National Kidney Disease Education Program

Health Care Providers and Kidney Disease

Literature Review

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Introduction

This paper presents key conclusions drawn from an extensive review of the recent medical and social sciences literature on health care providers and kidney disease. It focuses on the knowledge, attitudes, and practices of health care providers for treating and diagnosing kidney disease. It also examines physician knowledge and practices for hypertension and diabetes, the primary risk factors for kidney disease. Last, it examines physician knowledge and practices that generally relate to treatment decisions and outreach.

Knowledge and Practices for Kidney Disease

Physicians indicate they regularly test patients with diabetes for kidney function. Nearly all respondents in one study indicated they tested patients for serum creatinine (95%) and proteinuria (96%) (Drass et al., 1998). Other studies have found screening rates for proteinuria between 82% (Kraft, Lazaridis, Qiu, Clark, & Marrero, 1999) and 86% (Wong et al., 1999). Far fewer perform microalbuminuria screening; rates range from 12% (Kraft et al., 1999) to 58% (Wong et al., 1999).

Patients and patients' charts indicate infrequent testing for kidney function. In a study of patients with diabetes, 73% of those completing a pen-and-paper survey and 45% of those completing an Internet survey reported they received a yearly albumin/microalbumin test (Glasgow & Strycker, 2000). However, one study of records for patients with diabetes found that far fewer patients received yearly urinalysis: only 16.5% of those with no evidence and 21.5% of those with evidence of nephropathy had such a test (Mainous & Gill, 2001). Another study found that 68% of hospitalized patients with diabetes and 58% of those with hypertension had a urinalysis (McClellan, Knight, Karp, & Brown, 1997). Thus, 30% or more of hospitalized patients had not been tested.

Patient treatment may also be inadequate. One review of hospital discharge records for patients with diabetes and hypertension that also had impaired renal function did not reflect awareness of, treatment for, nor plans to further evaluate impaired renal function (McClellan et al., 1997). Other research reveals that patients are referred late to nephrologists (e.g., when creatinine value is greater than 3.0 mg/dl) (Nissenson et al., 2001).

A quality improvement intervention led to significant improvement in screening for diabetic nephropathy. In one study, four of five quality indicators improved significantly following program implementation (Kroll, 2000). Annual urine protein screening, full screening for diabetic nephropathy, follow-up of negative urine protein screening, and adherence with American Diabetes Association protocol improved. Prescription of ACE inhibitors showed no significant improvement.

A large proportion of patients start dialysis without prior referral to a nephrologist. Between 20-50% of patients begin dialysis without exposure to a nephrologist (Levin, 2000). Late referral limits therapeutic options, patient quality of life, and increases the overall burden of illness in society (Levin, 2000).

Knowledge and Practices in Hypertension Treatment

A number of barriers affect physicians' management of patients with hypertension. Factors such as time constraints, physician practice patterns, adverse drug affects, lack of adherence to practice guidelines, interaction quality with patients, and the complexity of prescribing and/or monitoring drug regimens have been identified (Oliveria et al., 2002).

Physicians differ in hypertension knowledge by specialty. A survey of over 1,000 physicians found that overall 37% could correctly answer four knowledge questions about hypertension and nearly 79% correctly answered three or more (Huse, Roht, Alpert, & Hartz, 2001). However, this varied by specialty: 26% of general practitioners, 38% of internists, and 50% of cardiologists correctly answered all four questions.

Physicians are familiar and agree with hypertension treatment guidelines. One study found that physicians were very familiar (52%) or somewhat familiar (48%) with JNC VI[1] guidelines for treating hypertension (Oliveria et al., 2002). Most of these physicians agreed with (76%) and reported following (62% usually and 14% always) these recommendations. Another study found that 60% of physicians agreed with JNC V definitions, 19% had higher blood pressure thresholds for at least one category, and 17% had lower thresholds (Huse et al., 2001).

