

Outpatient training in neurology

History and future challenges

MaryAlice Naley, MD; and Mitchell S.V. Elkind, MD, MS, FAAN

Abstract—The organization of neurology as a specialty and of neurology training specifically has evolved tremendously over the last 130 years. Originally primarily an outpatient specialty, the focus of training shifted to inpatient neurology in the early 20th century when accreditation of programs required training in newly established inpatient-based neurologic departments. Now and in the near future, the growth of neurologic critical care and the expansion of neurology intensive care units may require even more inpatient responsibilities in neurology residency programs. Contrary to these trends in training, most community neurology practice is still focused on outpatients, and surveys of neurologists have consistently indicated a need for more outpatient exposure in neurology training. This article briefly reviews the history of neurology training, discusses current challenges to outpatient training, and recommends possible solutions for the future.

Neurology training began primarily in outpatient clinics, but the focus shifted to inpatient neurology in the early 20th century with the development of academic medical centers and hospital-based residency training programs. In recent years, the discrepancy between general neurology practice, which is primarily outpatient, and neurology

training, which is predominantly inpatient-focused, has become increasingly evident. This imbalance between practice and training has engendered calls for a return to more outpatient training in neurology. Here we review this history and the current challenges to outpatient training, and make some recommendations for departments tackling this issue in their own residency programs.

The organization of American neurology and training

In December 1874, a group of seven American neurologists formed the American Neurologic Association (ANA) to create a society devoted to “the cultivation of neurologic science in its normal and pathologic relations.” Prior to this time, the scientific study of neuronal structure, neuraxis organization, and diseases of the nervous system, like syphilis, was the primary subject of neuroscience in America, but the clinical practice of neurology was largely contained within the specialty of internal medicine. In an early step at organizing the specialty, Edward C. Seguin, one of the initial ANA founders, started the first outpatient clinic exclusively for patients with neurologic disease, later known as the Vanderbilt Clinic in New York, and he subsequently became the first full-time professor of neurology.¹ For the next 50 years

after the ANA’s founding, neurology was primarily an outpatient specialty with patients generally seen in weekly outpatient clinics. While neurologic patients were administered under the care of general medical doctors, “neurology was taught [in New York] in outpatient clinics until Dana was given neurologic beds in Bellevue Hospital in 1898.”¹ At the turn of the 20th century, hospital divisions in neurology numbered only 12 in the United States, and there was only one full department in neurology.² Rare was the hospital in which patients with neurologic problems were admitted to a neurologic service. The Philadelphia General Hospital, in fact, was “unique in setting aside beds, and later whole wards, for acute and chronic neurologic cases.”¹ Neurologic patients requiring admission were under the care of the general medicine services and the bulk of the neurologists’ work was in the outpatient setting. Neurologic training was largely via individual apprenticeships, without clear definition of goals for training, and the lines were blurred between neurology and psychiatry.

During the early 20th century, however, American medicine moved toward sub-specialization in many fields, and neurology joined that trend. In 1909, the Neurologic Institute in New York City was established as the first American

From the Department of Neurology (M.A.N., M.S.V.E.), College of Physicians and Surgeons, Columbia University, and the Columbia University Medical Center of New York-Presbyterian Hospital; and Gertrude H. Sergievsky Center (M.S.V.E.), College of Physicians and Surgeons, Columbia University, New York, NY.

Disclosure: The authors report no conflicts of interest.

