

Monday, 14 Jun, 2004

## **Concordance, Compliance and Adherence in Health Care: Closing Gaps and Improving Outcomes**

Chris Wahl<sup>1</sup>, BSc, Jean-Pierre Gregoire<sup>2,3</sup>, MPH, PhD, Koon Teo<sup>4</sup>, MD, PhD,  
Michelle Beaulieu<sup>2</sup>, MEd, Serge Labelle<sup>2</sup>, PEng, MBA, Brigitte Leduc<sup>2</sup>, BSc,  
Bonnie Cochrane<sup>2</sup>, MSc, Liette Lapointe<sup>1</sup>, PhD, Terrence Montague<sup>2</sup>, MD

<sup>1</sup>Faculties of Management and Medicine, McGill University, Montreal, QC,

<sup>2</sup>Department of Patient Health, Merck Frosst Canada Ltd., Kirkland QC,

<sup>3</sup>Population Health Research Unit and Faculty of Pharmacy,  
Laval University, Quebec QC,

<sup>4</sup>Faculty of Medicine, McMaster University, Hamilton, ON

### **Correspondence:**

Dr. Terrence Montague  
Merck Frosst Canada Ltd.  
16711 Trans Canada Hwy.  
Kirkland, Quebec H9H 3L1  
Telephone: 514-428-3891  
Fax: 514-428-2850  
e-mail: [terence\\_montague@merck.com](mailto:terence_montague@merck.com)

**Running head:** The challenge and opportunity to improve patient adherence

**Abstract**

The gap between best care and usual care is large for many important diseases. In particular, poor adherence remains a significant, inadequately addressed, cause of the care gap. About half of all patients with chronic diseases stop refilling prescriptions by one year. Several effective interventions are available and adaptations of clinical trials practices offer promise for further improvement. Poor adherence is a remedial problem in health care quality and its improvement and accountability offer shared opportunities for providers and patients.

There is a large gap between best care, defined as the optimal use of proven efficacious therapies in whole populations at risk from any disease, and usual care, the actual level of efficacious care being provided (Montague et al 1997). This gap in patient care has four main causes: diseases may not be diagnosed, efficacious therapies may not be prescribed, access to therapy may be restricted or patients may not adhere to prescriptions.

Irrespective of causation, the ultimate result of care gaps is the same – less than optimal clinical outcomes and associated lost opportunities for improved quality of life and productivity. Systematic approaches to improving prescribing practices are increasing and there is much debate around improving patients' access to care. Poor diagnosis is judged to be relatively uncommon, leaving decayed adherence as the major under-addressed cause of care gaps and a major opportunity for improvement.

This paper reviews the scope and causation of sub-optimal adherence, evaluates improvement strategies and explores a best-practice benchmark.

### **The Importance of Adherence to the Health System**

Adherence is an umbrella term used to embrace various components involved in the process of patients taking medication as prescribed (Urquhart 2001). Acceptance is defined as the initial decision of the patient to agree to the treatment, fill the first prescription and obtain the first refill; persistence refers to continued prescription renewal; and, compliance refers to taking treatment in accord with facets such as proper dosage and time (Figure 1).

The degree of adherence varies across diseases, but for many chronic diseases, 40% to 50% of patients do not persist with initial treatments beyond 12 months (Andreade et

al 1995; Bloom 1998; Sidel et al 1998). In hypertension and cardiovascular risk management adherence rates at one year average about 60% (Figure 2), undoubtedly contributing to the less than optimal blood pressure control (Joffres 1997) and less than optimal clinical outcomes (Sullivan 1990) of these patients. In dollar terms, the cost of poor adherence for Canada, because of avoidable negative outcomes not being prevented, has been estimated to be \$7 to \$9 billion per year (Coombs 1995).

Improving adherence provides, therefore, an enormous national opportunity for both health and economic gains.

### **Causes of Non-adherence**

The causes of non-adherence are complex. Demographic characteristics, ethnicity, sex, age and socioeconomic status are not very predictive (Haynes 1979). More important are complexity of treatment (Meichenbaum and Turk 1987), patient self-efficacy, social support, disease knowledge, treatment alternatives, costs and side effects (Gregoire et al 2002); Sackett and Haynes 1976) and disruption of patients' life style (Baum et al 2000). These latter factors are important in the health belief model of patient decision making, which states: "In order for an individual to take action to avoid a disease he would need to believe (i) that he was personally susceptible to it, (ii) that the occurrence of the disease would have at least moderate severity on some component of his life and, (iii) that taking a particular action would in fact be beneficial by reducing his susceptibility to the condition or, if the disease occurred, by reducing its severity, and that it would not entail overcoming important psychological barriers such as cost, convenience, pain, embarrassment" (Rosenstock 1974).