Physicians tend to tolerate higher blood pressure rates than guidelines recommend. Physicians reported that 150 mm Hg was the lowest systolic and 91 mm Hg the lowest diastolic at which they would recommend drug treatment (Oliveria et al., 2002). One study found that in over 90% of cases where a physician reported satisfaction with a patient's blood pressure control, the patients had blood pressure above JNC VI guidelines (Oliveria et al., 2002). Physicians also tend to place more importance on diastolic than systolic BP readings (Oliveria et al., 2002).

Physicians overestimated the number of pharmacologically treated patients with blood pressure control. Physicians indicated that 50-60% of patients receiving drug treatment for hypertension had controlled blood pressure (Oliveria et al., 2002). However, the Third National Health and Nutrition Examination Survey data indicated that roughly 40% of treated patients had controlled blood pressure (Oliveria et al., 2002).

Physicians are slow to treat blood pressure pharmacologically. Physicians recommended drug treatment above 150 mm Hg systolic and 91 mm Hg diastolic (Oliveria et al., 2002). Physicians made lifestyle recommendations (47%) more frequently than prescribing medication (38%) (Oliveria et al., 2002). Level of blood pressure control, previous recommendations to increase blood pressure therapy, and the number of current hypertension medications predicted physicians' initiating or changing hypertension therapy (Oliveria et al., 2002).

Physicians cite a number of reasons for not initiating or changing hypertension medication. The most commonly cited reasons for not initiating or changing treatment were a desire to continue monitoring (35%) or satisfaction with patient's blood pressure (30%) (Oliveria et al., 2002). Other reasons included that the current patient visit was not focused on blood pressure control (29%), diastolic reading was satisfactory (16%), or that the patient was borderline hypertensive (10%).

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[1] Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure.

Knowledge and Practices in Diabetes Treatment

Laboratory screening may occur more often than patient-focused activities. Overall, the performance of laboratory screening measures such as microvascular and glycemic control tests was significantly higher (roughly 80%) than patient-focused activities (approximately 55%) such as behavioral self-management (Glasgow & Strycker, 2000).

Providers seem pleased with and utilize the hemoglobin A1c test. Focus groups with providers found that providers consistently mentioned A1c in favorable terms and seemed to regularly utilize this test (Child, 2001). Providers also indicated that patient awareness and understanding of the test was increasing.

Providers discuss a variety of "numbers" with diabetic patients. Providers discuss statistics with patients such as blood sugar, hemoglobin A1c, body weight, calories, blood pressure, lipids, protein, minutes of exercise, and coronary risk panel (Child, 2001).

Primary care physicians deliver the bulk of diabetes care. Data from the 1990 National Ambulatory Medical Care Survey showed that 80% of patients with diabetes received care from physicians in family practice, general practice, internal medicine, pediatrics, or endocrinology (Drass et al., 1998). More recent research has also noted that most people who have diabetes are managed by primary care physicians (Eknoyan, Levin, Levey, & Keane, 2001; Glasgow & Strycker, 2000).

Physicians' care patterns appear to be related to specialty. Internists/endocrinologists had higher levels of laboratory screening measures (e.g., tests of glycemic control and macrovascular function) than did primary care providers (Glasgow & Strycker, 2000). Internists also reported performing serum-creatinine tests more frequently than did general practitioners (Drass et al., 1998). Primary care providers showed higher levels of performance on patient-oriented measures (e.g., collaborative goal setting between physician and patient, provision of nutrition counseling, smoking cessation, etc.) than did internists/endocrinologists. Internists also tend to report screening more patients and prescribing ACE inhibitors more frequently than do family practitioners (Kraft et al., 1999).

Four diabetes treatment goals were rated highly by physicians: achievement of normal blood glucose level, achievement of normal glycosylated hemoglobin (GHb), elimination of symptoms, and achievement of ideal body weight (Drass et al., 1998).

