

The Translating Research Into Action for Diabetes (TRIAD) Study

A multicenter study of diabetes in managed care

THE TRIAD STUDY GROUP

Diabetes presents formidable challenges to the U.S. health care system because of its high prevalence and morbidity and the complexity and cost of managing the disease (1–2). Diabetes complications can be reduced with efficacious treatments, such as glycemic, blood pressure, lipid control and screening, and early treatment for eye, kidney, and foot disease (3–6); however, these treatments are not adequately implemented (7–11). Thus, there is a need to better understand modifiable factors that affect the quality and outcomes of care across diverse health care systems.

The Translating Research Into Action for Diabetes (TRIAD) study uses Donabedian's classic paradigm for studying quality of care by relating structural factors in health care systems and provider organization to the processes and outcomes of care (12). Because of the proliferation of managed care systems, with various organizational, reimbursement, and disease management approaches (13–20), managed care is a critical setting in which to apply this paradigm. The TRIAD study is a multicenter prospective study that seeks to identify modifiable barriers to optimal diabetes care across diverse managed care settings. This report describes TRIAD's study hypotheses, objectives, design, participants, and methods.

Study hypotheses

The fundamental hypothesis of the TRIAD study is that structural and organizational characteristics of health sys-

tems and health care provider groups affect the processes and quality of care that, in turn, influence health and economic outcomes (Fig. 1). More specifically, the TRIAD study hypothesizes that greater experience with managed care, less use of clinician incentives to limit referrals and care, more intense efforts to implement accepted practice guidelines, and the presence of systems to identify, risk stratify, and manage patients (e.g., via registries, reminder systems, and case managers) will be associated with better processes and outcomes of care. Additionally, more direct patient education, fewer financial barriers (e.g., lower copayments and greater pharmacy and supplies benefits) and fewer nonfinancial barriers (e.g., communication barriers and lack of a regular provider) will be associated with better processes and outcomes of care. Processes of care include HbA_{1c} tests; blood pressure and lipid tests; eye, renal, and foot screening; and smoking cessation and health promotion counseling. Primary health outcomes are those associated with diabetes complications (e.g., glycemic control, blood pressure, lipid levels, and microalbuminuria) and impact of the disease (e.g., resource utilization, cost, quality of life, functional status, and patient satisfaction).

Overall study design and data collection

The TRIAD study is a multicenter prospective cohort study. It includes baseline and 18-month follow-up data collection

from health plans, provider groups, and diabetic patients. Structural and health system factors are assessed using standardized in-person interviews of health plan and provider group medical directors and leadership personnel (21). These interviews assess general organizational and financial characteristics (e.g., clinician incentives and management of referral care) as well as diabetes-specific infrastructure and clinical activities (e.g., use of registries, case management, and diabetes-specific guideline use).

Patient data are obtained from surveys, medical record reviews, and administrative data. A patient survey, administered either by computer-assisted telephone interview or in writing, assesses sociodemographic characteristics, recommended diabetes care services received, and general health status and quality of life measures (the 12-item short-form health survey and the 5-item EuroQOL diabetes-specific symptom scale) (22–24). It also assesses access to care, patient satisfaction (the Consumer Assessment of Health Plans Survey), diabetes education received, participation in self-care activities, disease management, and financial barriers (25). The TRIAD study's medical record review includes data abstracted from paper and electronic medical records during the 18 months before the patient survey. Administrative data are derived from inpatient and outpatient claims and pharmacy and laboratory data provided by the health plans. These data are used to establish the initial sampling frame, measure health services utilization and costs (e.g., hospitalization and ambulatory care visits), and tabulate quality indicators (e.g., laboratory and diagnostic tests and drug prescriptions).

Study centers and participants

The TRIAD study includes six translational research centers (TRCs). These centers collaborate with 10 health plans and 63 provider groups, which serve ~180,000 patients with diabetes (Table 1). Managed care health plans are defined

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Members of the TRIAD study group are listed in the appendix.