Overlaying these factors is the human relationship between provider and patient. Patients want a more active role in their medical care (Vertinsky 1974), supported by information from their physicians (Cassileth et al 1980). More conversation by patients,

relative to physicians, is positively correlated to health status (Kaplan et al 1989). But Leclere et al (1990) rate the doctor - patient relation as the most common difficulty in medical practice. Key problems are differing perceptions of the health problem and expectations from its treatment.

One way to improve this relationship is enhancement of communication skills of providers, an important determinant of patient satisfaction with care (Williams and Calnan 1991). Patient satisfaction, in turn, is a major determinant of commitment to adherence (Newcomer et al 1996). Communication behaviors that reinforce patients' self-confidence, motivation and positive view of their health improve patient satisfaction and health practices (Donovan 1995), including adherence improvement (DiMatteo et al 1993); dissatisfaction fosters non-adherence (Roter 1977).

### **Concordance**

Traditionally, adherence is viewed in a relational context where the provider weighs the diagnosis and therapies in terms of risk and benefit, makes a decision, informs the patient and assumes the patient understands and will adhere. In this model, patient beliefs may even be viewed as an obstacle to treatment.

The concordance model of the patient - physician relation is characterized as: "two sets of contrasted but equally cogent health beliefs - that of the patient and that of the doctor. The task of the patient is to convey his or her health beliefs to the doctor; and of the doctor, to enable this to happen. The task of the doctor or other provider is to convey his or her health beliefs to the patient; and of the patient, to entertain these. The intention is to assist the patient to make as informed a choice as possible about the diagnosis and treatment, about benefit and risk and to take full part in a therapeutic alliance. Although reciprocal, this is an alliance in which the most important determinations are agreed to be those made by the patient" (Royal Pharmaceutical Society 1997).

Improved provider - patient communication is intuitively attractive to improve adherence and health outcomes. However, one very practical challenge is the enormous degree of non-concordance of patients and providers in how they rate the importance of adherence as a cause of care gaps and sub-optimal outcomes (Figure 3). Briefly, providers rate poor adherence as the greatest contributing cause; patients, on the other hand, rate it at zero.

### **Interventions for Improvement**

Programs to increase adherence fall under the category of disease management, the focused application of resources to drive improved care and outcomes (Montague et al 2003). Weingarten et al (2002) recently evaluated the efficacy of interventions used to improve the management, including adherence, in chronic diseases like asthma, coronary disease, depression, diabetes, hypertension and pain. Patient education was the most common intervention (78%), followed by provider education (40%) and feedback (27%); with most (59%) programs using a combination of interventions.

At the provider level, all interventions were associated with significant improvements in adherence to guidelines (44% to 61%) and disease control (17% to 35%). Among patients, interventions were also associated with significant increments in disease control, including education (24%), reminders (27%) and financial incentives (40%).

A traditional focus for providers has been continuing medical education, including newer online decision support systems to help doctors with diagnosis and treatment decisions (Montgomery et al 2000). Programs focusing on improvement in patient-centered interviews are also gaining popularity. They encourage concordance by facilitating patients to intervene and express their expectations, ideas and feelings (Levenstein 1986). Measurement and feedback of actual practices to providers is a proven tool for

generating improved prescription patterns (Montague et al 2003). Provider reminders, independent of measurement-feedback programs, are less common but they also improve medication management (Bennett and Glasziou 2003).

Patient education is the most widely used disease management intervention and includes one-on-one sessions, mailings and telephone calls (Piette et al 2001). These programs incorporate various providers of the education including physicians, pharmacists, nurses and trained educators. Topics normally include information on the disease, possible treatments and lifestyle changes. For example, a rheumatoid arthritis program might involve sessions with a nurse practitioner focusing on drugs, physical exercise and joint protection, pain control and general coping strategies (Hill et al 2001).

