The Tube and Epidural Database (TEPID) —installation notes for MS-Windows users

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1.1 Introduction

Over the years I have collected double-lumen Tube and EPIdural Data from my thoracic and emergency lists. As this data has increased I have found that it serves as an accurate predictor of tube size & length and midline epidural depth for particular patients. This data (the TEPID database) is searchable on the Linux PC I have in theatre 6, using search programs written in Perl.

In order to make the data easily available to MS-Windows users I have put the database on a CD together with some search tools, text editors, and the latest ActivePerl MS-Windows implementation of the Perl programming language. In short—everything you need is on the CD—just follow the instructions.

The value of writing programs in Perl is that they are then available to everyone since they can be run on all computer platforms (e.g. Linux, Unix, Mac, MS-Windows). Visual-Basic programs, however, can only be run on Microsoft platforms.

1.2 Preliminaries

The files on the CD are organised into the following directory structure.

```
TEPIDdatabaseWin32\
------------------\perl\
------------------\readmeWin32\
------------------\TEPIDwin32\
------------------\TextEditors\
```

The TEPID package consists of the database file (`tepid.dat`) and a few supporting files in the directory `TEPIDdatabaseWin32\TEPID\`. In order to use the TEPID database it is necessary to install a few things as follows (all instructions are detailed below; all required files are on the CD).

1. Install Perl

2. Install the TEPID database and supporting files

3. Install a text-editor (optional—but recommended, particularly if you intend writing Perl programs)

1.3 Installation

Copy the `TEPIDdatabaseWin32\TEPID\` directory and contents from the CD to your filespace on the hard-drive. The filenames and functions are as follows.

```
launcher32.pl        Perl program which creates the widget
perlcamel.gif        Perl camel logo
tdata.txt            last instance of the TEPID output file
tepid.bat            batch file to launch the widget from any directory
tepid.dat            TEPID database
tepid32.pl           Perl program for searching the database
tepidhwr32.pl        Perl program for writing the TEPID output file
twidget.bat          batch file to launch the widget
```

1.4   The TEPID program

The TEPID program was written in Perl 5.8.6 on a Linux Mandrake 9.2 platform. The program asks for patient gender (M/F), weight (kg), height (cms or inches), and range (enter a suitable positive value; default is $\pm 7 \cdot 5$ kg $\pm 7 \cdot 5$ cms). It then selects and averages all data within the specified range, and writes the results to the screen (in the DOS-box). The screen results are saved as an ASCII file called `tdata.txt`, and all the specific data used in compiling the results is saved as an ASCII file called `tepid.log`. These can then of course be viewed, edited, and printed as necessary. The TEPID database is a simple ASCII file called `tepid.dat`[1]. The results as presented are constrained as follows.

- Paramedian data is not processed

  Although the TEPID database does contain paramedian data, only the midline epidural data is processed by the search program. This is because it was found quite early on that the paramedian data was too variable and hence had little or no predictive value.

- Search range

  For convenience the value entered is used for both weight and height. So, if you enter a value of 5, then the database will search only for values within the range `wt`± 5 kg and `ht`± 5 cms.

- The epidural data is pooled (male + female)

  This is because the mean male & female data for a given weight and height were not significantly different.

- Tube length & size

  The mean male & female data for a given weight and height significantly different. However, some of this difference probably reflects some selection bias in view of the tendency for anaesthetists to start with a 39F for female patients and a 41F for male patients.

- Estimated carina position

  This is estimated from the mean position of the tracheal orifice of the double-lumen tubes, by adding $1 \cdot 5$ cm (a typical side-hole—carina distance). This may be a useful guide for avoiding inadvertent endobronchial intubation in short fat patients (Mackenzie M and MacLeod K (2003). Repeated inadvertent endobronchial intubation during laparoscopy. *Br. J. Anaesthesia*, <u>91</u>, 297–298).