Address correspondence and reprint requests to Dr. Mitchell S.V. Elkind, Neurological Institute, 710 West 168th Street, New York, NY 10032; e-mail: mse13@columbia.edu

hospital devoted solely to the care of patients with neurologic disease. It was modeled on similar hospitals in Europe, such as the National Hospital, Queen Square, for Diseases of the Nervous System including Paralysis and Epilepsy, which had been founded 50 years earlier in 1859. Over the next 20 years many American hospitals established divisions and later departments of neurology. By 1929, the Neurologic Institute merged with Columbia Presbyterian Medical Center and expanded to include departments of neuropathology and neuroanatomy. Nationwide the number of departments in neurology continued to grow throughout the next 50 years: in 1935 there were 4 full departments in neurology, but by 1975 there were 74.²

Simultaneously, neurology training became more organized. By 1934, with the creation of the American Board of Psychiatry and Neurology, the training model of apprenticeship had changed to a standardized approach. Initial requirements for board certification were 1 year of medical internship, 1 year of “full time” neurology training at a “special neurologic hospital,” and 1 year of psychiatry training “in a hospital devoted to psychiatry.” Also required during these 3 years was training in neuropathology and neuroanatomy. Board certification also required, after training, 3 years of clinical practice in neurology or psychiatry.³ Specific activities during the 3 years of training were otherwise not clearly defined. While there were no formal requirements for time spent in inpatient, outpatient, or academic pursuits, it is notable that the experiences for both neurology and psychiatry were clearly defined as hospital-based experiences. In 1954 the Residency Review Committee (RRC) in Psychiatry and Neurology was established.³ The committee immediately created criteria for programs based on those used by the American Medical Association (AMA). The first set of “Essentials” (RRC requirements) was published in 1960, thereby de-

termining official criteria for RRC review and accreditation.³

As this organizational structure grew throughout the 20th century, so did the number of trained neurologists. Simultaneous with the ABPN certifying more neurologists, the RRC became more established, the number of departments in neurology grew, and neuroscience research increased. Increasing numbers of physicians passed the neurology boards, from 3 in 1935 to 285 in 1985.³ The American Academy of Neurology (AAN) was also formed in 1948 with 52 members, and increased to over 1,000 in 1955 and over 17,000 by 2000.⁴ Not surprisingly, the training of these new neurologists was increasingly concentrated in academically affiliated neurology departments that met RRC requirements and offered research opportunities.

Outpatient neurology in residency training and neurology practice

Despite the emphasis on hospital-based inpatient neurology throughout this period of growth, the importance of outpatient training remained clear to many neurologists. In 1933, Walshe wrote in his discourse on neurologic training that “in seeking clinical material, the outpatient clinic is an essential complement to the ward” in its ability to let trainees see “minor and ambulant disorders such as are seldom seen in patients admitted to a ward, and also the preliminary sorting out of the mass of unselected clinical material.”⁵ By the 1970s, however, there was a sense that neurology training had a lack of exposure to commonly encountered outpatient illnesses. In 1977, a community neurologist reported that his own caseload was 87.5% office-based and only 12.5% inpatient, while only 10 to 20% of residents’ time was spent in an outpatient setting.⁶ He proposed instead that up to 50% of residents’ time be spent in the outpatient setting.⁶ In 1978, another neurologist, echoing this concern, wrote that there were pressures for a “renewed

commitment to ambulatory care and education” within neurology.⁷

In England in 1983, similarly, outpatient neurology visits far exceeded inpatient admissions. A British neurologist concluded that the patient population covered by 153 consultant neurologists required only 6 inpatient beds.⁸ He concluded that “inpatient investigation or treatment is relatively seldom required in neurologic practice.”⁸

In 1995, a resident at Boston University concluded (based on his own caseload) that the average resident encountered 7.5 new admissions or 13 consults per week, and an average of only 2.5 new and 3.0 follow-up outpatients per week.⁹ Meanwhile, the average community neurologist at the time was encountering 2.5 new admissions, 8.7 new consults, and 13.2 new and 22.4 follow-up outpatients per week.⁹ The disorders most commonly seen in the inpatient setting, moreover, did not reflect the most common neurologic diagnoses seen by practicing neurologists. The most common disorder admitted by residents was acute ischemic stroke, the most common consultation metabolic encephalopathy, and the most common outpatient encounter radiculopathy. When comparing the cases of residents to those of practicing general neurologists, the most underrepresented diagnoses in the resident experience were headache and trauma, and the most overrepresented diagnoses in residency were behavioral or cognitive diseases, movement disorders, and neoplasms.⁹ The particular diseases encountered, moreover, were dependent on the specialties of the faculty in the institution, and did not necessarily reflect the spectrum of neurologic disorders seen after graduation from the specific institution in which one trained.

