

# Medi\_Vizz User Guide

(Developed based on the Windows 11)

If you struggle with any part of the user guide or running the application, please contact Ms Uscinnia Dyn'ko at this address: [uscinnia.dynko@ut.ee](mailto:uscinnia.dynko@ut.ee)

Medi\_Vizz is an application for the concurrent visualisation of medical data. It can visualise diagnoses encoded by ICD-10 classification and numerical laboratory measurements.

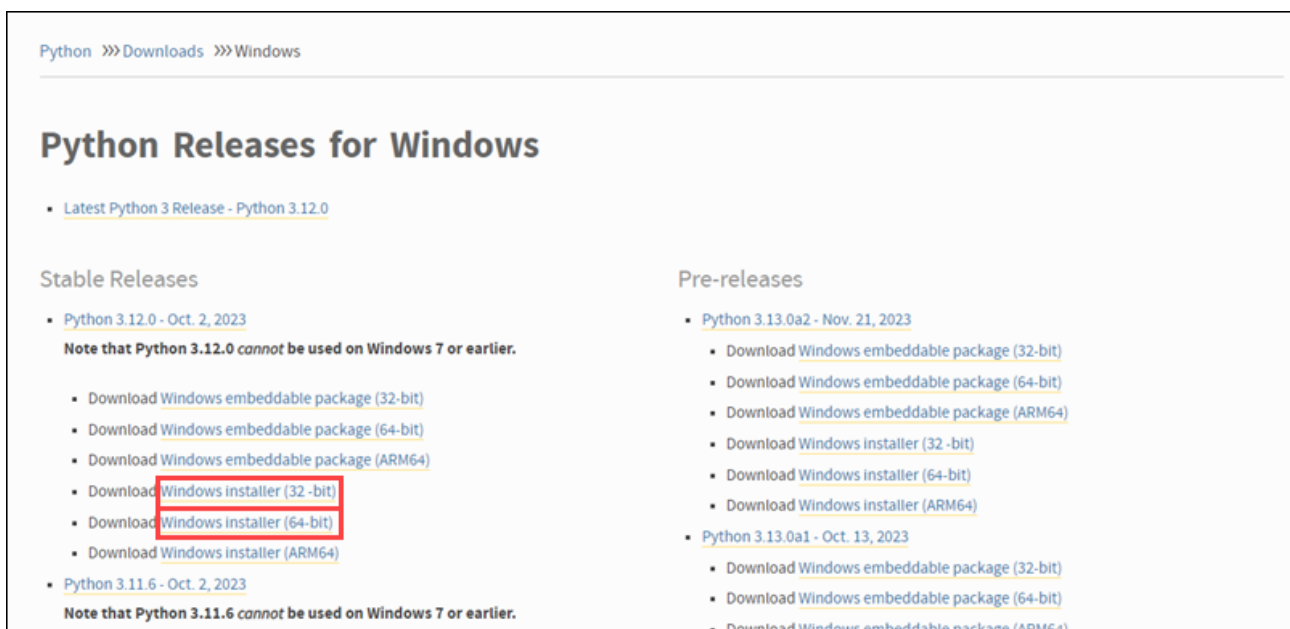
**Medi\_Vizz is not designed for data protection.** Please don't leave personal identification in the names of the files or the data. It runs without access to the Internet, so there is no possibility of a data leak. However, the application's creator is not responsible for who sees your computer screen with the data while you run the application.

## Installing Python to run the Medi\_Vizz

(original guide <https://phoenixnap.com/kb/how-to-install-python-3-windows>)