Pharmacist-based patient education is growing, in part because pharmacists are appreciated to be “in a privileged position, with their expertise in pharmacological treatment, to provide education, identify medication adherence issues and counsel the patient ” (Rosenstock 1974). In addition, many pharmacists utilize shared databases and information system capabilities that facilitate the flow of information and generate improved clinical outcomes and cost benefits in the management of diseases like hypertension (Chabot et al 2003; Cote et al 2003), diabetes and cardiovascular disease (Galt 1998; Munroe et al 1997), asthma (Munroe et al 1997) and HIV (Bozek et al 1998).

In one recent Canadian trial to improve treatment persistence among patients with hypertension, hypercholesterolemia and heart failure, 824 patients were enrolled by their pharmacist in two Ontario communities (Poston et al 1999). In the control setting (n=28 pharmacies), all usual practices were followed; in the intervention setting (n=26 pharmacies), patients were given serial educational videos, printed materials and newsletters, in addition to all usual pharmaceutical care and counseling. Patients were

followed at 3 month intervals, for an average duration of 269 days. For lipid lowering therapy, among new patients, the intervention was associated with an increase of 13% in patient adherence ( $p < 0.005$ ). For patients prescribed angiotensin converting enzyme inhibitor medication, the impact was an additional 8% adherence in the intervention arm for new patients. Interestingly, in both control and intervention sites, patients had higher than usually reported adherence rates, suggesting the presence of an important trial associated with the enrollment process.

Patient reminders are also becoming more prevalent as an adherence strategy, usually as telephone calls and/or mailings before a prescription must be refilled or after the refill date if the prescription has gone unfilled. Lastly, a small number of interventions incorporate patient financial incentives. Although they have had their sustainability and cost-effectiveness questioned, they can be efficacious in improving adherence ((Bock et al 2001).

### **Establishing a benchmark**

The overriding goal of patient adherence programs is to increase acceptance of, and persistence with, prescribed treatment regimens. However, it is unclear as to what constitutes the best case benchmark that can be reasonably achieved. What is the gold standard for patient adherence?

Some HIV medication treatment programs set their target benchmark at  $> 90\%$  adherence because patients must take their antiretrovirals 95% of the time to get complete viral suppression (Paterson et al 2000). In coronary heart disease an equivalent target might be 80%, since studies have found progressively decreased risk reduction, or increased risk of clinical events, with adherence levels below that figure (Psaty et al 1990; Blackburn et al 2004).

The highest reported adherence rates occur in randomized controlled trials, as high as 95% for multiple medications over several years (Figure 4; Teo et al 2000). If the clinical trials results are assumed to be optimal adherence, and the levels from database analyses are considered the real-world average, then the average gap between best and usual adherence, after three months of treatment, is about 20%, increasing to about 50% at 12 months.

However, rates in trials are likely inflated by run-in periods, during which continued eligibility usually demands >80% adherence with medications for 2-6 weeks before randomization. This results in a pre-randomization exclusion of non-compliant patients that is not a realistic management option in usual practice. Notwithstanding, it is important to realize that it is the repeated measurement and feedback of adherence levels to patients that is the vital discriminating process between trials and usual medical practice. This continuous measure-feedback loop almost certainly drives the superior and persistent adherence levels that characterize clinical trials.

The variation in how adherence is measured adds some complexity to this issue. Patient self-reports, biochemical measures, pill counts, electronic monitoring, pharmacy renewal rates and provider assessment have all been used. No single measurement may be appropriate for all situations. The over-riding, take-home lesson is formal measurement of some kind is valuable, particularly if it is fed back to patients.

In summary, irrespective of situational, drug-specific and measurement-specific adjustments, the weight of data suggests that persistence expectation can be realistically set at >80%, and perhaps as high as 95%, over long periods.

## **Conclusions**

Poor adherence is a complex and significant cause of the gap between usual and best care and a driver of sub-optimal health outcomes. Interventions improve adherence, although achieving optimal levels remains elusive. A communicative and concordant

patient-provider relationship offers promise of further improving adherence, as does measurement and feedback of actual adherence patterns as a regular aspect of patient care and communication. If these promising changes were made in usual care practices the adherence gap would almost certainly close.

Despite its important contributory role in less than optimal care and outcomes, and its demonstrated improvability, adherence is somewhat of an orphan in terms of stakeholder attention, ownership and commitment to make things better. There seems to be an inertial gap between what we know and what we can do. There is lots of opportunity and accountability to share, especially for patients and providers. The arena needs champions. Things can be better.

## References

Andrade SE et al. Discontinuation of antihyperlipidemic drugs. Do rates reported in clinical trials reflect rates in primary care settings?, *N Engl J Med* 1995; 332: 1125-31.