A typical output (for Male / 76 kg / 177 cms / range $\pm 7 \cdot 5$) is shown below

```
**************************************************
**                                              **
**        TEPID                                  **
**        A TUBE AND EPIDURAL DATABASE           **
**        Mon Feb 28 15:53:14 2005               **
**                                              **
```

---

[1] A spare copy of this file—named `tepid.data`—is kept in the top directory (just in case!). If you do need to replace the original file remember to rename its filename extension `.data` → `.dat`

```
*************************************************

Male, Wt 76 kg, Ht 177 cm (69.6 inches) [BMI = 24.2]
[wt/ht range: +- 7.5 cm, 7.5 kg]

RESULTS midline data: (male + female combined)
-----------------------------------------------
  BS(-1) [T6-7]   mean midline depth = 5.75 (n=1)
  BS( 0) [T7-8]   mean midline depth = 5.68 (4.5 -- 6.5) n=17 SD=0.58
  BS(+1) [T8-9]   mean midline depth = 5.47 (4.75 -- 6.5) n=9 SD=0.51
  BS(+2) [T9-10]  mean midline depth = 5.06 (4 -- 6.5) n=5 SD=1.1
  BS(+3) [T10-11] mean midline depth = 4.41 (4 -- 5) n=6 SD=0.37
  BS(+5) [T12-L1] mean midline depth = 4 (n=1)

RESULTS Double-lumen tube data: (Male)
---------------------------------------
  41L mean length = 30.02 (range 28 -- 32) n=52
  39L mean length = 29 (n=1)
  37L ----
  35L ----
  41R mean length = 29.1 (range 28 -- 30) n=5
  39R mean length = 28.16 (range 27.5 -- 29.5) n=3
  37R ----
  35R ----

RESULTS estimated carina position: (Male)
------------------------------------------
   mean DL side-hole position  = 24.19 (range 21 -- 26.5) n=61
 estimated mean carina distance = 25.69 (range 22.5 -- 28) n=61


 database numbers
 ---total no of entries in database: n = 528
 ---midline epidural entries in database
               (male + female combined): n = 285
 ---(tube + Male) entries in database: n = 256


 ------------------------------------------------------------
```

1.5 Running TEPID

There are several different ways of running TEPID as described below. The advantage of using the widget is that the output can then be accessed (edited and printed) simply by clicking on the 'view file' button. The screen position of the widget can be customised by editing the -geometry command in the file twidget.bat (see below).

- Create a 'short-cut' icon for the DeskTop

  A convenient way of running TEPID via the wedget directly from the DeskTop is to make a 'short-cut' icon and place it on the 'DeskTop'. To do this, go to the \TEPID\ directory; now right-click on the file twidget.bat and select the

create a short-cut option; now drag and drop the new 'short-cut' file (which will now have appeared in the same directory) to the DeskTop screen.

- Double-click on the perl filename

  If you go to the `\TEPID\` directory and double-click on the file `tepid32.pl` Perl will automatically open a DOS-box and run the TEPID search program (asks for gender, weight, height, and closes down if you enter Q). The data is automatically written to the file `tdata.txt` in the same directory. To view the output file double-click on the filename `tdata.txt` and it will appear in a NotePad window, from which it can be edited (add patient's name etc.) and then printed.

- Using the command-line

  Access the DOS-box (best via the `programs/accessories/command-prompt` menu), and extend the window to its maximum width and to about 2/3 of the screen height. Customise the DOS-box for colour, font etc as required. Now type at the command prompt `perl tepid32.pl`, and Perl will run the TEPID program as described above, and write its output to the DOS-box and saves it to the file `tdata.txt`.
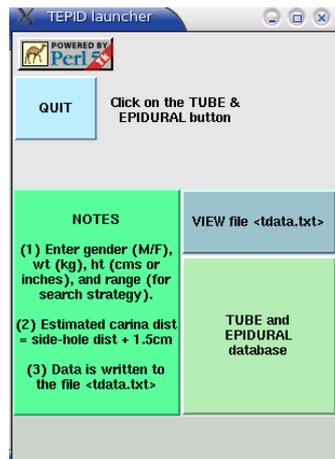
- Using the TEPID widget.

Figure 1: The TEPID widget as it appears on the screen. Click on the 'tube and epidural' button to run the TEPID search program. Click on the 'view file tdata.txt' button to view file (and print) via NotePad.

