

COST EFFECTIVENESS

Regan DM, Harbert K. "Measuring the financial productivity of physician assistants." Geisinger Clinic, Danville, PA 17822. *Med Group Manage J.* 38(6):46, 48, 50-2, Nov-Dec 1991.

Journal abstract: The first formal physician assistant (PA) program began at Duke University 25 years ago, write David Regan, MS and Kenneth Harbert, MHA, PA-C. Since then, PAs have become widely utilized in the medical field, yet little has been done to measure their financial contribution. The authors provide a methodology and framework for groups to measure the financial productivity of their PAs.

Burg B. "When - and when not - to add a physician to your practice." *Med Econ.* 44-53, Sep 3, 1990.

An overworked physician should answer these questions before recruiting a colleague: is the "overworked" practice really just inefficient? Can the patient base support another physician - or should the new addition be a technician instead? What kind of physician is needed? In a comparison of "the bottom line", one worksheet examines expenses associated with hiring another physician compared to a physician assistant or nurse practitioner.

Oliver DL. "PA services economical for employers, not patients." *Physician Assist.* 14(7): 8, Jul 1990.

Mr. Oliver responds to the Saxon SR letter "Defeating the purpose," 14(4): 8, 1990. Contrary to Mr. Saxon's argument that PAs must keep their salaries low to remain "cost-effective", Mr. Oliver states that salary exploitation of PAs must end. He suggests that PAs should be paid according to income generated and argues that profits realized by employing a "cost-effective" PA are not realized by either the patient or the PA.

Cawley JF. *The cost-effectiveness of physician assistants. A report of the combined research committee of the Educational & Research Foundation and the American Academy of Physician Assistants and House of Delegates.* Alexandria, VA: American Academy of Physician Assistants. May 1986.

Examines PA cost-effectiveness utilizing the major studies on PA productivity and cost-effectiveness and the limitations and generalizability of this data. Addresses the applicability of cost-effectiveness analysis to physician assistant health manpower and, by inference, the difficulties in determining cost-effectiveness of a complex activity like medical work. Questions whether the beneficiaries of PA cost-effectiveness are the employer, the patient, or society as a whole.

Poirier-Elliott E. "Cost-effectiveness of non-physician health care professionals." *Nurse Pract.* 9(10):54-6, Oct 1984.

Journal abstract: Non-physician health care professionals provide high-quality primary care and increase consumer access to primary care. This article compares the physician/non-physician health care system with the all-physician system in three areas: the degree of patient delegation to non-physician health care professionals; the level of productivity; and the costs of training and employment. Studies of physician/non-physician health care professional substitution ratios show four non-physician health care professionals can replace two to three physicians. The addition of

a non-physician health care professional to a physician office results in an average increase of approximately 40 to 50 percent in total office visits. Total cost savings when a non-physician health care professional replaces a physician is more than \$34,000 a year. An analysis of several studies demonstrates that the substitution of non-physician health care professionals results in a significant cost savings.

Edmonson N. "Are physicians' assistants cost-effective?" *Physicians Manage.* 22(9): 41-42, 45, 48-49, Sep 1982.

Careful consideration of the issues involved in hiring and effectively utilizing a PA is urged. Questions to consider are: (1) money spent on a PA before substantial practice revenue is realized, (2) choice between another physician or a PA, (3) attitudes toward delegating responsibility, (4) time needed for supervision and training of a PA.

"NPs and PAs cost less, but the system's stacked against them, study says." *Health Plann Manpower Rep.* 11(13): 7-8, Jun 30, 1982.

US Congress, Office of Technology Assessment. *The implications of cost-effectiveness analysis of medical technology.* GPO stock No. 052-003-00765-7. Washington, DC: US Government Printing Office, August 1980. *Background Paper #2: Case studies of medical technologies. Case Study #16: The costs and effectiveness of nurse practitioners.* July 1981.

This case study is one of 17 studies comprising *Background Paper #2* for OTA's assessment, *The implications of cost-effectiveness analysis of medical technology.* That assessment analyzes the feasibility, implications, and value of using cost-effectiveness and cost-benefit analysis (CEA/CBA) in health care decisionmaking. The study on nurse practitioners highlights data on NPs but incorporates other types of physician extenders including PAs where the data is relevant. This OTA analysis reviews the literature on physician extender practice and analyzes findings using CEA/CBA.

Record JC, McCally M, Schweitzer SO, Blomquist RM, Berger BD. "New health professions after a decade and a half: delegation, productivity and costs in primary care." *J Health Polit Policy Law.* 5(3): 470-497, Fall 1980.

Journal abstract: Though knowledge about physician's assistants and nurse practitioners is far from conclusive, these new health practitioners (NHPs) appear to perform a large percentage of primary care services at a high level of quality and productivity. Moreover, the gap between the physician/NHP substitution ratio and the NHP/physician cost ratio seems wide enough to assure cost savings when NHPs are used well.