Baum A et al. Patient adherence to treatment regimen. *Handbook of Healthy Psychology*; 2000, pg 571-80.

Bennett JW and Glasziou PP. Computerised reminders and feedback in medication management: a systematic review of randomised controlled trials. *Med J Aust* 2003; 178(5): 217-22.

Blackburn D et al. Cardiovascular morbidity associated with non-adherence. *Proceedings of the Canadian Therapeutics Congress* 2004, Winnipeg; pg 50.

Bloom BS. Continuation of initial antihypertensive medication after 1 year of therapy. *Clin Ther* 1998; 20: 671-81.

Bock NN et al. A spoonful of sugar...: Improving adherence to tuberculosis treatment using financial incentives. *Int J Tuberc.Lung Dis* 2001; 5: 96-8.

Bozek PS et al. Effect of pharmacist interventions on medication use and cost in hospitalized patients with or without HIV infection. *Am J Health Syst Pharm* 1998; 55: 1151-5.

Cassileth BR et al. Information and participation preferences among cancer patients. *Ann Intern Med* 1980; 92: 832-6.

Chabot et al. A pharmacist intervention program for control of hypertension. *Ann Pharmacother* 2003; 37: 1186-93.

Coombs RB et al. Review of the scientific literature on the prevalence, consequence and health costs of non-compliance and inappropriate use of prescription medication in Canada. University of Toronto Press, Toronto, 1995.

Cote I et al. A pharmacy-based health promotion programme in hypertension: Cost-benefit analysis. *Pharmacoeconomics* 2003; 21: 415-28.

DiMatteo MR et al. Physicians' characteristics influence patients' adherence to medical treatment: Results from the medical outcomes study. *Health Psycho.* 1993; 12: 93-102.

Donovan JL. Patient decision making. The missing ingredient in compliance research. *Int J Technol Assess Health Care* 1995; 11: 443-55.

Galt KA. Cost avoidance, acceptance and outcomes associated with a pharmacotherapy consult clinic in a veterans affairs medical center. *Pharmacotherapy* 1998; 18: 1103-11.

Gregoire JP et al. Determinants of discontinuation of new courses of antihypertensive medications. *J.Clin Epidemiol* 2002; 55: 728-35.

Haynes RB, et al. Determinants of compliance: the disease and the mechanics of treatment. In: Haynes RB, Taylor DW, Sackett DL, eds. *Compliance in Health Care*. Baltimore, MD, Johns Hopkins University Press; 1979; pg. 49-62.

Hill J et al. Effect of patient education on adherence to drug treatment for rheumatoid arthritis: A randomised controlled trial. *Ann.Rheum.Dis* 2001; 60: 869-75.

Kaplan SH et al. Assessing the effects of physician-patient interactions on the outcomes of chronic disease. *Med Care* 1989; 27: S110-S27.

Leclere H et al. Why are clinical problems difficult? General practitioners' opinions concerning 24 clinical problems. *CMAJ* 1990; 143: 1305-15.

Levenstein JH et al. The patient-centred clinical method. A model for the doctor-patient interaction in family medicine. *Fam Pract.* 1986; 3: 24-30.

Meichenbaum D and Turk DC. *Facilitating treatment adherence: a practitioner's guidebook*. New York, Plenum Press, 1987, pg 72-79.

Montague T et al. Patient health management: a promising paradigm in Canadian healthcare. *Am J Manag.Care* 1997; 3: 1175-82.

Montague T et al. Improving cardiovascular outcomes in Nova Scotia (ICONS): A successful public-private partnership in primary healthcare. *Hosp Quart* 2003; 6: 32-8.

Montgomery AA et al. Evaluation of computer based clinical decision support system and risk chart for management of hypertension in primary care: Randomised controlled trial. *BMJ* 2000; 320: 686-90.

Munroe WP et al. Economic evaluation of pharmacist involvement in disease management in a community pharmacy setting. *Clin Ther* 1997; 19: 113-23.

Newcomer R et al. Health plan satisfaction and risk of disenrollment among social/HMO and fee-for-service recipients. *Inquiry* 1996; 33: 144-54.

Paterson DL et al. Adherence to protease inhibitor therapy and outcomes in patients with HIV infection. *Ann Intern Med* 2000; 133: 21-30.

