Neurology training around the world

Juzar Hooker, Matthew Eccher, Kamakshi Lakshminarayan, Fabiana C Souza-Lima, Konrad Rejdak, Hubert Kwiecinski, Francesco Corea, and José M Lopes Lima

Kenya: help from abroad

Juzar Hooker

Africa's history of neurology remains largely undiscovered and unwritten, except in countries like Egypt. The more modern history of neurology has been peppered with remarkable people such as Osuntokun in the latter part of the 20th century, followed by an unedifying gap in training and development in the specialty. Neurological morbidity, especially from human immunodeficiency virus (HIV) related neurological disease and stroke, is rising in much of the continent including Kenya.

Kenya currently has six neurologists for a population of 30 million. (Contrast this with the demand to increase the number of neurologists in the UK, where over 300 consultant neurologists serve a population of 69 million, and it puts the situation neatly into perspective; figure.)[1] All of them work in Nairobi; four work at the Kenyatta National Hospital—the national referral and teaching hospital and the apex health institution of the public health service—but also in part-time private practice, and two work in private practice. Of the four public-health-service neurologists, three hold academic appointments with the University of Nairobi Medical School, and only one actually works for the hospital board (the equivalent of a UK National Health Service contract). I have been appointed by the hospital to develop my interest in clinical neurology and will become the seventh neurologist in the country when I return later this year.

A Kenyan neurologist's long journey begins in medical school, with 5 years of undergraduate medical training, followed by a 1 year internship, leading to at least 2 years as a medical officer in a district general hospital. One can then apply for the formal internal medicine residency at the Kenyatta National Hospital, which takes a minimum of 3 years. This includes a research project—in addition to the clinical and academic workload—done over 2 years, which, in the case of the fledgling neurologist, is commonly on a topic of neurological interest (mine was on tuberculous meningitis, a problem of immense importance to the neurologist in an HIV and tuberculosis endemic region). At the end of this residency is an examination modelled on the Membership of the Royal College of Physicians (MRCP) assessment. My own initial training followed this pattern.

There is no proper neurology training programme in Kenya. The trainee neurologist would thus seek a medical specialist or lecturer job at the Kenyatta National Hospital, which is the only institution with anything resembling neurological training in Kenya. All the Kenyan neurologists have cut their teeth at this amazing hospital. There are so many patients with such a wide range of neurological pathologies, a substantial proportion of which is infectious and therefore eminently treatable. This post normally lasts for 2 years, as in my case, before the trainee proceeds overseas to gain experience at a neurological centre of excellence. All but one have come to the UK for the latter part of their training, for between 6 months and 2 years. I am doing 2 years of clinical training at The National Hospital for Neurology and Neurosurgery at Queen Square in London, which includes a 6 month movement disorders fellowship.

Drawing from my own experience, I can say that I learnt most of my basic neurology in Nairobi. The clinical material is remarkable, the patients are very helpful in the teaching process, and often the signs are fairly florid. There are important limitations: after the well organised internal medicine training, the neurology training is unstructured, with poorly organised service commitment and little supervision—one has to actively look for senior advice from the few consultants who are helpful. There is no proper neurological unit or ward, although two general medical wards have a neurology bias. In addition, laboratory support is poor and there are no trained neuropathologists. There are only two privately owned MRI scanners and no fully trained neuroradiologist (although one radiologist dealing with MRIs is very good with neuroimaging). There is no dedicated neurophysiologist, and economic constraints mean that investigational and therapeutic methods are severely restricted. Library facilities are limited, to say the least, and information technology less than pervasive. Training is, therefore, very much self-driven. One learns a lot, despite the difficulties, and yet the training is incomplete.

Coming to the UK has enabled me to build on the foundation I was blessed with from Kenya and to gain

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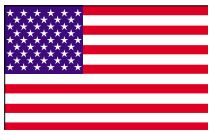
confidence in neurological diagnosis and therapeutics. Some things are different in emphasis, substance, and style: we would look strange looking for clonus in the middle of testing for tone in Kenya; we are much more sensitive to subtle clinical clues to HIV infection and multisystem disease; and we are very poor at analysis of eye movement abnormalities, something that I learnt nearly from scratch here in the UK. A big gap in clinical neurological practice in Kenya is the practice of movement disorders: even though there is, I suspect, a significant movement disorders problem, we had not been trained to recognise them in this highly visual and observant specialty, and it is a particular privilege to train in this specialty in the UK.