Current perceptions of outpatient training

Despite these cries for recognition of the importance of outpatient neurology in training, surveys in the 1990s clearly suggested that

neurology residents were still receiving inadequate outpatient training, while neurology was becoming even more of an outpatient specialty. A 1994 survey of American neurology residency program directors reported a consensus that "current approaches to teaching in the outpatient setting fall short of an educationally ideal system."¹⁰ It was reported that residents were spending only 23% of their time in outpatient clinics, an amount of time thought to be clearly inadequate by the program directors. Four areas were defined for improvement: 1) more time should be devoted to outpatient care, 2) more continuity at the resident level should be provided for patients in subspecialty clinics, 3) faculty should provide more supervision of residents when they see follow-up patients, and 4) conferences specifically directed at outpatient management issues should be developed. The program directors agreed that the ideal proportion of time to be spent on outpatient activities was 35%.

Five years later, little had changed. In 1999, Pedley noted, "neurology has experienced the impact of the shift from inpatient to outpatient care, but many training programs, including ours, are still struggling to deal effectively and appropriately with this sea-change."¹¹

A 1999 survey (results published in 2002) of neurology residency program directors by the Graduate Education Subcommittee (GES) of the AAN found that the average resident was still spending only 4 months in outpatient clinics and 15 months on the inpatient wards.¹² At that time approximately two thirds of the programs surveyed had dedicated rotation months for outpatient training.¹²

In a survey in 2000 by the AAN of 1,000 of its members (US neurologists and residents, 54% response rate), 72% recommended increasing outpatient training. The proportion of positive responses was not statistically different between residents and faculty.¹³

RRC requirements have changed

to reflect these pressures. Previously (as of 2003), the RRC required 18 months of patient care responsibilities of which there had to be 6 months of full-time equivalent outpatient experience in clinical neurology and one half day weekly of continuity clinic throughout the residency. New RRC requirements (January 2005) differ only in specifying that, of the 18 months of clinical care, 6 months must be inpatient months and that the 6 months of outpatient care can include the continuity clinic time divided over 3 years.

Even according to the new guidelines, however, neurology still falls short of the outpatient training requirements for training programs in other similar medical specialties. The Internal Medicine RRC requirements, for example, require that a full one third of the 3-year residency be spent in the ambulatory setting.¹⁴ Pediatrics requires outpatient continuity clinics one half to one full day per week and a separate and formal non-clinical community experience to "prepare residents for the role of advocate for the health of children within the community."¹⁵ Neurology has no such requirement for a community experience, although interestingly, the Vascular Neurology program requirements do require "involvement in community activities, including outpatient primary and secondary prevention of stroke," and "participation in the delivery of educational programs about stroke and stroke prevention."¹⁶

The balance between inpatient and outpatient training

Imbalances between residency training clinical experiences and postgraduate neurology practice do not necessarily constitute a problem. First, a direct comparison of training and practice responsibilities may not always be appropriate. Residents in training may learn more about neurologic localization, neurologic emergencies, and clinical neuroscience during inpatient activities than they might in the outpatient setting. It may be more

important to learn about critically ill neurologic patients so as to be better able to recognize serious neurologic disease later. Because we expect lifelong learning in neurology, learning of outpatient neurology may occur more efficiently after graduation with a stronger background in inpatient neurology.

Second, neurology training should not only be viewed as a preparation for practice. Many neurologists choose alternatives to practice, including research or administration, for their careers. No data demonstrate that the current system of training is better or worse preparation for clinical practice than more outpatient-centered training. It may even be argued that more outpatient training would be a less efficient use of time for those entering research or administration.