Piette JD et al. Impact of automated calls with nurse follow-up on diabetes treatment outcomes in a department of veterans affairs health care system: A randomized controlled trial. *Diabetes Care* 2001; 24: 202-8.

Poston J et al. The medication use study: A large-scale controlled evaluation of the effects of the vital interests program on adherence to medication regimens. *Can Pharm J* 1999; 123: 31-8.

Psaty BM et al. The relative risk of incident coronary heart disease associated with recently stopping the use of beta-blockers. *JAMA* 1990; 263: 1653-7.

Rosenstock IM. Historical origins of the health belief model. *Health Educ Monogr* 1974; 2: 328-35.

Roter DL. Patient participation in the patient-provider interaction: The effects of patient question asking on the quality of interaction, satisfaction and compliance. *Health Educ. Monogr* 1977; 5: 281-315.

Royal Pharmaceutical Society: Merck, Sharp and Dohme. From compliance to concordance: achieving shared goals in medicine taking. London, 1997.

Sackett DL and Haynes RB. A critical review of the determinants of patient compliance with therapeutic regimens. In: Sackett DL, Haynes RB, eds. *Compliance with Therapeutic Regimens*, Baltimore, MD, Johns Hopkins University Press, 1976, pg. 26-39.

Sidel J et al. Shaping the healthcare environment through evidencebased medicine: A case study of the ICONS project. *Hosp Quart* 1998; 2: 29-33.

Sullivan SD et al. Non-compliance with medication regimens and subsequent hospitalizations: A literature analysis and cost of hospitalization estimate. *J Res Pharm Econ* 1990; 2: 19-33.

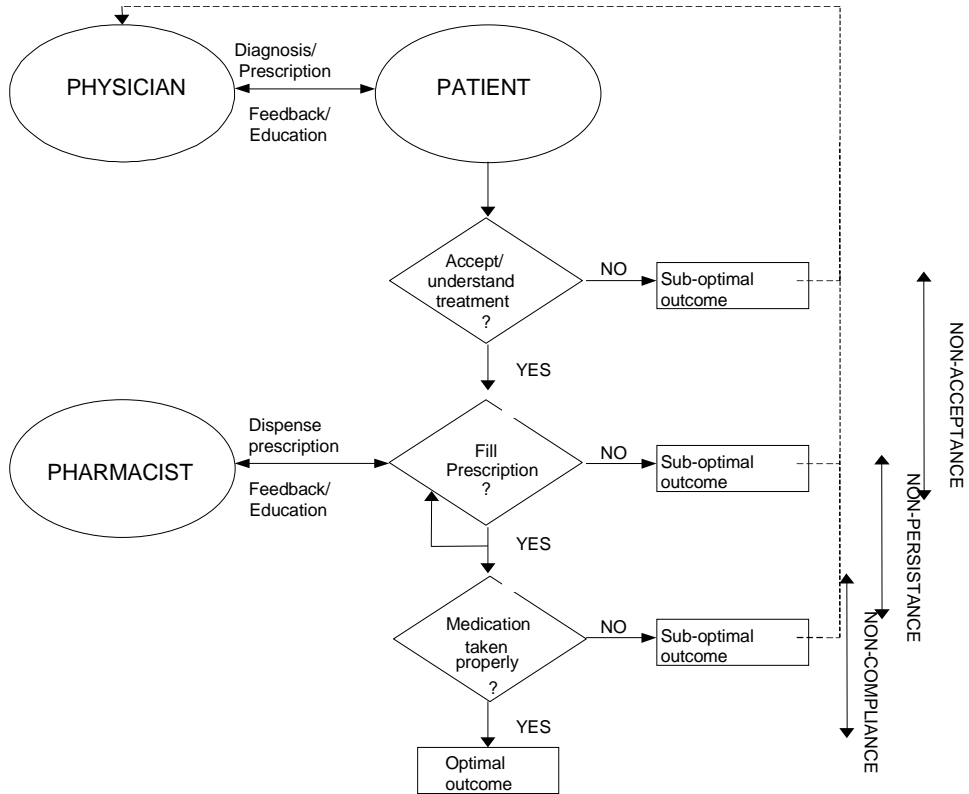
Teo et al. Long-term effects of cholesterol lowering and angiotensin converting enzyme inhibition on coronary atherosclerosis: the simvastatin/enalapril coronary atherosclerosis trial (SCAT). *Circulation* 2000; 102: 1748-54.

