Acknowledgments

Partial funding was provided by the National Coalition on Health Care and the Institute of Medicine. We are indebted to Allison L. Diamant, MD, MSPH, Mark Chassin, M.D., M.P.P., M.P.H., Janet Corrigan, Ph.D., Molla Donaldson, PhD, Rachel Spilka, PhD, and Joseph H. Triebwasser, MD, for comments on drafts of this paper. We are also indebted to James Tebow, Ph.D., Lauren N. Nguyen, MPH, Yuko Sano, A.B., and Sinaroth Sor, MD, for document and research assistance.

References

American Academy of Pediatrics. 1988. *Guidelines for Health Supervision II.* Elk Grove Village, Ill.

---------. 1994. *1994 Red Book: Report of the Committee on Infectious Diseases.* Elk Grove Village, Ill.

Bates, D.W., D.J. Cullen, N. Laird, et al. 1995. Incidence of Adverse Drug Events and Potential Adverse Drug Events. *Journal of the American Medical Association* 274:29-34.

Berger, A.K., D.W. Edris, J.A. Breall, et al. 1998. Resource Use and Quality of Care for Medicare Patients with Acute Myocardial Infarction in Maryland and the District of Columbia: Analysis of Data from the Cooperative Cardiovascular Project. *American Heart Journal* 135: 349-356.

Bernstein, S.J., L.H. Hilborne, L.L. Leape, et al. 1993a. The Appropriateness of Use of Coronary Angiography in New York State. *Journal of the American Medical Association* 269:766-9.

Bernstein, S.J., E.A. McGlynn, A.L. Siu, et al. 1993b. The Appropriateness of Hysterectomy: A Comparison of Care in Seven Health Plans. *Journal of the American Medical Association* 269:2398-402.

Brechner, R.J., C.C. Cowie, L.J. Howie, W.H. Herman, J.C. Will, and M.I. Harris. 1993. Ophthalmic Examination among Adults with Diagnosed Diabetes Mellitus. *Journal of the American Medical Association* 270:1714-18.

Brennan, T.A., L.L. Leape, N.M. Laird, et al. 1991. Incidence of Adverse Events and Negligence in Hospitalized Patients. *New England Journal of Medicine* 324:370-6.

Bronstein, J.M., V.A. Johnson, C.A. Fargason, Jr. 1997. Impact of Care Setting on Cost and Quality under Medicaid. *Journal of Health Care for the Poor and Underserved* 8: 202-216.

Brook, R.H., M.R. Chassin, and A. Fink. 1986. A Method for Detailed Assessment of the Appropriateness of Medical Technologies. *International Journal Technology Assessment in Health Care* 2:53-3.

Brook, R.H. 1994 The RAND/UCLA Appropriateness Method. In: McCormick KA, Moore SR, Siegel RA, eds. *Clinical Practice Guideline Development: Methodology Perspectives*, AHCPR Pub. No. 95-0009, Rockville, MD: U.S. Public Health Service 59-70.

Carey, T.S., K. Weis, and C. Homer. 1991. Prepaid versus Traditional Medicaid Plans: Lack of Effect on Pregnancy Outcomes and Prenatal Care. *Health Services Research* 26(2):165-81.

Centers for Disease Control and Prevention. 1993a. Mammography and Clinical Breast Examinations among Women Aged 50 Years and Older—Behavioral Risk Factor Surveillance System, 1992. *Morbidity and Mortality Weekly Report* 42:737-41.

---------. 1993b. Physician and Other Health-Care Professional Counseling of Smokers to Quit—United States, 1991. *Morbidity and Mortality Weekly Report* 42:854-7.

---------. 1993c. State-Specific Changes in Cholesterol Screening—Behavioural Risk Factor Surveillance System, 1988-91. *Morbidity and Mortality Weekly Reports* 42:663-7.

---------. 1994a. Addressing Emerging Infectious Disease Threats: A Prevention Strategy for the United States. *Morbidity and Mortality Weekly Report* 43(RR-5):1-18.

---------. 1994b. Adults Taking Action to Control Their Blood Pressure—United States, 1990. *Morbidity and Mortality Weekly Report* 43:509-17.

---------. 1995a. Recommended Childhood Immunization Schedule—United States, 1995. *Morbidity and Mortality Weekly Report* 44(RR-5):1-9.

---------. 1995b. Influenza and Pneumococcal Vaccination Coverage Levels among Persons Aged >65 Years—United States, 1973-1993. *Morbidity and Mortality Weekly Report* 44:506-15.

---------. 1995c. Trends in Cancer Screening—United States, 1987 and 1992. *Morbidity and Mortality Weekly Report* 45:57-61.

---------. 1997. National, State, and Urban Area Vaccination Coverage Levels among Children Aged 19-35 Months—United States, January-December 1995. *Morbidity and Mortality Weekly Report* 46:176-82.

Chassin, M.R., J. Kosecoff, R.E. Park, et al. 1987. Does Inappropriate Use Explain Geographic Variations in the Use of Health Care Services? A Study of Three Procedures. *Journal of the American Medical Association* 258:2533-7.

