effect of undertaking the trial.

Assessments and Data Analysis

Data on age, sex, stroke side, stroke subtype,¹⁷ neurological deficit,¹⁸ and premorbid abilities were collected as baseline. Patients were assessed for incontinence, dysphasia, dysphagia, and visual/sensory inattention on entry to the study. The Barthel Activities of Daily Living Index¹⁹ was assessed at 1, 4, 12, and 26 weeks. Anxiety and depression scores were assessed with the Hospital Anxiety and Depression Scale²⁰ at 4, 12, and 26 weeks. Rankin Score²¹ and Euroqol Quality of Life Score²² were assessed at 12 and 26 weeks. The total therapy time for physiotherapy and occupational therapy was logged on a daily basis. Data on mortality, cause of death, and discharge destination were collected up to 26 weeks. Research assessments were undertaken by 2 observers who were not directly involved in patient care. Both observers undertook independent assessments on each patient, and scores on which there was agreement were used. The κ value for interobserver agreement was 0.78 for Barthel and 0.86 for Rankin scores. In instances in which the assessments differed, the observers reviewed the patient together to arrive at a consensus.

Data were analyzed on an intention-to-treat basis. Continuous variables such as age, length of stay, and duration of therapy were compared with a *t* test. Comparison of qualitative variables such as sex, stroke subtype, stroke side, premorbid function, mortality, and institutionalization were assessed by χ^2 tests. Nonparametric variables such as Barthel Index and Quality of Life were compared by means of the Mann-Whitney test.

Results

The sample was drawn from 335 consecutive, acute-stroke patients. Of these, 69 (21%) patients died in the acute phase (0 to 14 days) and 63 (19%) patients with mild deficits did not require inpatient rehabilitation. Twenty-one (6%) patients were excluded because of severe cognitive or physical disability before stroke. A further 30 (9%) patients with severe strokes were excluded because they could not comply with specialist rehabilitation procedures when assessed within the first 2 weeks. One hundred fifty-two (45%) eligible patients were randomized (median 6 days; range 2 to 10 days), and 76 patients were allocated to each group.

Review of the ICP records in 76 patients managed by this methodology showed good compliance with the care pathway in all domains assessed (Table 1). The vast majority of interventions and events were recorded appropriately; only 14 (18%) sets of records showed incomplete documentation in 1 or more domains assessed. At least 80% of the specified interventions had been undertaken in >80% of the patients who had complete records.

There were no significant differences in age and stroke characteristics between the 2 groups (Table 2). Although

TABLE 1. Compliance With and Variance From the ICP Algorithm in 76 Patients Managed Using ICP Methodology in the RCT

Domain	Incomplete Records, n (%)	Patient With >80% Specified Interventions, n (%)	Sensitivity of Compliance	
			Min	Max
Medical	9 (12)	59/67 (88)	78%	89%
Nursing	2 (3)	71/74 (96)	93%	96%
Physiotherapy	7 (9)	61/69 (88)	80%	90%
Occupational therapy	9 (12)	54/67 (80)	71%	83%
Speech therapy	4 (5)	69/72 (96)	91%	96%
Discharge planning	5 (7)	69/71 (97)	91%	97%
Patient/career education	2 (3)	68/74 (92)	89%	92%

there were more men in the ICP-managed group, this difference was not statistically significant. The 2 groups were also comparable for premorbid function, neurological impairment, and level of disability at randomization (Table 2).

There were no significant differences in the length of hospital stay (the primary outcome measure) between patients assigned to ICP management and those assigned to conventional multidisciplinary care (Table 3). Patients receiving ICP care stayed in the hospital for 5 more days on average (95%

TABLE 2. Patient Characteristics of 152 Subjects on Entry to the Randomized Study

	ICP Method	MDT Care	<i>P</i>
No. of patients	76	76	
Mean age (SD), y	75 (11)	74 (10)	NS
Men	35 (46%)	43 (56%)	NS
Side of stroke, n (%)			NS
Left	40 (52)	39 (51)	
Right	34 (45)	35 (46)	
Stroke subtype, n (%)			NS
TACS	20 (26)	17 (22)	
PACS	36 (47)	38 (50)	
LACS	16 (21)	17 (22)	
POCS	4 (6)	4 (6)	
Premorbid ability, n (%)			
Independent in:			
Continence	72 (95)	75 (99)	NS
Dressing	74 (97)	75 (99)	NS
Mobility	74 (97)	76 (100)	NS
On study entry			
Incontinent	36 (47)	39 (51)	NS
Dysphasic	26 (34)	28 (37)	NS
Dysphagic	37 (48)	43 (56)	NS
Visual inattention	17 (22)	18 (24)	NS
Sensory inattention	43 (57)	34 (45)	NS
Mean Orgogozo Score (SD)	57 (24)	53 (22)	NS
Median Barthel Index (range)	5 (0–17)	5 (0–17)	NS

ICP indicates Integrated Care Pathway; MDT, MultiDisciplinary Team; TACS, total anterior circulation syndrome; PACS, partial anterior circulation syndrome; LACS, lacunar syndrome; and POCS, posterior circulation syndrome.