Access the DOS-box and at the command prompt type the following command (take care to type the `300x400-700-200` exactly as shown with no added spaces).

```
perl  launcher32.pl  -geometry 300x400-700-200
```

This command will launch the TEPID widget as shown in Figure 1 (note that this command is included in the file `twidget.bat` described below). Click on the green 'tube and epidural' button; the widget will disappear and Perl will start the TEPID program in the DOS-box, and saves the output in the file `tdata.txt`. When Q is entered (to quit) the widget will reappear. If you now click on the blue 'view file tdata.txt' button, the file will be displayed in a NotePad window, allowing easy editing and printing.

It is usually best to position the DOS-box over to the right-hand side of the screen as then the TEPID widget will appear to the left of the DOS-box, as shown in

Figure 2. The actual screen location of the widget can be customised by adjusting the last two figures -700-200 of the -geometry command; the first of these (-700) is the number of horizontal pixels from the right-hand side of the screen, while the final value (-200) value is the number of vertical pixels from the bottom of the screen. In practice some initial repositioning of the DOS window & widget may be needed.

- Double-click on file twidget.bat

  If you are in the \TEPID\ directory, then double-clicking on the file twidget.bat will also launch the widget, since this batch file contains the following command.

  ```
  perl  launcher32.pl  -geometry 300x400-700-200
  ```

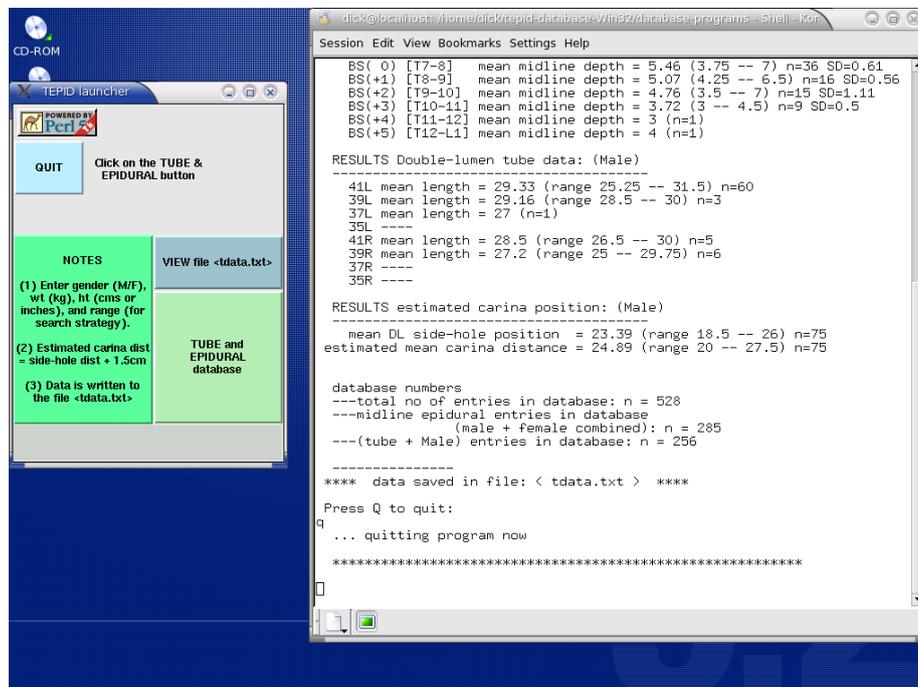 Note that this will only work from within the \TEPID\ directory.

Figure 2: A screenshot showing the widget and the DOS-box after running the TEPID search program. To edit or print the output just click on the 'view file tdata.txt' button which will present the output file in a NotePad window.

1.6 Using a batch file to run TEPID from any directory

Since it is a bit irksome having to first move to the correct directory and then to type the command given above to launch the widget, the suggested approach is to use a batch file to make life easier. The idea is to allow the TEPID program to be run easily from any directory by placing an appropriate batch file with the filename, say, tepid.bat,

in a directory in the PATH. Now you will be able to run the TEPID program from any directory simply by typing the command tepid at the command-line.