Cullen, D.J., B.J. Sweitzer, D.W. Bates, E. Burdick, A. Edmondson, LL Leape. 1997. Preventable Adverse Drug Events in Hospitalized Patients: A Comparative Study of Intensive Care and General Care Units. *Critical Care Medicine.* 25:1289-97.

Davis, K.C., M.E. Cogswell, S. Lee, R. Rothenberg, J.P. Koplan. 1998. Lipid Screening in a Managed Care Population. *Public Health Services* 113:346-350.

Depression Guideline Panel. 1993. *Depression in Primary Care.* Volume 2: *Treatment of Major Depression. Clinical Practice Guideline Number 5.* Pub. no. (PHS) 93-0551. Rockville, Md.: U.S. Department of Health and Human Services.

Donabedian, A. 1980. *Explorations in Quality Assessment and Monitoring,* Volume 1: *The*

Definition of Quality and Approaches to Its Assessment. Ann Arbor, Mich.: Health Administration Press.

Dowell, S.F., and B. Schwartz. 1997. Resistant Pneumococci: Protecting Patients through Judicious Use of Antibiotics. *American Family Physician* 55:1647-54.

Draper, D., K.L. Kahn, E.J. Reinisch, et al. 1990. Studying the Effects of the DRG-Based Prospective Payment System on Quality of Care. Design, Sampling, and Fieldwork. *Journal of the American Medical Association* 264:1956-61.

Dubois, R.W., and R.H. Brook. 1988. Preventable Deaths: Who, How Often, and Why? *Annals of Internal Medicine* 109:582-9.

Ellerbeck, E.F., S.F. Jencks, M.J. Radford, et al. 1995. Quality of Care for Medicare Patients with Acute Myocardial Infarction: A Four-State Pilot Study from the Cooperative Cardiovascular Project. *Journal of the American Medical Association* 273:1509-14.

Franks, P., C.M. Clancy, M.R. Gold. 1993a. Health Insurance and Mortality: Evidence from a National Cohort. *Journal of the American Medical Association* 270:737-41.

Franks, P., C.M. Clancy, M.R. Gold, P.A. Nutting. 1993b. Health Insurance and Subjective Health Status: Data from the 1987 National Medical Expenditure Survey. *American Journal of Public Health* 83:1295-1299.

Froehlich, F., I. Pache, B. Burnand, et al. 1997. Underutilization of Upper Gastrointestinal Endoscopy. *Gastroenterology* 112:690-7.

Gonzales, R., J.F. Steiner, and M.A. Sande. 1997. Antibiotic Prescribing for Adults With Colds, Upper Respiratory Tract Infections, and Bronchitis by Ambulatory Care Physicians. *Journal of the American Medical Association* 278:901-904.

Gray, D., J.R. Hampton, S.J. Bernstein, J. Kosecoff, and R.H. Brook. 1990. Audit of Coronary Angiography and Bypass Surgery. *Lancet* 335:1317-20.

Greenfield, S., D.M. Blanco, R.M. Elashoff, and P.A. Ganz. 1987. Patterns of Care Related to Age of Breast Cancer Patients. *Journal of the American Medical Association* 257:2766-70.

Greenspan, A.M., H.R. Kay, B.C. Berger, R.M. Greenberg, A.J. Greenspon, and M.S. Gaughan. 1988. Incidence of Unwarranted Implantation of Permanent Cardiac Pacemakers in a Large Medical Population. *New England Journal of Medicine* 318:158-63.

Guadagnoli, E., C.L. Shapiro, J.C. Weeks, et al. 1998. The Quality of Care for Treatment of Early Stage Breast Carcinoma: Is It Consistent with National Guidelines? *Cancer* 83:302-9.

Hand, R., S. Sener, J. Imperato, et al. 1991. Hospital Variables Associated With Quality of Care

for Breast Cancer Patients. *Journal of the American Medical Association* 266:3429-3432.

Hannan, E.L., J.F. O'Donnell, H. Kilburn, Jr., H.R. Bernard, A. Yazici. 1989. Investigation of the Relationship between Volume and Mortality for Surgical Procedures Performed in New York State Hospitals. *Journal of the American Medical Association* 262:503-10.

Hannan, E.L., A.L. Siu, D. Kumar, H. Kilburn, Jr., M.R. Chassin. 1995. The Decline in Coronary Artery Bypass Graft Surgery Mortality in New York State: The Role of Surgeon Volume. *Journal of the American Medical Association* 273:209-13.

Hannan, E.L. H. Kilburn, M. Racz, E. Shields, and M.R. Chassin. 1994. Improving the Outcomes of Coronary Artery Bypass Surgery in New York State. *Journal of the American Medical Association* 271:761-766.

Hilborne, L.H., L.L. Leape, S.J. Bernstein, et al. 1993. The Appropriateness of Use of Percutaneous Transluminal Coronary Angioplasty in New York State. *Journal of the American Medical Association* 269:761-5.

Hillner B.E., M.K. McDonald, L. Penberthy, et al. 1997. Measuring Standards of Care for Early Breast Cancer in an Insured Population. *Journal of Clinical Oncology* 15:1401-8.

Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pres sure. 1993. The Fifth Report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (JNC V). *Archives of Internal Medicine* 153:154-83.

Kahan, K.L., S.J. Bernstein, L.L. Leape, et al. 1994. Measuring the Necessity of Medical Procedures. *Medical Care* 32:357-65.

Kahn, K.L., W.H. Rogers, L.V. Rubenstein, et al. 1990. Measuring Quality of Care with Explicit Process Criteria before and after Implementation of the DRG-Based Prospective Payment System. *Journal of the American Medical Association* 264:1969-73.

Kelly, J.V., F.J. Hellinger. 1986. Physician and Hospital Factors Associated with Mortality of Surgical Patients. *Medical Care* 24:785-800.

Kitahata, M.M., T.D. Koepsell, R.A. Deyo, C.L. Maxwell, W.T. Dodge, and E.H. Wagner. 1996. Physicians' Experience with the Acquired Immunodeficiency Syndrome as a Factor in Patients' Survival. *New England Journal of Medicine* 334:701-6.

Kleinman, L.C., J. Kosecoff, R.W. Dubois, and R.H. Brook. 1994. The Medical Appropriateness of Tympanostomy Tubes Proposed for Children Younger than 16 Years in the United States. *Journal of the American Medical Association* 271:1250-5.

Klinkman, M.S., D.W. Gorenflo, and T.S. Ritsema. The Effects of Insurance Coverage on the Quality of Prenatal Care. *Archives of Family Medicine* 6:557-66.

Kogan, M.D., G.R. Alexander, M. Kotelchuck, D.A. Nagey, and B.W. Jack. 1994. Comparing Mothers' Reports on the Content of Prenatal Care Received with Recommended National Guidelines for Care. *Public Health Reports* 109:637-46.

Kottke, T.E., L.I. Solberg, M.L. Brekke, et al. 1997. Delivery Rates for Preventive Services in 44 Midwestern Clinics. *Mayo Clinic Proceedings* 72: 515-523.

Krumholz, H.M., M.J. Radford, E.F. Ellerbeck, et al. 1995. Aspirin in the Treatment of Acute Myocardial Infarction in Elderly Medicare Beneficiaries: Patterns of Use and Outcomes. *Circulation* 92:2841-7.

---------. 1996. Aspirin for Secondary Prevention after Acute Myocardial Infarction in the Elderly: Prescribed Use and Outcomes. *Annals of Internal Medicine* 124(3):292-8.

Krumholz, H.M., D.M. Philbin, Y. Wang, et al. 1998. Trends in the Quality of Care with Medicare Beneficiaries Admitted to the Hospital with Unstable Angina. *Journal of the American College of Cardiology* 31: 957-63.

Landon, B.E., I.B. Wilson, and P.D. Cleary. 1998. A Conceptual Model of the Effects of Health Care Organizations on the Quality of Medical Care. *Journal of the American Medical Association* 279:1377-82.

Laouri, M., R.L. Kravitz, S.J. Bernstein, et al. 1997. Underuse of Coronary Angiography: Application of a Clinical Method. *International Journal for Quality in Health Care* 9(1):5-22.

Lazovich D., E. White, D.B. Thomas, R.E. Moe. 1991. Underutilization of Breast-Conserving Surgery and Radiation Therapy Among Women With Stage I or II Breast Cancer. *Journal of the American Medical Association* 266:3433-3438.

Leape, L.L., T.A. Brennan, N. Laird, et al., 1991. The Nature of Adverse Events in Hospitalized Patients: Results of the Harvard Medical Practice Study II. *New England Journal of Medicine* 324:377-84.

Leape, L.L., L.H. Hilborne, R.E. Park, et al. 1993. The Appropriateness of Use of Coronary Artery Bypass Graft Surgery in New York State. *Journal of the American Medical Association* 269:753-60.

Leape, L.L., L.L. Hilborne, J.S. Schwartz, et al. 1996. The Appropriateness of Coronary Artery Bypass Graft Surgery in Academic Medical Centers. *Annals of Internal Medicine* 125(1):8-18.

Legorreta. A.P., J. Christian-Herman, R.D. O'Connor, et al. 1998. Compliance with National Asthma Management Guidelines and Specialty Care: A Health Maintenance Organization Experience. *Archives of Internal Medicine* 158: 457-64.

Lieu, T.A., J.C. Mohle-Boetani, G.T. Ray, LM Ackerson, D.L. Walton. 1998. Neonatal Group B Streptococcal Infection in a Managed Care Population. *Obstetrics and Gynecology* 92: 21-27.

Lohr, K.N. Ed. 1990. *Medicare: A Strategy for Quality Assurance*. Washington D.C.: National Academy Press.

Luft, H.S., J.P. Bunker, A.C. Enthoven. 1979. Should Operations Be Regionalized? The Empirical Relation between Surgical Volume and Mortality. *New England Journal of Medicine* 301:1364-1369.

Lurie, N., N.B. Ward, M.F. Shapiro, R.H. Brook. 1984. Termination of Medical Benefits: Does it Affect Health? *New England Journal of Medicine* 311:480-484.