Type 1 patients receive more aggressive treatment than do type 2 patients. In one physician based study, over 80% reported performing routine urinalysis (86% of type 1 patients and 82% of type 2 patients) on more than half their patients (Kraft et al., 1999). Far fewer performed microalbuminuria screening on more than half their patients (17% of type 1 and 12% of type 2 patients). Another study found that type 1 patients also tend to be monitored more frequently than type 2 patients (Wong et al., 1999).

Physicians rate patient-focused issues as primary barriers to treating diabetic patients. In one study, patient nonadherence with treatment regimen was cited as the most frequent problem physicians confronted (Drass et al., 1998). In another study, physicians rated patients' not following prescribed diet (58%), family members not supporting patients' dietary regimen (33%), and patients' lack of interest in nutrition therapy (32%) as significant problems (Marrero, Kraft, Mayfield, Wheeler, & Fineberg, 2000). In all, 78% felt patients were not interested in controlling diabetes nutritionally, 97% believed patients were nonadherent with nutritional recommendations,

81% believed family members were not supportive, and 68% believed patient education level was a barrier to their efforts. Other barriers noted by physicians include patient denial of responsibility, denial or lack of understanding of diabetes' seriousness, limited capacity to comply, and health care system constraints (Child, 2001). Another factor is that the slow progression of diabetes means patients are often not aware of any changes in their condition (Child, 2001).

Providers utilize a number of strategies to motivate patients. Providers utilize tactics such as in-office patient education, support groups and classes, scare tactics, information parceling (e.g., providing concentrated information rather than bombarding a patient with many details at once), encouraging family support, positive reinforcement, cultural accommodation, and staff education (Child, 2001).

Providers recommend a variety of ways to educate patients about diabetes. Strategies recommended by physicians include emphasizing stroke risk[2], using analogies that resonate with patients, explaining the science behind a condition, and emphasizing risk factors in general rather than a specific outcome (Child, 2001).

Physicians of adults with diabetes utilize a number of treatment aids. Patient record-keeping systems (60%), staff training and education materials (56%), patient continuity-of-care flowsheets (54%), office-based patient reminder systems (36%), and personal performance feedback (21%) were used to facilitate diabetes care (Drass et al., 1998). Physicians favorably evaluated toolkits and patient "pocket cards" in focus groups conducted by the National Diabetes Education Program (NDEP) (Child, 2001). Physicians also indicated they would be very likely to use patient education materials on strategies for diabetes risk factor control and complications at various hemoglobin A1c levels, patient flowcharts, quick reference cards, electronic data tools, and patient education videos.

Physicians made a variety of suggestions to make materials effective. In focus groups conducted by the National Diabetes Education Program (NDEP), physicians recommended materials be kept simple, be varied (bumper stickers, billboards, infomercials, videotapes), be free of commercialism, utilize celebrity spokespersons, present positive messages, be available in-office (e.g., continuously running videotape or computer with programs for patients to access), tell successful "before and after" stories, and be multilingual (Child, 2001). Physicians also indicated a need for additional patient education materials. Specific materials recommended include patient "log books" of test results (e.g., "numbers"), patient flow sheets, videos showing complications of uncontrolled diabetes, patient cookbooks, and public service ads.

Care patterns may also be related to type of treatment aid utilized. Physicians who utilized a diabetes registry or guidelines/flowsheets had better performance on patient-focused activities (Glasgow & Strycker, 2000).

Setting aside practice time devoted to diabetes treatment improves patient care. Mini-clinics—blocks of practice time devoted to caring for patients with the same underlying condition—have been linked to improved glycemic control and a reduction in hospital stays (Mainous & Gill, 2001).

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[2] This finding is from a focus group study that particularly discussed cardiovascular disease and thus participants may have been primed to recommend this strategy.

Guidelines for diabetes management and care do not appear to have full adherence. A survey of pediatricians revealed that the majority met American Diabetes Association (ADA) guidelines for frequent follow-up evaluation but did not meet guidelines for blood-glucose monitoring, insulin injections, or screening for diabetes complications (Schoepflin & Thrailkill, 1999). One study found that while providers are often unfamiliar with specific guidelines they nonetheless feel confident of their general familiarity with the latest recommendations (Child, 2001).

