Systematic Literature Review of General Health Care Interventions Within Programs of Assertive Community Treatment

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Objective: Assertive community treatment (ACT) is one of the few evidence-based practices for adults with severe mental illness. Interest has slowly waned for ACT implementation. Yet ACT remains an appealing services platform to achieve the triple aim of health care reform (improved health outcomes, reduced cost, and improved satisfaction) through integration of primary care and behavioral health services. This review highlights the evidence for ACT to improve general medical outcomes, reduce treatment costs, and increase access to treatment.

Methods: Using a comprehensive list of relevant search terms, the authors performed a systematic literature database search for articles published through November 2015, resulting in ten articles for inclusion.

Results: No studies reported on clinical outcomes of general medical comorbidities or on mortality of ACT clients. Half of the studies reporting utilization (three of six) found a decrease in emergency room usage, and three of four studies identified an increase in outpatient primary care visits. Most studies found no increase in overall medical care costs. Of the few studies reporting on quality of life, most found mild to moderate improvements.

Conclusions: To date, rigorous scientific examination of the effect of ACT on the general health of the populations it serves has not been undertaken. Given ACT's similarity to emerging chronic illness medical management models, the approach seems like a natural fit for improving general medical outcomes of persons with severe mental illnesses. More research is needed that investigates the current effect of ACT teams on general medical outcomes, treatment costs, and access to care.

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Assertive community treatment (ACT) programs have been implemented globally to meet the needs of adults suffering with severe mental illnesses (1,2). ACT has repeatedly shown considerable evidence for reducing psychiatric hospitalizations (3,4), promoting housing stability (5,6), and improving client satisfaction with care (7,8). In spite of this widely accepted evidence base, more recent evaluations have called into question the cost-benefit yield of ACT services. In spite of this widely accepted evidence base, more recent evaluations have called into question the cost-benefit yield of ACT services. This is partly because intensive case management (ICM) programs within community behavioral health settings are somewhat ubiquitous and because hospital length of stay has fallen after the advent of managed behavioral health care. In addition, implementation in less fragmented international health care systems has yielded a lower level of cost offset, and the ACT model fidelity has drifted (9–12). States have struggled to provide the traditional ACT model of time-unlimited services for clients as their numbers have exceeded capacity within states' ACT infrastructure (13). Consequently, interest in implementation and sustainability of traditional ACT models over the past decade has been mixed at best. Some states continue to embrace ACT implementation as a bridge to community-based least-restrictive living arrangements for persons with severe mental illness (14), whereas others struggle to find a place for ACT in evolving service delivery models.

In stark contrast, over the past decade interest has increased rapidly both nationally and internationally regarding strategies to more effectively integrate primary care and behavioral health services to improve access to preventive health care for persons with severe mental illness. Such interest is fueled by the excessive cardiovascular disease mortality among adults with severe mental illness (15–18). A substantial portion of this mortality can be attributed to lack of access to high-quality primary and secondary preventive care (19,20). To address this lack of access to good care, national efforts, such as the Substance Abuse and Mental Health Services Administration's Primary Behavioral Health Care

Integration grant program (http://www.integration.samhsa.gov/about-us/pbhci) and state-federal partnerships (such as Medicaid health homes) have sought to replicate aspects of emerging models of primary care delivery reform centered on chronic illness medical management (the patient-centered medical home, for instance). These models were built upon Wagner's chronic disease model, and they are intended to achieve the triple aim in health care reform (improved outcomes, reduced costs, and better satisfaction with and access to care) (21,22). The reform has focused on severe mental illness populations that receive a majority of health care coordination in community behavioral health settings (23,24). Of significant interest is the potential cost savings in reduced utilization of emergency and inpatient hospital services for general medical conditions. Initial evaluations of pilot programs have yielded mixed results, highlighting the difficulty in blending services for persons with complex health problems in underresourced environments. More rigorous scientific testing of these programs is required (25,26).