Urquhart J. Some economic consequences of noncompliance. *Curr. Hypertens. Rep* 2001; 3: 473-80.

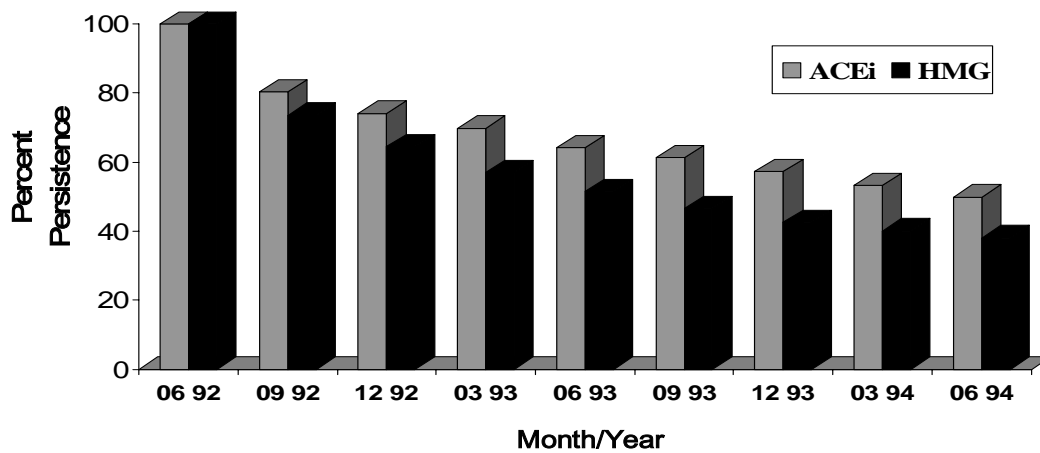
Vertinsky IB et al. Measuring consumer desire for participation in clinical decision making. *Health Serv. Res* 1974; 9: 121-34.

Weingarten SR et al. Interventions used in disease management programmes for patients with chronic illness - which ones work? Meta-analysis of published reports. *BMJ* 2002; 325: 925-32.

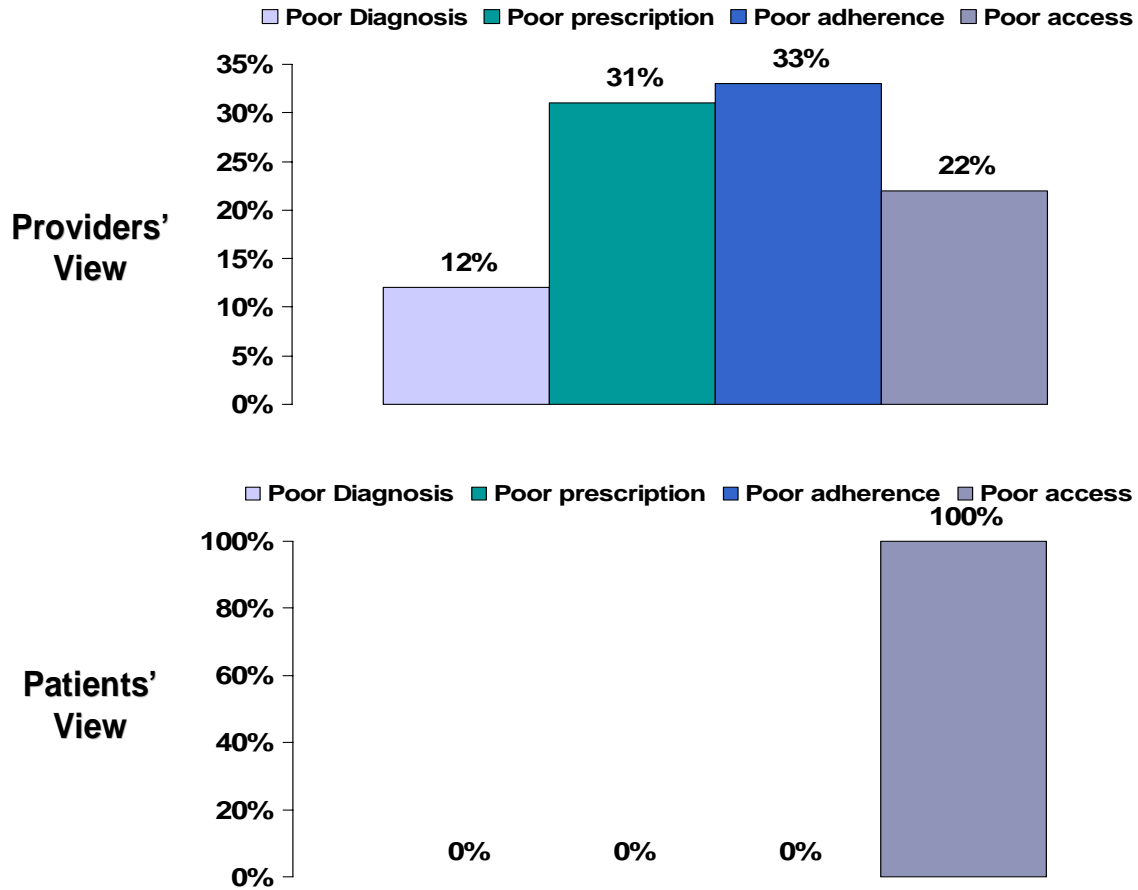
Williams SJ and Calnan M. Key determinants of consumer satisfaction with general practice. *Fam. Pract* 1991; 8: 237-42.