Physicians regularly utilize nutrition education and counseling. Most physicians (62%) reported referring at least some patients with diabetes for nutrition counseling (Marrero et al., 2000). The majority of these (76%) refer patients to a registered dietitian. Registered dietitians (86%) and hospital-based programs (67%) are widely available for physician referral (Marrero et al., 2000); ADA-recognized education programs (35%), certified diabetes educators (32%), or in-office nutrition education are less available (26%).

The primary sources of information about diabetes care are the American Diabetes Association, American Association of Family Physicians, pharmaceutical salespersons, and conferences. Other sources include HMO and hospital education programs, state guidelines, managed care handouts, media, and continuing education courses (Child, 2001).

Physicians believe that patients are most concerned with diabetes complications, fear of insulin, and blood sugar. Complications noted include loss of vision, limbs, erectile function, and kidney function (Child, 2001). Fear of heart attacks or strokes is not prevalent among people with diabetes, even among those who know there is an increased risk.

Physicians have expressed concerns about education campaigns. Focus groups conducted by the National Diabetes Education Program (NDEP) identified a number of concerns held by physicians about education campaigns including (Child, 2001, p. 20):

- Whether the NDEP recognizes how hard providers already work to educate and motivate patients and how time-consuming and costly patient education is.
- Whether giving patients more information about things to be concerned about would "overload" and discourage them.
- Whether providers personally would be held more accountable for patient success.

Specific comments by providers included:

- "Does this imply we're not doing our job? We spend a lot of time with them . . . it seems to me we're already doing this" (Child, 2001, p. 20).
- "I don't think the government is willing to subsidize this care. They want this, but how can you do it?" (Child, 2001, p. 21).
- "I think that's tremendous information but there can be an overload when we start talking about every system . . . I'm a little worried that more information may not necessarily be beneficial" (Child, 2001, p. 21).

Creating physician buy-in is important. The focus groups held by the National Diabetes Education Program (NDEP) revealed that low awareness of NDEP negatively affected some providers' views of the campaign (Child, 2001). As one provider noted, "We don't need yet another organization promulgating standards that doctors must adhere to, implying that doctors are not treating patients well enough, and that they have to meet more standards—more bars—that national committees have set up. I'd rather have them try to help us. What are they going to do to help the patient get better?" (Child, 2001, p. 21)

General Knowledge and Practice Patterns

Physicians consider drug costs when making medication choices but lack information and often make inaccurate assumptions about drug costs. One study found that between 9-53% of physicians correctly estimated drug costs (Walkzak, Swindells, & Bhardwaj, 1994). Some of the most expensive drugs had the poorest rate of correct responses: Zantac had correct estimates ($84) 10% of the time, Naprosyn ($60) 18%, Prozac ($50) 36%, and Cipro ($49) 49%.

Referral patterns are influenced by a number of factors. Research has noted the effect of perceived side effects (Zimmerman, Schlesselman, Baird, & Mieczkowski, 1997), time, availability of staff, and availability of clinicians (Lewis et al., 1999).

Physician attitudes affect adherence to medical practice guidelines. As noted above, physicians do not follow practice guidelines for kidney disease, hypertension, or diabetes. This may be due to the fact that physicians regard guidelines primarily as a source of update, review, and education (Banks, 1995). Physicians also believe that guidelines often have more to do with cutting costs than improving care. Some physicians lament that guidelines lead to "cookbook medicine" and others stress that guidelines cannot treat patients—only physicians can do this. Other barriers to implementing guidelines include lack of time, inadequate staff, and insufficient reimbursement (McAuley, Mott, Schommer, Moore, & Reeves, 1999).

Guidelines alone have minimal impact. Behavior change is more likely when guidelines are developed by an institution with which the physician has a direct relationship, disseminated through an education program/intervention, and implemented via administrative systems that provide automatic reminders when physicians see particular patients (Banks, 1995).

