Published in final edited form as:

Am J Ophthalmol. 2010 December ; 150(6): 761–763. doi:10.1016/j.ajo.2010.07.006.

Health Services Research and How It Can Inform the Current State of Ophthalmology

Kelly W. Muir, Hayden B. Bosworth, and Paul P. Lee

Duke University Eye Center, Durham, North Carolina (K.W.M., P.P.L.); and the Durham VAMC Center for Health Services Research in Primary Care and the Departments of Medicine, Psychiatry, and Nursing, Duke University, Durham, North Carolina (H.B.B.)

Health services research spans multiple fields of scientific inquiry and informs healthcare policy making on various levels. Although both classic epidemiology and health services research are concerned with populations, health services research differs in its emphasis on the structure, process, and effects of health services as opposed to focusing on disease prevalence and prevention. Likewise, health services research differs from clinical epidemiology, which emphasizes the causation and natural history of disease. As a multidisciplinary field, however, health services research incorporates epidemiology, as well as economic and social science, into the analysis of healthcare delivery (Figure 1).

EXAMINING STRUCTURE, PROCESS, AND EFFECTS

The structure of healthcare services relates to issues such as physician workforce considerations. For example, while evaluating patterns of care, trends in work effort, and models of population growth, Lee and associates concluded that ophthalmology will experience substantial challenges in manpower in the next 10 to 20 years.¹ Projections for the ophthalmology workforce demonstrate how health services research can inform us about the future in addition to evaluating the healthcare delivery of the present.

The study of structure also pertains to medical education. Surgical fields such as ophthalmology may benefit from technological advances in simulation of medical procedures. Simulation-based surgical training is one avenue by which residency programs can form part of healthcare learning organizations, a concept that has gained traction in the business and policy community. Health services research allows educators to evaluate the success of such programs.

Health services research also evaluates the process by which healthcare is provided. Process issues include access to care and use of services and how such variables may differ for specific populations. For example, in reviewing rates of medical and surgical treatment for glaucoma from 1992 to 2002 among Medicare beneficiaries, Stein and associates found that Latino and Asian beneficiaries with glaucoma were less likely to receive treatment than were whites.²

Inquiries to Kelly W. Muir, Duke University Medical Center, Box 3802, Durham, NC 27710; kelly.muir@duke.edu.

PUBLICATION OF THIS ARTICLE WAS SUPPORTED BY GRANT 5K12 EY016333-05 FROM THE NATIONAL EYE INSTITUTE, National Institutes of Health, Bethesda, Maryland. Dr Lee is a consultant for Pfizer, Allergan, Genentech, and Alcon; has received research support from Pfizer, Alcon, Allergan, Genentech, and Merck; and owns stock in Merck and Pfizer, but neither he nor any of the coauthors have a conflict of interest specific to this manuscript. Involved in Conception of the editorial (K.W.M., P.P.L., H.B.B.); Literature search (K.W.M.); Writing of manuscript (K.W.M.); Review of manuscript (K.W.M., P.P.L., H.B.B.). Because this manuscript is an editorial and does not contain original research, approval from the Institutional Review Board of Duke University Medical Center was not required.

In the context of Health services research, effects includes the outcomes of health care. Outcomes assessment can take many forms. Traditionally, outcomes of interest in the medical literature were mortality or physiologic measures as defined by diagnostic tests. In ophthalmology, traditional outcomes include legal blindness and loss of acuity or visual field as well as physiologic measures such as intraocular pressure or retinal thickness. More recently, investigators have included patient-centered outcomes such as performance measures (reading speed, mobility) and quality-of-life indicators. In fact, ophthalmology was one of the first fields to develop instruments to quantify disease-specific quality of life. The VF-14, an index of visual functioning for use in patients with cataracts,³ was found to predict self-reported satisfaction with vision better than visual acuity or a general health status score.⁴ More recently, the National Eye Institute developed the Visual Function Questionnaire, which has been used to evaluate the impact on visual function by a multitude of ophthalmic conditions.⁵ Quality-of-life outcomes now are included commonly as secondary end points in major clinical trials such as the Collaborative Initial Glaucoma Treatment Study.

