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# Exploration and Analysis Tool for Enriched Linked Health Records

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## Motivation

- Using Linked Data it is possible to link Clinical Registry data to other health related sources or enrich it with other relevant external sources.
- Other sources may provide environmental data which, when combined, can lead to further insights to patient conditions.
- Understanding this data is difficult for nontechnical users.
- While RDF visualisation tools exist – they do not cater specifically to “enriched” registry data for exploration and analysis purposes.

## Problem Statement

Linked data in its raw form is difficult to utilise effectively. It is necessary to provide an interface between the data and the clinician in order to give them an opportunity to understand the structure of the data before they can gain additional insights.

## Potential Impact

- Ease the exploration and visualization of enriched registry data.
- Support new insights into health problems through visual analysis of clinical and external data.

## Solution:

### Layered tool to explore enriched linked health records

- Layer a **node-by-node exploration** interface over a more **traditional visualization** interface. (Fig 1)
- Unlike existing node-by-node exploration tools such as DBPedia (<https://wiki.dbpedia.org/>) which explore the data itself, the exploration here is over the **structure** of the dataset.
- Node-by-node exploration supports the **gradual build up** of a **general query** before homing in on specific aspects of the records. (Fig 2)
- Finds records that **match the pattern** defined in the query.
- Supports detailed single patient analysis and multi patient aggregations. (Fig 3)
- Advanced record **filtering** and **sorting** capabilities. (Fig 3)
- Visualization of the **combined data records** in graphs and charts. (Fig 4)
- Ability to home in on specific aspects of the records. (Fig 4 & 5)