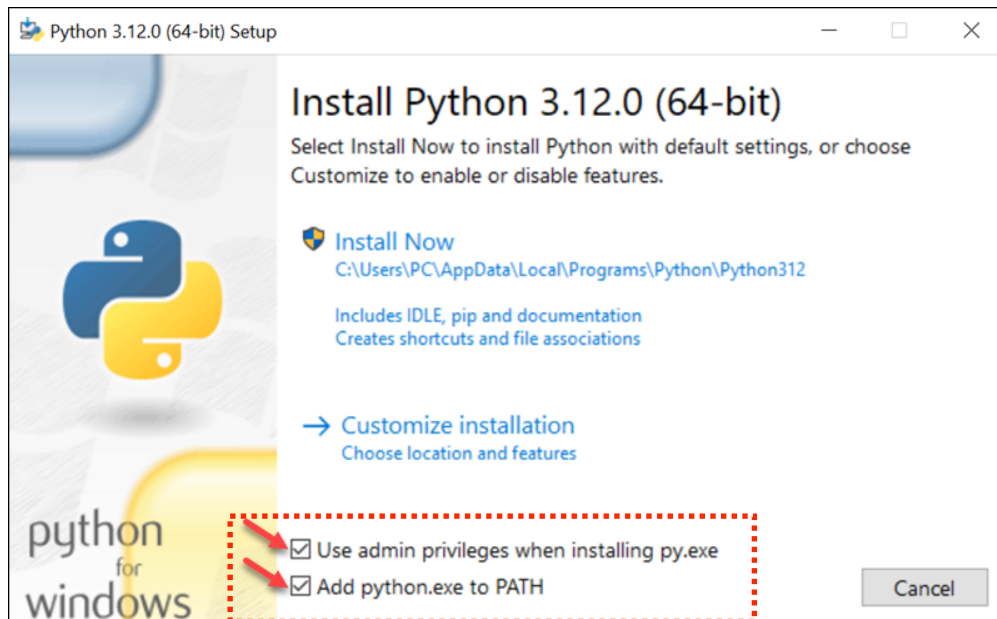
Medi\_Vizz is coded in Python, and to start the application, you need to have Python version 3.12 or later versions.

1. Go to <https://www.python.org/downloads/windows/> and select the Python version and a suitable computer architecture (Fig. 1).



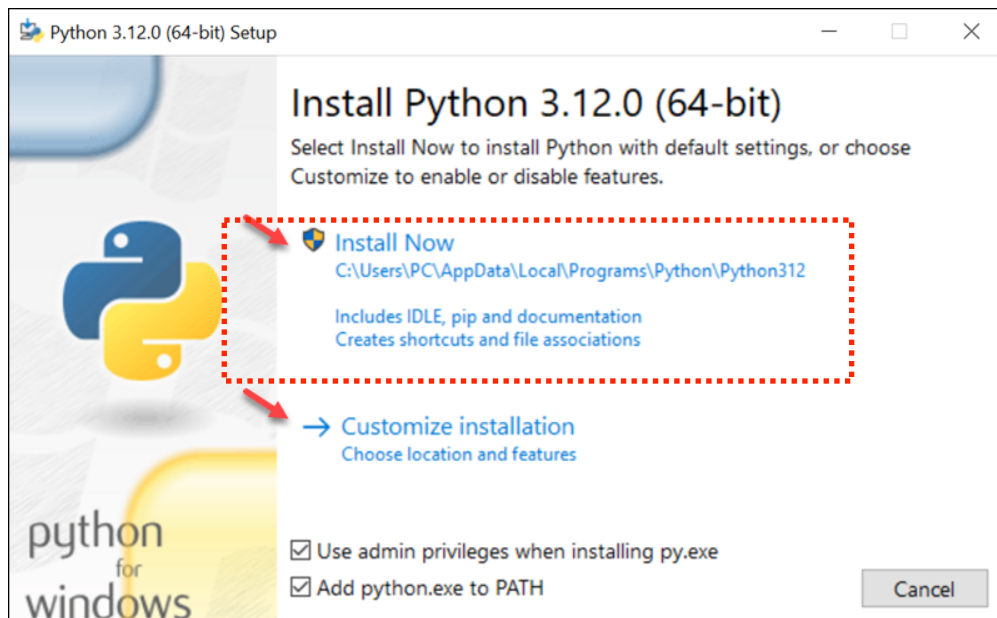
**Fig. 1.** Python version selection of the [python.org](https://www.python.org) website. Use the version for either 32-bit or 64-bit computer architecture indicated by red box.

2. Find the installer in the Downloads folder and run it. Check all the boxes indicated by red arrows (Fig. 2).



**Fig. 2.** Python installer started. Tick the boxes highlighted by the red rectangle and arrows.

3. Select the “Install Now” option (Fig. 3, red box).



**Fig. 3.** Installation process. Press on the “Install Now” highlighted by red box.

4. Check the installation in the command line:

- Press the buttons combination “Windows” + “R”.
- Write **cmd** command to start the command line and press “Enter”.
- Type in **python --version**. The expected output is shown in Fig. 4.



```
C:\Users\PC>python --version
Python 3.12.0
```

**Fig. 4.** Expected output after running the command **python --version** in the command line. The blue arrow points at the entered command, and the red arrow points at the output after running the command.