CI –14 to 24 days) compared with those receiving conventional multidisciplinary care. Although more patients died in the ICP group, most of these deaths were after discharge from the hospital, and the difference did not achieve statistical significance. Causes of death were recurrent stroke (n=4), bronchopneumonia (n=4), myocardial infarction (n=2), and pulmonary embolism (n=3). A higher institutionalization rate was seen in patients receiving conventional multidisciplinary care (21% versus 13%). The trend toward shorter length of stay for multidisciplinary care was not at the cost of increased institutionalization in patients treated with this strategy (Table 3). Odds ratios for death [0.6 (95% CI 0.3 to 2.3)], institutionalization [1.5 (95% CI 0.5 to 2.8)], and the combined end points of death or institutionalization [1.1 (95% CI 0.5 to 2.1)] did not show significant difference between the 2 groups.

The median Barthel Index and Rankin scores were comparable between the 2 groups at all assessment points (Table 4). Patients receiving conventional multidisciplinary care improved significantly faster between 4 and 12 weeks (median change in Barthel Index 6 versus 2; $P<0.01$). There were no significant differences in the proportion of patients with Rankin score of ≤ 2 (good recovery) and those with scores of ≥ 3 (residual disability) between the 2 groups at 26 weeks (21

TABLE 3. Length of Hospital Stay, Mortality, and Institutionalization

	ICP Method	MDT Care	<i>P</i>
No. of patients	76	76	
Cumulative Deaths at			
1 week	0	0	NS
4 weeks	1	2	NS
12 weeks	5	4	NS
26 weeks	10 (13%)	6 (8%)	NS
Discharged to			
Home	56 (74%)	54 (71%)	NS
Institution	10 (13%)	16 (21%)	NS
Days in hospital, mean (SD)			
Overall	50 (19)	45 (23)	NS
Patients discharged home	45 (21)	37 (19)	NS
Discharged to institutions	79 (12)	74 (9)	NS

TABLE 4. Longitudinal Assessments of Activities of Daily Living, Handicap, Anxiety, Depression, and Quality of Life in Stroke Survivors

	ICP Method	MDT Care	P
Median Barthel Index score			
Baseline (n=152)	5	6	NS
Week 1 (n=152)	7	8	NS
Week 4 (n=149)	13	11	NS
Week 12 (n=143)	15	17	NS
Week 26 (n=136)	17	17	NS
Median Rankin score			
Premorbid (n=152)	1	1	NS
Week 12 (n=143)	3	3	NS
Week 26 (n=126)	3	3	NS
Median Anxiety score			
Week 4 (n=134)	5	5	NS
Week 12 (n=128)	4	4	NS
Week 26 (n=124)	4	4	NS
Median Depression score			
Week 4 (n=134)	6	5	NS
Week 12 (n=128)	5	5	NS
Week 26 (n=124)	5	5	NS
Median Euroqol score			
Week 4 (n=134)	41	44	0.1
Week 12 (n=128)	59	65	0.07
Week 26 (n=124)	63	72	<0.005

[32%] versus 26 [37%]; $P=NS$). There was a steady and comparable decline in anxiety and depression in both groups during the 6-month period of follow-up (Table 4). The Quality of Life scores improved significantly in both groups ($P<0.005$) between week 4 and week 26. There was a trend toward higher scores in patients receiving multidisciplinary care at 12 weeks that was significant by 26 weeks (Table 4).

The mean duration of physiotherapy and occupational therapy received by patients in both groups was comparable at 12 weeks and 26 weeks (Table 5). Nearly all of the therapy received by patients in the first 6 months of stroke was provided during their inpatient stay; postdischarge therapy accounted for <10% of the input in both groups. Patients in both groups received intensive physiotherapy [mean 2.0 (1.5) versus 1.9 (1.6) h/d] and occupational therapy [mean 0.6 (0.4) versus 0.5 (0.4) h/d] input during the active phase of their rehabilitation program. However, the mean amount of therapy received per day of the entire hospital stay was small because of dilution caused by the time spent awaiting supported discharge or institutionalization in both groups.