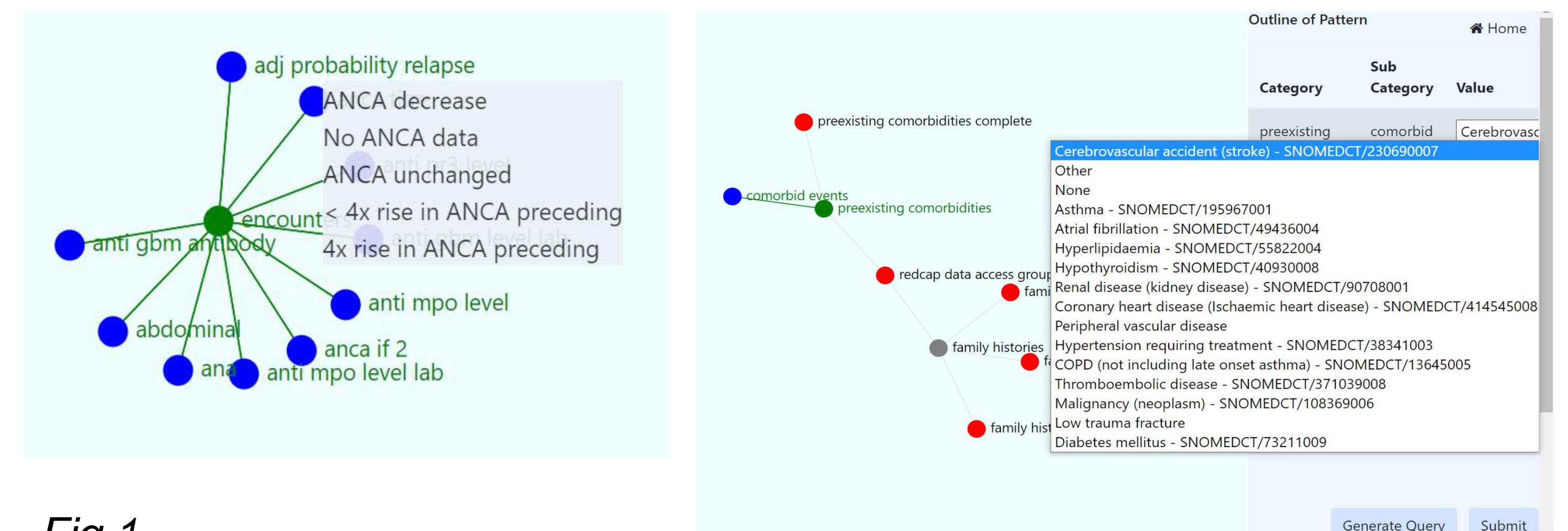


Fig 1

Fig 2

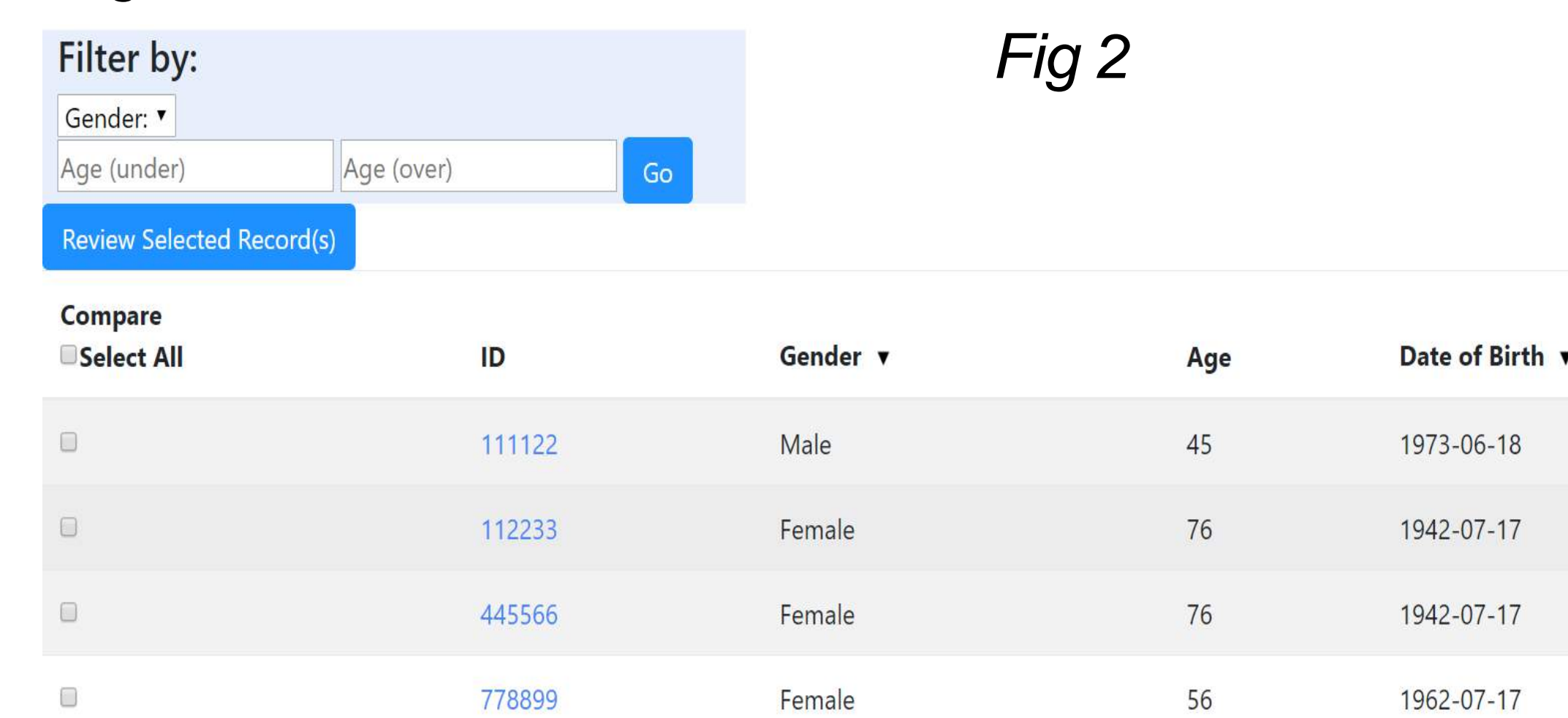


Fig 3

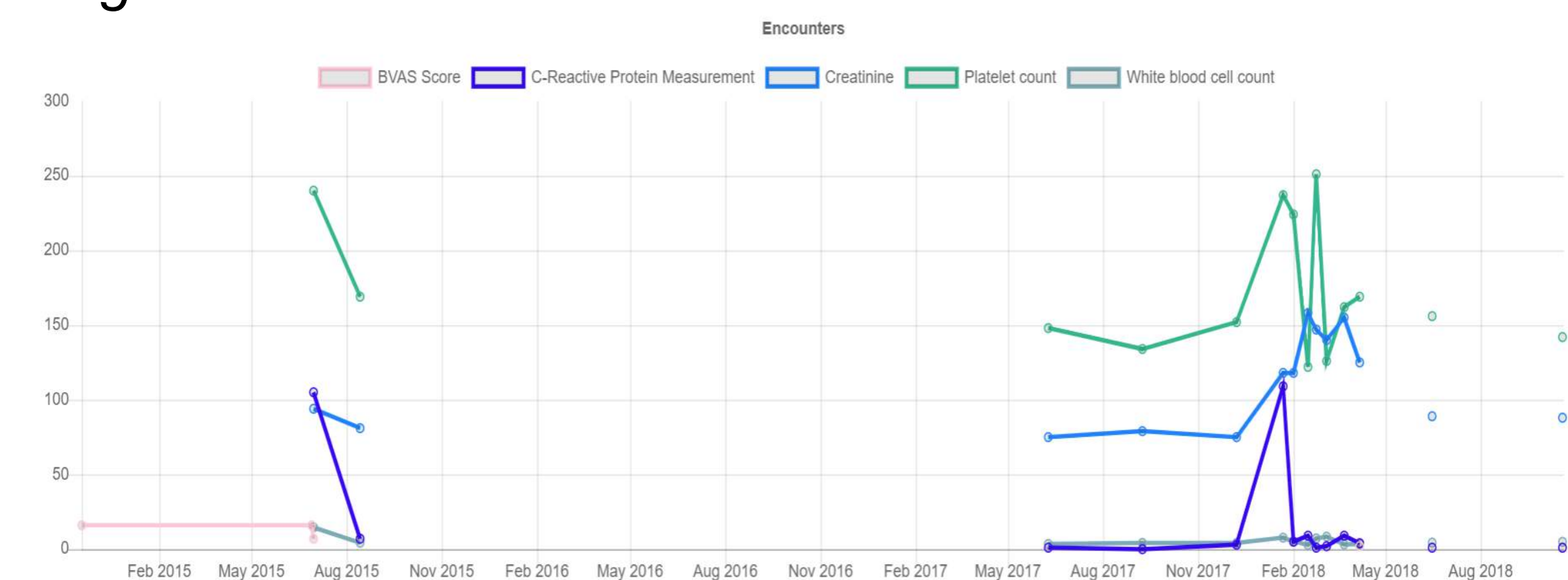


Fig 4

BVAS variables	2014-01-16	2014-07-01	2014-07-08	2014-07-25	2014-08-11	2014-08-15	2014-08-22	2014-10-03	2014-10-24	2014-11-28	2014-12-19	2015-01-23	2015-02-20	2015-04-10	2015-06-12	2015-08-21	2015-08-28
Purpura	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Skin ulcer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Progressive cutaneous gangrene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cutaneous vasculitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ulcer of mouth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fig 5

## Future Work

- Carry out further research specifically relating to the *User Interface* and *User Experience* to ensure the tool is understandable to the intended audience, clinical researchers.
- Extend the tool to work dynamically with other data of varying structures and content.
- Such generalization could be achieved by providing the tool with a schema of the data. The provided schema would allow the tool to understand the structure of the data and thus allow it to make accurate and meaningful queries.
- Potential for the tool to create such schema itself using the linked data provided.