Visual Analytics Approach to Practice Evidence Based Medicine

Ketan K. Mane, Ph.D.1, Charles Schmitt, Ph.D.1, Chris Bizon, Ph.D.1, Kenneth Gersing, MD2, Bruce Burchett, Ph.D.2, Ricardo Pietrobon, MD, Ph.D., MBA2

1 Renaissance Computing Institute, Chapel Hill, NC, 2 Duke University Medical Center, Durham, NC

**Goal**
To use visual analytics approach to help clinicians quickly determine best treatment options by providing evidence derived knowledge of how similar patients have fared under different treatments.

**Overview**
- **Use data from electronic medical record systems (EMRs):** Used sample data from MindLinc, an EMR used to federate de-identified psychiatry data from different institutions throughout the United States.
- **Use data visualization to reduce information overload and increase data cognition:** To assist practitioners who are strained by reduced time per patient, which limits their ability to interpret and make sense of evidence from EMR data.
- **Use EMR data to quickly identify comparative effectiveness options:** Instead of using expensive, slow, and controlled clinical trials to determine what works and does not work, use EMR data.
- **Facilitate decision to define custom comparative population:** Built-in interactions are available to filter the data to a sub-population data of interest.
- **Provide multi-variate decision support:** Different visual views are available to study underlying patterns and trends for patient and comparative population.
- **Guide decision-making process to select optimal treatment options:** Visual representations are used to help quickly identify different treatment options, and also to correct suboptimal treatment choices to avoid unnecessary healthcare costs.
- **Reduce complexity to use clinical guidelines as a reference:** Using comprehensive clinical guidelines as a template to understand the patient's treatment profile in limited time.
- **Point of care integration for decision support:** Ability to identify treatments in real-time is critical.

**Potential approach to identify patient treatment options:** based on everything we know about patient's medical condition

- **Identify Comparative Population:** Given a patient, use patient's symptoms as a metric to identify similar patient population. The evidence from patient population data can be used to identify different treatment options.
- **Use Clinical Guidelines:** Flowchart-based guidelines define options at different stages in the course of treatment. These options can be used as rules to locate patient population of interest and study the evidence available through their treatment.
- **Modeling Approach:** This approach is used to identify other meaningful features (if any) of the patient that needs to be taken into account to determine available treatment options.

**Visual user interface**

**Features**
- Visual encoding of horizontal bars to identify best treatment options (green for CGI ≤ 2.5, and red for CGI > 2.5)
- Yellow highlight for Rx is used to link this view to other views in the interface

**Contextual information available**
- Time-based Treatment Response
- Alternate View: Visited-based Treatment Response
- Patient Response
- Identified similar patient's response

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**Figure Description**

The figure illustrates the use of visual analytics to identify patient treatment options. It shows a visual interface with various views and features, including
- Patient demographics
- Filters
- Visual encoding of horizontal bars
- Yellow highlight for Rx
- Contextual information available
- Time-based Treatment Response
- Alternate View: Visited-based Treatment Response
- Patient Response
- Identified similar patient's response