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The European Association of Epilepsy Centers
 Swiss Epilepsy Center, Zurich, Switzerland
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1. Historical background and recent developments

The Swiss Epilepsy Center was founded in 1886, by the representatives of the Reformed Church and teachers, as a private institution with the objective of creating a home that provided welfare, healing, nursing, and education for the poorest in society. The original “Institution for Epileptics” developed over decades into a modern center of competence for epilepsy, the now renowned Swiss Epilepsy Center, which is part of the Swiss Epilepsy Foundation. All establishments run by the Swiss Epilepsy Foundation (EPI) are located on an open site on the outskirts of Zurich with a magnificent view over the city, the lake, and the Alps.

Since our last report appeared in 2003 (e.g., [1]), the Swiss Epilepsy Center (SEC) hospital, the Swiss Epilepsy Clinic (EPI Clinic), has changed in many ways. First, the needs of inpatients and consequently, the focus of services offered have changed significantly. Second, since 2012, the EPI Clinic can no longer charge day rates for its services, but has to apply flat rates per case according to the SwissDRGs. Third, the EPI Clinic is no longer an independent hospital but part of the new Clinic Lengg, founded by the Swiss Epilepsy Foundation and the Foundation of Zurich Rehabilitation Centers in 2014. Another important development is the separation in 2013 of the long-stay residential care unit into the organization of EPI WohnWerk – Assisted Living and Working. Nowadays, this facility is also open to people who do not suffer from epilepsy.

2. Service population

The Swiss are the main users of the EPI's services. In 2015, 44% of inpatients in the EPI Clinic came from the Canton of Zurich, 54% from the rest of Switzerland, and only about 2% from abroad. At EPI WohnWerk, the long-stay sector, 63% of residents came from the Canton of Zurich and 37% from the rest of Switzerland. Today, some 200 clients live and work here.

3. Main sectors of the center and strategic advantages of the services offered

3.1. EPI Clinic

3.1.1. Inpatient department

The EPI Clinic has 20 beds for adults and 6 beds for children. In addition, there are 6 beds for video-EEG monitoring in our epilepsy monitoring unit. While up to 2002 many patients came to our hospital for medical treatment, nowadays, approximately 70% of our patients are admitted for neurophysiological (differential diagnostic or presurgical) workups. As predicted in our previous report [1], medical treatment has kept shifting from in- to outpatient services; admissions

for medical treatment are reserved for patients with very difficult changes of medication or for patients with difficult accompanying somatic or psychiatric diseases. Neurophysiological evaluations concentrate on long-term EEG (usually recorded for several days with mobile recording systems using electrodes fixed according to the international 10–20 system) or intensive video-EEG monitoring; for this purpose, we have 6 beds under continuous 7/24 surveillance by specialized EEG staff in our epilepsy monitoring unit. All in all, more than 68,000 h of EEG have been recorded and analyzed in 2015. These examinations were complemented by postprocessing studies of medical images, since established as a specialty of the EPI Clinic (e.g., [2]). The extension of these diagnostic services has led to an increase in the number of inpatients from 470 in 2002 to 933 in 2015 (see Fig. 1).

The shift from medical treatment to diagnostic workups has also led to a significant reduction in the mean length of stay to 8.2 days in 2015. This development may have advantages when the services of a hospital are reimbursed per flat rate according to the SwissDRGs. However, it also entails problems and risks for epilepsy centers, because they also have to care for patients with difficult-to-treat epilepsies who are not candidates for surgery and may have complex additional (neuro) psychological, psychiatric, and social issues. Although SwissDRGs provide case groups for “complex therapies”, these patients with “complex” issues often require longer inpatient treatments and thus, run the risk of becoming so-called “high-outliers”, who are not profitable for hospitals. One of our challenges in the future is to continue to be able to provide these patient groups with the medical care they need – in spite of all financial demands.

The services of the *outpatient department* of the EPI Clinic are not only mainly provided for patients from the surrounding region, but also for patients from other German- (and occasionally Italian-) speaking Swiss cantons. In 2015, 2433 patients visited our outpatient department for 3505 consultations. The services of the *Institute for Neuropsychological Diagnostics and Imaging* of the EPI Clinic are not only mainly for patients with epilepsy, but also for children and adults with other neurological and neuropsychological problems. Additional departments include (i) the *Center for Sleep Medicine*, which concentrates on neurologically induced sleep disturbances, (ii) the *Department for Psychiatry and Psychotherapy*, whose main focus is on patients with epilepsy with psychiatric problems and patients with psychogenic nonepileptic seizures, and (iii) a *Social Counselling Department*, which serves both the EPI Clinic and the Neurorehabilitation Center under the umbrella of Clinic Lengg.

3.2. EPI WohnWerk – Assisted Living and Working

As an establishment being run by the Swiss Epilepsy Foundation and being part of the Swiss Epilepsy Center, EPI WohnWerk provides a

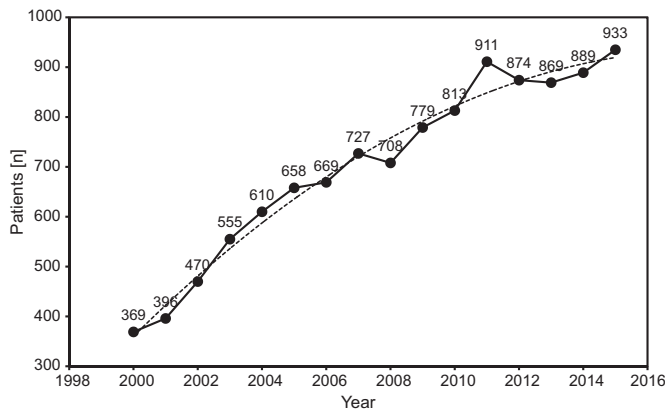


Fig. 1. Number of inpatients at the Swiss Epilepsy Clinic from 2000 to 2015.

home, a place to live and work, as well as a broad spectrum of other facilities and services for people with disabilities. Many of the people living here have a type of epilepsy which is often resistant to treatment, and they, therefore, need additional specialized, professional nursing and care. The contracting authority of EPI WohnWerk is the Social Welfare Office of the Canton of Zurich. Furthermore, two of the three residential homes are on the cantonal health department's list of care homes. The services offered by EPI WohnWerk are open to adults over the age of 18 who have cognitive and mental disabilities.