Even though the Neurology Society of Kenya brings together neurologists and neurosurgeons in the country, and accepts junior doctors with an interest in the clinical neurosciences as associate members, there is no dedicated forum for trainee neurologists. Opportunities for travel are very limited, with lack of funding being the major obstacle.

After I return to Kenya, I would hope to develop my interest in my area of specialisation. This can be a tremendous challenge. I believe the solution to this problem lies in the establishment of a neurological centre in Kenya, enabling more relevant training in neurology for junior doctors, reducing the need for overseas training and restricting it to training in highly specialised skills, as well as for research and continuing professional development. Such a strategy would require support from—and links and exchanges with—an overseas centre of excellence, as well as adequate funding together with commitment from a dedicated team of Kenyan neurologists with a passionate desire to develop the specialty. That is the hope I live with.



USA: shaped by regulation and society

Matthew Eccher

American neurological training is a diverse amalgam of individual training programmes, overseen by a dizzying superstructure of professional organisations, legal bodies, and governmental agencies. As such, it is a microcosm of American medicine and American society as a whole—decentralised and diverse, yet woven together by a web of institutional ties. Hopefully, this system optimises the advantages of individual freedom and diversity while preserving the need for enforceable acceptable standards. This system can be richly productive and nurturing of young clinicians, but can also prove daunting to understand.

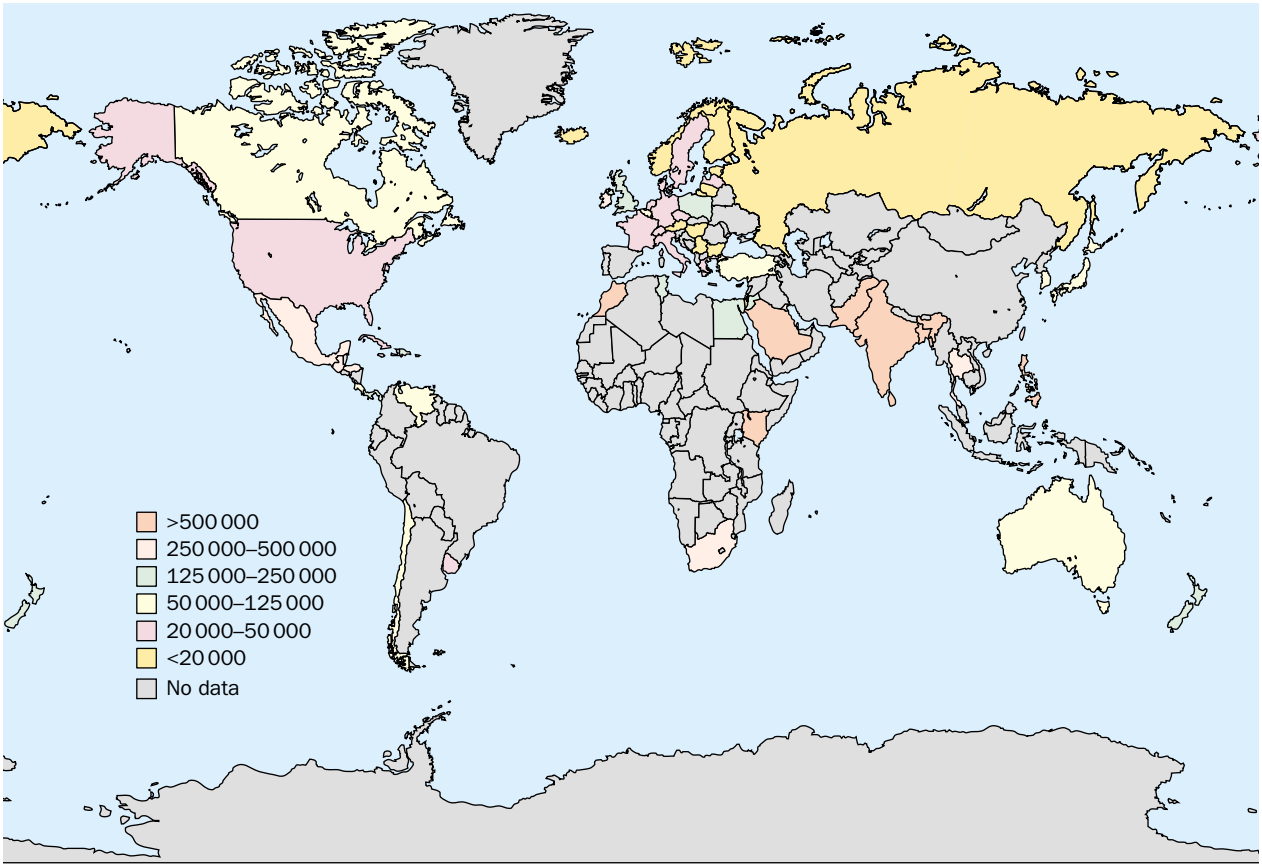
Medical training begins for most US physicians after completion of 4 years of university education and attainment of a bachelor's degree. Most prospective physicians apply for admission to medical school during their last year of college. College for many future doctors is devoted to the "pre-med" requirements and the grades needed to compete for admission. Our system contrasts to that of much of Europe, Africa, and Asia, in which prospective physicians enter medical training fresh out of secondary school, and combine their bachelor's degree and medical educations in 4–6 years. A few trainees in the USA do enter a combined bachelor's and medical degree programme, but these programmes are currently offered by few medical schools. Men and women who come to realise their calling to medicine late find it relatively easy to apply to medical school, which is the undeniable advantage of the system; the undeniable disadvantage is the increased number of years sacrificed to training in one's career, and the accompanying debt.