## **Installing required libraries for Medi\_Vizz**

*(based on [https://ehmatthes.github.io/pcc/chapter\\_12/installing\\_pip.html#pip-on-windows](https://ehmatthes.github.io/pcc/chapter_12/installing_pip.html#pip-on-windows))*

You will use the pip manager to install Python libraries required by the Medi\_Vizz tool.

1. Check that the pip manager is installed using the Windows command line:
  - Press the buttons combination “Windows” + “R”.
  - Write **cmd** command to start the command line and press “Enter”.
  - Type in **python -m pip --version**.

2. If pip is not found during the previous step:

First, try to install it using the command **python3 -m ensurepip --default-pip**

If that doesn’t work, try these steps:

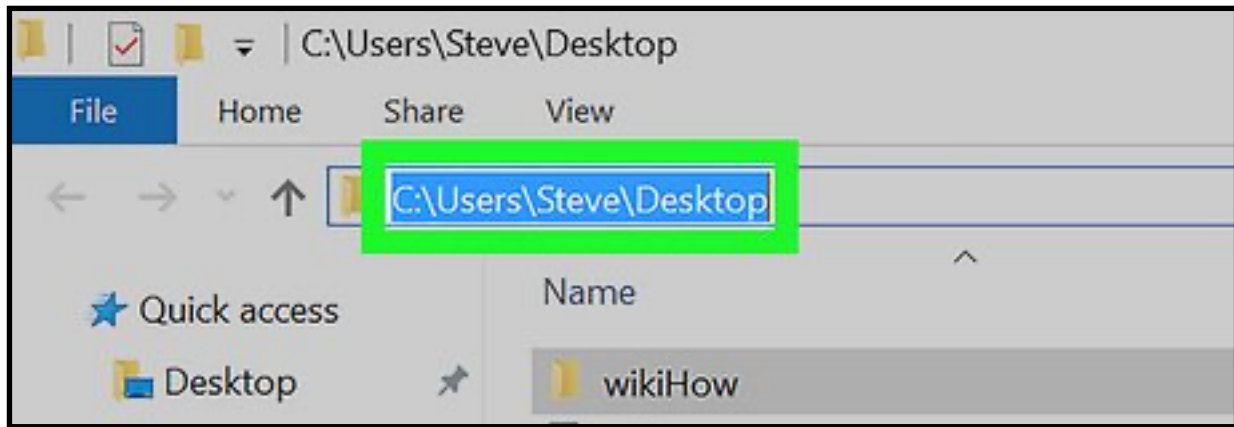
- Go to the website <https://bootstrap.pypa.io/get-pip.py>
- Select the entire text using Ctrl+A and copy it into any text editor.
- Save the copied text into your Downloads folder as a .txt file named “get-pip.py”.
- Go to your command line and navigate into your Downloads folder using the command **cd “path”**

The path here can be found by opening File Explorer, going to the Downloads folder and copying the path from the top search bar (Fig. 5).

The overall command in this case would look like this:

**cd “C:\Users\Steve\Desktop”**

- Run the command **python get-pip.py**
- Check that the pip is installed using the command **pip3 --version**



**Fig. 5.** Find the path to the file in Windows File Explorer.

3. After pip is installed, in the terminal, run two commands:

**py -m pip install dash plotly pandas dash-bootstrap-components python-dateutil**  
**py -m pip install kaleido numpy**

This command installs the list of libraries required by Medi\_Vizz. It will take a minute to run and gives a large output (part of the output is shown in Fig. 6).

Then, run the command **pip install --upgrade "kaleido==0.1.\*"**

**This command is very important if you want to save your analysis into a TXT file and an SVG figure.** There is a problem on Windows with using the most recent Kaleido library responsible for saving data, hence, you need to download an older version.