Abbreviations: HMO, health maintenance organizations; TRC, translational research center; TRIAD, Translating Research Into Action for Diabetes.

A table elsewhere in this issue shows conventional and Système International (SI) units and conversion factors for many substances.

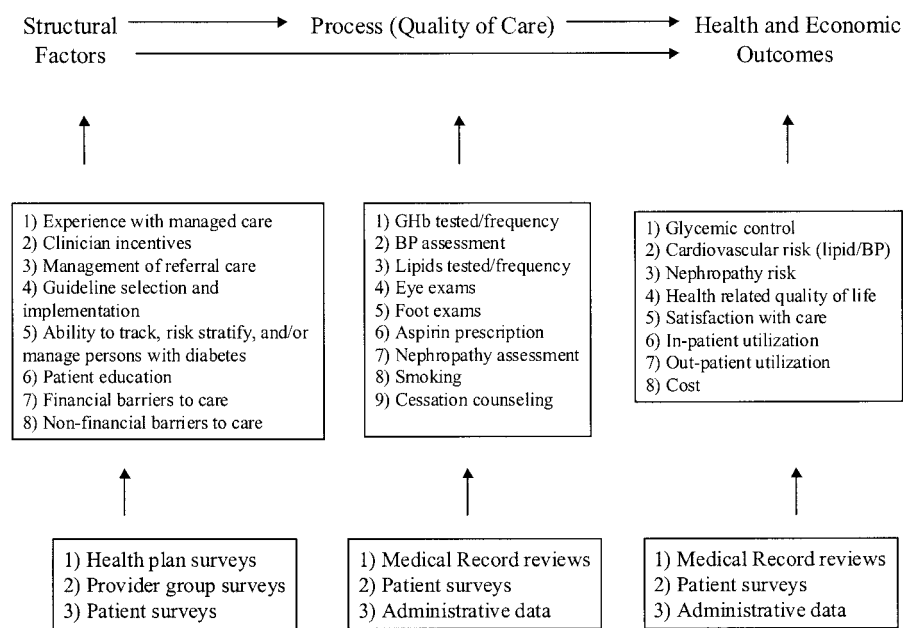


Figure 1— Conceptual overview of TRIAD and study hypotheses. Detailed predictor-specific, outcome-specific hypotheses and survey instruments are available upon request from the corresponding author.

as entities that deliver, administer, and/or assume risk for health services to influence quality, access, cost, and outcomes of health care for a defined population (20). Health plans participating in the TRIAD study include staff model health maintenance organizations (HMOs), network/IPA (independent provider association) model HMOs, point-of-service plans, and preferred-provider organizations (Table 1). These plans include for-profit, not-for-profit, Medicare, and Medicaid products. Altogether, 63 provider groups contracting with the TRIAD study's partner health plans were also recruited into the study. For the TRIAD study, a provider group has considerable autonomy, determines compensation arrangements and financial incentives with physicians, and may be directly engaged in diabetes care management, as well as controlling access to specialty and referral care.

The patient population is diverse in terms of age, sex, race/ethnicity, and health status (Table 1). It uses a stratified random sample to recruit ~9,500 adults with diabetes (1,500–2,000 per TRC). Study patients must be aged ≥ 18 years, community-dwelling, English- or Spanish-speaking, continuously enrolled in the health plan for ≥ 18 months, and not pregnant, and they must have ≥ 1 claim

for health service during the previous 18 months. Patients are sampled from provider groups that have at least 50 patients with diabetes enrolled in the study's health plans. Recruitment was completed in September 2001.

Conclusions

Because effective diabetes management requires complex integration of primary, specialty, and self-care, diabetes presents numerous challenges to managed care plans to provide high-quality, cost-effective care. Because managed care systems are so heterogeneous, little is known about how health plan benefits, physician payment mechanisms and financial incentives, and approaches to influence the management of primary care and referral care affect diabetes care and outcomes (13–15). Similarly, managed care organizations have used numerous approaches for diabetes disease management programs, including computerized registries to identify high-risk patients, nurse case management, telephone contact, computerized reminder systems, group visits, and diabetes education (16–20). However, evaluation of the effects of these strategies on the processes or outcomes of care across diverse systems and subgroups of patients is extremely limited. Finally, the TRIAD study will examine the

extent to which patient-level financial (e.g., insurance costs, level of copayment, patient access, and expenses related to medications, supplies, education and specialist visits) and nonfinancial barriers (e.g., culturally appropriate health promotion counseling) affect care and outcomes (26,27).