Third, an increase in outpatient experience needs to be balanced against other trends in neurology and neurologic education. Currently, hospitalized neurology patients are often more critically ill and require more specialized care during their stay than in the past. For example, with advances in stroke care, including IV and intra-arterial thrombolytic approaches, increasingly sophisticated management and monitoring of blood pressure, intracranial pressure, and other physiologic parameters is required. In fact, recent trends support further sub-specialization of care of these diseases. Data published in 2005 support the advantages of well-organized stroke centers in giving tPA¹⁷; also in 2005, recommendations were published for certification and training of specialists involved in invasive neuroradiology procedures.¹⁸ Neurologic intensive care units (NICUs) are developing in many hospitals and neurologists are taking an increasing role in managing these patients. In our own institution, the 12-bed NICU is expanding to an 18-bed unit. Also at our institution, intermediate level care ("step-down beds"), which did not exist 6 years ago, now includes four general beds

and four dedicated stroke beds. Even those hospitals that do not support a NICU may require neurologists to have more experience in managing critically ill patients as our knowledge about treatment improves. Thus, neurology training is also faced with an increasing responsibility to train residents in inpatient care and specifically acute and critical care neurology without taking time from appropriate outpatient training. This move toward more intensive care is not unique to neurology. National data for all specialties show that while hospital beds nationwide are decreasing, ICU beds are increasing.¹⁹

Fourth, there is a dearth of data regarding the relative educational value of inpatient vs outpatient training. A study of medical students found that those students who had increased time on ambulatory rotations had a more positive experience, and scored as well on objective measures of learning, as students with mostly inpatient rotations.²⁰ A survey of medical clerkship directors recommended one-third of medical student time be spent in ambulatory care compared with 50% in the inpatient setting.²¹ The relative benefits for residents may be different, however: in one study at an academic medical center residents gave better evaluations to inpatient than outpatient teaching physicians.²²

Challenges to implementing more outpatient training

Independent of questions about the proper balance between inpatient and outpatient training, there are several logistical issues that may influence the ability to increase outpatient training, enumerated below:

1. Alternative means of caring for inpatients
2. Availability of attending time for clinic teaching
3. Availability of clinic space
4. Availability of support staff
5. Mechanisms for continuity of care
6. Billing regulations

7. Financing increased outpatient training

Increasing exposure of residents to outpatients assumes that alternatives for inpatient care are available. One option would be to increase the workload of attending physicians. Many practicing neurologists, particularly at large academic centers, may not be eager to assume more inpatient responsibilities. Another option would be to utilize more non-neurologist health professionals in the care of inpatients. Candidates might include physician's assistants, nurse practitioners, or even medical hospitalists. Perhaps advanced inpatient neurology training (neurology hospitalist fellowships) could be developed as more specialized fellowship-level training parallel to neurocritical care fellowships. Currently 1- to 2-year fellowships in hospital medicine exist within internal medicine and could be a model for similar neurology hospitalist training.²³

An increase in outpatient training will require more resources directed to the clinic setting. Attending coverage, increased space for resident outpatient activities, and more non-professional staff to support these efforts will be needed. In our program, we instituted a first year resident rotation that includes exposure to several of the private neurology practices in the Neurologic Institute. The outpatient resident of the month has use of an office for that month, shares the support staff of the General Neurology practice group, and functions almost like a neurologist in private practice. The resident spends each half-day session with a different specialty group or with the General Neurology group. The resident is relieved from in-hospital call for that month.

Continuity of care may be adversely affected when residents care for outpatients, as their frequently changing responsibilities and relatively short period of time in the program means that they will not continue to care for the

patients. This has always been a limitation to the "continuity clinics" required by residency training requirements, but it is likely that this issue will only grow in significance as residents become even more involved in outpatient care. Connecting residents with one or a few general neurologists who also get to know the patients well, and who oversee patient care during the outpatient rotations, may help resolve some of these problems.