The cost of care from the perspective of the patient, provider, or society also is an outcome in health services research. Large clinical trials often include cost analysis. For example, the Ocular Hypertension Treatment Study investigators analyzed the cost effectiveness of treating versus observing patients with ocular hypertension. Cost analysis revealed that the treatment of patients with intraocular pressure of 24 mm Hg or more and 2% or more annual risk of the development of glaucoma is likely to be cost effective.⁶ Cost analysis can also be used to compare the costs of various treatments. Cantor and associates developed a Markov model to compare the 5-year costs of treating glaucoma with medications, laser trabeculoplasty, or filtering surgery and found that laser trabeculoplasty resulted in the least cost.⁷

Recently, studies of comparative effectiveness have generated much discussion in the health services research community. Comparative effectiveness simply means comparing how effective different treatment strategies are at improving health outcomes. In February, an article in the *New England Journal of Medicine* stated that “the American Recovery and Reinvestment Act of 2009 authorizes the expenditure of \$1.1 billion to conduct research comparing ‘clinical outcomes, effectiveness, and appropriateness of items, services, and procedures that are used to prevent, diagnose, or treat diseases, disorders, and other health conditions.’”⁸ Supporters of comparative effectiveness research argue that we can contain healthcare costs by limiting less-effective treatment options.

METHODS IN HEALTH SERVICES RESEARCH

Because health services research draws on different fields of scientific inquiry, research methods are diverse. Health services research can be basic (eg, the development of a vision-related quality-of-life instrument) or applied (eg, the use of the quality-of-life instrument to compare the outcomes of 2 treatment strategies). Study designs used in health services research can include secondary data analysis, survey research, or qualitative research including focus groups and interviews. Advanced statistical techniques such as propensity scores and case-mix adjustments often are needed to address large numbers of variables in real-world data. Health service research investigators also are involved in the development of interventions for patients, providers, and the healthcare system. The evaluation of these interventions and, if successful, their broad-scale implementation also are fields of study in health services research.

IMPACT OF HEALTH SERVICES RESEARCH

REDUCING HEALTH DISPARITIES

Epidemiology and health services research perform complementary roles in reducing health disparities. Epidemiologic studies that span a large population of varying socioeconomic strata such as the Baltimore Eye Survey have the power to capture disparities in disease prevalence that may be missed in smaller studies. For example, the investigators in the Baltimore Eye Survey reported that African Americans were more likely to be blind from cataracts than were whites.⁹ One approach to explore why such a disparity exists is to examine the structure and process of healthcare delivery to different populations. Williams and associates examined longitudinal rates of cataract surgery for more than 8000 older Americans and found that African Americans were less likely to undergo cataract surgery.¹⁰

INFORMING PUBLIC POLICY

Information gained from health services research has the potential to change healthcare policy on the local and the national level. Of particular interest in the United States is the growing number of older Americans afflicted with age-related macular degeneration. In a study involving Medicare claims data from more than 30 000 people 68 years of age and older diagnosed with age-related macular degeneration, Wysong and associates found that those with age-related macular degeneration have significantly greater visual and functional impairment than their aged-matched peers.¹¹ Information about functional impairment in large populations such as in this study allows policy makers to make better-informed decisions about resource allocation. On the state level, in the 1970s, several states revisited certificate-of-need programs because of research suggesting that such programs were ineffective at reducing costs.¹²

DEVELOPING AND EVALUATING PRACTICE GUIDE-LINES

The development of clinical practice guidelines has evolved from the advice of experts to the rigorous evaluation of the best evidence-based medicine available. Combining outcomes assessment and cost analysis is one way in which health services research can improve guideline development. Additionally, Health Services Research investigators can assess the effectiveness of practice guidelines. For example, in a population of Medicare beneficiaries from 1994 through 2002, diabetics who received ophthalmic care consistent with practice guidelines experienced lower rates of onset of low vision and blindness than did others.¹³

CHALLENGES IN HEALTH SERVICES RESEARCH

Health services research addresses complex problems, creating logistical and analytic challenges for investigators. Secondary database analysis may provide a large quantity of data, but the data are incomplete.¹⁴ Testing an intervention in a real-world setting elicits difficulties that may not arise in a clinical trial.