The underlying principle here is to make the batch file 'point' to the directory containing the TEPID program file. For example, if the PATH of the TEPID directory is, say, d:dicknickalls\TEPID, and the current command-line may be on either C drive or D drive, then the batch file will need to be something along the lines of the following.

```
@ECHO OFF
ECHO launching the TEPID widget
d:
cd \dicknickalls\TEPID
perl launcher32.pl -geometry 300x400-700-200
```

It is therefore often convenient to create a special directory called, say, ...\batchfiles, and place this directory in the PATH. Then, you simply place all your batch files into this directory.

2   Perl

The free ActivePerl implementation is a well regarded choice of Perl for the Win32 platform, and is simple to install. The current version for download at the time of writing is Perl 5.8.6. There is excellent web support (e.g. documentation etc) via their ASPN website (ActiveState Programming Network).

- http://www.activestate.com/Products/ActivePerl/

- http://aspn.activestate.com/ASPN/docs/ActivePerl/

The complete ActivePerl package consists of the following:-

- Perl (binary core Perl distribution)

- An installer package

- Perl Package Manager (PPM—a Perl extension installer and manager)

- Documentation

- Perl ISAPI (IIS plug-in that enhances the speed of standard Perl)

- PerlScript (ActiveX scripting engine)

- PerlEz (embedded Perl)

2.1   Installation

In addition to the Perl system itself Windows 9x/ME/2000/NT also require you to download a special 'installer' package to implement the installation (see below). About 36 MB of hard-drive space is required. Note that the filename and sizes indicated below are those at the time of writing. A useful installation guide can be found at http://www.activestate.com/ASPN/docs/ActivePerl/install.html.

From the CD-ROM: Although the following describes how to install the latest version of Perl from the internet, all the files mentioned here are for the current version

at the time of writing, and all these files can be found on the CD under the directory `TEPIDdatabaseWin32\perl\ActivePerl\`. For example, installing Perl on a Windows-2000 machine requires the two files `instMsiW.exe` and `ActivePerl-5.8.6.811-MSWin32-x86-122208.msi`, while a Windows-XP machine requires only the latter file (see instructions below).

Step 1:

First, create a temporary directory for files which need to be downloaded. Then go to the ActiveState web-site (http://www.activestate.com/) and click on the Language/ActivePerl link which will take you to the ActivePerl page. Follow the 'download' links until you reach the 'download' page (you can skip the 'contact-info' section by clicking the 'next' button), and then read the Windows section for the latest version of ActivePerl (version 5.8.6).

Step 2:

Download the latest ActivePerl `.msi` file (12·6 MB).
`ActivePerl-5.8.6.811-MSWin32-x86-122208.msi`

Step 3:

Installation: the exact procedure depends on your particular Windows system as detailed below. The default installation is the recommended 'complete' installation.

- Windows 9x/Me:

  Download the 'installer' file `instMsiA.exe` into the same directory. To install double click on the `instMsiA.exe` file and follow the instructions.

- Windows 2000/NT:

  Download the 'installer' file `instMsiW.exe` into the same directory. To install double click on the `instMsiW.exe` file and follow the instructions.

- Windows XP/2003:

  To install simply double click on the ActivePerl `.msi` file and follow the instructions (these systems do *not* require a separate installer file).

2.2 Running Perl

Now that Perl is installed, we can progress to creating and running a Perl program. To create a Perl program, simply open your favorite text-editor (see below for information on some suitable text-editors) and write the program (as an ASCII text file), and finally save it with a `.pl` extension.

For example, open a new file and type the following into it, and then save it with the file-name `test.pl` (note that in Perl the # sign is the 'comment' symbol; the \n starts a new line; variable names start with a \$).

```
#!/usr/bin/perl
# test.pl
print "hello world\n";
$a=3, $b=7;
$sum=$a + $b;
print "sum = $sum\n";
```

When this is run it will show the following output

```
hello world
sum = 10
```

We can run this Perl program several ways, as follows.