**Fig. 6.** Installing the list of libraries required by Medi\_Vizz. Red arrows indicate the command entered.

```

C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.22631.3447]
(c) Microsoft Corporation. All rights reserved.

C:\Users\sasha>pip install dash plotly pandas dash-bootstrap-components python-dateutil
Collecting dash
  Using cached dash-2.17.0-py3-none-any.whl.metadata (10 kB)
Collecting plotly
  Using cached plotly-5.22.0-py3-none-any.whl.metadata (7.1 kB)
Collecting pandas
  Using cached pandas-2.2.2-cp312-cp312-win_amd64.whl.metadata (19 kB)
Collecting dash-bootstrap-components
  Using cached dash_bootstrap_components-1.6.0-py3-none-any.whl.metadata (5.2 kB)
Collecting python-dateutil
  Using cached python_dateutil-2.9.0.post0-py2.py3-none-any.whl.metadata (8.4 kB)
Requirement already satisfied: Flask<3.1,>=1.0.4 in c:\users\sasha\appdata\local\programs\python\python312\lib\site-pack
ages (from dash) (3.0.3)
Requirement already satisfied: Werkzeug<3.1 in c:\users\sasha\appdata\local\programs\python\python312\lib\site-packages
 (from dash) (3.0.3)
Requirement already satisfied: dash-html-components==2.0.0 in c:\users\sasha\appdata\local\programs\python\python312\lib
\site-packages (from dash) (2.0.0)
Requirement already satisfied: dash-core-components==2.0.0 in c:\users\sasha\appdata\local\programs\python\python312\lib
\site-packages (from dash) (2.0.0)
Requirement already satisfied: dash-table==5.0.0 in c:\users\sasha\appdata\local\programs\python\python312\lib\site-pack
ages (from dash) (5.0.0)
Requirement already satisfied: importlib-metadata in c:\users\sasha\appdata\local\programs\python\python312\lib\site-pac
kages (from dash) (7.1.0)
Requirement already satisfied: typing-extensions>=4.1.1 in c:\users\sasha\appdata\local\programs\python\python312\lib\si
te-packages (from dash) (4.11.0)
Requirement already satisfied: requests in c:\users\sasha\appdata\local\programs\python\python312\lib\site-packages (fro
m dash) (2.31.0)

C:\Users\sasha>pip install kaleido numpy
Collecting kaleido
  Using cached kaleido-0.2.1-py2.py3-none-win_amd64.whl.metadata (15 kB)
Requirement already satisfied: numpy in c:\users\sasha\appdata\local\programs\python\python312\lib\site-packages (1.26.4
)
Using cached kaleido-0.2.1-py2.py3-none-win_amd64.whl (65.9 MB)
Installing collected packages: kaleido
Successfully installed kaleido-0.2.1

C:\Users\sasha>

```

## Starting the Medi\_Vizz application

Download the zip folder “Medi\_Vizz.zip” with the code and example files from the GitHub link [https://github.com/PlanetWyh/Medi\\_Vizz](https://github.com/PlanetWyh/Medi_Vizz)

To start the application, you must extract files from the folder, navigate to it through the command line, and start the application using Python.

You can try to start the script through file explorer by double-clicking on the “dash\_app.py” file in the Medi\_Vizz folder. If that doesn’t work for you, follow the steps below.

1. In the command line, navigate into the Medi\_Vizz folder saved in Downloads (Fig. 7, upper red arrow):
  - Press the buttons combination “Windows” + “R”.
  - Write **cmd** command to start the command line and press “Enter”.
  - Find the path to the Medi\_Vizz folder using Windows File Explorer. Go to the Downloads folder and then to the Medi\_Vizz folder (can be downloaded as a zip folder from GitHub [https://github.com/PlanetWyh/Medi\\_Vizz](https://github.com/PlanetWyh/Medi_Vizz) and should be unpacked by right clicking on it and choosing “Extract All...”)
  - Find the path to the folder on top of the File Explorer and copy it (Fig. 5).

In your case, it should be something like this:

**cd “C:\Users\Your\_Username\Downloads\Medi\_Vizz”**

- Write the modified command from the previous step with your username into the command line (Fig. 6).

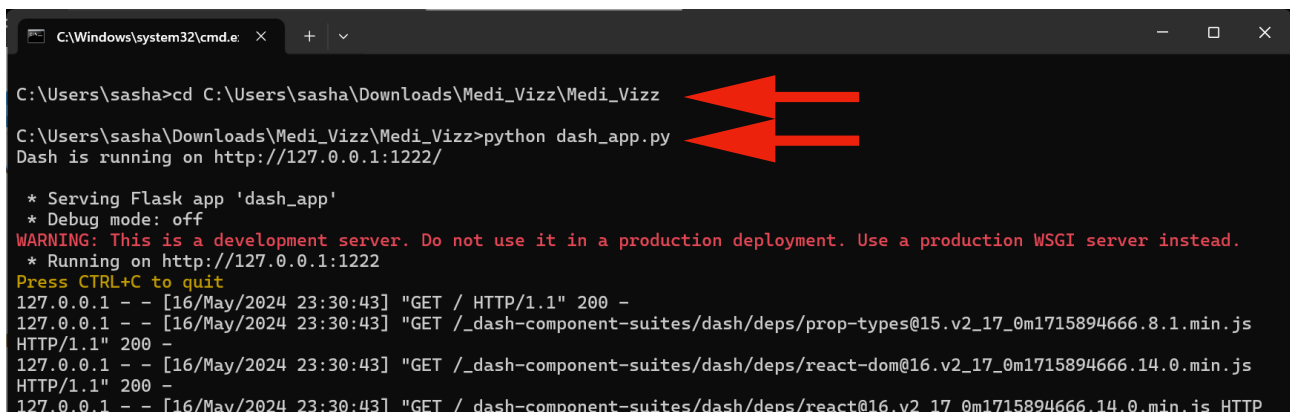
2. Check that you are in the correct folder by running the command:

**dir**

This short command displays the contents of your folder.

3. To start the application, run the command (Fig. 7):

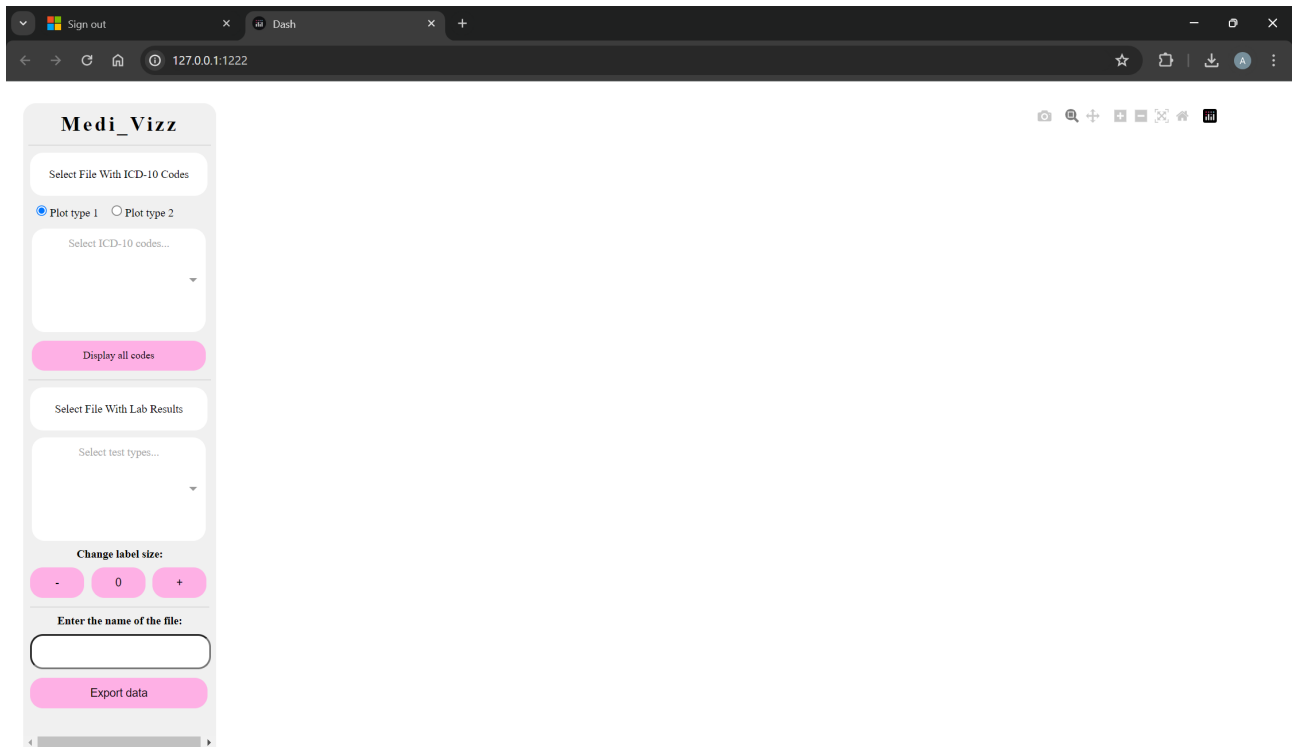
**python dash\_app.py**



```
C:\Windows\system32\cmd.exe: X + v
C:\Users\sasha>cd C:\Users\sasha\Downloads\Medi_Vizz\Medi_Vizz
C:\Users\sasha\Downloads\Medi_Vizz\Medi_Vizz>python dash_app.py
Dash is running on http://127.0.0.1:1222/

* Serving Flask app 'dash_app'
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:1222
Press CTRL+C to quit
127.0.0.1 - - [16/May/2024 23:30:43] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [16/May/2024 23:30:43] "GET /_dash-component-suites/dash/deps/prop-types@15.v2_17_0m1715894666.8.1.min.js
HTTP/1.1" 200 -
127.0.0.1 - - [16/May/2024 23:30:43] "GET /_dash-component-suites/dash/deps/react-dom@16.v2_17_0m1715894666.14.0.min.js
HTTP/1.1" 200 -
127.0.0.1 - - [16/May/2024 23:30:43] "GET /_dash-component-suites/dash/deps/react@16.v2_17_0m1715894666.14.0.min.js HTTP
```

**Fig. 7.** Starting the Medi\_Vizz application from the command line. Red arrows point



at the commands.