Hansen JP, Stinson JA, Herpok FJ. "Cost effectiveness of physician extenders as compared to family physicians in a university health clinic." *J Am Coll Health Assoc.* 28(4): 211-214, Feb 1980.

Journal abstract: The cost effectiveness of four physician extenders and five family physicians was examined in a university health center. The two groups were compared both in the Student Health Clinic, a type of prepaid system, and in the fee-for-service Family Practice Clinic. Total hours worked, patients seen, revenue generated, and salaries paid were collected for the nine providers over a 49-week period. In the Student Health Clinic, the average cost in providers' salaries to the clinic for each visit to an extender was \$5.49, whereas, it was \$8.53 for each visit to a physician. In the Family Practice Clinic, revenue generated per dollar of salary was \$2.68 for extenders and

\$2.62 for physicians. Physician extenders were as cost effective as physicians in the Family Practice Clinic and much more cost effective in the Student Health Clinic.

Davidson SM, Connelly JP. "Physician extenders and the cost of medical care." January 1979. *Pediatrics*. 63(4): 681-683, Apr 1979.

Journal summary: The existing evidence does not support increasing the number of physician extenders as a reliable cost-containing measure. More research is needed on the conditions under which they can limit costs and those under which they may increase costs. There may be other reasons for use of physician extenders, however, such as to maintain existing levels of productivity and allow the physician to work shorter and better scheduled hours; to replace foreign medical graduates as hospital staff; and to increase comprehensiveness of care and maintain continuity.

"NPs and PAs in MD practices improve quality of care, prove cost-effective." *Am J Nurs*. 78(6): 972, 1092, Jun 1978.

Briefly summarizes a System Sciences, Inc. study of reimbursement for physician extenders (Contract SSA-600-76-0167). A study population of 70 medical practices with physician extenders was matched with 50 comparison practices with no PEs. Use of PEs appeared to be beneficial in terms of cost effectiveness, patient acceptance and quality of care.

Stoltz MK. "Physician extender use can have impact on cost control." *Health Care Week*. 1(48): 15, Jun 12, 1978.

Olsen D, Kane R, Manson J, Newman J. "Measuring impact of Medex using third-party payer claims." *Inquiry*. 15: 160-165, Jun 1978.

Ten physician-Medex practices and ten control practices (which did not employ a Medex) in Utah, Colorado and Idaho were studied for proportional changes in revenue and net profit. The financial impact of the Medex, measured by charges made to a third-party payer was consistently positive. An increase in both the number and amounts charged for lab/x-ray services and outpatient/office and inpatient (non-surgery) charges after the arrival of the Medex in the practice was noted. A 394% increase in lab/x-ray services was larger than the doubling expected; perhaps due to recent university training, the Medex is more likely to order diagnostic lab and x-ray services and he may indirectly influence his preceptor to do the same.

McKibbin R. "Cost effectiveness of physician assistants: a review of recent evidence." *PA J*. 8(2): 110-115, Summer 1978.

Several major studies on cost effectiveness are assembled and evaluated. Many indicate significant cost savings and increased productivity with the utilization of PAs. This conclusion has several qualifications and implications: "(1) the generalizability of physician assistants' cost effectiveness has not yet been demonstrated, (2) patients and third parties may not benefit so that physician assistants may serve only to increase physician incomes, which may reduce patient acceptance and affect overall utilization rates of physician assistants, and (3) reimbursement policies are inadequate and may curtail cost-effective utilization of physician assistants...."

Lawrence D. "Physician assistants and nurse practitioners: their impact on health care access, costs and quality." *Health Med Care Serv Rev.* 1(2): 1, 3-12, Mar/Apr 1978.

A review of the literature concerning the impact of new health practitioners (NHPs) on health care delivery. This article briefly describes the growth and development of the physician assistants (PAs) and nurse practitioners (NPs). A summary of the state-of-the-art regarding impact evaluation and research follows. Briefly, some of the findings are: when compared to physicians, NPs are going into rural, inner-city areas and smaller cities and are found in larger proportions in primary care ambulatory settings; acceptance of NPs and PAs appears high once patients have been treated by such practitioners; generally, NPs and PAs generate at least enough revenue to offset the costs to employ them in fee-for-service settings and they impact on care patterns in such a way as to decrease per patient costs.

Kane R, Olsen D, Castle C. "Effects of adding a Medex on practice costs and productivity." *J Community Health.* 3(3): 216-226, Spring 1978.

Journal abstract: Archival data on ten rural practices employing a Medex and on ten matched controls were compared to determine changes in the volume of patients seen and changes in the practice finances before and after the employment of a Medex. There were no significant differences in the changes in patient volume; however, the practices that employed a Medex showed an increase in revenue and in net profit per physician. On the average, the net profit increased approximately \$11,000 (22%) for the physicians with Medex, compared with \$9,000 (21%) for the control physicians.