Lurie, N., N.B. Ward, M.F. Shapiro, et al. 1986. Termination of Medical Benefits: A Follow-Up Study One Year Later. *New England Journal of Medicine* 314:1266-1268.

Mainous, A.G., W.J. Hueston, and J.R. Clark. 1996. Antibiotics and Upper Respiratory Infection: Do Some Folks Think There Is a Cure for the Common Cold? *Journal of Family Practice* 42:357-61.

McBride, P.M., H.G. Schrott, M.B. Plane, G. Underbakke, R.L. Brown. 1998. Primary Care Practice Adherence to National Cholesterol Education Program Guidelines for Patients with Coronary Heart Disease. *Archives of Internal Medicine* 158: 1238-1244.

McCaig, L.F., and J.M. Hughes. 1995. Trends in Antimicrobial Drug Prescribing among Office-Based Physicians in the United States. *Journal of the American Medical Association* 273:214-19.

McGlynn, E.A., C.D. Naylor, G.M. Anderson, et al. 1994. Comparison of the Appropriateness of Coronary Angiography and Coronary Artery Bypass Surgery between Canada and New York State. *Journal of the American Medical Association* 272:934-40.

Meehan, T.P., J. Hennen, M.J. Radford, M.K. Petrillo, P. Elstein, and D.J. Ballard. 1995. Process and Outcome of Care for Acute Myocardial Infarction among Medicare Beneficiaries in Connecticut: A Quality Improvement Demonstration Project. *Annals of Internal Medicine* 122:928-36.

Meehan, T.P., M.J. Fine, H.M. Krumholz, et al. 1997. Quality of Care, Process and Outcomes in Elderly Patients with Pneumonia. *Journal of the American Medical Association* 278: 2080-2084

Meijler, A.P., H. Rigter, S.J. Bernstein, et al. 1997. The Appropriateness of Intention to Treat Decisions for Invasive Therapy in Coronary Artery Disease in the Netherlands. *Heart* 77(3):219-24.

Miller, R.H., and H.S. Luft. 1993. Managed Care: Past Evidence and Potential Trends. *Frontiers of Health Services Management* 9(3):3-37.

---------. 1994. Managed Care Plan Performance since 1980: A Literature Analysis. *Journal of the American Medical Association* 271:1512-19.

Murata, P.J., E.A. McGlynn, A.L. Siu, et al. 1994. Quality Measures for Prenatal Care: A Comparison of Care in Six Health Care Plans. *Archives of Family Medicine* 3(1):41-9.

National Library of Medicine. 1997. Medical subject headings, Annotated Alphabetic List, 1998. Bethesda, Md.: U.S. Dept. of Health and Human Services, Public Health Service, National Institutes of Health, National Library of Medicine; Washington, D.C.

National Library of Medicine. 1997. Medical Subject Headings, Tree Structures, 1998. Bethesda, Md.: U.S.Dept. of Health and Human Services, Public Health Service, National Institutes of Health, National Library of Medicine; Washington, D.C.

Nyquist, A., R. Gonzales, J.F. Steiner, and M.A. Sande. Antibiotic Prescribing for Children With Colds, Upper Respiratory Tract Infections, and Bronchitis. *Journal of the American Medical Association* 279:875-877.

O'Connor, G.T., S.K. Plume, E.M. Olmstead, et al. 1996. A Regional Intervention to Improve the Hospital Mortality Associated With Coronary Artery Bypass Graft Surgery. *Journal of the American Medical Association* 275:841-846.

Payne, S.M., C. Donahue, P. Rappo, et al. 1995. Variations in Pediatric Pneumonia and Bronchitis/Asthma Admission Rates. Is Appropriateness a Factor? *Archives of Pediatrics and Adolescent Medicine* 149:162-9.

Peterson, E.D., E.R. DeLong, J.G. Jollis, L.H. MuhlBaier, and D.B. Mark. 1998. The Effects of New York's Bypass Surgery Provider Profiling on Access to Care and Patient Outcomes in the Elderly. *Journal of the American College of Cardiology* 32:993-9.

Phibbs, C.S., J.M. Bronstein, E. Buxton, and R.H. Phibbs. 1996. The Effects of Patient Volume and Level of Care at the Hospital of Birth on Neonatal Mortality. *Journal of the American Medical Association* 276:1054-9.

Pilpel, D., G.M. Fraser, J. Kosecoff, S. Weitzman, and R.H. Brook. 1992. Regional Differences in Appropriateness of Cholecystectomy in a Prepaid Health Insurance System. *Public Health Review* 20:61-74.

President's Advisory Commission on Consumer Protection and Quality in the Health Care Industry. 1998. *Quality First: Better Health Care for All Americans. Final Report to the President of the United States.* Washington, D.C.

Retchin, S.M. and J. Preston. 1991. Effects of Cost Containment on the Care of Elderly Diabetics. *Archives of Internal Medicine* 151:2244-2248.

Regier, D.A., W.E. Narrow, D.S. Rae, R.W. Maderscheid, B.Z. Locke, and F.K. Goodwin. 1993. The de facto US Mental and Addictive Disorders Service System. *Archives of General Psychiatry* 50:85-94.