- Step 3 should open your default browser e.g. Google Chrome (Fig. 8).

**Fig. 8.** Medi\_Vizz in the Google Chrome browser.

## Data preprocessing

To use the application, you must format your data in a specific way. There are two example files in the zip folder.

### ICD-10 file (“ICD-10-example-file.txt” in a zip folder)

The ICD-10 diagnoses file should include three columns:

- Numbers
- Dates: the column header should be **Dates**, while the column with codes should be labelled **Codes**. Dates should be written only in the format **YYYY-MM-DD without time** (e.g. 1978-12-19).
- Codes. The column header should be **Codes**. Codes should be written as in the ICD-10 classification.

Fig. 9A shows the data format example from the ICD-10-example file.txt, which you can download from GitHub.

Save the file in the **tab-delimited .txt format** (e.g. using Excel software).

ICD-10-example-file			LAB-MES-example-file			
Numbers	Dates	Codes	Numbers	Dates	TestTypes	TestResultNumeric
1	2000-11-08	R36.4	1	2018-10-07	Test-1	0.1
2	2001-01-09	W45	2	2010-06-21	Test-1	0.5
3	2001-01-09	L74.80	3	2014-09-17	Test-1	0.02
4	2001-01-09	S82.4	4	2015-05-06	Test-1	0.9
5	2002-04-20	J80.3	5	2016-02-29	Test-2	6.7

**Fig. 9. A)** ICD-10 file example. **B)** Laboratory measurements file example.

### Laboratory measurements file (“LAB-MES-example-file.txt” in a zip folder)

To make the file with laboratory results, you need to have four columns:

- Numbers
- Dates written in the format **YYYY-MM-DD without time** (e.g. 1978-12-19), the column labelled **Dates**



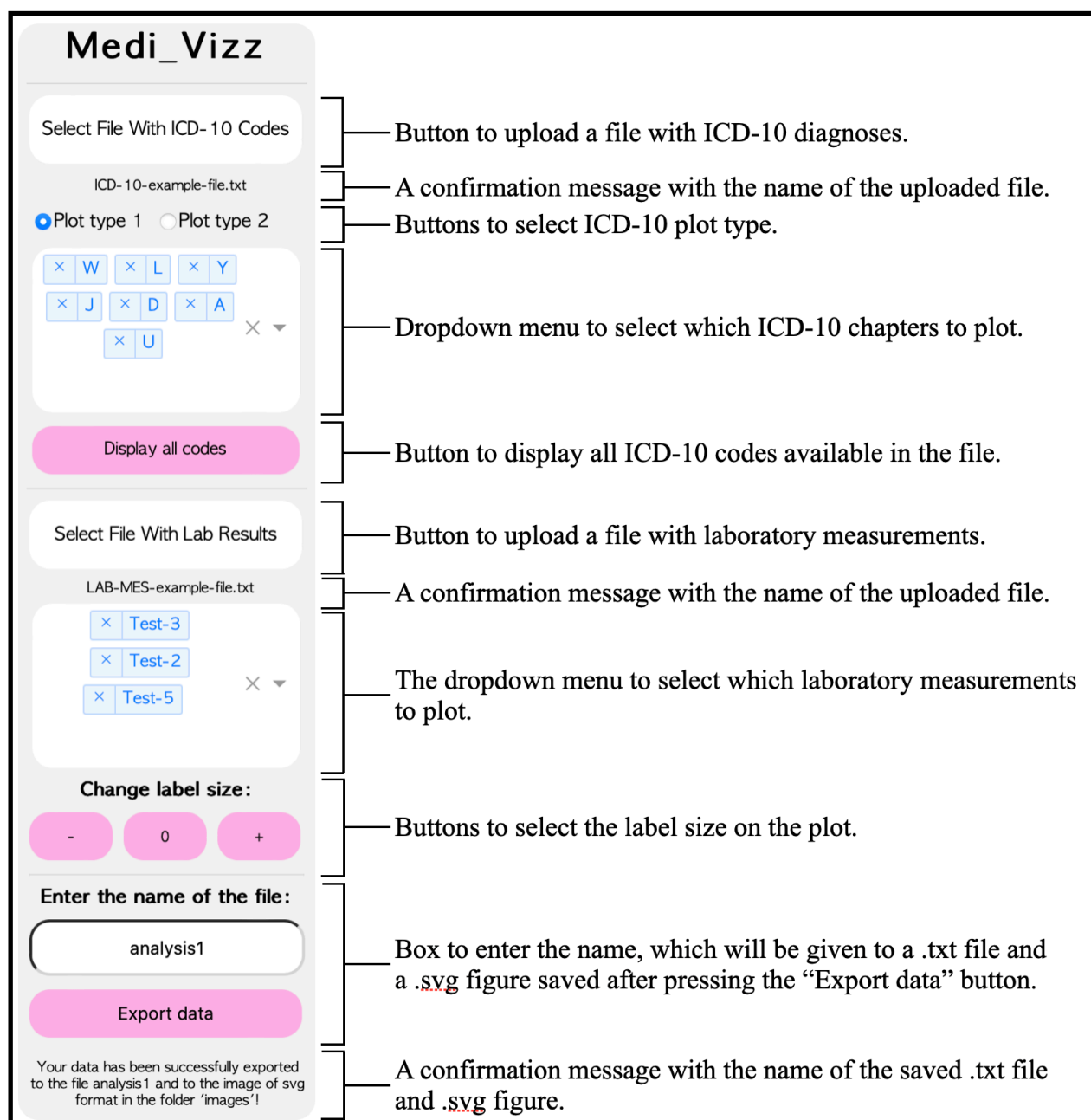
- A column with measurement types that can include text data labelled *TestTypes*
- A column with numeric test results labelled *TestResultNumeric*

