The European Neurosurgical Electronic Logbook of Operations

During neurosurgical training it is required to record all operations performed in a logbook. We would like to propose an electronic version of this logbook that helps the trainee to record all operations in an easy and fast way.

The electronic logbook program is a **standalone executable** written in Borland Delphi® that runs under any version of **Microsoft Windows**®. It is not depended on any external programs such as Microsoft Office®, other commercial products or libraries. Linux users can run the program under the freely available Windows emulation environment Wine. There are no specific requirements regarding hardware equipment, which means that the program will run on any computer that is suited for standard office use.

The application is designed to support **multiple languages** for all text messages and the list of diagnoses. Currently English and German are supported. By translating special source files, any other language can easily be added. Switching the language can be done during runtime of the application by clicking on a designated menu item.

For **security** reasons all data entered is encrypted using the AES algorithm (Rijndael), which is the current standard encrypting algorithm by the U.S. government.

To allow **multiple users** to access their data on one single computer, the application supports an unlimited number of accounts that can be accessed by one installation of the program. For even more flexibility, the program can be configured to use any directory for data storage, even locations on network attached storage devices. This way you can access your data from every computer which has the program installed and can access this network hard drive.

Furthermore, there is an **automatic update function** build in. During the installation process, the user is asked to enable or disable the function. If enabled, which is highly recommended, there is another input field to specify a proxy server that is by some institutional networks required to access the internet. If the user agrees to enable the automatic update function, the program will check for new versions automatically at every start-up. In case there is a new version, it will be automatically downloaded and installed. A hint window will inform the

user about the changes in the current version. Privacy is maintained during this process. No personal information will be sent or recorded.

The program will be distributed by a **dedicated website**, which is currently in progress. This website can be linked by the EANS and local institutions. Besides the download of the program, there will be additional help files, a version history and a contact email for bug reports and suggestions.

Installation of the application is as straightforward as installing other standard applications. The downloaded file comes as a setup program that guides the user through the installation. Some information such as the location for the program files, the location of the data directory and enabling or disabling the automatic update function will be asked during this process.

When a user first time starts the program, an **introduction and configuration dialog** is shown.

The first page of this dialog displays basic explanatory notes such as the role of the logbook during the training, the classification of operations and of the role of the trainee during an operation and furthermore the required numbers that each trainee must meet at the end of his training.

The second page allows the user to enter his personal data such as name, surname, date of birth, title, country, name of the clinic, section and the start of his training period. This information is used for different kind of program generated reports which will be covered later in this article. All fields of this page are mandatory. If any value is missing, an explanatory hint will be shown.

On the third page of the dialog a password must be chosen that is used to secure the data and must be entered any time in future the user wants to access his data.

The fourth and last page displays some basic usage advices on how to use the program, add operations and generate reports. This information can also be accessed later by clicking on the "Help" menu item.

After completing this first time dialog, the program's main window is shown. Next time the program is run, a login dialog appears that lists all users registered. The user can now either select his account from the list, enter his password and use his logbook or create a new account.

The **main window** of the application shows the so called "Continued List of Operations" which is a table style list of all operations the user entered so far. This list is by default sorted descending by date of operation but can be sorted by any field if needed. On the top of the window there is a toolbar and menu. The toolbar features buttons to add a new operation, generate reports, access the personal information and display a help page. The menu allows the user to exit the program and change the language and some other functions.

The **database of operations** to be entered by the trainee consists of ten fields. These are the following:

- Classification by age into adult and child
- Name of the patient
- Surname of the patient
- Date of birth of the patient
- Date of the operation
- Role of the trainee during the operation

  This value can either be "T" , "TS", "C" or "A":

  T=Trainee: The trainee has done the operation. The supervising consultant must not have made a decision/practical manoeuvre significantly affecting the execution of the operation.

  TS=Trainee (+Consultant Supervising): The trainee has done the operation but the supervising consultant has made a significant decision/practical manoeuvre during the operation.

  C=Component: The trainee has performed component parts during the operation under supervision of a senior surgeon: Positioning, operative approach, closure, drainage, draping, instructions for postoperative care.

  A=Assistant: The trainee is the principal assistant during the operation.
- Craniotomy, either performed of not performed and if applicable the role of the trainee during the craniotomy. This option is included as a certain number of craniotomies is required by the EANS. There is no need to enter a craniotomy separately therefore.
- Category of the operation
- Diagnosis of the operation
- Comment

To **add an operation** to the logbook, simply click on the "Add entry" button. A new window opens that allows the user to enter all then information needed consisting of the fields of the database outlined above.

After specifying the date of birth of the patient and the date of the operation, the corresponding list of operation categories and operation diagnoses for either adults or children is available.

All fields of this window except the comment are mandatory. If the user misses to fill out a required field, a hint window will alert him.

To generate **reports**, there are two options available:

The "**Consolidated List of Operations**"

This report lists all diagnoses grouped by categories and the sum of operations performed on each diagnoses, split by the role of the trainee during the operation. There are separate lists for adults and children.

That list allows the trainee to gain a quick overview over the operations he has performed yet, although the list does not respect the requirement for training. It can also be used for internal documentation, for example to summarize the operations performed during a specific rotation.

The "**Training Requirement List (Key Procedures)**"

The EANS published a detailed list of operations with minimum and optimum figures for each entry that a trainee must meet at the end of his training. This list in included in the program and, based on the much more detailed "Consolidated List of Operations", each entry of the list of operations is assigned to the appropriate key procedure. The "Training Requirement List" shows all those key procedures, the minimum and optimum figure, the current value (based on the operations entered so far) and the percentage of the minimum figures. Again you can choose between children, adults and a tab called "Assists". The latter shows those operations you have to take part as an assistant.

To be counted as a key procedure, the operation has to be performed by the trainee either classified as "T" or "TS" regarding the role during the operation. The program takes respect of the role of the operation and only counts those entries meeting the stated requirement.

In summary, this list allows the trainee to gain an overview of his current status regarding the needs for training and quickly assess the fields where he might need to put special attention on to meet the EANS requirements.

Both lists mentioned can be **printed**. On the printed version the name, clinic and section taken from the personal information are noted, also there are fields for signatures from the trainee and the supervisor.

In summary, the program allows a neurosurgeon in training to easily record all operations performed or assisted. The official EANS requirements for trainees are fully integrated.