Prior analyses have demonstrated marked overlap in the structure and function of the ACT model and the primary care patient-centered medical home (27), suggesting that high-fidelity ACT teams are poised to address prevention and chronic conditions by virtue of their multidisciplinary team composition and workflows and their focus on population-based care and accessibility. National survey data have also suggested that ACT teams routinely engage in identification and management of chronic general medical conditions in spite of a lack of formal charge, training, funding, or access to primary care consultation (28). As a result, there is a significant need to identify and understand the degree to which ACT could address general medical conditions, reduce emergency room visits or inpatient hospitalizations for general health conditions, and affect general program costs with or without primary care integration. This systematic literature review examines the current state of evidence available for the effect of ACT on general health service utilization and on general medical outcomes and costs.

METHODS

A systematic literature search of English-language manuscripts was conducted in PubMed (Medline), PsycINFO, Embase, Evidence Based Medicine Reviews, and CINAHL (Cumulative Index to Nursing and Allied Health Literature). Search terms utilized included assertive community treatment or intensive case management as primary terms, with the following additional terms: chronic disease, hypertension, diabetes mellitus, cardiovascular diseases, neoplasms, hospitalization, primary health care, nursing care, preventive medicine, preventive health services, prevention, smoking cessation, life style, health status, physical health, or wellness. When available, MeSH terms and descriptors were applied to the searches and expanded. ICM was used as a search term to capture programs of ACT, which may have been erroneously referred to as stand-alone case management. After cross-referencing and removal of duplicate publications, 658 articles were identified for initial abstract review.

Through discussion, several investigators (ERV, BFH, MM-D, LMS, and PSM) agreed on an algorithm for inclusion of articles for further review. To proceed, articles were first required to report use of a standardized ACT fidelity measure or to describe the intervention as a team-based, interdisciplinary approach of intensive proactive and assertive case management (small caseloads of typically five to 20 persons) coupled to nursing and psychiatric caseload review with extended accessibility. Ambiguity in the description of an intervention was handled through direct communication with the study authors, when possible. Second, the articles must have described the effect of ACT enrollment on the prevalence of general health conditions or outcomes (including cost, utilization, or clinical outcomes) of the population receiving care. Because many analyses report change in inpatient treatment utilization through claims data and the historical focus of ACT has been primarily behavioral, we assumed that analyses reporting change in inpatient hospitalization were focused only on psychiatric hospitalization unless otherwise stated and therefore excluded them. Studies with insufficient detail obtained in the abstract were also identified for further full-text review. This process resulted in 32 articles for full-text review. After exclusion of analyses that reported only prevalence characteristics of general health conditions and those that had no comparison group, ten studies were left for review. [The selection process is depicted in an online supplement.]

RESULTS

Table 1 displays characteristics of the ten studies included. Four of the ten were randomized controlled trials (RCTs), and the others represent five cohort analyses and one case-control analysis. Eight of the ten interventions were ACT teams, and the other two described ICM models very similar in structure and function to ACT. All of the studies except one involved adults with severe mental illness. The exception was the study by Mares and Rosenheck (29), which primarily enrolled homeless adults with a mental disorder, 65% of whom were classified as having a severe mental illness. Three of the ten selected studies also required homelessness or the threat of homelessness as an eligibility requirement for the intervention. Nine of the ten studies reported on health care utilization, six studies described physical health functioning (via common quality-of-life scales) or number of general medical conditions, and six studies described cost outcomes. No studies reported actual clinical outcomes—by degree or severity of illness or improvements in or resolution of medical conditions over time—of general medical disorders or mortality of ACT or ICM clients.