Riley, G., J. Lubitz. 1985. Outcomes of Surgery among the Medicare Aged: Surgical Volume and Mortality. *Health Care Financing Review* 7:37-47.

Schucker, B., J.T. Wittes, N.C. Santanello, et al. 1991. Change in Cholesterol Awareness and Action. *Archives of Internal Medicine* 151:666-73.

Schuster M.A., E.A. McGlynn, R.H. Brook. 1998. How Good Is the Quality of Health Care in the United States? *Milbank Quarterly* 76:517-63.

Shekelle, P.G., I. Coulter, E.L. Hurwitz, et al. 1998. Congruence Between Decisions to Initiate Chiropractic Spinal Manipulation for Low Back Pain and Appropriateness Criteria in North America. *Annals of Internal Medicine* 129: 9-17.

Simon, G.E., and M. VonKorff. 1995. Recognition, Management, and Outcomes of Depression in Primary Care. *Archives of Family Medicine* 4:99-105.

Simpson, R.J. Jr, R.R. Weiser. S.Naylor, C.A. Sueta, A.K. Metts. 1997. Improving Care for Unstable Angina Patients in a Multiple Hospital Project Sponsored by a Federally Designated Quality Improvement Organization. *American Journal of Cardiology*. 80(8B):80H-84H.

Sorlie, P.D., N.J. Johnson, E. Backlund, D.D. Bradham. 1994. Mortality in the Uninsured Compared with that in Persons with Public and Private Insurance. *Archives of Internal Medicine* 154:2409-2416.

Soumerai, S.B., T.D. McLaughlin, E. Hertzmark, G. Thibault, and L. Goldman. 1997. Adverse Outcomes of Underuse of Beta-Blockers in Elderly Survivors of Acute Myocardial Infarction. *Journal of the American Medical Association* 277:115-21.

Soumerai, S.B., T.J. McLauglin, J.H. Gurwitz, et al. 1998. Effect of Local Medical Opinion Leaders on Quality of Care for Acute Myocardial Infarction: A Randomized Controlled Trial. *Journal of the American Medical Association* 279: 1358-1363.

Starfield, B., N.R. Powe, J.R. Weiner, et al. 1994. Costs vs Quality in Different Types of Primary Care Settings. *Journal of the American Medical Association* 272:1903-8.

Stone, V., G. Seage, T. Hertz, and A. Epstein. 1992. The Relation between Hospital Experience and Mortality for Patients with AIDS. *Journal of the American Medical Association* 268:2655-61.

Stoner T.J., B. Dowd, W.P.Carr, G. Maldonado, T.R. Church, J. Mandel. 1998. Do Vouchers Improve Breast Cancer Screening Rates? Results from a Randomized Trial. *Health Services*

Research. 33:11-28.

Tamblyn, R., L. Berkson, W.D. Dauphinee, et al. 1997. Unnecessary Prescribing of NSAIDs and the Management of NSAID-Related Gastropathy in Medical Practice. *Annals of Internal Medicine* 127:429-38.

Thamer, M., N.F. Ray, S.C. Henderson, et al. 1998. Influence of the NIH Consensus Conference on *Helicobacter Pylori* on Physician Prescribing Among a Medicaid Population. *Medical Care* 36:646-660.

Thompson, J.W., J. Bost, F. Ahmed, C.E. Ingalls and C. Sennett. 1998. The NCQA's Quality Compass: Evaluating Managed Care in the United States. *Health Affairs* 17(1):152-8.

Thorndike, A.N., N.A. Rigotti, R.S. Stafford, and D.E. Singer. 1998. National Patterns in the Treatment of Smokers by Physicians. *Journal of the American Medical Association* 279: 604-608.

Tobacman, J.K., P. Lee, B. Zimmerman, H. Kolder, L. Hilborne, and R.H. Brook. 1996. Assessment of Appropriateness of Cataract Surgery at Ten Academic Medical Centers in 1990. *Ophthalmology* 103(2):207-15.

Udvarhelyi, I.S., K. Jennison, R.S. Phillips, and A.M. Epstein. 1991. Comparison of the Quality of Ambulatory Care for Fee-for-Service and Prepaid Patients. *Annals of Internal Medicine* 115:394-400.

U.S. Preventive Services Task Force. 1989. *Guide to Clinical Preventive Services*. Baltimore: William & Wilkins.

---------. 1996. *Guide to Clinical Preventive Services*. Baltimore: William & Wilkins.

Weiner, J.P., S.T. Parente, D.W. Garnick, J. Fowles, A.G. Lawthers, and H. Palmer. 1995. Variation in Office-Based Quality: A Claims-Based Profile of Care Provided to Medicare Patients with Diabetes. *Journal of the American Medical Association* 273:1503-8.

Wells, K.B., R.D. Hays, M.A. Burnam, et al. 1989. Detection of Depressive Disorder for Patients Receiving Prepaid or Fee-for-Service Care: Results from the Medical Outcomes Study. *Journal of the American Medical Association* 262:3298-3302.

Wells, K., W. Katon, B. Rogers, and P. Camp. 1994a. Use of Minor Tranquilizers and Antidepressant Medications by Depressed Outpatients: Results from the Medical Outcomes Study. *American Journal of Psychiatry* 151:694-700.