Upon attainment of a medical degree (MD or DO, a distinction that I will not further discuss here), physicians in the USA do still legally retain the option of entering directly into practice. Few if any do so. Selection of training programmes by prospective neurology trainees and vice versa takes place through the Match, a centralised process whereby applicants rank-order their choices of programmes and programmes rank the applicants they wish to accept (www.sfmatch.org). A computer algorithm matches the pools of rankings against one another to generate a list of who has "matched" where. This system was devised to replace a chaotic scramble for jobs and trainees that once took place annually toward the end of each medical school year.

Neurology training begins only after the completion of 1 year of general medical internship (secured through a separate match system, www.nrmp.org). The form and content of each resident's 3 years of training in neurology depends fundamentally on where he or she matches, because, as trainees, we look after our supervisors' patients, and we see what they see. Residents at public, inner city hospitals see a significantly greater amount of the complications of poverty, drug and alcohol abuse, and trauma than do trainees at more suburban, private hospital programmes. For economic and manpower reasons, public hospital programmes offer trainees more independence and less direct supervision; however, recent reforms in public health-care funding have significantly narrowed this gap.

Residents' experience also depends upon the expertise of their institution's staff. For example, during residency at Case Western Reserve and University Hospitals of Cleveland I had an outstanding exposure to eye movement abnormalities with Robert Daroff and John Leigh. By contrast, trainees from Cleveland's other programme, at the Cleveland Clinic, see a great deal more epilepsy. In all American programmes, 3 months of training is devoted to child neurology; depending on the programme, this may be spent primarily in the inpatient or outpatient setting. Conspicuously absent from the experience of most US trainees is exposure to many infectious diseases common in the developing world. For example, most residents see some patients with herpes encephalitis and the complications of HIV (cryptococcal meningitis, toxoplasma encephalitis, pml, etc), few if any US trainees have seen a single patient with cerebral malaria, trypanosomiasis, or leprosy—the most common cause of acquired neuropathy worldwide! The clinical experience of US neurology trainees is thus, not surprisingly, fundamentally shaped by US society; largely protected from epidemic disease and malnourishment, but prey to the complications of social pathology and sedentary lifestyles.

Clinical practice, by the same token, is highly



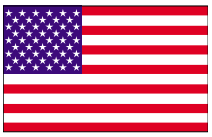
Number of people for each neurologist around the world. Adapted from reference 1.

technologically driven. Electroencephalography (EEG), electromyography (EMG), and vascular ultrasound are every bit as important to US neurological practice as anywhere, and nearly universally available. Most residency programmes do not permit sufficient experience in EEG or EMG to afford a trainee complete competency in their use and interpretation; most trainees who want this experience take an extra year in a neurophysiology fellowship. MRI, of course, is much more freely used than outside the USA. As nervous-system specialists, we are well aware of how much CNS pathology we can miss clinically that might be apparent on MRI. Whether this use of MRI is cost-effective is another matter, as is the degree to which the litigiousness of our society drives its frequency.