TABLE 1. Characteristics of assertive community treatment (ACT) studies included for review

Study	Analysis[a]	Patients or population[b]	Intervention[c]	Comparison	Outcomes		
					Utilization	Clinical	Cost[d]
Aberg-Wistedt et al., 1995 (30)	RCT	N=40 patients with psychotic disorder and "long-term" schizophrenia; randomly assigned	ACT-type ICM, psychiatrist led	Standard psychiatric services	Emergency room (ER) usage significantly lower ($p<.004$)	Greater quality of life (QoL)	na
Ford et al., 1997 (35)	RCT	N=77 persons with SMI; randomly assigned	ACT-like ICM with psychiatric and nursing support	Care as usual	Increased primary care utilization	No difference in health-related QoL	Threefold increase in primary care costs
Hastrup and Aagaard, 2015 (34)	Case-control	N=86 persons with SMI receiving ACT, N=88 with SMI in control group not receiving ACT	ACT with fidelity criteria	Care as usual	No difference in outpatient primary care use, no difference in ER use	na	Trend to lower costs for outpatient, hospitalization, significantly lower cost ($p<.006$) for less specialty use
Kane and Blank, 2004 (36)	Prospective cohort	N=38 adults with SMI receiving ACT-level services with primary care, compared with 21 adults enrolled in ACT	Enhanced ACT with primary care focus	ACT as usual, separate ACT community control	na	Improved satisfaction; greater report of physical symptoms (on AIMS testing)[e]	na
Lee et al., 2015 (33)	Prospective staggered cohort	N=70 adults with SMI and 3 hospitalizations compared with 2 control groups of 70 adults with similar criteria 1 year before and after recruitment year	ACT	N=140, usual care before and after time period	No significant difference in ER utilization between groups, all had decrease	na	na
Lehman et al., 1997 (5)	RCT	N=152 persons with SMI and homelessness; randomly assigned	ACT	Usual care	Lower ER visits; more outpatient psychiatric visits	Less severe symptoms; better life satisfaction and perceived health status	na
Liem and Lee, 2013 (32)	Time-varying cohort	N=70 frequently hospitalized adults with SMI compared with historical control group (N=70) from 2 years before intervention	ACT	Usual care	Intervention with greater ER visits at 2 years, intervention had fewer missed outpatient appointments	na	na
Mares and Rosenheck, 2011 (29)	Prospective cohort	N=281 homeless adults (65% with SMI) compared with control group (N=104)	ACT and supportive housing	N=104, usual care	Higher number of outpatient medical visits; greater case management associated with greater receipt of outpatient general health care; higher proportion with primary care provider	Greater likelihood that health behaviors discussed; no difference in physical health (SF-12)[f]	Greater number of insured patients; no difference in medical costs; overall cost increase (primarily on mental health side)

continued

TABLE 1. *continued*

Study	Analysis[a]	Patients or population[b]	Intervention[c]	Comparison	Outcomes		
					Utilization	Clinical	Cost[d]
Wiley-Exley et al., 2013 (31)	Longitudinal, observational cohort with Medicaid claims	N=1,065 individuals with SMI enrolled in ACT compared with "potential ACT" (met diagnosis and use requirements but not enrolled; N=1,426); SMI comparison group without service use (N=41,417)	ACT	Usual care	Percentage or N of ER visits significantly lower by 2% per quarter; percentage of patients receiving primary care visits was lower in ACT; ACT had lower N of primary care visits	Medical comorbidities significantly lower in ACT	Overall cost increase for Medicaid compared with control group, by quarter; no difference in medical costs
Wolff et al., 1997 (9)	RCT	N=85 patients with SMI and threat of homelessness, randomly assigned	ACT with community workers; ACT only	Brokered case management	No difference in inpatient or outpatient services	na	No difference in inpatient or outpatient costs

[a] RCT, randomized controlled trial
[b] SMI, severe mental illness
[c] ICM, intensive case management
[d] na, not available
[e] AIMS, Abnormal Involuntary Movement Scale
[f] SF-12, 12-Item Short Form of the Medical Outcomes Survey

Of the six studies reporting on utilization of emergency health care services, three identified significantly lower emergency room utilization (5,30,31). The work of both Aberg-Wistedt and colleagues (30) and Lehman and colleagues (5) were RCTs. Aberg-Wistedt's team found 42 fewer admissions for their 20 intervention patients over a year, compared with 16 fewer admissions for their control group of 20—a statistically significant ($p<.003$) difference. Lehman's team (5) found a similar drop in emergency room utilization by homeless adults with severe mental illness at two, six, and 12 months postenrollment in ACT. With a disease- and utilization-matched control group, Wiley-Exley and colleagues (31) demonstrated a 2% reduction in emergency room utilization over three months for persons receiving ACT services. In contrast, Liem and Lee (32) uncovered higher utilization of emergency room systems in their ACT intervention cohort compared with a retrospective control group, and Lee and colleagues (33) and Hastrup and Aagaard (34) were unable to detect a significant difference in emergency room utilization in their prospective cohort and case-control designs.