Greenfield S, Komaroff A, Pass T, Anderson H, Nessim S. "Efficiency and cost of primary care by nurses and physician assistants." *New Engl J Med.* 298(6): 305-309, Feb 9, 1978.

Journal abstract: We conducted a prospective study in a pre-paid primary-care practice (health-maintenance organization) of a system in which nurses and physician assistants used protocols, and compared the efficiency and costs of this "new-health-practitioner" protocol system to a physician-only nonprotocol system. In five months, we studied 472 patients with any of four common acute complaints – respiratory infections, urinary and vaginal infections, headache and abdominal pain; a subset of 203 patients was randomly allocated between the two systems. In the new-health-practitioner system physician time per patient was reduced by 92 percent, from 11.8 to 0.9 minutes, and average visit costs – including practitioner time and charges for laboratory tests and medications were 20 percent less ($P=0.01$). We conclude that this protocol system saves physician time and reduces costs.

Washington Business Group on Health. "The role of nurse practitioners and physician assistants in controlling health care costs." *Labor-Management Group Position Papers on Health Care Costs, 1978.* Washington Business Group on Health, 605 Pennsylvania Ave., SE, Washington, DC 20003.

Recommendations by the Labor-Management group are: "(1) Support training programs for nurse practitioners and physician assistants, (2) encourage education about cost advantages of employment of nurse practitioners and physician assistants, (3) work toward passage of clear, uniform laws, (4) ensure that savings are passed on to payors, and (5) further explore use of nurse practitioners and physician assistants to best assure cost-effective utilization."

Tompkins R, Wood R, Wolcott B, Walsh B. "The effectiveness and cost of acute respiratory illness medical care provided by physicians and algorithm-assisted physicians' assistants." *Med Care*. 15(12): 991-1003, Dec 1977.

Study of patients presenting with acute respiratory illness at two different clinics during a 14- to 21-month period who were treated by physicians or by physician-supervised PAs using clinical algorithms. Illness outcome, patient satisfaction, and medical care cost data were obtained from all patients after the index illness. Results demonstrated that the medical care delivered by the physician-supervised, algorithm-assisted PAs was as effective and less costly than care provided by physicians.

Wright D, Kane R, Snell G, Woolley F. "Costs and outcomes for different primary care providers." *JAMA*. 238(1): 46-50, Jul 4, 1977.

Journal abstract: This study examined the relationship between levels of medical training and direct costs for 1,700 episodes of acute illness treated in ambulatory-care clinics. Faculty, family practice resident, and physician assistants were included as the providers. Total cost and four component costs were examined. An outcome was defined as good if the patient returned to his usual level of functioning after an acute illness episode. Average total cost per episode was not related to type of provider, but there were significant differences among providers in laboratory and medication costs. Faculty and physician assistants produced higher costs, especially for patients who experienced bad outcomes. Both costs and percentage of good outcomes achieved were similar in first-, second-, and third-year residents.

Schneider D, Foley W. "A systems analysis of the impact of physician extenders on medical cost and manpower requirements." *Med Care*. 15(4): 277-297, Apr 1977.

Journal abstract: This paper presents a descriptive narrative of the mathematical manpower model and the results of an analysis of the effect physician extenders have on medical costs and manpower requirements. The model is extensively developed, through the use of a new medical classification system in the area of delegation of specific task areas and patient visits to physician extenders. Additionally the models incorporate a complete cost structure for a group practice. Field trials in seven HMOs indicate that the models accurately represent the actual system and can be used effectively as planning aids. Results are presented that analyze the use of physician extenders from the following viewpoints: minimum cost solution for adult medicine, pediatrics and obstetrics/gynecology (OB/GYN); maximum physician extender use; effect of physician extender salary on minimum cost utilization; level of independence exercised; size of clinic and regional manpower planning; and a case study of HMO planning. The type of results presented include cost analysis, manpower analysis, and the types of patient visits best delegated to physician extenders (PE).

Record J, O'Bannon J. *Cost effectiveness of physician's assistants*. Final Report. Prepared under contract HMEIA NO1-MB-44173(P) Phase I. DHEW, Health Resources Administration, Bureau of Health Resources Development and Kaiser Foundation Health Services Research Center, Portland, Oregon. Apr 1976. Phase II of this contract: *Cost effectiveness of physician's assistants in a maximum-substitution model*.

An empirical and theoretical assessment of the financial impact of PAs on prepaid group practice, the Kaiser-Permanente in Portland, Oregon. Data were collected by observation and examination of Kaiser patient records. Assuming that PA productivity is equal to that of MDs for non-complex services, the average cost savings from PA employment is at least in the middle range between

\$15,263-\$34,017. The middle range equals \$24,600. The currently employed PAs saved the system approximately \$20,000/year/PA.

