More information

For more information about the ANNOTeM project,
please visit the dedicated website: https://www.annotem.de

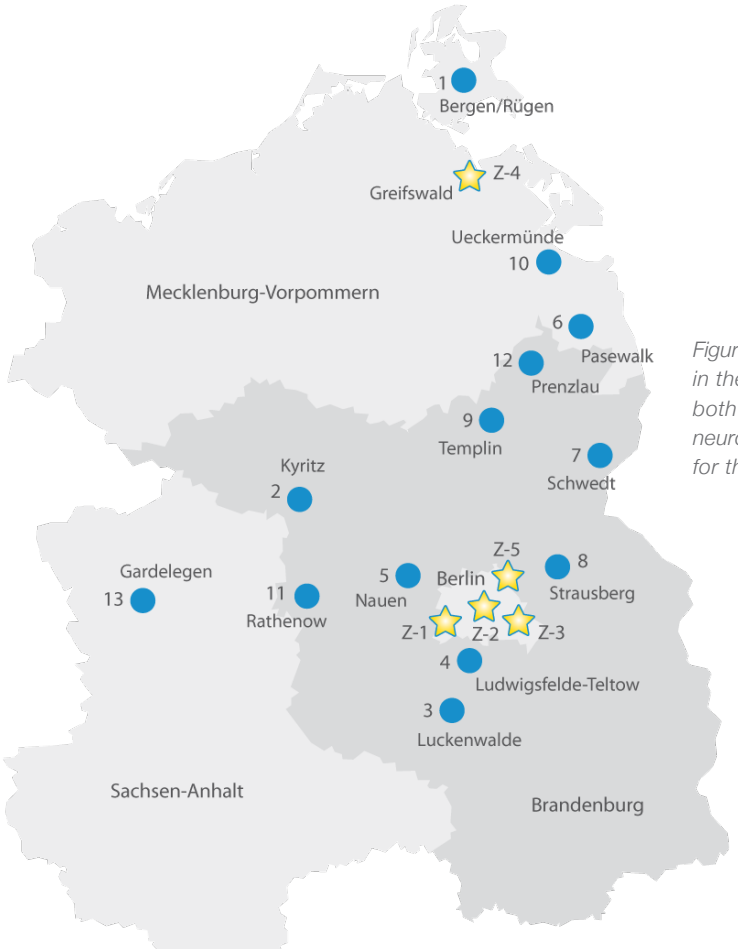

Figure 1: Network of partner institution in the ANNOTeM project - showing both the larger hospitals providing neurological expertise (yellow stars) for the regional clinics (blue dots).

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Showcase: The ANNOTem project

Using teleneurology and dry EEG
to improve neurological care

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The ANNOTeM project: using teleneurology and dry EEG to improve neurological care

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Time is brain

Patients with acute neurological damage (e.g., through suffering a stroke, during status epilepticus) require immediate treatment in order to minimize future neurological impairments (Saver, 2006). This is problematic in rural areas in which patients have to travel large distances to reach the nearest hospital with adequate resources and expertise (Dorsey, Glidden, Holloway, Birbeck, & Schwamm, 2018). The recently started ANNOTeM project aims to improve neurological care in the German states of Brandenburg and Mecklenburg-Vorpommern by using telemedicine. Another objective is to validate the outcome of applying the latest teleneurological technologies to provide optimal healthcare support from a distance.

The ANNOTeM project

ANNOTeM is a large-scale project funded by the German Federal Joint Committee *(Gemeinsamer Bundesausschuss G-BA)* that brings together experts in the fields of neurology, telemedicine, and neuro-imaging manufacturers in cooperation with health insurance companies to improve emergency care in remote areas in northeastern Germany. The project is led by Professor Audebert, Medical Director of the Clinic for Neurology at the Campus Benjamin Franklin of the Charité Universitätsmedizin Berlin, and Professor Endres, Director of the Department of Neurology at the Charité Universitätsmedizin Berlin. Project members include centers with high-level neurological expertise and regional hospitals in less populated areas, mainly without their own neurological department *(see Figure 1, p.t.o.)*. Using a network station, neurologists from central hospitals are available around the clock to examine patients telemedically in remote clinics and to advise treating physicians without leaving their office.

One of the crucial technologies for enabling remote diagnostics is the use of suitable brain imaging techniques and equipment, which can be applied quickly and easily without the need of expert knowledge in remote regions. ANT Neuro's dry EEG cap **wave**guard™touch and **eego**™mylab EEG amplifiers have been selected as the optimal solution for these requirements. Two major advantages of dry EEG over conventional gel-based EEG are the significantly reduced time for electrode application and that it requires minimal training to operate. **wave**guard touch enables rapid EEG acquisition at hospitals in rural areas while the experts from specialized central hospitals can focus on the review of the received EEG signals for quick initial diagnosis. Such quick screening is especially crucial in the case of acute neurological emergencies such as altered mental status caused by status epilepticus. An additional advantage of combining **wave**guard touch and **eego** mylab is that it can be performed in a multitude of environments such as the emergency room or intensive care unit (ICU). **wave**guard touch and **eego** mylab work optimally together to ensure robust signal acquisition in the noisy ICU or emergency room due to the integrated active shielding.

Dr. Weber and the teams in the neurological centers in Berlin, Greifswald and Bernau (near Berlin) can access the EEG recordings performed at the remote clinics through dedicated computer systems and networks. Data collected during the three-year project will help the project team to draw well-founded conclusions about the efficacy and efficiency of teleneurological care. This approach could prove to be an ideal solution for clinics in remote areas that do not have a neurology department.

Future directions

The ANNOTeM project is currently ongoing and ultimately aims to compare performance of clinics using telemedicine support to those applying conventional care. If the use of telemedicine and quick imaging technologies is proven to increase coverage and quality of care and to positively influence health outcomes in patients with acute neurological emergencies, this could mean a milestone for better clinical care for a huge population living in rural areas across the world.

References

[1] Saver, J.L. (2006). Time is brain - quantified. *Stroke, 37*(1), 263-266.

[2] Dorsey, E.R., Glidden, A.M., Holloway, M.R., Birbeck, G.L. & Schwamm, L.H. (2018) Teleneurology and mobile technologies: the future of neurological care. *Nature Reviews Neurology, 14*(5), 285-297.

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