In summary, the TRIAD study is a multicenter study designed to determine how the structure and organization of managed care systems influence the processes and outcomes of diabetes care. These factors include general organizational characteristics, as well as infrastructure and activities designed specifically for diabetes. Factors will range from those acting at the health plan level to those acting at the individual patient level. By linking information from health plans, provider groups, and patients across a wide range of models of care and diverse populations, the TRIAD study offers unique opportunities to improve understanding of both the facilitators and barriers to diabetes care in a variety of managed care settings and a rich diversity of patients. These findings should be useful for diabetes and other chronic disease management programs.

APPENDIX

The TRIAD Study Group

Pacific Health Research Institute. Principal investigator: J. David Curb, MD, MPH. Co-investigators: Beth Waitzfelder, MA; Richard Chung, MD (Hawaii Medical Service Association [HMSA]); Peggy Latore, MD (Kaiser Permanente Hawaii [KPH]); Lynette Honbo, MD (Hawaii State Department of Human Services [HDHS]); R. Adam Dudley, MD, MB (University of California, San Francisco); Beatriz Rodriguez, MD, PhD; and Robert Abbott, PhD. Consultant: Joseph Humphry, MD (HMSA). Analysts: Rebecca Glavan; Andrew White, PhD (HMSA); Ken Forbes (KPH); and James Cooper, MA (HDHS). Administrative assistants: Ruth Baldino and Esther Nakano.

Indiana University Translational Research Center. Principal investigator: David G. Marrero, PhD. Project coordinator: Susanna R. Williams, MSPH. Co-investigators: Morris Weinberger, PhD; William M. Tierney, MD; and M. Sue Kirkman, MD.

Table 1—Characteristics of participating centers

Center	Region	No. of health plans	No. of provider groups	Types of managed care plans	No. of patients with diabetes	Target sample	Race and ethnicity distribution (estimated*)
Pacific Health Research Institute	Hawaii	2	13	HMO, PPO	40,000	1,500	59% Asian/Pacific Islander; 14% non-Hispanic white; 7% Hispanic; 1% non-Hispanic black; 19% other
Indiana University Translational Research Center	Central Indiana	2	2	HMO	3,800	1,500	51% Non-Hispanic black, 42% non-Hispanic white; 1% Hispanic; 1% Asian; 5% other
Kaiser Foundation Research Institute	Northern California	1	1	HMO	117,000	1,500	54% Non-Hispanic white; 14% Hispanic; 12% non-Hispanic black, 11% Asian; 9% other
University of California, Los Angeles School of Medicine	Two large metropolitan areas in Texas	1	27	HMO	8,800	2,000	51% Hispanic; 38% non-Hispanic white; 5% non-Hispanic black; 1% Asian; 6% other
University of Medicine and Dentistry of New Jersey	New Jersey, Pennsylvania	3	3	HMO, POS, PPO	9,700	1,500	46% Non-Hispanic white; 39% non-Hispanic black; 4% Hispanic, 4% Asian, 7% other
University of Michigan Health System	Southeastern Michigan	1	17	HMO, POS	5,900	1,500	78% Non-Hispanic white; 12% non-Hispanic black; 2% Hispanic; 1% Asian; 7% other

POS; point-of-service plan; PPO; preferred-provider organization. *Race/ethnicity estimates are based on an interim analyses of 8364 (88% of the projected sample) completed surveys.

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Klemm Analysis Group. David N. Cowan, PhD, MPH, and Tonya D. Samuel, MS.

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TRIAD-wide Administrative Data Coordinator: Barbara R.K. Smith, MHSA.

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