Apart from one group living at an external facility with 4 beds in the inner-city area, all residential homes, workshops, and daycare centers, as well as the medical and therapeutic services offered, are located at the Swiss Epilepsy Foundation's main site. The three residential homes, together with the separate home for the external group, have a total of 202 beds. The workshops (90 spots) and the daycare centers (110 spots) are also open to clients living offsite. At the same time, some residents pursue regular employment outside the EPI main site.

Clients receive care and nursing tailored to their individual needs, and our mixed interdisciplinary team is on hand to offer them support; EPI WohnWerk has its own therapists for speech therapy and therapeutic horse riding and is additionally supported by occupational therapists and physiotherapists from Clinic Lengg. Protestant Reformed Church and Catholic Church ministers, working on behalf of the Swiss Epilepsy Foundation, ensure that spiritual guidance is provided. A dedicated doctor's and dentist's surgery is available for medical support. The Epilepsy Clinic ensures that specialist epileptological, psychiatric, and psychological treatment is available at the same site.

3.3. EPI Hospital School

The EPI Hospital School, along with the medical, nursing, psychological, and therapeutic disciplines, is a further element of the comprehensive package of services offered by the Swiss Epilepsy Center.

Between one and four young patients receive lessons several times daily. Special educational needs teachers train children and adolescents (4–16 years old) if their inpatient stay lasts five days or longer. The EPI Hospital School represents an important package offered to hospitalized children, because it bridges the gap with their school at home. The course content is set after agreeing this with the regular school and once the pupil's state of health and capability have been considered. However, the Hospital School's function extends beyond giving lessons. Within the interdisciplinary team, there is support for special educational needs, and advice is also provided for parents or teachers at the regular school. Because work is often carried out on a one-to-one basis, the observations of the Hospital School teachers are important indicators. By giving lessons, the Hospital School makes a great contribution to ensuring that there is a clear daily structure for the children. The school is located next to Clinic Lengg, and so the children only have to

walk a short "distance to school". The classroom represents a piece of everyday life and makes the hospital stay, along with the illness that is associated with it, fade into the background. In short: be a pupil again, not a patient. Schoolchildren attending the EPI Hospital School are supported in accordance with their resources so that they can have a positive experience and, in spite of the unsettling situation, are able to boost their self-efficacy.

4. Personnel and organization

The Swiss Epilepsy Center consists of the EPI Clinic (part of Clinic Lengg), the EPI WohnWerk, and the EPI Hospital School. The common interests and activities are the responsibility of the Managers of these establishments and the Director of the Swiss Epilepsy Foundation.

The Swiss Epilepsy Center today employs around 460 people, occupying a total of 342 positions; 27 are doctors, 341 persons work in the medical or other specialist fields, there are 76 accredited and 45 nonaccredited nursing professionals, and 113 specialist members of staff in the occupational therapy and activation sector. In 2013, the administrative and central services, such as catering, cleaning, technical services, IT support, personnel, and finance, were placed in a separate organization, EPI Services. Today, these services are available to all EPI establishments as well as third parties, and currently employ 186 people. If the other EPI institutions, the Center for Neurorehabilitation at Clinic Lengg, the Youth Center of the Schenkung Dapples, and the Oberstufenschule Lengg, are also taken into account, then the EPI currently employs around 830 people in around 665 positions.

5. Cooperation and networking, especially with the university hospitals

At the time of our last report in 2003, cooperation between hospitals offering services to patients with epilepsy in Zurich was – at best – waiting in the wings. However, when the Swiss cantons started preparing an "intercantonal agreement" on what would be defined as "highly specialized medicine", including epilepsy surgery for both adults and children, it became clear that actual cooperation was inevitable. Therefore, the Departments of Neurology, Neurosurgery, and Neuroradiology of University Hospital Zurich, the University Children's Hospital Zurich, and the Swiss Epilepsy Center started to cooperate first in the fields of presurgical evaluations and epilepsy surgery, but then also in all other aspects of epileptology. Finally, this cooperation received its adequate organizational framework in 2015 when the cooperating institutions founded the Zurich *Center of Epileptology and Epilepsy Surgery*. Within this network of clinics, the Department of Neurosurgery of the University Hospital Zurich is responsible for all epilepsy surgery, while the Department of Neurology is especially responsible for the neurooncological treatment of patients with epilepsies associated with malignant brain tumors. The EPI Clinic performs both noninvasive and invasive video-/EEG monitoring for adults and children. Presurgical evaluations in children are performed in close cooperation with the Children's Hospital in whose intensive care unit invasive recordings in those under the age of 12 are conducted with the help of EEG personnel and equipment of the EPI Clinic.

6. Scientific contributions, education, information, and public relations

6.1. EPI Clinic

For several years, one of our main fields of research into medical imaging at the EPI Clinic has been to develop, validate, and apply software techniques for the postprocessing of MRI data. With this aim, we have built a reference databank of brain scans of healthy subjects and developed methods to compare brain scans of individual patients with these normal data [2,3]. At the same time, neuropsychological research

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