# **Materials and Methods**

# ***Identifying seed nodes for multi-layered network exploration***

## The node degree, closeness, betweenness and eigenvector centrality metrics were computed using the igraph package in R. The integrated centrality score measures the difference among centralities for each node and describes the average distance.

Let represent the centrality score calculated for each node in a disease state graph, . The integrated node centrality score is calculated using **equation 1**.

*Equation 1*

Where is the number of centrality measures calculated

(**Equation 2**) is the distance between the centrality of nodes in each graph.

*Equation 2*

Where is the average node centrality score as shown in **equation 3**

*Equation 3*