Wells, K.B., G. Norquist, B. Benjamin, W. Rogers, K. Kahn, and R. Brook. 1994b. Quality of Antidepressant Medications Prescribed at Discharge to Depressed Elderly Patients in General Medical Hospitals before and after Prospective Payment System. *General Hospital Psychiatry* 16:4-15.

Wells, K.B., W.H. Rogers, L.M. Davis, et al. 1993. Quality of Care for Hospitalized Depressed Elderly Patients before and after Implementation of the Medicare Prospective Payment System. *American Journal of Psychiatry* 150:1799-805.

Winslow, C.M., J.B. Kosecoff, M. Chassin, D.E. Kanouse, and R.H. Brook. 1988. The Appropriateness of Performing Coronary Artery Bypass Surgery. *Journal of the American Medical Association* 260:505-9.

Wong, J.H., J.M. Findlay, and M.E. Suarez-Almazor. 1997. Regional Performance of Carotid Endarterectomy: Appropriateness, Outcomes, and Risk Factors for Complications. *Stroke* 28:891-8.

Young, A.S., G. Sullivan, M.A. Burnam, R.H. Brook. 1998. Measuring the Quality of Outpatient Treatment for Schizophrenia. *Archives of General Psychiatry* 55: 611-617.

TABLE 1. EXAMPLES OF QUALITY OF HEALTH CARE IN THE UNITED STATES UNDERUSE: DID PATIENTS RECEIVE THE CARE THEY SHOULD HAVE RECEIVED?

Health care service[a]	Sample description	Data source	Quality of care	Reference[b]
PREVENTIVE CARE				
Immunizations				
Childhood Vaccines				
3 Polio; 4 Diphtheria, Tetanus, Pertussis; 1 Measles, Mumps, Rubella; and 3 Haemophilus influenzae type b (Hib) by 18 months old. (3-4 doses of Hib are recommended, depending on formulation; 3 Hepatitis B virus vaccines [HBV] are also recommended but were not included in this particular study.) (American Academy of Pediatrics [AAP] 1994; CDC 1995a).	Children 19-35 months old in 31,997 households from a nationally representative sample of the U.S.	National Immunization Survey (NIS), 1995.	74% received all the vaccines. (If 3 doses of Hib are not included, the percentage is 76%.)	CDC 1997
Influenza Vaccine				
Annual vaccination of all people ≥65 years old is recommended (U.S. Preventive Services Task Force [USPSTF] 1989). This recommendation has since been reiterated (USPSTF 1996).	Approximately 8,000 adults ≥65 years old from a sample of people representative of the U.S. civilian, noninstitutionalized population.	National Health Interview Survey (NHIS), 1993.	52% received annual influenza vaccine.	CDC 1995b
Influenza Vaccine				
Same as above.	From a sample of 7,997 randomly selected patients ≥ 20 years old who had	Mailed surveys with phone follow-up of patients who visited one of 44 clinics	72% of people 65 years or older had an influenza vaccine in the prior year.	Kottke et al. 1997

	visited a clinic during the study period, 6,830 (85%) completed surveys.	from 8/1-9/9/94 in the Minneapolis-St. Paul metropolitan area with contracts with one of two managed care companies.		
Pneumococcal Vaccine				
One-time vaccination for all people ≥65 years old is recommended (USPSTF 1989). In 1996, the recommendation was modified to specify one-time vaccination for all immunocompetent individuals ≥65 years old (USPSTF 1996).	Same as above.	Same as above.	28% received pneumococcal vaccine.	CDC 1995b
Pneumococcal Vaccine				
Same as above.	From a sample of 7,997 randomly selected patients ≥ 20 years old who had visited a clinic during the study period, 6,830 (85%) completed surveys.	Mailed surveys with phone follow-up of patients who visited one of 44 clinics from 8/1-9/9/94 in the Minneapolis-St. Paul metropolitan area with contracts with one of two managed care companies.	36% of people 65 years or older had ever had a pneumococcus vaccine.	Kottke et al. 1997
Cancer Screening				
Breast Cancer Screening				
Recommendations vary. In 1989, the USPSTF recommended an annual CBE for women ≥40 years old and mammography every 1-2 years for women 50-75 years old (USPSTF 1989). In 1996, it	21,601 women ≥50 years old from a sample of people representative of the U.S. (excluding Arkansas and Wyoming, and including the District of Columbia).	Behavioral Risk Factor Surveillance System, 1992.	58% had CBE in the prior year; 46% had mammography in the prior year; 40% had both examinations in the prior year.	CDC 1993a