Discussion

This prospective randomized controlled study of one team using an integrated care pathway versus another team using standard care showed that the ICP method of stroke care did not reduce the length of inpatient stroke rehabilitation. There were no significant differences in the duration of therapy received by patients compared with conventional multidisciplinary

TABLE 5. Duration of Therapy Input in Hours (Mean and SD) Received by Stroke Patients Undergoing Rehabilitation

	ICP Method, h	MDT Care, h	P
Physiotherapy			
Cumulative duration at			
12 weeks	38.0 (28.8)	34.8 (27.8)	NS
26 weeks	42.8 (41.2)	39.4 (36.4)	NS
Mean duration of treatment <i>per patient per day</i> of hospital stay	0.8 (0.6)	0.7 (0.6)	NS
Occupational therapy			
Cumulative duration at			
12 weeks	8.0 (6.0)	7.5 (7.0)	NS
26 weeks	8.5 (7.5)	8.0 (7.5)	NS
Mean duration of treatment <i>per patient per day</i> of hospital stay	0.2 (0.4)	0.2 (0.2)	NS

The duration of therapy represents the time actually spent in treating the patients (face-to-face contact) and has been adjusted for the seniority and number of therapists involved in the treatment session.

plinary care. Mortality, institutionalization, and the combined end point of mortality and institutionalization were comparable between the 2 groups. Both groups showed consistent improvements in functional ability and anxiety and depression levels, which were comparable at 6 months. It appeared that ICP management had little advantage over established multidisciplinary care in the setting of the study.

Objective evaluation of processes of care is methodologically difficult because of dependence on clinical practice, susceptibility to inadvertent bias, and lack of validated measures to detect small changes in stroke recovery. The development and piloting of the ICP methodology before the evaluation in this study enabled differences from conventional multidisciplinary care to be defined and reduced errors caused by practice effects or staff preference. Crossover of interventions was minimized by using 2 different teams in 2 different ward areas to implement the 2 different strategies. Sample size calculations were based on objective data from previous studies on the unit and the primary outcome measure (length of hospital stay) reflected the key objective of ICP management.^{5,6} Comparisons of mood and quality of life up to 6 months after stroke were undertaken to ensure that subtle differences in outcome were not missed because of the insensitivity of more commonly used measures to detect minor changes in stroke outcome.^{23,24}

Stroke management involves the expertise of several disciplines, which can result in poor coordination or inefficiencies in patient treatment.^{25,26} This can be avoided by the use of ICP methodology, which ensures that important areas of treatment are not overlooked and unnecessary delays are prevented by timely intervention.^{5,6,9} However, the success of ICP management seen in previous "before and after" studies^{13,14,27,28} is not supported by randomized controlled trial data. This may be because stroke rehabilitation units have specialized multidisciplinary input, which reduces the need for additional information, planning, or coordination that an ICP may

Appendix

STROKE CARE PATHWAY DOCUMENT
(interventions with suggested timing)

Stroke date:

Rehabilitation week 1	Day 1/2	Day 3/4	Day 5/6
Medical Investigations	Medical/Neurological assessment, Neurological score Check CT scan results Review blood pressure Aspirin, Anticoagulation, Lifestyles Are all investigations completed? If not send relevant investigations: Blood glucose, cholesterol, carotid duplex scan, ECHO Special investigations if <60 years Prevention of complications Review discharge plans	Medical Assessment Check all assessments completed Review all investigations: Commence secondary prevention measures: Aspirin, Statin, Antihypertensive Blood Glucose control Smoking Advice Anticoagulate if embolic & infarct < 2.5cm diameter on CT scan	Medical assessment. All assessments complete? All investigations seen? Appropriate secondary measures in place? Blood pressure controlled? Patient/family aware of diagnosis, prognosis, prevention? Review discharge plans
Nursing Continence Skin integrity Mood Education	Perform initial assessment Commence Core care plans. Assess and plan for further individualised care plans. Advise patient and family of ward routine. Check swallowing and refer to SLT Referral to OT and early discharge planning Refer to dietician	Detailed assessment for urinary continence. Joint planning with therapists Liaise with dietician. Keep patient/family updated with progress, risk prevention, support literature Assess feasibility of early discharge Contact social services	Review Observation charts Visible continence management plan Consider self medication/education Liaise with pharmacist Discharge planning reviewed Discuss discharge options with patient and relatives
Physiotherapy Position/transfers Mobility	Assessment of transfer abilities (bed, chair), trunk control and limb positioning	Assessment for balance & mobility for early discharge Visible management plan by the bedside	
Occupational Therapy	Assessment for balance, power, co-ordination and proprioception.	Assessment ADL, neglect & perception. Consider fast track referral to social service OTs.	Assessment for discharge safety & ADL in early recovery Visible management plan for OT input
Speech Therapy: Cognition Speech/ Communication	Reassess dysphagia Initial assessment of speech and language Visible management plan for dysphagia	Discuss SLT with relatives Visible management plan for speech and language therapy	Assessment for videofluoroscopy Book slot for videofluoroscopy
Dietetics Nutrition/ Hydration	Assess fluids/food intake Review adequacy of: Method of feeding Food content and consistency Recommend supplements		Consider PEG in patients on NG feeding