Fig. 9B shows the data format example from the LAB-MES-example file.txt, which you can download from GitHub.

Save the file in the **tab-delimited .txt format** (e.g. using Excel software).

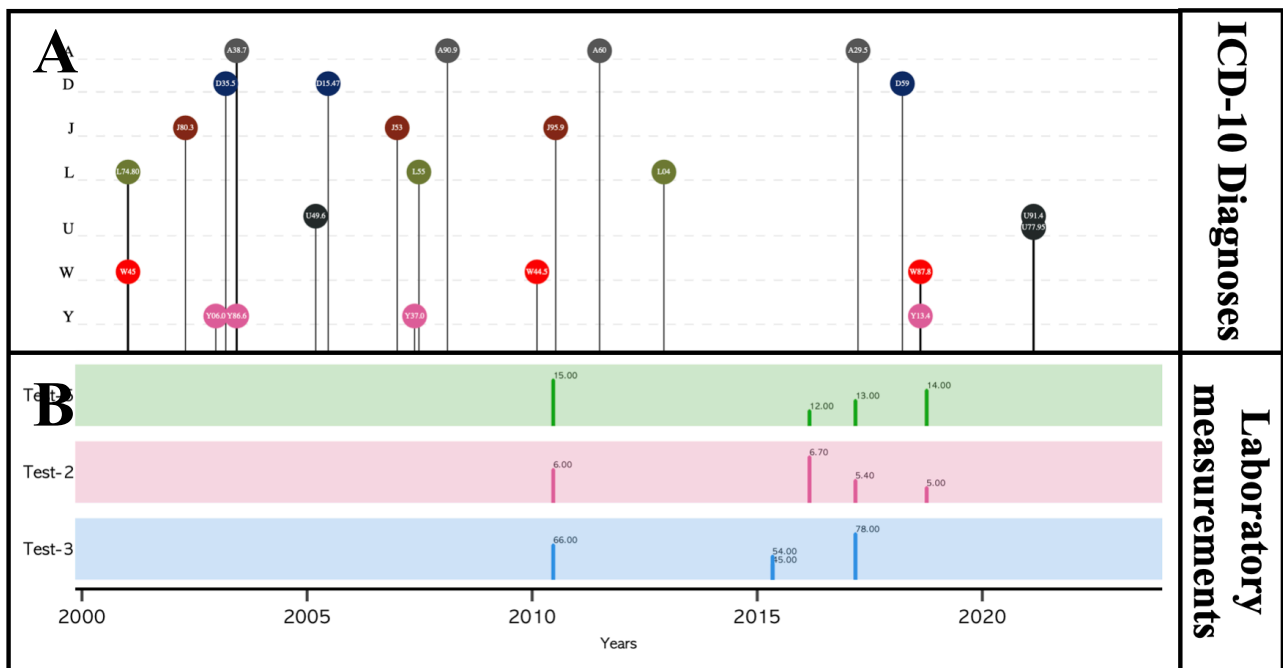
## Medi\_Vizz functionality

Fig. 10 shows the Medi\_Vizz menu and functionalities associated with each element.



