

## Neurological Services for Children in Finland

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### INTRODUCTION

In Finland, after the Second World War, child healthcare took important and great steps in preventive medicine, that is, prevention of onset, early identification and effective care of perinatal injuries and infections and postnatal traumata. In fact, some reforms of social legislation in that direction were made already during the war. A lot of attention was paid to population general hygiene and promotion of wellbeing of lower social status families. The results of the measures can be seen in statistical parameters. In 2020, perinatal mortality was 3.7/1000, neonatal mortality 1.4/1000 and infant mortality 1.9/1000 (Statistics Finland 2021, kuolemansyyt@tilastokeskus). Incidence of infections, like contagious diseases, diarrhea and poliomyelitis got drastically lower and many of them totally disappeared due to the effective national vaccination programs with a very high coverage of the whole child population. However, neurological handicaps, such as cerebral palsy, autism spectrum disorder, attention deficit hyperactivity disorder and epilepsy continue to be a challenge to child neurological resources, knowledge and expertise.

The roots of modern child neurological services in Finland date back to the 1950s. In the early 1960s, the first post in child neurology was established and the formal requirements for Child Neurology Specialty given by the then National Board of Health. In 1967, the Child Neurology Association, as part of the Finnish Neurology Association, was established, and the specialty rights were granted the first board-certified physician. The establishment of the recognized full specialty status and new independency of the Finnish Child Neurology Association were a start for a rapid growth and development of treatment for children with neurological needs [1].

### ORGANIZATION OF CHILD NEUROLOGICAL SERVICES

Newborn infants are their two first weeks of life within the public maternity health care and are thereafter automatically transferred to the books of children's welfare centers and furthermore, at the age of seven years, to school health care until the age of 17. Virtually all (99.7%) expecting mothers [2] and

99.5% of children [3] are within the public preventive healthcare. During the 100-year history of children's welfare clinics, the percentage of children who visit the clinics has been very stable.

Children who, in a children's healthcare center, are found to have health problems are referred to municipal health care center or, if needed, straight to a pediatric outpatient clinic. A much more common way is to have a visit straightforward to health care center or outpatient clinic. Child neurological specialist services are offered in 20 so-called central hospitals with designed catchment areas, which together cover the whole country. All the central hospitals have a child neurological unit. In case of demanding specialist care, five university hospitals are available.

Another way to seek medical care is a parallel private sector. Child neurological services are offered by single-handed or teams of specialists in many bigger cities. Specialists working as hospital physicians can have and often do a private surgery outside working hours. Taking epileptic seizures as an example of referral frequencies, children with seizures or seizure-like events were admitted to the Turku University Hospital through a referral by health center in 26%, other hospital 14%, child welfare center 1%, school health doctor 1%, other 17% of cases and by private sector in 6%. One third of children with epilepsy arrived without referral as emergency cases. More than half of children were transported by ambulance car or helicopter.

### TRAINING OF CHILD NEUROLOGISTS

#### Training program

The six-year specialty training includes service for the minimum of three years in child neurology and the remaining years in public healthcare center, general pediatrics, or adult neurology, mostly in an university hospital or other hospital accepted by the university for teaching purposes. A smaller part of training may be substituted with a service in other relevant neurospecialties. For authorization to practice as child neurology specialist, the trainee must have acceptably passed relevant theoretical studies for 60 hours, acquired 30 credits in management training and

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passed the national written examination. Training does not incur any financial costs for trainees.

## TRAINED PHYSICIANS

Child Neurology as a specialty has proved popular with no enrollment problems. The training capacity largely meets the needs, even though a slight deficit of specialists due to training opportunities can be anticipated in the future. During 1967-2018, a total of 159 physicians or, on the average, more than three trainees per year were granted the specialist rights. During the five last decades until 2017, attrition of 47 of 159 specialists has taken place in the form of retirement (39, 25%), death (7, 4%) and moving abroad (1, 1%). In 2018, 112 specialists were in the workforce. Of them, 80% were working full-time in public health care, 10% practiced in municipal settings, 5% in civil service tasks, and the remaining 5% in full-time private practice, research or similar activities.

## SPECIALIST DENSITY

At the end of 2018, there were 941,356 children less than 16 years, or 17.1% of the total population (5,517,919) in Finland. The mean child neurology specialist density was 2.03 (range: 0.40-4.07) per 100,000 general population or 11.9 (3.2-25.72) per 100,000 child population, which makes 8405 children per one specialist. It is to be noted that the specialist densities and the accessibility to child neurological services are not straightforward inter-comparable from the patient perspective because, in specialist low-density areas, there are many means, such as advance patient transport services, medical staff structure, etc., to compensate the regional differences [4].

## DESIGNED NURSES

In larger hospital with a high patient flow – university hospitals in particular – there are designed nurses for child patients with long-term diseases like epilepsy and cerebral palsy. They are contact persons between the family and hospital, guides for social benefit, the third sector organizations and other practical questions. They have a workplace training and standing position in the treatment group [5].

## CONCLUSION

A new medical specialty needs always its pioneers who devote their time and effort on a new thinking of treatment and care.

In Finland the first certified child neurologist was Associate Professor Märta Donner at the University of Helsinki and staff specialist at the Helsinki University Hospital. During two decades, she trained several specialists in Child Neurology. The second name is professor Matti Sillanpää who, during three decades, served as Associate Professor and the first full permanent Professor of Child Neurology in Finland and the Nordic Countries, was founding chair of the Finnish Child Neurology Association and some other neurological organizations, was involved in many international child neurological organizations and has published almost 600 peer-reviewed scientific papers and 20 books or book chapters. At the age of 86, he is still active in both research work and continuing medical education. Märta Donner has been characterized as “Mother“ and Matti Sillanpää as “guru” or “Father of the Finnish Child Neurology”. Be as it may, during the two professors, Child Neurology obtained its position as a recognized full specialty with academic posts, organized training program, training facilities and offices in the university and regional hospitals all over the country. The recognized specialty status also enabled and enriched scientific research into Child Neurology. Today, Child Neurology is an appreciated, recognized specialty of full standing among other specialties in Finland. Neurological disorders will remain part of children’s health problems, and advanced diagnostic gene and other methodologies and improved habilitation strategies will need increased child neurological expertise in the future.

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