Wiley-Exley and colleagues (31) reported lower primary care ambulatory services in the ACT intervention compared with a control group. In contrast, three other studies included in this review reported increased outpatient primary care services. Mares and Rosenheck (29) and Ford and colleagues (35) found a statistically significant ($p<.05$) increase in the number of primary care appointments for persons enrolled in ACT and ICM, whereas the absolute increase in number of appointments provided through ACT and supportive housing compared with usual care in the Mares and Rosenheck cohort was only .66 visits in a 24-month period (not significant). Mares and Rosenheck also demonstrated a correlation between receipt of community-based case management services (as opposed to usual care) and a higher likelihood of having primary care appointments. Liem and Lee (32) demonstrated significantly fewer missed medical appointments in follow-up for those receiving ACT-like services. Wolff and colleagues (9) found no significant difference in inpatient or outpatient utilization between the groups (ACT with community health workers, ACT alone, or ICM) but greater satisfaction and better psychiatric symptom control in the ACT group.

Mares and Rosenheck (29), Wiley-Exley and colleagues (31), and Ford and colleagues (35) all showed an overall (not just medical) cost increase resulting from enrollment in ICM or ACT. The overall cost increase in the Mares and Rosenheck cohort was attributable primarily to increased outpatient mental health expenditures (29). Hastrup and Aagaard (34) were able to demonstrate significantly ($p<.006$) lower outpatient "somatic" specialist costs compared with a control group. Wolff and colleagues (9), Wiley-Exley and colleagues (31), and Mares and Rosenheck (29) all reported no difference in specific medical care costs between intervention and control groups over their respective follow-up periods.

Significantly greater satisfaction with care and quality of life were reported in the three analyses evaluating patient-reported or health functioning outcomes (5,30,36). Lehman and colleagues (5) demonstrated statistically significant ($p<.006$) improvements in the 36-Item Short Form of the Medical Outcomes Survey (SF-36) for health functioning of adults who were randomly assigned to receive ACT versus usual care. Wiley-Exley and colleagues (31) showed that clients receiving ACT-level services had, on average, almost one fewer medical condition per year ($p<.01$) compared with a control group of potential ACT clients, who met diagnosis and use requirements but were not enrolled. Mares and Rosenheck (29) found no difference in physical health functioning as measured by the SF-12.

DISCUSSION AND CONCLUSIONS

The results of this analysis point to an overall lack of significant research or available outcome data regarding physical health or general medical care for persons receiving ACT or ICM. This is somewhat surprising, given the recent focus on integrated primary care and behavioral health services to address health disparities for persons with severe mental illness, the worldwide dissemination and familiarity with ACT models, and similarity of these models to emerging efforts within primary care to better coordinate care for chronic conditions. On the other hand, general health outcomes have not been the traditional focus of ACT or ICM interventions. Most studies assessing these outcomes, as noted above, occur in the context of total cost analyses or as secondary outcomes.

Available data seem to reveal a general pattern toward reduced emergency room utilization. Aberg-Wistedt and colleagues (30) and Lehman and colleagues (5) both reviewed emergency room utilization within the framework of an RCT, finding significant reductions for ACT-like ICM (more team based) and ACT, respectively, when compared with care as usual. Although the articles reviewed herein did not differentiate emergency room utilization based on psychiatric or general medical causes, emergency room utilization, seen as a marker of fragmented, costly, and reactive care, has been targeted as a primary outcome of many emerging health services interventions (37–39).