Physicians have clear preferences for guideline formatting. Physicians prefer guidelines that are brief, easy to read, authoritative, and easy to reproduce (Banks, 1995). A visually handy format, such as a flowsheet, desk card, chart, or pocket card, is preferred. Guidelines that repeat, reinforce, and graphically represent key recommendations have the greatest impact. Text should be bulleted or highlighted in some way (e.g., text-boxed, placed on colored background, etc.) Guidelines should clearly outline their purpose, basic information needed for physician practice, and areas of disagreement or interpretation.

Physicians have clear channel preferences. Direct mail is preferred; medical conferences and generalist medical journals are also effective channels (Banks, 1995).

Physicians are less influenced by research evidence than other factors. Research articles are rated below other information sources in terms of use frequency and preference (Banks, 1995). Factors such as personal characteristics, attitudes, values, habits, and experience; peer attitudes and values; social norms; skills and resources; and patient feedback may be more influential.

Provider intervention programs can change provider practices. Implementation of a confidential feedback and education program increased the use of antibiotics among Canadian physicians (Hux, Melady, & DeBoer, 1999). The researchers believed the collegial tone of materials and the confidential feedback they provided via written summaries of prescribing patterns made the program effective. The materials they distributed promoted clinical guidelines, and were simply designed and written in a brief, informal style emphasizing practical tips. Other researchers found that a more extensive approach utilizing academic detailing was effective in changing physicians' cancer prevention and screening practices (Gorin et al., 2000). This approach involves a detailer engaging the provider in brief, frequently repeated (3+ contacts), focused discussions. The cost of such an approach is potentially prohibitive at approximately $1600 per intervention participant. A multifaceted intervention to alter physician breast cancer screening practices was also successful with primary care physicians (Costanza et al., 1992). This program used continuing medical education courses and outreach education.

References

Banks, J. (1995). *National Heart, Lung, and Blood Institute marketing research study on the formatting, disseminating, and use of clinical practice guidelines: Executive overview*. Bethesda, MD: Office of Prevention, Education, and Control, National Heart, Lung, and Blood Institute.

Child, W. (2001). *Focus groups with primary care providers (January-March 2001): Summary of Findings*. Bethesda, MD: National Diabetes Education Program Comprehensive Care Campaign.

Costanza, M. E., Zapka, J. G., Harris, D. R., Hosmer, D., Barth, R., Gaw, V. P., Greene, H. L., & Stoddard, A. M. (1992). Impact of a physician intervention program to increase breast cancer screening. *Cancer Epidemiology, Biomarkers and Prevention*, 1, 581-589.

Drass, J., Kell, S., Osborn, M., Bausell, B., Corcoran, J., Moskowitz, A., & Fleming, B. (1998). Diabetes care for Medicare beneficiaries: Attitudes and behaviors of primary care physicians. *Diabetes Care*, 21(8), 1282-1287.

Eknoyan, G., Levin, N. W., Levey, A. S., & Keane, W. F. (2001). The national epidemic of chronic kidney disease: What we know and what we can do. *Postgraduate Medicine*, 110(3), 23-29.

Glasgow, R. E., & Strycker, L. A. (2000). Preventive care practices for diabetes management in two primary care samples. *American Journal of Preventive Medicine*, 19(1), 9-14.

Gorin, S. S., Gemson, D., Ashford, A., Bloch, S., Lantigua, R., Ahsan, H., & Neugut, A. (2000). Cancer education among primary care physicians in an underserved community. *American Journal of Preventive Medicine*, 19(1), 53-58.

Huse, D. M., Roht, L. H., Alpert, J. S., & Hartz, S. C. (2001). Physicians' knowledge, attitudes, and practice of pharmacologic treatment of hypertension. *Annals of Pharmacotherapy*, 35, 1173-1179.