Medicare itself may provide further obstacles to change because of its 1996 regulations on teaching attending responsibilities. In 1996, the Health Care Financing Administration (HCFA) issued Intermediate Letter 372 (IL-372), which clarified requirements for attending supervision in a teaching setting (The Teaching Physician Rule).^{24,25} These demands provide challenges to outpatient training. Because in the typical inpatient setting, relatively few patients are presented to a team of residents each day, there is opportunity for the attending to teach many residents simultaneously while still examining each patient and writing thorough notes as required for billing purposes. In the clinic setting, however, particularly if a single attending is responsible for several residents, compliance with these same guidelines may be prohibitively labor-intensive. There is some evidence that the additional administrative burdens created by IL-372 have adversely affected the quality of teaching in internal medicine, although this assessment was based on questionnaires of house-staff rather than other objective measures of physician performance.²⁶ A survey of all program directors in family medicine found that the newly mandated level of supervision in the outpatient setting increased faculty attending time by approximately one-quarter full-time equivalent.²⁷ It is also not clear that the new guidelines regarding the explicit requirement that attending physicians see residents' patients

Short-term changes

- Addition of more required outpatient time
- Clearly defined time limits on intensive care unit and inpatient training experiences
- Use of non-neurologist staff for inpatient care (nurse practitioners, physician assistants, general hospitalists)

Long-term changes

- Neuro-hospitalist fellowships and use of neuro-hospitalists to cover inpatients
 - Increase in the duration of neurology residency to cover more outpatient time while still preparing qualified inpatient neurologists and researchers
 - Development of different neurology residency tracks: outpatient, research, or inpatient (hospitalist and critical care)
 - Development of alternative funding for residencies to include more of those with a stake in outpatient care
 - Development of alternate sources of funding for residencies and for the attending staff involved in time-consuming outpatient teaching
-

in clinics will improve patient care or contact with attending physicians: in one analysis of a national hospital administrative database, the proportion of patients seeing attending physicians increased after 1996, but still only to 52%.²⁸

Suggestions for the future

Addressing all of these issues will likely require an increase in funding for residency education. Because funding for residency training comes primarily through inpatient-associated Medicare payments to hospitals, however, we are unlikely to see a substantial expansion of funding for outpatient training in the near future. Balancing what many perceive as a need for increased outpatient training with both the practical realities of current financing and the other requirements of neurologic training, as outlined above, will be difficult, and will likely require an open discussion among all those with a stake in the excellence of neurologic education. Some changes may be temporizing measures in the short term, others may fundamentally challenge neurology training as it is today (table).

Still, this model for funding could be changed in the future with political will, particularly as the stability of Medicare subsidization is now in question.²⁹ Currently, contributors to graduate medical education funding include Medicare (the primary source), Medicaid

(funding varies by state), the Department of Veterans Affairs, the Department of Defense, the Public Health Service, and disproportionate share (DSH) payments to hospitals in underserved areas.^{30,31} Ideally, other organizations with a stake in paying for outpatient services, such as private medical insurance companies, could contribute to outpatient training. Alternatively, federal or state funds could be set aside for teaching at non-hospital sites. Taxes on health insurance premiums would be one method to provide additional resources for this funding, but this may not be politically feasible. To date, there have been movements toward all-payor subsidization in the popular press, but no bills presented, laws passed, or studies published to define the benefits of this possible change. Leadership from academic medicine and support from the legislative action arms of the various medical specialty organizations, including the AAN, could help to make this transition to a broader payor scheme a reality. Education of the public regarding the sources of graduate medical education funding, and particularly the importance of funding outpatient training as more care moves to the outpatient setting, would also help. Neurology may be in a unique position to assist in this public education process since neurologic disorders associated with aging are expected to be increasingly preva-

lent in coming decades. Finally, more outcomes research on the quality and long-term benefits to society of different educational approaches, including outpatient and inpatient settings, is needed to provide objective measures on which to base recommendations. The ACGME has taken important steps toward this with its Outcomes Project.³²