- Use the command-line:

  Open a DOS box, move to the required directory, and at the command-line prompt type the following command, and then press <enter>

  ```
  perl test.pl
  ```

  The output generated by the program will be written to the screen in the usual way. If you want the output written to a file (say. test.txt) then instead type perl test.pl > test.txt

  Accessing the DOS-box:– the recommended method for using the DOS-box for use with Perl is to access it via the menu programs/accessories/command-prompt, as this automatically enables the extremely useful DOSKEY facility[2]. Once opened, the DOS-box can then be customised with regard to colour and font etc. (right-click to access its 'properties' menu).

- Double-click on the filename

  If you just double-click on the perl filename in the directory listing (provided it has the .pl filename extension) then ActivePerl will automatically open a DOS box, run the program, and then close the DOS box. This is fine if the program output is directed to a file, but if the output is simply directed to the screen (the default, i.e. the DOS-box) then you need to add the <> command at the end of the Perl script, as this will keep the screen open (so you can read the screen) until you hit a key.

  ```
  #!/usr/bin/perl
  # test.pl
  print "hello world\n";
  $a=3, $b=7;
  $sum=$a + $b;
  print "sum = $sum\n";
  # -------------------
  print "press any key to exit\n";
  <>
  ```

---

[2]DOSKEY is the utility by which previous command-line commands are stored in memory and can be accessed using the arrow-up↑ and arrow-down↓ keys.
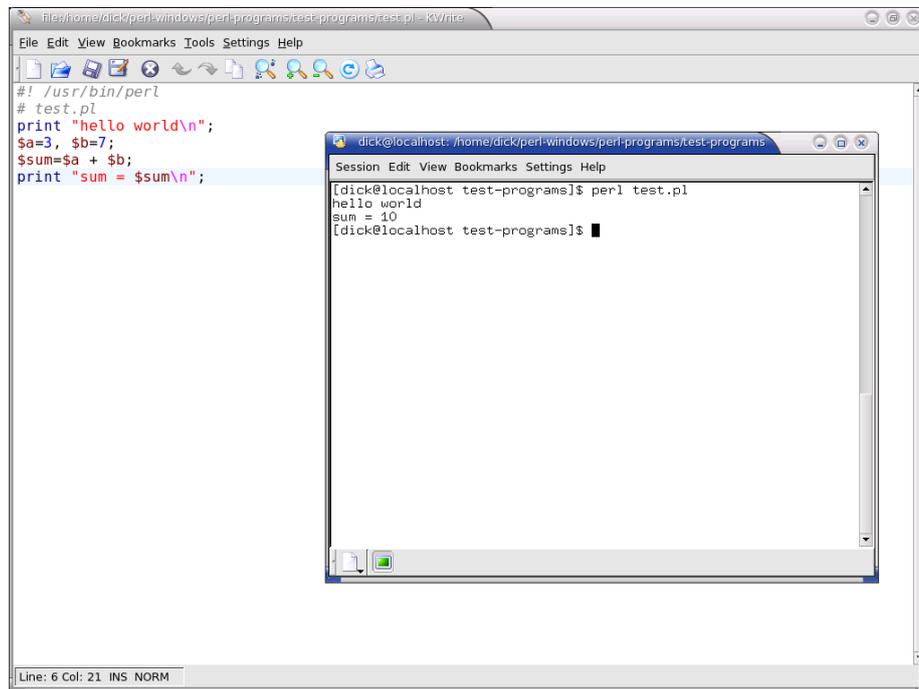
Figure 3: A screenshot showing the program `test.pl` in a text-editor in the background, and the DOS window showing the command `perl test.pl` at the command-line and resulting program output (`hello world; sum=10`) in the foreground.

- Using a batch file:

  Create a separate batch file with the name, say, `test.bat` containing the following lines:

  ```
  perl test.pl %1 %2
  ```

  This batch file now has to be run at the command-line as shown above. Note that ActivePerl can create a batch file from an ordinary perl program by using the command utility `pl2bat.bat`. Simply access the command-line and type

  ```
  pl2bat test.pl
  ```

  which will then generate the file `test.bat` which can then be run at the command-line by just typing `test`.