Record J. *Cost effectiveness of physician's assistants in a maximum-substitution model.* Final Report. Prepared under contract 231-76-0601. Report no. HRP-0900097. Phase II of a Two-Phase Study. DHEW, Health Resources Administration, Bureau of Health Manpower and Kaiser Foundation Health Services Research Center, Portland, Oregon, 1976. Phase I of this contract: *Cost effectiveness of physician's assistants.*

Model designed to maximize substitution of PAs for MDs in the Department of Medicine performing outpatient services. The difference between \$2,042,932 for an all-MD staff and \$1,715,945 for the model's combination of MDs and PAs is \$326,987. This figure represents a 16% savings of the cost an all-MD staff would incur of \$11,160/year/PA. "In sum, the Model, in addition to providing the framework for a rationalized triage system and production function – a personnel plan – embodies some attractive trade-offs among cost, quality, access, patient satisfaction, provider satisfaction and conservation of resources. Perhaps its greatest weakness lies close to its greatest strength: its structured approach may frustrate the development of sufficient variety of MD-PA teams to permit individual talent to be expressed adequately or innovative collaboration to develop fully."

Nelson E, Jacobs A, Cordner K, Johnson K. "Financial impact of physician assistants on medical practice." *New Engl J Med.* 293(11): 527-530, Sep 11, 1975.

Journal abstract: A study of revenues generated and expenses incurred by 12 physician assistants (Medex) who had held salaried positions for at least one year was conducted to determine their financial impact on primary-care practices. Daily charge logs were used to make annual estimates of Medex-generated revenues. One method of estimating annual revenues produced a mean of \$28,190 per year, and a second method yielded a figure of \$30,210 per year. Financial statements were used in two different ways to estimate annual expenses related to the employment of the Medex. One procedure indicated average costs of employment were \$15,900, and the other \$20,100. Ten of the 12 practices in the study experienced substantial gains of estimated revenue over expenses ascribed to the activities of the Medex.

Willemain T, Moore G. "Planning a medical practice using paramedical personnel." *Health Serv Res.* 9: 53-61, Spring 1974.

Variables related to the use of paramedical personnel include their number, cost, work rate and degree of autonomy. A methodology is outlined to allow the planner to quickly determine some of the trade-offs between these key parameters, in terms of economical team size, type of paramedical to choose, and desired size of practice. The cost, speed, and autonomy of paramedical personnel of various types as well as effectiveness of related technologies such as protocols, may also be evaluated by this method.

Shuman L, Young J, Naddor E. "Manpower mix for health services: a prescriptive regional planning model." *Health Serv Res.* 6(2): 103-119, Summer 1971.

A mathematical programming model is formulated to determine the mix of manpower and technology needed to maximize quality care and minimize total cost in a hypothetical neighborhood health center. Total costs include the direct costs associated with providing the services and developing additional manpower and the indirect costs (shortage costs) resulting from not providing

needed services. Adaptation of the model for use in hospital planning as well as extension of the model to incorporate two dynamic factors (multiple planning periods and attrition) are discussed.

Theodore C. "Physician support personnel in the '70s —economic implications." *JAMA*. 214(7): 1301-1302, Nov 16, 1970.

General discussion of the economic considerations in the utilization of physician assistants. Short- and long-range impact of physician assistants on manpower supply is addressed.

Carlson R, Hershey J, Kropp D. *Use of optimization and simulation models to analyze outpatient health care settings*. Project supported by Grant Number 1 RO3 HS 02398-01 from the National Center for Health Services Research, HRA. 31 p. no date.

Author abstract: Recent work dealing with planning outpatient health care facilities has proposed the use of a recursive optimization-simulation approach. This technique takes advantage of the best features of both optimization and simulation while minimizing the disadvantages of each method used alone. In this paper a mixed integer program produces staffing and facility plans, and a simulation model evaluates their day-to-day acceptability. Then a linear regression uses the simulation results to generate upper bound constraints on patient waiting time to be added to the optimization model. Results from a hypothetical setting are used to demonstrate the value of this recursive method.

Scheffler R. *The supply and demand for new health professionals: physician's assistants and Medex*. DHEW, Health Resources Administration, Bureau of Health Manpower, Division of Medicine. Contract NO1-44184. no date.

Study introduction: This report is an economic analysis of the Physician's Assistant (PA) and Medex...the study of these new health practitioners will assist in describing the economic status of the NHPs in the health services industry. On the supply side in Part I of the two-part report, the aggregate supply, the spatial distribution, the productivity, and the current employment status of NHPs in analyzed. The estimation of demand in Part II determined the magnitude of the employment demand for NHPs by physicians, hospitals and other institutions; and what factors influence the decision to hire a NHP.