In the absence of increased funding, an alternative strategy to increasing outpatient training for all neurology residents would be to consider the possibility that a one size fits all approach to training is not appropriate in the current era. In 1971, it was proposed that an identical 3-year neurologic training experience might not be sufficiently versatile to train a neurologist for both academic and community practice.³³ At that time the suggestion was to lengthen neurology residency training, but in the 1999 AAN survey of program directors only 33% favored increasing the duration of training.¹² Perhaps we could now alter this idea to have different tracks for the 3 years of training. Specific tracks could focus on preparing neurologists for community practice, hospital-based acute and critical care practice, or research careers. In so doing, we could vary requirements for outpatient exposure. Alternatively, if sufficient elective time is preserved in current training requirements, resi-

dents may make these choices for themselves.

References

1. Denny-Brown D. The centennial of the American Neurological Association. *Arch Neurol* 1975;32:277–280.
2. Denny-Brown D. Centennial anniversary volume of the American Neurological Association, 1875 to 1975. New York: Springer, 1975.
3. Hollender MH. The American Board of Psychiatry and Neurology: the first fifty years. Deerfield, IL: American Board of Psychiatry and Neurology, 1991.
4. Rowland LP. NINDS at 50: an incomplete history celebrating the fiftieth anniversary of the National Institute of Neurological Disorders and Stroke. New York: Demos Medical Publishing, 2001.
5. Walshe F. Training of the neurologist. *Arch Neurol Psychiatry* 1933;29:368–381.
6. Simpson C. A community neurologist's personal viewpoint on neurological training. *Can J Neurol Sci* 1977;4:265–268.
7. Earnest M. Ambulatory neurology in residency training programs: a perspective. *Neurology* 1978;28:1–4.
8. Perkin G. Necessity for inpatient services in neurological practice. *J R Soc Med* 1983;76:920–923.
9. D'Esposito M. Profile of a neurology residency. *Arch Neurol* 1995;52:1123–1126.
10. Gelb D. Teaching neurology residents in the outpatient setting. *Arch Neurol* 1994;51:817–820.
11. Pedley TA. The changing face of academic neurology: implications for neurologic education at the millennium. *Neurology* 1999;53:906.
12. Corboy J, Boudreau E, Morgenlander J, Rudnicki S, Coyle P. Neurology residency training at the millennium. *Neurology* 2002;58:1454–1460.
13. Ringel S, Vickrey B, Keran C, Bieber J, Bradley W. Training the future neurology workforce. *Neurology* 2000;54:480–484.
14. ACGME. Program requirements for residency education in internal medicine. Available at: http://www.acgme.org/acWebsite/RRC_140/140_prIndex.asp. Accessed August 29, 2005.
15. ACGME. Program requirements for residency education in pediatrics. Available at: <http://www.acgme.org/req/320pr701.asp>. Accessed August 29, 2005.
16. ACGME. Program requirements for residency education in vascular neurology. Available at: http://www.acgme.org/acWebsite/downloads/RRC_progReq/188pr202_u105.pdf. Accessed August 29, 2005.
17. Douglas VC, Tong DC, Gillum LA, et al. Do the Brain Attack Coalition's criteria for stroke centers improve care for ischemic stroke? *Neurology* 2005;64:422–427.
18. John J, Connors I, Sacks D, et al. Training, competency, and credentialing standards for diagnostic cervicocerebral angiography, carotid stenting, and cerebrovascular intervention: a joint statement from the American Academy of Neurology, the American Association of Neurological Surgeons, the American Society of Interventional and Therapeutic Neuroradiology, the American Society of Neuroradiology, the Congress of Neurological Surgeons, the AANS/CNS Cerebrovascular Section, and the Society of Interventional Radiology. *Neurology* 2005;64:190–198.