recommended mammography every 1-2 years with or without annual CBE for women 50-69 years old (USPSTF 1996).				
Breast Cancer Screening				
Same as above.	From a sample of 7,997 randomly selected patients ≥ 20 years old who had visited a clinic during the study period, 6,830 (85%) completed surveys.	Mailed surveys with phone follow-up of patients who visited one of 44 clinics from 8/1-9/9/94 in the Minneapolis-St. Paul metropolitan area with contracts with one of two managed care companies.	72% of women 50 years or older had a breast examination in the prior two years; 68% of women 50 years or older had a mammogram in the prior two years.	Kottke et al. 1997
Breast Cancer Screening				
Same as above.	187 women > 50 years old.	Interview survey of women in farm households randomly sampled in 6 southern Minnesota states, 1992.	38% of women had not received a mammogram in the prior 18 months.	Stoner et al. 1998
Cervical Cancer Screening				
Women with an intact uterus (have a cervix) should have a Papanicolaou (Pap) smear after initiation of sexual intercourse and every 1-3 years thereafter. Some organizations recommend starting Pap smears for all women who have reached 18 years old, regardless of sexual history (USPSTF 1989). These recommendations have since been reiterated	Women ≥18 years old with an intact uterus from a sample of 128,412 people representative of the U.S. civilian, noninstitutionalized population.	NHIS, 1992.	67% had a Pap smear in the prior 3 years.	CDC 1995c

(USPSTF 1996).				
Cervical Cancer Screening				
Same as above.	From a sample of 7,997 randomly selected patients ≥ 20 years old who had visited a clinic during the study period, 6,830 (85%) completed surveys.	Mailed surveys with phone follow-up of patients who visited one of 44 clinics from 8/1-9/9/94 in the Minneapolis-St. Paul metropolitan area with contracts with one of two managed care companies.	84% of women had a Papanicolaou test in the prior two years.	Kottke et al. 1997
Colon Cancer Screening				
Recommendations vary. In 1980, the American Cancer Society recommended annual fecal occult blood testing (FOBT) starting at 50 years old. Some other organizations made similar recommendations. In 1989, the USPSTF did not make recommendations (USPSTF 1989), but in 1996, it recommended annual FOBT, sigmoidoscopy (periodicity unspecified), or both starting at 50 years old (USPSTF 1996).	Adults ≥40 years old from a sample of 128,412 people representative of the U.S. civilian, noninstitutionalized population.	Same as above.	14% of men and 15% of women had FOBT in the prior year; 44% of men and 43% of women had ever had FOBT; 11% of men and 7% of women had sigmoidoscopy in the prior 3 years.	CDC 1995c
Colon Cancer Screening				
Same as above.	250 women 40-65 years old who had no major illnesses, who received primary care at one of the group practices, and who were eligible for preventive care.	Medical records for patients from 4 group practices in Massachusetts, 11/1/85-10/31/87.	51%–59% of women had FOBT every 2 years or flexible sigmoidoscopy every 5 years.	Udvarhelyi et al. 1991

Cardiac Risk Factors				
Smoking Counseling				
The USPSTF recommends a complete history of tobacco use as well as tobacco cessation counseling on a regular basis (USPSTF, 1989, 1996). The Agency for Health Care Policy (AHCPR) and Research recommends that primary care physicians identify patients' smoking status and counsel smokers at every visit (AHCPR, 1996).	8,778 smokers ≥18 years old from a sample of 43,732 people representative of the U.S. civilian, noninstitutionalized population.	NHIS, 1991.	37% of smokers who had a visit with a physician or other health-care professional during the prior year had been advised to quit smoking.	CDC 1993b
Smoking Counseling				
Same as above.	From a sample of 7,997 randomly selected patients ≥ 20 years old who had visited a clinic during the study period, 6,830 (85%) completed surveys.	Mailed surveys with phone follow-up of patients who visited one of 44 clinics from 8/1-9/9/94 in the Minneapolis-St. Paul metropolitan area with contracts with one of two managed care companies.	53% of smokers were asked their smoking status. 47% of smokers were advised to quit.	Kottke et al. 1997
Smoking Counseling				
Same as above.	A nationally representative sample of 3,254 physicians representing 145,716 adult patient ambulatory care visits.	The National Ambulatory Medical Care Survey (NAMCS), 1991-1995.	Physicians knew the patient's smoking status at 66% of all patient visits. (The percentage for primary care physicians ranged from about 61%-67%, depending on the year.) Smoking counseling was provided at 22% of visits of known smokers. (The percentage for primary care physicians	Thorndike et al. 1998

			ranged from 20%-38%.)	
Blood Cholesterol Testing				
In 1988, the National Heart, Lung, and Blood Institute recommended routine cholesterol screening at least every 5 years starting at 20 years old. In 1989, the USPSTF recommended periodic screening for middle-aged men (USPSTF, 1989), and in 1996, it recommended periodic screening for men 35-65 years old and women 45-65 years old. Treatment involves dietary therapy or lipid-lowering medications, as well as increased physical activity (National Cholesterol Education Program [NCEP], 1993).	3,700 adults ≥18 years old from a representative sample of the non-African American U.S. population.	Telephone survey by the National Heart, Lung, and Blood Institute, 1990.	65% of adults had ever had a blood cholesterol test; 51% had the test in the prior year; and an additional 14% had it prior to that. 35% had never had a blood cholesterol test.	Schucker et al. 1991
Blood Cholesterol Testing				
Same as above.	Adults ≥ 20 years old from a sample of people representative of the U.S. (excluding Wyoming, Kansas, and Nevada, and including the District of Columbia) (sample sizes for individual states range from 670 to 3,190 people).	CDC's Behavioral Risk Factor Surveillance System data, 1991.	The state-specific rates of adults who had cholesterol screening in the prior 5 years ranged from 57%–70%.	CDC 1993c
Blood Cholesterol Testing				
Same as above.	From a sample of 7,997 randomly selected patients ≥ 20 years old who had	Mailed surveys with phone follow-up of patients who visited one of 44 clinics	68% had had their cholesterol measured during the prior five years.	Kottke et al. 1997