2.3   Perl modules

Additional modules can be downloaded from the huge Perl archives available on the internet. These Perl modules can be installed either automatically (via the internet using the PPM utility), or manually (download the module and then use the `nmake` utility).

The `nmake` utility is a Microsoft port of the Unix `make` utility, and can be downloaded from the Microsoft internet archive at ftp://ftp.microsoft.com/Softlib/MSLFILES/. The current version is bundled in the self-extracting package `nmake15.exe`. For information

regarding the `nmake` utility see section 9 of the file
`\perl\html\faq\Windows\ActivePerl-winfaq.html` which is part of the standard ActivePerl installation.

2.4   Useful Perl links

- *Introduction to Perl on Windows.*
  http://www.wdvl.com/Authoring/Languages/Perl/Windows/

- CPAN Perl Ports (binary distributions).
  http://www.cpan.org/ports/index.html

- How to install Perl modules.
  http://www.cpan.org/modules/INSTALL.html

- Perl documentation.
  http://www.perldoc.com

3   Text editors

A good text editor can offer an excellent environment for both writing and processing Perl programs and LaTeX documents. While text editors are a standard currency in the Unix/Linux domain, there are several good equivalents for MS-Windows, for example Crimson, WinEDIT, WinEdt, GNU Emacs (no doubt there are others too). A useful summary of available text-editors for the MS-Windows environment is maintained by Frank Duschek at http://www.itsfd.de/texwin/

You can of course use the Windows own `NotePad` utility for writing small programs, but the context-sensitive colour highlighting and extensive features of text-editors make it seriously worthwhile installing a general purpose text-editor.

In fact I would suggest you install a couple of text-editors (or more even) and try them out—you will soon see which you like. In my view the best are (a) Crimson editor (free), (b) `WinEDIT` (commercial—free trial period), and (c) `WinEdt` (shareware—free trial period). All of these are included on this CD (look in the `TEPIDdatabaseWin32/texteditors/` directory).

3.1   Crimson (free)

This is an excellent 'all-purpose' editor for Win-32 platforms, with good syntax highlighting. To install just double click on the file `edt370r.exe`

3.2   WinEDIT (commercial)

The WinEDIT ProPack (free download from http://www.winedit.com/download.asp/) is an excellent and comprehensive top-of-the-range commercial ($ 63) general purpose text editor for the Win32 platform, having a 21-day free trial period.

To install WinEDIT just copy across the file `wpropack_setup.exe`[3] (self extracting executable; 5·3 MB) from the CD directory `/texteditors/winEDIT/program/` into a temporary directory, and double-click on the `.exe` file.

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[3] I downloaded this free trial version from http://www.winedit.com/download/wpropack_setup.exe

3.3   WinEdt (shareware)

This is an excellent 'all-purpose' text editor. It has good syntax highlighting. It is available for download from http://www.winedt.com/. Note that a free licence for this editor is provided as a membership benefit by many TEX User Groups (e.g. ukTUG).

Various platform-dependent versions are currently available as shown below (copies are on the CD). The most recent version (2005) is Winedt-54.

- Windows XP/2000 systems:

    Winedt-54 (5·4 MB; year 2005)

    Winedt-53 (4 MB; year 2002)

- Windows 95/98/ME/NT systems

    Winedt-32 (2·1 MB; year 1998)

To install WinEdt-32 you need to copy across the *whole directory* `winedt32` from the CD directory `/texteditors/winedt/` into a temporary directory. Locate the self extracting executable file `winedt32.exe` and double-click on it.

To install WinEdt-53 or -54 just copy across the appropriate `.exe` file (`winedt53.exe` or `winedt54.exe`) from the CD directory `/texteditors/winedt/winedt5*/` into a temporary directory. Now double-click on it to install.

3.4   GNU Emacs (free)

This is a public domain (free) text editor. It is available from the GNU distribution page as follows http://www.gnu.org/software/emacs/windows/. See also Harry Halpin's web page entitled *How to install Perl and Emacs on a Windows machine* which can be found at http://lcb.unc.edu/software/perl/perl.html.