Hux, J. E., Melady, M. P., & DeBoer, D. (1999). Confidential prescriber feedback and education to improve antibiotic use in primary care: A controlled trial. *Canadian Medical Association Journal*, 161(4), 388-392.

Kraft, S. K, Lazaridis, E. N., Qiu, C., Clark, C. M., & Marrero, D. G. (1999). Screening and treatment of diabetic nephropathy by primary care physicians. *Journal of General Internal Medicine*, 14, 88-97.

Kroll, M. (2000). Missouri practitioners show notable improvement in diabetic kidney disease screenings. *Missouri Medicine*, 97(5), 154-155.

Levin, A. (2000). Consequences of late referral on patient outcomes. *Nephrology, Dialysis, Transplantation*, 15 (Supp. 3), 8-13.

Lewis, J. D., Asch, D. A., Ginsberg, G. G., Hoops, T. C., Kochman, M. L., Bilker, W. B., & Strom, B. L. (1999). *Journal of General Internal Medicine*, 14(5), 297-302.

Mainous, A. G., & Gill, J. M. (2001). The lack of screening for diabetic nephropathy: Evidence from a privately insured population. *Family Medicine*, 33(2), 115-119.

Marrero, D. G., Kraft, S. K., Mayfield, J., Wheeler, L., & Fineberg, N. (2000). Nutrition management of Type 2 diabetes by primary care physicians. *Journal of General Internal Medicine*, 15, 818-821.

McAuley, J. W., Mott, D. A., Schommer, J. C., Moore, J. L., & Reeves, A. L. (1999). Assessing the needs of pharmacists and physicians in caring for patients with epilepsy. *Journal of the American Pharmacological Association*, 39(4), 499-504.

McClellan, W. M., Knight, D. F., Karp, H., & Brown, W. W. (1997). Early detection and treatment of renal disease in hospitalized diabetic and hypertensive patients: Important differences between practice and published guidelines. *American Journal of Kidney Diseases*, 29(3), 368-375.

Nissenson, A. R., Collins, A. J., Hurley, J., Petersen, H., Pereira, B. J., & Steinberg, E. P. (2001). Opportunities for improving the care of patients with chronic renal insufficiency: current practice patterns. *Journal of the American Society of Nephrology*, 12(8), 1713-1720.

Oliveria, S. A., Lapuerta, P., McCarthy, B. D., L'Italien, G. J., Berlowitz, D. R., & Asch, S. M. (2002). Physician-related barriers to the effective management of uncontrolled hypertension. *Archives of Internal Medicine*, 162, 413-420.

Schoepflin, H. M., & Thrailkill, K. M. (1999). Pediatric diabetes management in Appalachian Kentucky: Adherence of primary care physicians to ADA guidelines. *Journal of the Kentucky Medical Association*, 97(10), 473-481.

Walzak, D., Swindells, S., & Bhardwaj, A. (1994). Primary care physicians and the cost of drugs: A study of prescribing practices based on recognition and information sources. *Journal of Clinical Pharmacology*, 34, 1159-1163.

Wong, T., Foote, E. F., Lefavour, G. S., Cody, R. P., Brown, C. J., & Sherman, R. A. (1999). Physician knowledge and practice patterns relating to diabetic nephropathy. *Journal of the American Pharmaceutical Association*, 39(6), 785-790.

Zimmerman, R. K., Schlesselman, J. J., Baird, A. L., & Mieczkowski, T. A. (1997). A national survey to understand why physicians defer childhood immunizations. *Archives of Pediatrics and Adolescent Medicine*, 151(7), 657-664.

Bibliography

Anderson, R. M., Herman, W. H., Davis, J. M., Freedman, R. P., Funnell, M. M., & Neighbors, H. W. (1991). Barriers to improving diabetes care for Blacks. *Diabetes Care*, 14(7), 605-609.

Ayanian, J. Z., Cleary, P. D., Weissman, J. S., & Epstein, A. M. (1999). The effect of patients' preferences on racial differences in access to renal transplantation. *New England Journal of Medicine*, 341(22), 1661-1669.