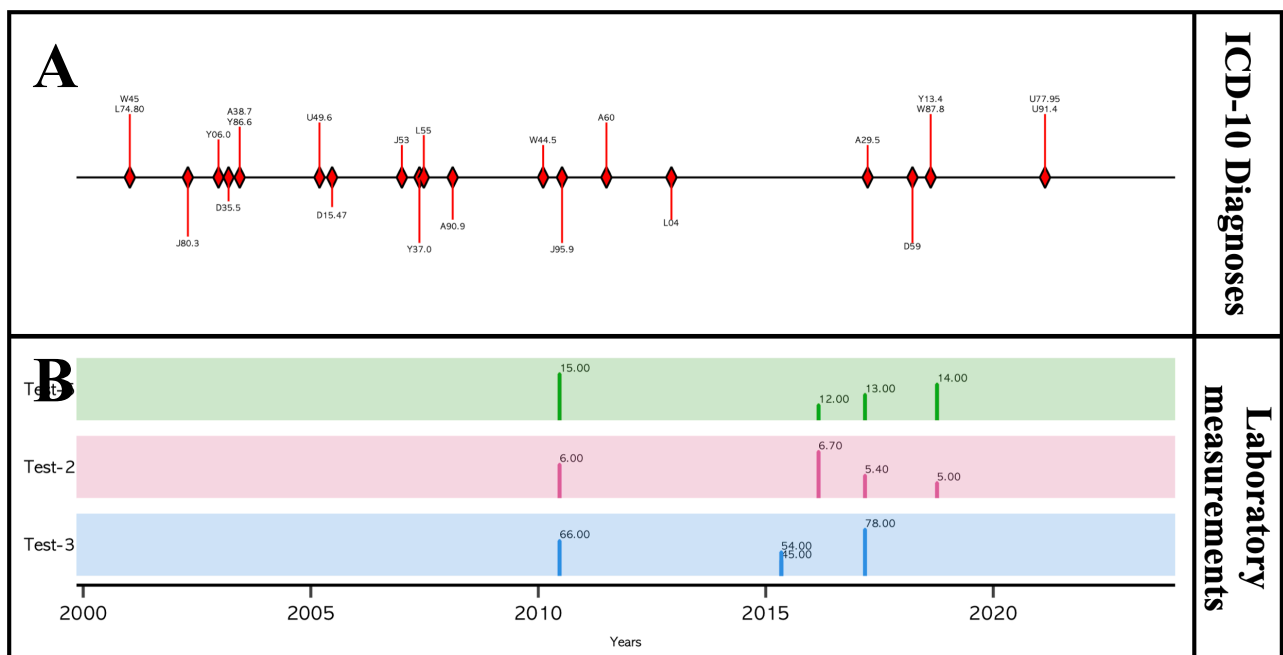
**Fig. 10.** Medi\_Vizz menu layout with corresponding functionalities.





Medi\_Vizz can generate two types of panels which only differ by how the ICD-10 diagnoses are represented. The first type of plot (Plot type 1) includes diagnoses as bubbles on the lines (Fig. 11). Line thickness shows how many diagnoses were assigned in one day, and diagnoses are displayed alphabetically. Plot type 2 shows diagnoses plotted in groups over lines (Fig. 12). The laboratory measurements panel stays the same between Plot Type 1 and Plot Type 2. Medi\_Vizz considers the maximum and minimum results and distributes all the other values between them.

**Fig. 11.** Plot type 1. **A)** ICD-10 diagnoses part. **B)** Laboratory measurements part.



**Fig. 12.** Plot type 2. **A)** ICD-10 diagnoses part. **B)** Laboratory measurements part.

You can find a video example of how to use the application using this link:

[https://drive.google.com/file/d/1OoZ-JSpeAznnTq8mTncb2Wjbv\\_-UzwSE/view?usp=sharing](https://drive.google.com/file/d/1OoZ-JSpeAznnTq8mTncb2Wjbv_-UzwSE/view?usp=sharing)