Oversight of our training is complex. The direct responsibility belongs to the Accreditation Council for Graduate Medical Education (ACGME; www.acgme.org), a non-governmental agency made up of academic clinicians drawn from every medical specialty. The ACGME is charged with developing standards for residency training in each medical speciality, and determining via regular site visits whether each residency training programme is in compliance with the standards for its specialty. The Council draws on the professional organisations of each specialty for members with the expertise required to set the standards. For US neurology, these are the American Neurological Association (www.aneuroa.org), the American Academy of Neurology (www.aan.com), and the Association of University Professors of Neurology (www.aupn.org). Many clinicians of academic prominence are members of all these organisations at some point, and may serve in positions of authority in more than one. Board certification in neurology is granted by a different body, the American Board of Psychiatry and Neurology (*ABPN* www.abpn.com), which is an entirely separate institution. Upon completion of a certified residency, the applicant for certification sits first for a written and then for an oral examination, after the surrender of thousands of dollars in fees. At the best of times, there is fair concensus between these organisations on matters regarding neurology training; however, this is not always the case. In the end, the ACGME accredits training programmes, and the ABPN certifies trainees as competent.

What voice do neurology trainees have in their specialty? On the day-to-day basis, most trainees' concerns are about their own programme, and are handled between themselves and their residency director and department chair. At the national organisational level, the only group representing trainees' interests is the Consortium of Neurology Residents and Fellows, a division of the AAN, of which I am the current chair. Created only 5 years ago, this group provides a place at the table for residents and fellows with those who train us in our profession.

In the end, neurology training in the USA is like training in any medical specialty anywhere—a daily struggle to both get the work done and provide the best possible care for one's patients, while at the same time finding the time and energy for self-education to become the best physician one can be. The difference, of course, is the regulatory structure and social context.



USA: a career in research

Kamakshi Lakshminarayan

Basic and clinical research is a core professional activity of a small but significant percentage of neurologists in the USA. Figures compiled by the American Academy of Neurology estimate that about 6% of US neurologists are physician scientists (ie, they are primarily engaged in research rather than clinical practice). Some of these physician scientists specialise in basic neurosciences whereas others are involved in translational or clinical research. Though they account for a few of all neurologists, physician–scientists have an important role in the advancement of neuroscience and the clinical practice of neurology. Here, I describe some features of the education and development of physician–scientists specialising in neurology in the USA.

Neurology training in the USA, like physician training elsewhere in the world, is based on activities necessary for the development of clinical skills and the absorption of knowledge needed to provide good patient care. The mainstay of residency is learning through doing: residents are required to see as many patients as possible with the aim of exposing them to a wide variety of neurological disorders. For most trainees the time spent on research, either clinical or neuroscientific, is minimum. The ACGME, which accredits programmes that train physicians in the USA, specifies the minimal time to be spent in various clinical settings; for example, 18 months in adult neurology, 3 months in paediatric neurology, etc. By contrast, the amount of time spent in research is discretionary, although some exposure is expected. Most neurology programmes attempt to introduce residents to research traditions and methodology through journal clubs and weekly conferences, where staff physicians and scientists present their ongoing research. Some programmes (such as the University of Minnesota, where I trained) require annual research presentations by residents; many programmes actively encourage residents to attend and present at national conferences.

Despite the limited focus on research during the residency years, resident training is important to anyone pursuing a career in clinical research. It provides state of the art knowledge about hospital systems and medical practice in the USA, and exposes the would-be researcher to various clinical problems. This experience is a valuable aid to later attempts at the formulation of useful and practical research questions. The same can be said of postresidency clinical fellowships where trainees specialise in learning about the clinical features of specific diseases, such as movement disorders or epilepsy, rather than learning how to do research in those areas. Medical credentials are also important for acceptance into the medical community, particularly in the USA, where physicians are generally quite sceptical of clinical researchers who do not have the requisite MD. Furthermore, access to patients, which is important in both clinical and translational research, generally requires an MD qualification. Some American universities offer a combined MD and PhD track, which is used by trainees interested in basic or translational neurosciences rather than clinical research. The option extends the typical 4 year neurology residency training to 6 or more commonly 7 years. Candidates who are accepted into such programmes typically work toward a PhD in the neurosciences and complete the requirements for residency training. Because both residency and doctoral research are quite arduous and time consuming, most MD–PhD trainees work sequentially rather than concomitantly on their PhD and neurology residency.