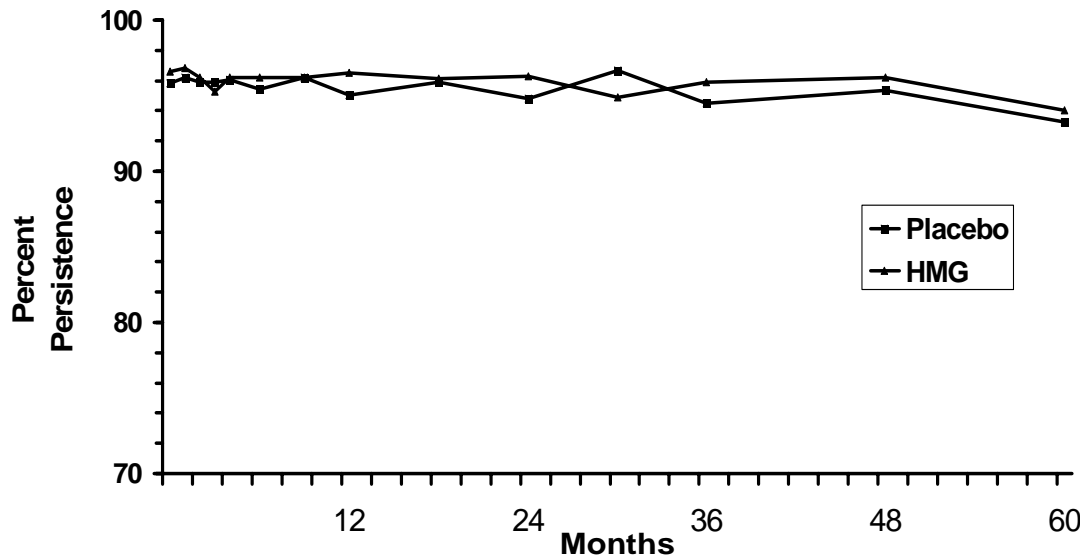
**Figure 1.** The adherence processes depicted as serial decision points in a patient's therapeutic journey.



**Figure 2.** Two-year persistence patterns of 26,000 patients prescribed cardiac risk-reduction therapy, either angiotensin converting enzyme inhibitor (ACEi) or lipid-lowering (HMG) medications, all of whom were beneficiaries of third party insurance coverage for the medication costs. Reproduced, with permission, from *Hospital Quarterly* (Sidel et al 1998).



**Figure 3.** A concordance gap: providers' (top graph) and patient-consumers' (bottom graph) opinions of the relative importance of the major causes of care gaps, the difference between best and usual care. Providers feel that adherence is the single most important cause of care gaps; consumers of care, on the other hand, seem to feel that restriction in access is the only cause of care gaps. Provider results were determined from an audience survey at the 1999 Atlantic Canada Cardiovascular Conference; the respondents, a mix of physicians, nurses and pharmacists. Patient consumer results were determined from an audience survey of a 2000 meeting of the Kiwanis Club of Montreal.



**Figure 4.** Five-year persistence patterns of several hundred patients prescribed lipid-lowering (HMG) or placebo control (Placebo) medications during the Simvastatin/enalapril Coronary Atherosclerosis Trial (SCAT). Adapted, with permission, from data provided by the SCAT investigators (Teo et al 2000).