Cost analyses included in our review generally revealed no difference in total cost, or increase in total cost, over time. Mares and Rosenheck (29) and Wiley-Exley and colleagues (31) found no significant cost differences in inpatient or emergency room use or overall medical care for ACT clients, whereas Ford and colleagues (35) found an overall cost increase three times higher than care as usual. It is notable that with a case-control study, Hastrup and Aagaard (34) identified a significant ($p<.032$) cost savings overall for ACT in Denmark when following participants up to four years; most of the savings occurred with psychiatric hospitalization in the first two years of treatment—a finding similar to that in prior ACT analyses. Because coordination of medical care and cost controls were not consistent targets of these interventions, it is not surprising to find substantial differences in overall medical care expenditures across these analyses.

Of the studies examining quality of life or satisfaction with general medical care, three of five studies found improvements in physical functioning and satisfaction with treatment. These included the Abert-Wistedt and colleagues (30) and Lehman and colleagues (5) RCTs and the Kane and Blank (36) cohort. Of note, the Kane and Blank intervention specifically enhanced ACT with an advanced practice nurse, with additional focus on screening for general medical conditions, and counseling coupled with a peer specialist focused on modeling wellness. They found an improvement in health orientation and attitudes as well as more frequent report of physical symptoms via the Abnormal Involuntary Movement Scale. No specific clinical health outcomes were available for analysis.

Several limitations to this analysis are notable. A significant shortcoming of much of ACT research is limited use and report of fidelity measures to gauge program implementation. This review specifically focused on ACT, although there is a multidimensional continuum between ICM models and full-fledged ACT, and it may be that this review missed some interventions labeled as ICM that were really ACT and aberrantly included some models that were referred to as ACT but that may have lacked program fidelity. More consistent use of fidelity standards in program assessment would be useful on multiple levels, given that the higher-fidelity ACT teams are likely to realize better outcomes than teams with lower fidelity (40). Furthermore, high-fidelity teams have been shown to have significant overlap with criteria used to establish a primary care patient-centered medical home (27).

In addition, we assumed that emergency room utilization for mental health treatment was not discernible from overall emergency room utilization, including treatment for general medical conditions. This may have resulted in misattributing findings from reduced psychiatric emergency services to all emergency services, unless otherwise stated. Several of the studies demonstrated a consistent upswing in outpatient primary care appointments upon enrollment in ACT, which is consistent with survey-based feedback from ACT team leaders, who consistently report efforts to arrange for basic primary care services for their clients (28). Access to and greater use of ambulatory primary care services have been tied to reductions in emergency room utilization in other studies (41–43). Although it may be reasonable to hypothesize several mechanisms by which ACT may affect emergency room utilization, current data suffer from a lack of clear definitions and existing programs lack a formal charge or capacity to necessarily improve general medical outcomes. As such, it is hard to draw definitive conclusions about utilization of general health services within ACT models.

Published literature regarding the effect of ACT teams on general clinical outcomes is also sorely missing, making

inferences on an ACT team's effect on general health indirect, at best. Given the pace of reform within state mental health systems embracing primary care integration, this is an essential area in need of further thoughtful and dedicated study. Inadvertent discarding of essential studies may have occurred during the abstract review phase, but methods were in place to meticulously review inclusion and exclusion criteria, and questionable studies were flagged for further text review, limiting the chances of erroneous exclusion. Finally, because of variances in reported outcomes and generally small sample sizes, data aggregation and meta-analysis were not possible, limiting the power of the conclusions. Attempts were made to include only the highest-quality evidence: requiring comparison groups and ascertainment of some reported outcome to try and identify any trends available in published literature.

As efforts to integrate primary care and behavioral health care for persons with severe mental illness materialize, it will be crucial to examine existing evidence-based practices to avoid reinventing the wheel of health services delivery. Widespread models of coordinated, team-based, population-focused care are in place in many communities, and making minor adjustments could result in great dividends in health and quality of life for the persons they serve.

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