Medical research in the USA, whether at universities or elsewhere, is heavily dependent on funding from government organisations such as the National Institutes of Health (NIH) or from private sources such as pharmaceutical companies and charitable foundations. An established academic researcher is expected to obtain funding to support the costs of required equipment and staff such as analysts and research assistants. In addition, he or she has to either earn his or her own salary from research grants or provide other services (administrative, patient care, teaching) to the university. Because residency training does not include instruction in research skills per se (eg, advanced bioscience, statistics, grant writing, etc), most new graduates (including most of those on the MD–PhD track) spend time with an already established faculty scientist as a postdoctoral trainee or fellow. In return for working on the faculty scientist's research projects, the fellow gains experience in doing research, and also develops practical insights into the publication and grant submission process, with the goal of eventually becoming a principal investigator on funded grants and possibly director of a scientific laboratory. This incubation period, where a potential researcher is mentored by a more established colleague, plays a very important, though poorly defined part, in the development of a physician–scientist.

I completed my residency training in neurology at the University of Minnesota in 2002. Despite having a PhD (obtained before residency training), I needed some additional time for the transition into a faculty position with my own funded projects. Therefore I applied for, and was awarded, a clinical research training fellowship from the AAN foundation to help with this transition. This fellowship provides support for a period of 2 years with the expectation that I would spend at least part of the time in obtaining formal training in clinical research methodology including course work in biostatistics, clinical trials, ethics, and epidemiology. The remainder of my time is spent working on research projects with experienced mentors and preparing materials for scientific publication. My

research involves analysing databases of patient records pertaining to stroke care, with the goal of improving our understanding of the relations between treatment guidelines, physician adherence to these guidelines, and patient outcomes. I also participate in ongoing stroke prevention studies to gain practical experience in the conduct of clinical trials.

A portion of my time in the upcoming year will be spent working on grant applications of my own to support my research during the following year and beyond. The amount of time (after grant submission) for research projects to get reviewed and possibly funded varies from 6 months to a year or longer, and the competition is stiff—for instance, the anticipated acceptance rate for National Institute of Neurological Diseases and Stroke (NINDS) research project grant applications in 2003 is 30%. A portion of grants that are not initially accepted are deemed eligible for resubmission with changes (both textual and substantive) in response to reviewer critiques; however, the resubmission process itself may take another year or more. A career in research involves a willingness to take chances and the fortitude to keep trying if initial attempts at funding do not succeed. In spite of this element of uncertainty, researchers are motivated by the possibility that their research could contribute to an improved standard of care, ultimately helping large numbers of patients in many different countries.

Brazil: inequity and an ageing population

Fabiana C Souza-Lima

Brazil currently has 82 medical schools, taking into account both private and public institutions, spread throughout the country. After a 6 year graduate course, a doctor is able to work as a general practitioner. However, disparities in the academic reputations of these medical schools are widely recognised. Nevertheless, it is only in the last 3 years that the government has begun to assess young doctors.

Until last year, a neurologist had to complete 1 year of internal medicine training, followed by 2 years in general neurology. Now, 2 years in internal medicine are required; this is the result of a government effort to improve basic health programmes.

There are currently over 2000 neurologists in Brazil, with nearly 70% concentrated in the south east, the most developed region. There are 47 Neurology residency programmes recognised by the Brazilian Academy of Neurology. As with the medical schools, there are large differences between them. Training in university public hospitals tends to be more well respected, on account of the professors who have a wide clinical exposure. These hospitals are referral hospitals in the public health hierarchy and consequently attract many specialised and challenging cases. In addition to the completion of a neurology residency programme, a candidate must pass a three-step examination in order to become a neurologist of the Academy. However, this examination is not mandatory to practice as a neurologist, which clearly shows the disparities in professional qualifications in the country.

What really determines how well trained a young doctor becomes is his or her self-motivation. One has to do one's best to cope with many social and not strictly medical problems, to overcome cultural gaps, and to be creative in treatment when short of funds. It is common to request private care to help patients who cannot afford diagnostic exams that are unavailable through public medical care. It is not surprising that here, not only as a consequence of our Latin heritage, the doctor–patient relationship tends to be very warm and supportive.

