**EUCIC course 11-12 September 2023**

***Visualization of network and outbreak data***

**Network reconstruction and visualization**

We are going to reconstruct (again) the within hospital network, based on the provided dataset (“patient location data.csv”). After reconstructing the network, we are going to visualize an outbreak based on the provided dataset (“outbreak1.csv”).

We’ll do this in MOTIVARE, a tool developed for democratisation of the network reconstruction process, visualization and performing calculations that are oftentimes useful in Infection Prevention.

> First start the app, locally or on [motivare.net](https://motivare.net).

A screenshot of a computer

Description automatically generated

> Upload the file patient location data.csv by clicking on the Browse button and selecting the file.

A screenshot of a computer

Description automatically generated> In a text editor open the file for inspection. In the picture on the right you get an impression of what it looks like (in the Sublime Text editor).

As you can see the fields are **separated** by a semicolon and the **date format** is yyyy-mm-dd

> Next, in MOTIVARE, set the date format and ‘Separating character’ accordingly, and click ‘Load data’. This will load the data and provide the first and last dates found along with the number of days present in the dataset.

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> Select the date range that you want to have the network reconstructed for. For performance reasons, during this practical select a period that’s not too long. Leave the field ‘same case # days’ at 30, and click the ‘Analyze!’ button

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> While you’re watching the app’s progress bar.. remember your work drawing the network for a tiny subset of the data.. and appreciate the app is doing this work now for you 😉.

> When the network is reconstructed, the app will automatically switch to the ‘Network’ tab and show the resulting network.

> Set ‘label alpha’ to 0 and ‘edge alpha’ to 0.3 get a tidier picture.

> Play around a bit with the Layout criterion and Node size centrality measures. Please notice that every action takes a while to complete.

**Outbreak visualization**

Now we’ll use the file outbreak.csv to visualize and inspect an outbreak.

> Open outbreak.csv in a text editor:

> What information does the file contain?

> What information do you think can be inferred with this data in addition to the network data?

> What if there are multiple strains or species?

> Find the index case, now what is the ‘index ward’? (Manually in RStudio)

> Watch <https://www.youtube.com/watch?v=ECJ2DdPhMxI> for appreciation of the relation between geodesic distance and effective distance, the latter being depicted in the radial plot.

> Activate the ‘Outbreak’ tab in MOTIVARE.

> Why is the radial plot not yet shown? In other words: what do you need for creating a radial plot?

> Select outbreak.csv and click ‘Load’.

What ward was the index patient admitted to? (compare to your own answer)

> Step to timestep 1: For each timestep you get data reported.

* Inspect the ‘Contact data’ tab (‘Locations tested positive’): does it find the same ‘index ward’? Also look at the ‘Transfers of patients tested positive’
* Inspect in the ‘Visualization’ tab the radial plot and the schematic network: do you see the ‘Transfers of patients tested positive’ represented here? Why is the ‘from’ ward coloured yellow?

> Step to timestep 2:

Why is ‘Transfers of patients tested positive’ empty now?

And why no new ward in ‘Locations tested positive’?

> Step tot timestep 3:

What explains that there are 3 new wards affected, but only one transfer of patients tested positive?

Switch to ‘Visualization’ tab again

Set CJ as ‘source unit’: what’s the effect in the radial plot?

Look back at the network tab.

> What would have been the effect if the top 10 of betweenness ranking would have been screened every x days? In other words: which nodes would have detected being affected the earliest?

CJ,

**Extra**

# find ward that the index case was admitted to when tested POS

tOutbreak = read.csv('Resources/outbreak.csv', sep = ';') %>% as\_tibble()

tOutbreak %>% arrange(date)

# copy the first date

*patMovDB %>%*

*filter(*

*case %in% '<index case id>',*

*admission <= ymd('<date found POS>'),*

*discharge >= ymd('<date found POS>')*

*)*