

Summary: This project addressed the chain of responsibility with respect to technological aspects of the use of CFM at the NICU. In the first part of this project a purchase advice for a new monitor was written, and this monitor was successfully implemented. Based on the demands of the NICU in the MMC and the possibilities on the market, the NicoletOne is introduced as a second clinical monitor. As part of its implementation, the suitability of different electrodes has been examined, focusing on long-term behavior in a warm and humid incubator, and the effects they have on fragile skin. A specific type of adhesive electrodes was found to be suitable, and a cooperation with a manufacturer of electrode caps has been set up for further analysis. The second part of the project focused on training of medical personnel, which is essential with the introduction of a new method. Since regular instructions, also part of this project, proved to be insufficient for the training of medical personnel, a training program has been designed. This screen-based training program, called the CFM simulator, is based on the different training needs of medical specialists, residents, and nurses. In several levels both theory and simulated measurements are trained. Using this program medical personnel can train individually, respecting their own training needs. As a final step in the chain responsibility, to enhance the knowledge concerning the measured signals, two projects have been described for automated analysis of the EEG and CFM signals. In the first project, an algorithm for the automatic detection of seizures in CFM signals has been developed. The algorithm had good results for seizures that were clear to expert neurophysiologists. It can be used to help in the interpretation of CFM signals, and as an alarm function on the monitor. The second project concerned the underlying EEG signals for preterm newborns. An algorithm was developed for the quantitative analysis of different background patterns of these signals. Evaluation of by the algorithm analyzed signals by two independent medical experts, resulted in high agreement. Though further development of the algorithm is required, the quantitative analysis showed to have an extra value compared to expert interpretation, which was liable to subjectivity. With this project a substantial foundation has been made for adequate, technologically skilled and fully functioning use of CFM at the NICU.