As trainee neurologists, we divide our time between a residency schedule and searching for additional experience in other institutions with accessible technological facilities, or even taking some training abroad at our own cost. Likewise, most educational resources are not available in hospital libraries. We often have to take on additional work in order to be able to afford training.

At present, I feel that doctors live under the shadow of the development boom of the 1970s. Many huge hospitals were built, which generated unbearable costs that cannot be sustained. Training opportunities for doctors have changed accordingly. It is now extremely difficult to get onto an overseas PhD programme funded by the government. Opportunities to study abroad are scarce and mostly shaped on an individual basis, as there are few formal opportunity to travel.

Being a doctor in Brazil means getting acquainted with disparities. In large public hospitals—including the one in which I did my residency—technological facilities, such as interventional radiology can be found whereas ordinary laboratory examinations are scarce. Public programmes to control hypertension and diabetes are sometimes inefficient owing to difficulties in the supply of drugs to less privileged patients. However, a small proportion of the population benefits from government-paid treatments like intravenous immunoglobulin, interferon, or riluzole.

As in some other developing countries in Latin America, we are undergoing an epidemiological transition from infectious to degenerative diseases, bearing in mind the regional differences of a population of over 150 million people. At least in metropolitan areas, the elderly population is growing substantially and the welfare system is not able to handle its needs.

Most Brazilian doctors split their professional activities between public (70%) and private (59%) institutions. In addition, 74% have a private practice, and are paid directly by the patients or are reliant on the draconian rulings of health-insurance companies. In Brazil, doctors are less vulnerable to unemployment than the general population, despite not being high earners.

Neurology training in Brazil mirrors the contradictions of the whole country. The best training is in public hospitals, but the best technological facilities and salaries are concentrated in the private sector. Despite these imbalances, young Brazilian doctors studying abroad always tend to come back home because of a strong sense of national identity. In addition, although health care is not universally accessible, there is a feeling of

optimism because of initiatives to control public health issues such as HIV, tuberculosis, and poliomyelitis. It is a challenge to find solutions to the problems brought about by an ageing population, to the young victims of urban violence, and to the lack of balance among different geographic regions.

Poland: rapidly changing standards

Konrad Rejdak and Hubert Kwiecinski

The system of neurology training in Poland has been evolving over the past decade in response to the country's socioeconomical transformation and membership of the European Union. There is now one uniform training programme, obligatory for all trainees, which was derived by the Experts Committee appointed by the ministry of health and chaired by one of us (Hubert Kwiecinski, a national consultant in neurology).

Neurologists are trained at 15 major academic neurology centres but also at a number of authorised, specialised neurology wards at state hospitals across the country. A young doctor who has recently graduated from medical school has to complete 1·5 years of general training, including rotations in all major medical disciplines; a board examination must be passed to acquire full registration. It is then possible to enter the neurology course in a specialised centre, but only after an examination and an interview by the local recruitment committee.

There are three different options in specialty courses: first, a residency post that is funded by the state or by the teaching institution (the most popular option, but available to only a few applicants); second, a voluntary post for those who decide to specialise but who are not employed other than in teaching institutions of the national health service; and third, a research post for those who combine clinical training with PhD studies. The duration of neurology training is 5 years and is done under the supervision of a consultant neurologist. The training programme consists of an introductory 5 day course organised by a regional consultant, general neurology residency, and rotations. The general neurology training is completed at the selected centre and lasts 42·5 months, including time (up to 20%) attending an out-patient clinic.

The detailed programme of clinical skills and procedures requires each trainee to document their performance and display their competence in each area, as confirmed by the consultant trainer. This includes at least 120 night duties spent in admission and on in-patient wards and completion of at least 100 independent neurological consultations. Additional subspeciality courses in electrophysiology, neuropathology, neuroradiology—as well as the main specialties of neurology such as stroke, epilepsy, movement disorders, neuromuscular disorders, etc—are required throughout the training period. The organisation of such teaching courses is coordinated by the Centre for Postgraduate Medical Education and only authorised departments with available specialists in the given specialty are permitted to provide them.