19. Halpern N, Pastores S, Greenstein R. Critical care medicine in the United States 1985–2000: an analysis of bed numbers, use, and costs. *Crit Care Med* 2004;32:1254–1259.
20. Kalet A, Schwartz MD, Capponi LJ, Mahon-Salazar C, Bateman WB. Ambulatory versus inpatient rotations in teaching third-year students internal medicine. *J Gen Intern Med* 1998;13:327–330.
21. Bass EB, Fortin AH, Morrison G, Wills S, Mumford LM, Goroll AH. National survey of clerkship directors in internal medicine on the competencies that should be addressed in the medicine core clerkship. *Am J Med* 1997;102:564–571.
22. Ramsbottom-Lucier MT, Gillmore GM, Irby DM, Ramsey PG. Evaluation of clinical teaching by general internal medicine faculty in outpatient and inpatient settings. *Acad Med* 1994;69:152–154.
23. University of California San Francisco Hospital Medicine/General Internal Medicine Research Fellowship. <http://dgim.ucsf.edu/resfelshi/hospitalfelo.html>. Accessed August 29, 2005.
24. Higgins GL 3rd, Becker MH. A continuous quality improvement approach to IL-372 documentation compliance in an academic emergency department, and its impact on dictation costs, billing practices, and average patient length of stay. *Acad Emerg Med* 2000;7:269–275.
25. Cohen JJ, Dickler RM. Auditing the Medicare-billing practices of teaching physicians—welcome accountability, unfair approach. *N Engl J Med* 1997;336:1317–1320.
26. McConville JF, Rubin DT, Humphrey H, Carson SS. Effects of billing and documentation requirements on the quantity and quality of teaching by attending physicians. *Acad Med* 2001;76:1144–1147.
27. Stevermer JJ, Stiffman MN. The effect of the teaching physician rule on residency education. *Fam Med* 2001;33:104–110.
28. Stern RS. Medicare reimbursement policy and teaching physicians' behavior in hospital clinics: the changes of 1996. *Acad Med* 2002;77:65–71.
29. Dickinson TA. The future of financing medical education: questions about Medicare's Role. *Am J Med* 2004;117:287–290.
30. Weinrich M. Federal funding for graduate medical education. *Neurology* 1999;53:1175–1179.
31. Bruccoleri R, Hexom B. AMSA Graduate medical education funding. Available at: http://www.amsa.org/pdf/Medicare_GME.pdf. Accessed May 1, 2005.
32. ACGME Outcome Project: enhancing resident education through outcomes assessment. Available at: <http://www.acgme.org/Outcome/>. Accessed August 25, 2005.
33. Baker A. The neurologist—vintage 1971. *Trans Am Neurol Assoc* 1971;96:1–11.

Neurology[®]

Outpatient training in neurology: History and future challenges

MaryAlice Naley and Mitchell S.V. Elkind

Neurology 2006;66;E1-E6

DOI 10.1212/01.wnl.0000191319.07563.eb

This information is current as of January 9, 2006

Updated Information & Services	including high resolution figures, can be found at: http://n.neurology.org/content/66/1/E1.full
References	This article cites 24 articles, 6 of which you can access for free at: http://n.neurology.org/content/66/1/E1.full#ref-list-1
Citations	This article has been cited by 6 HighWire-hosted articles: http://n.neurology.org/content/66/1/E1.full##otherarticles
Permissions & Licensing	Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at: http://www.neurology.org/about/about_the_journal#permissions
Reprints	Information about ordering reprints can be found online: http://n.neurology.org/subscribers/advertise

Neurology® is the official journal of the American Academy of Neurology. Published continuously since 1951, it is now a weekly with 48 issues per year. Copyright . All rights reserved. Print ISSN: 0028-3878. Online ISSN: 1526-632X.