Banks, J. (1995). *National Heart, Lung, and Blood Institute marketing research study on the formatting, disseminating, and use of clinical practice guidelines: Executive overview*. Bethesda, MD: Office of Prevention, Education, and Control, National Heart, Lung, and Blood Institute.

Banks, J. (1995). *Physicians' views on formatting, disseminating, and using clinical practice guidelines: A focus group study*. Bethesda, MD: Office of Prevention, Education, and Control, National Heart, Lung, and Blood Institute.

Becker, H. (1986). Factors that influence a "no treatment" choice. *New England Journal of Medicine*, 314(1), 14-19.

Child, W. (2001). *Focus groups with people with diabetes (February-March 2001): Summary of Findings*. Bethesda, MD: National Diabetes Education Program Comprehensive Care Campaign.

Child, W. (2001). *Focus groups with primary care providers (January-March 2001): Summary of Findings*. Bethesda, MD: National Diabetes Education Program Comprehensive Care Campaign.

Child, W. (2001). *Formative research with primary care providers and people with diabete: (January-May 2001): Executive summary*. Bethesda, MD: National Diabetes Education Program Comprehensive Care Campaign.

Child, W. (2001). *Input from primary care profviders via self-administered questionnaire (February-March 2001): Background and summary of findings*. Bethesda, MD: National Diabetes Education Program Comprehensive Care Campaign.

Costanza, M. E., Zapka, J. G., Harris, D. R., Hosmer, D., Barth, R., Gaw, V. P., Greene, H. L., & Stoddard, A. M. (1992). Impact of a physician intervention program to increase breast cancer screening. *Cancer Epidemiology, Biomarkers and Prevention*, 1, 581-589.

Drass, J., Kell, S., Osborn, M., Bausell, B., Corcoran, J., Moskowitz, A., & Fleming, B. (1998). Diabetes care for Medicare beneficiaries: Attitudes and behaviors of primary care physicians. *Diabetes Care*, 21(8), 1282-1287.

Dunn, E. J., Burton, C. J., & Feest, T. G. (1999). The care of patients with diabetic nephropathy: Audit, feedback, and improvement. *Quarterly Journal of Medicine*, 92, 443-449.

Eknoyan, G., Levin, N. W., Levey, A. S., & Keane, W. F. (2001). The national epidemic of chronic kidney disease: What we know and what we can do. *Postgraduate Medicine*, 110(3), 23-29.

Glasgow, R. E., & Strycker, L. A. (2000). Preventive care practices for diabetes management in two primary care samples. *American Journal of Preventive Medicine*, 19(1), 9-14.

Gorin, S. S., Gemson, D., Ashford, A., Bloch, S., Lantigua, R., Ahsan, H., & Neugut, A. (2000). Cancer education among primary care physicians in an underserved community. *American Journal of Preventive Medicine*, 19(1), 53-58.

Hobbs, F. D. R., Jones, M. I., Allan, T. F., Wilson, S., & Tobias, R. (2000). European survey of primary care physician perceptions on heart failure diagnosis and management (Euro-HF). *European Heart Journal*, 21, 1877-1887.

Huse, D. M., Roht, L. H., Alpert, J. S., & Hartz, S. C. (2001). Physicians' knowledge, attitudes, and practice of pharmacologic treatment of hypertension. *Annals of Pharmacotherapy*, 35, 1173-1179.

Hux, J. E., Melady, M. P., & DeBoer, D. (1999). Confidential prescriber feedback and education to improve antibiotic use in primary care: A controlled trial. *Canadian Medical Association Journal*, 161(4), 388-392.

Kraft, S. K, Lazaridis, E. N., Qiu, C., Clark, C. M., & Marrero, D. G. (1999). Screening and treatment of diabetic nephropathy by primary care physicians. *Journal of General Internal Medicine*, 14, 88-97.