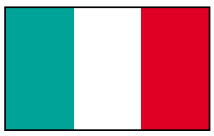
There are several rotations in other medical disciplines that are necessary in order to complete the training scheme. This includes placements in: intensive care (1 month), psychiatry (2 months), internal medicine (2 months), neurosurgery (1 month), neurorehabilitation (2 weeks) and neuropaediatrics (3 months). All those activities are equally distributed throughout the 5 year curriculum and after each year there is an oral examination organised by the tutor. The board examination ends the formal neurology training and is obligatory for all trainees. It is organised twice a year by the National Medical Examinations Centre and consists of three parts: written multiple-choice questions test, practical, and oral examinations. In addition, the trainee needs to document sufficient knowledge of at least one foreign language: English, French, or German.

Each year, an average of 50 trainees graduate from the neurology programme and receive a full licence to work as consultant neurologists in public and private health services. The number of neurologists per capita has remained at about 1 to 15 000 over the past 5 years. There is an unequal distribution of specialists with many in the bigger cities and fewer elsewhere. Under National Health System services, the patient must be referred to the neurologist by a family doctor. Most consultants work in the public sector of the health service but most of them also run private practices. Only a few work exclusively in private practices, but this number is gradually increasing. This reflects the general situation in the Polish health service where almost all hospitals are in public hands with the few private hospitals financed through national health insurance and not directly by patients. Such a system does not provide sufficient funding for health care and the debate of how to improve it has been going on for years. This also affects the situation of neurology trainees, particularly those who do not have a permanent resident position, as they are underpaid (€300 monthly at the resident post). Many of them do not complete the course, preferring to take jobs in the pharmaceutical industry or elsewhere. Despite that, neurology remains quite popular among young doctors entering specialty training, which is probably due to recent improvement in patients care and treatment but also from a long tradition of that discipline in Poland starting in Joseph Babinski's time.

In recent years there has been increasing scope for neurology trainees to travel abroad or practise as consultants in order to get better insight to the newest advances in neurology. This has become possible through the international scientific conferences and workshops, but also temporary clinical placements in prestigious neurological centres. Formal training abroad can be accepted and included in the neurology curriculum of the individual after returning to their teaching institution in Poland. However, the fellowships and grants for such activities are not provided by Polish teaching institutions or other regulatory bodies. Funding is only available through the support of international neurological organisations (ie, ENS, EFNS) or local foundations. The Neurology Trainees Section has been recently established within the Polish Neurological Society to further facilitate and provide information resource on such opportunities.

This is in agreement with the policy of the European Association of Young Neurologists (www.ynt-europe.com), which has a similar role at the European level.

In summary, the neurology training system in Poland is both functional and effective. The programme content is consistent with that in more developed countries, although the so called "European standard curriculum" has not yet been proposed. The system gives more advantages to the young doctors based in academic centres and those who are fortunate enough to get funding from the state for residency posts. The access to the internet and electronic neurological literature is still far too limited for those from smaller non-academic centres. Further developments on the governmental and structural basis are needed.



Italy: a structured compromise

Francesco Corea

There are about 2500 neurologists in Italy, most of whom work for governmental institutions including public hospitals and universities. Specialist training in neurology involves a 5-year period of training sponsored by grants from government institutions, generally the Ministry of University (for EU citizens). In the past decade the Italian National Society of Neurology has created a junior section for young neurologists without permanent positions, with the aim of improving the trainee status and promoting exchange of experiences. Prizes from private sponsors for the best qualification thesis are also available to members.

After passing the admission test, the candidate receives a 5 year grant of €900 a month, which corresponds roughly to 50% of a standard institutional base assistant salary. The candidate is also charged the annual university fees which are a minimum of €1000 a year. Most training programmes are run in large academic medical hospitals with established neurological centres but there is a wide variation among the hospitals in programme planning.

The programmes begin in autumn with faculty members deciding the number of active disciplines as well as the number of hours, resulting in a big variability throughout the country. Typically, 4–10 h a week are dedicated to conventional activities with formal lessons on related disciplines such as pharmacology, neuroimaging, and neurosurgery. The teaching courses give a consistent level of teaching according to regularly updated content requirements, providing a good training in the diagnosis and treatment of patients with neurological disorders. Each student is required to spend, on average, 38 h on institutional activities, but most trainees spend more than 50 h a week in the ward or in the labs.