	visited a clinic during the study period, 6,830 (85%) completed surveys.	from 8/1-9/9/94 in the Minneapolis-St. Paul metropolitan area with contracts with one of two managed care companies.		
Blood Cholesterol Testing and Treatment				
Same as above.	1004 people 40-64 years old from a sample that had been enrolled continuously for at least five years and had at least one outpatient visit during the study period.	Medical records from three sites of a managed care plan (South Florida; Jacksonville, FL; and Atlanta, GA), 1/1/88-12/31/93.	84% were screened for elevated cholesterol levels at least once during the six-year period. 86% with a diagnosis of hypercholesterolemia were treated with diet therapy, cholesterol lowering drugs, or both.	Davis et al. 1998
Blood Pressure Screening				
In 1989, the USPSTF recommended blood pressure measurements for normotensive patients ≥ 21 years old once every two years if their last diastolic and systolic blood pressure readings were below 85 mm Hg and 140 mm Hg, respectively, and annually if their last diastolic was 85-89 mm Hg (USPSTF, 1989). In 1996, these recommendations were modified to specify *apparently* normotensive patients (USPSTF, 1996).	From a sample of 7,997 randomly selected patients ≥ 20 years old who had visited a clinic during the study period, 6,830 (85%) completed surveys.	Mailed surveys with phone follow-up of patients who visited one of 44 clinics from 8/1-9/9/94 in the Minneapolis-St. Paul metropolitan area with contracts with one of two managed care companies.	88% had blood pressure measured at the most recent visit.	Kottke et al. 1997
General Preventive Care				

Well-child care				
The AAP recommends routine history, physical examination, screening tests, and anticipatory guidance throughout childhood (AAP 1988).	All children who had their second birthday during the first half of the study year, and all 2-year-olds with otitis media or asthma, from a sample of 2,024 patients of 135 providers.	Medical records from physicians' offices, community health centers, and hospital outpatient facilities sampled from Maryland Medicaid claims data, 1988.	For each type of clinical setting, the study reports the average percentage of technical quality indicators for well-child care that were not met. Each average was located in the 35%–65% range.	Starfield et al. 1994
Well-adult care				
Patients should have preventive health visits every 1-3 years when 19-64 years old and every year when ≥65 years old (USPSTF 1989).	All adults with asthma, hypertension, and diabetes from a sample of 2,024 patients of 135 providers.	Same as above.	For each type of clinical setting, the study reports the average percentage of technical quality indicators for well-adult care that were not met. Each average was located in the 45%–55% range.	Starfield et al. 1994
ACUTE CARE				
Respiratory Illness				
Pneumonia				
	1,408 patients hospitalized with pneumonia from a nationally representative sample of 7,156 patients hospitalized with any of 5 conditions (congestive heart failure, acute myocardial infarction, pneumonia, stroke, hip fracture) (Draper et al. 1990).	Medical records for Medicare patients from 297 hospitals in 5 states (California, Florida, Indiana, Pennsylvania, Texas), 7/1/85-6/30/86.	52%–90% of patients with pneumonia received appropriate components of care (e.g., documentation of tobacco use/nonuse and lower-extremity edema; blood pressure readings; oxygen therapy or intubation for hypoxic patients).	Kahn et al. 1990
Pneumonia				
	1,343 patients ≥ 65 years old hospitalized with pneumonia.	National Medicare claims data and medical records, 10/1/94-9/30/95.	89% had oxygenation assessment within 24 hours of hospital arrival, 76%	Meehan et al. 1997

			received antibiotics within 8 hours of arrival, 69% had blood cultures within 24 hours of arrival, and 57% had blood cultures collected before initial antibiotic administration.	
Otitis Media				
Treatment				
	464 children ≥ 3 years old diagnosed with otitis media from a sample of 2,024 patients of 135 providers.	Medical records from physicians' offices, community health centers, and hospital outpatient facilities sampled from Maryland Medicaid claims data, 1988.	For each type of clinical setting, the study reports the average percentage of technical quality indicators for otitis media that were not met. Each average was located in the 10%–40% range.	Starfield et al. 1994
Urinary Tract Infections				
Urinary Tract Infections				
	535 episodes of urinary tract infection (UTI) from 465 children who received ambulatory care for UTIs out of a sample of 147,356 children <8 years old with continuous Medicaid coverage (exclusive of children with Medicaid because of Supplemental Security Income) for all 12 months of 1992.	Medicaid claims from Alabama, 7/1/89-6/30/93.	52% received a urine culture.	Bronstein et al. 1997
Pregnancy and Delivery				
Prenatal Care: Medical History, Physical Examination, and Laboratory Tests				