Many of the questions health services research investigators seek to answer are derived from products of health services research projects. For example, a multitude of quality-of-life instruments have been developed, and now investigators must choose which to use. Even vision-specific instruments such as the Visual Function Questionnaire may not capture patient-reported outcomes related to a particular disease or treatment. Using multiple testing instruments, however, is complicated by the inability to combine scores. Some health services research investigators advocate item banking, a research method that uses item response theory and computer adaptive testing to manage patient-reported outcomes in a way that allows testing tailored to the individual.¹⁵

In recent years, we have seen remarkable advancements in the treatment options available to patients with ophthalmologic disease. Clinical trials are crucial to proving the effectiveness of new drugs and surgeries, but the success of these innovations must be implemented, disseminated, and evaluated in the real world as well. When the clinician has multiple treatment strategies from which to choose, the comparative effectiveness of each strategy can inform the treatment decision. Drawing from epidemiology, economics, and clinical science, health services research can help us to answer these questions.

REFERENCES

1. Lee PP, Hoskins HD Jr, Parke DW 3rd. Access to care: eye care provider workforce considerations in 2020. *Arch Ophthalmol*. 2007; 125(3):406–410. [PubMed: 17353416]
2. Stein JD, Ayyagari P, Sloan FA, Lee PP. Rates of glaucoma medication utilization among persons with primary open-angle glaucoma 1992 to 2002. *Ophthalmology*. 2008; 115(8):1315–1319. 1319.e1. [PubMed: 18321581]
3. Steinberg EP, Tielsch JM, Schein OD, et al. The VF-14. An index of functional impairment in patients with cataract. *Arch Ophthalmol*. 1994; 112(5):630–638. [PubMed: 8185520]
4. Schein OD, Steinberg EP, Cassard SD, et al. Predictors of outcome in patients who underwent cataract surgery. *Ophthalmology*. 1995; 102(5):817–823. [PubMed: 7777281]
5. Mangione CM, Berry S, Spritzer K, et al. Identifying the content area for the 51-item National Eye Institute Visual Function Questionnaire: results from focus groups with visually impaired persons. *Arch Ophthalmol*. 1998; 116(2):227–233. [PubMed: 9488276]
6. Kymes SM, Kass MA, Anderson DR, et al. Management of ocular hypertension: a cost-effectiveness approach from the Ocular Hypertension Treatment Study. *Am J Ophthalmol*. 2006; 141(6):997–1008. [PubMed: 16765666]
7. Cantor LB, Katz LJ, Cheng JW, et al. Economic evaluation of medication, laser trabeculoplasty and filtering surgeries in treating patients with glaucoma in the US. *Curr Med Res Opin*. 2008; 24(10):2905–2918. [PubMed: 18768105]
8. Weinstein MC, Skinner JA. Comparative effectiveness and health care spending—implications for reform. *N Engl J Med*. 362(5):460–465. [PubMed: 20054039]
9. Sommer A, Tielsch JM, Katz J, et al. Racial differences in the cause-specific prevalence of blindness in east Baltimore. *N Engl J Med*. 1991; 325(20):1412–1417. [PubMed: 1922252]
10. Williams A, Sloan FA, Lee PP. Longitudinal rates of cataract surgery. *Arch Ophthalmol*. 2006; 124(9):1308–1314. [PubMed: 16966626]
11. Wysong A, Lee PP, Sloan FA. Longitudinal incidence of adverse outcomes of age-related macular degeneration. *Arch Ophthalmol*. 2009; 127(3):320–327. [PubMed: 19273797]
12. Eisenberg JM. Health services research in a market-oriented health care system. *Health Aff (Millwood)*. 1998; 17(1):98–108. [PubMed: 9455019]
13. Sloan FA, Grossman DS, Lee PP. Effects of receipt of guideline-recommended care on onset of diabetic retinopathy and its progression. *Ophthalmology*. 2009; 116(8):1515–1521. 1521e1–1521e3. [PubMed: 19651311]
14. Coleman AL. Gathering evidence from claims data: caveats. *Ophthalmology*. 2007; 114(9):1597–1598. [PubMed: 17822970]
15. Cella D, Yount S, Rothrock N, et al. The Patient-Reported Outcomes Measurement Information System (PROMIS): progress of an NIH Roadmap cooperative group during its first two years. *Med Care*. 2007; 45 Suppl 1(5):S3–S11. [PubMed: 17443116]

FIGURE 1. Schematic illustrating the interactions between basic science research, clinical research, and health services research.