The clinical component of the educational programme involves outpatient and inpatient care—including management of ward activity, treatment of patients in intensive care, and doing and interpretation of non-invasive electrophysiological studies. The partial clinical responsibilities include night duties under close supervision of a board certified neurologist. Generally, the junior trainee is also involved in the direct assessment of neurological patients in the emergency room, under the supervision of a senior resident who is invloved in the decision making process. With regards to specific medical procedures, trainees are expected to acquire experience in performing lumbar punctures (the number of procedures depends on the disposition of the local supervisor). Only few institutions, to my knowledge, produce a logbook to trace the student's activities and duties. Training could also include conferences and other clinical sessions concerning general neurology.

With respect to research, it is unfortunate that laboratory-time in rotations is too short to develop a real understanding of the issues, current research, or technical skills involved, or to finish an experiment. Moreover, the training programme rarely includes courses on the use of clinical epidemiological techniques and population databases, or on preparation of research grants, the handling of clinical research data in a computerised format, and the editing and validation of data sets.

During the 5-year period, 6–12 months is normally spent abroad, with the aim of acquiring specific competence in techniques or subjects of interest. Now the trainee has the hybrid status of a university student and a full legal responsibility for patients' care (a good insurance coverage at the students own expense is strongly recommended because the standard university umbrella is thought insufficient). Trainees represent a low cost support for the health service and academic system. Recently the national general union of trainees organised street demonstrations and strikes, with a suspension of their clinical activities in order to urge a reassessment of their position.

Europe:

José M Lopes Lima

Trainee neurologists in Europe are represented by two associations: European Union of Medecal Specialities (UEMS) and the European Board of Neurology (EBN).

The UEMS

The UEMS unites the professional organisations of the European Union (EU) countries in addition to Norway, Iceland, Switzerland, and Liechtenstein. It is organised into "monospecialties" whose members include one or two delegates from the professional organisations of each country. Later, it was felt that the scientific branches of the specialties should also have an input, and the scientific organisations of each country now also send two delegates to represent them at monospecialty meetings. The UEMS reports to the Standing Committee of Medical Doctors, as do other medical organisations. The Standing Committee has a role in reporting to the Advisory Committee for Medical Training (ACMT), which sends proposals to the European Commission (EC) for consideration and approval by the European Commission and the Council of Ministers.

The European Board of Neurology

The European Board of Neurology (EBN) regulates and assesses medical training centres to ensure trainee neurologists reach the standardised level required to achieve

a European qualification. Postgraduate training has been the subject of much discussion. Two recent surveys[2,3] assessed neurology training in 36 and 15 European countries respectively.

These studies have led to the publication of several recommendations for the standardisation of postgraduate training—including the establishment of a core curriculum that should be followed by accredited training centres throughout Europe. This training should be mainly clinical but complemented by exposure to basic sciences, subspecialities, ethical and administration issues, and opportunities for research. Apprenticeship should last at least 5 years and should be spent in more than one training centre in preferably more than one country. At least 50% of the time should be devoted to clinical practice. Each trainee should be allocated a supervisor and should maintain a log book throughout the 5 years.

These recommendations were carefully discussed by the EBN and a consensual formulation was made, which is part of Chapter VI of the UEMS Charter for Medical Training in Neurology. This sets out a number of regulations regarding the curriculum as well as the entry requirements for the training schemes. It states that a trainee should be considered competent to practice independently 6 years after finishing medical school.This period should encompass basic training, including unselected emergency patients.

The period of training in neurology should be a minimum of 5 years, of which at least 3 years should be in clinical practice, including child neurology, neurosurgery, neurorehabilitation, intensive care, or emergency department work. Practice of internal medicine, psychiatry, neurosurgery, neurophysiology and neuroimaging as well as a period of research, and time in a subspecialty is recommended. The training should be completed in more than one centre and preferably in more than one country. The European qualification is valid for EU citizens practising in any EU country, but only the country of qualification for non-EU citizens. These recommendations were approved consensually by the EBN but have not been adopted by the European Commission (EC). The directive 93/16/EC was kept as before in the new proposal of the March 7, 2002: the minimum accepted by the EC is 4 years of neurology practice after 6 years of medical school.

Open facilities for neurology training in Europe

Another initiative was implemented for postgraduate training, namely an exchange programme enabling trainees to complete parts of their course in different European countries. The Open Facilities for Training in European Neurology (OFTEN) programme is a data bank of the different neurology departments in each country which are willing to accept trainees from abroad for a limited period of time. There is not yet any financial support available for the programme. Each interested trainee should look for support from his or her own country[4] or from the host department.

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