Please date and initial interventions in the Patient Multidisciplinary Care Document. All variances must be documented

STROKE CARE PATHWAY DOCUMENT
(interventions with suggested timing)

Rehabilitation week	2	3	4	5
Medical	Review blood pressure: need for treatment: Anticoagulation if AF and eligible Prevention of complications Review discharge plans	Prevention of complications Diagnosis, prognosis and prevention discussed with patient/carer Review discharge plans	Prevention of complications Review discharge plans Review secondary prevention. Reinforce lifestyles advice	Final assessments Neurological score Discharge plans & notification Follow up arrangements
Nutrition and swallowing	Maintains weight Tolerates normal diet. Receives therapy if swallowing problems (refer core plans). Videofluoroscopy	Normal diet Maintains weight If not: refer core plans	Understands diet and special instructions	Maintains weight Competent with diet
Bowel/Bladder	Demonstrates continence or Bladder/bowel training to continue (refer core plans)	Continence control established. If not alternative strategies (refer core plans)	Continent and controlled. If not alternative strategies in place.	Continent and controlled If not, adequate arrangements made
Skin integrity	Dry and intact if broken: refer core plans	Dry and intact Discuss with patient/family implications of positioning.	Skin clear and intact.	Skin clear and intact. Positioning instructions
Mood/Cognition	Ongoing evaluation and support	Screening for depression Commence treatment if appropriate.	Treatment for depression if appropriate.	Continue treatment if appropriate.
Safety	Maintains safe position Does not wander Follows instructions	Safe positioning Safe transfers	Safe on unit. Manageable with available support at home.	Safety demonstrated at home.
Mobility/transfer	Demonstrates baseline abilities	Pre gait abilities Feasibility of ambulation	Progress to ambulation with aids.	Outpatient rehabilitation initiated.
ADLs	Baseline skills in • Feeding • Hygiene/grooming • Dressing	Feeding/hygiene, grooming after means provided. Toilet transfers with help of one. Dressing/undressing skills.	ADL practice Kitchen assessment Plan home visit.	Home visit Aids and adaptations Care package available Fix discharge date
Education	Aware of rehabilitation process Discusses reasonable discharge options	Carer learns transfer technique. Carer/patient demonstrates knowledge of medicines.	Patient/carer understands prognosis and disability. Carer practices "hands on" techniques	Understands care package. Aware of discharge date

Please date and initial interventions in the Patient Multidisciplinary Care Document. All variances must be documented

offer.²⁹ ICPs are based on the premise that patients will have predictable recovery, whereas stroke patients show considerable variability in the timing, nature, and order of recovery. Other explanations for the lack of benefit include the dependence on external influences such as accommodation, personal support, and services provided by other organizations that may not share the priorities of the treating unit.

There is some evidence in this study to suggest that conventional multidisciplinary care may be better than ICP management. The median change in Barthel Index between week 4 and 12 was significantly greater in this group of patients, which suggested that flexibility in goal setting and interventions based on continuing patient assessment may hasten (but not increase the extent) of functional recovery. Quality of Life scores showed significantly greater improvement in patients receiving multidisciplinary care, suggesting that a less structured approach in which patients may dictate the pace of their rehabilitation may play a role in their perceptions of well-being. The use of ICP required the appointment of an additional staff member to coordinate it, thus costing more to achieve a similar or less favorable outcome.

There is considerable enthusiasm to introduce successful cost containment and quality improvement methods such as Integrated Care Pathways and Case Management into diverse clinical settings. There are no doubts that these techniques will be effective and reduce costs in several clinical areas, especially those in which care has been coordinated poorly in the past. However, implementation of change without robust evidence may be counterproductive, especially if organized care already exists. This study emphasizes the need for caution in introducing inadequately tested patient management strategies into the complex area of healthcare provision at the expense of proven strategies.

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