Kroll, M. (2000). Missouri practitioners show notable improvement in diabetic kidney disease screenings. *Missouri Medicine*, 97(5), 154-155.

Levin, A. (2000). Consequences of late referral on patient outcomes. *Nephrology, Dialysis, Transplantation*, 15 (Suppl. 3), 8-13.

Lewis, J. D., Asch, D. A., Ginsberg, G. G., Hoops, T. C., Kochman, M. L., Bilker, W. B., & Strom, B. L. (1999). *Journal of General Internal Medicine*, 14(5), 297-302.

Mainous, A. G., & Gill, J. M. (2001). The lack of screening for diabetic nephropathy: Evidence from a privately insured population. *Family Medicine*, 33(2), 115-119.

Marrero, D. G., Kraft, S. K., Mayfield, J., Wheeler, L., & Fineberg, N. (2000). Nutrition management of Type 2 diabetes by primary care physicians. *Journal of General Internal Medicine*, 15, 818-821.

McAuley, J. W., Mott, D. A., Schommer, J. C., Moore, J. L., & Reeves, A. L. (1999). Assessing the needs of pharmacists and physicians in caring for patients with epilepsy. *Journal of the American Pharmacological Association*, 39(4), 499-504.

McClellan, W. M., Knight, D. F., Karp, H., & Brown, W. W. (1997). Early detection and treatment of renal disease in hospitalized diabetic and hypertensive patients: Important differences between practice and published guidelines. *American Journal of Kidney Diseases*, 29(3), 368-375.

Nissenson, A. R., Collins, A. J., Hurley, J., Petersen, H., Pereira, B. J., & Steinberg, E. P. (2001). Opportunities for improving the care of patients with chronic renal insufficiency: current practice patterns. *Journal of the American Society of Nephrology*, 12(8), 1713-1720.

Oliveria, S. A., Lapuerta, P., McCarthy, B. D., L'Italien, G. J., Berlowitz, D. R., & Asch, S. M. (2002). Physician-related barriers to the effective management of uncontrolled hypertension. *Archives of Internal Medicine*, 162, 413-420.

Renal Physicians Association. (2001). RPA position on development of effective collaborative practice models for chronic renal care. *Clinical Nephrology*, 56(3), 255-256.

Schoepflin, H. M., & Thrailkill, K. M. (1999). Pediatric diabetes management in Appalachian Kentucky: Adherence of primary care physicians to ADA guidelines. *Journal of the Kentucky Medical Association*, 97(10), 473-481.

Shaul, R. Z., & Mendelssohn, D. C. (1997). Scare resource allocation decisions: Issues of physician conflict and liability. *Humane Health Care International*, 13(1), 25-28.

Trinh, N., & Ngo, H. H. (2000). Practice variations in the management of sinusitis. *Journal of Otolaryngology*, 29(4), 211-217.

Walzak,, D., Swindells, S., & Bhardwaj, A. (1994). Primary care physicians and the cost of drugs: A study of prescribing practices based on recognition and information sources. *Journal of Clinical Pharmacology*, 34, 1159-1163.

Way, D., Jones, L., Baskerville, B., & Busing, N. (2001) Primary health care services provided by nurse practitioners and family physicians in shared practice. *Canadian Medical Association Journal*, 165(9), 1210-1214.

Whittemore, R. (2000). Strategies to facilitate lifestyle change associated with diabetes mellitus. *Journal of Nursing Scholarship*, 32(3), 225-232.

Wong, T., Foote, E. F., Lefavour, G. S., Cody, R. P., Brown, C. J., & Sherman, R. A. (1999). Physician knowledge and practice patterns relating to diabetic nephropathy. *Journal of the American Pharmaceutical Association*, 39(6), 785-790.

Zimmerman, R. K., Schlesselman, J. J., Baird, A. L., & Mieczkowski, T. A. (1997). A national survey to understand why physicians defer childhood immunizations. *Archives of Pediatrics and Adolescent Medicine*, 151(7), 657-664.