Introduction and Background

In early 2014, Northwestern University's Galter Library began implementing a cohesive set of services around research evaluation and impact assessment. The services were complementary to the expertise and data already available from the library. Many of these services use bibliographic data, since it can be mined and visualized using a variety of techniques to gain a better understanding research impact. Deeper investigation also allows for a better understanding of effective research dissemination, mentorship relationships, professional development and more.

Telling a Story

This study was requested by an awards committee to investigate the work of an eminent researcher and clinician in cardiovascular disease epidemiology. The committee hoped to highlight the scholar's career achievements, significant contributions to the scholarly literature, and to demonstrate the scholar's collaboration with and mentoring of others in this field. Metadata was harvested from open and commercial data aggregators including Scopus, PubMed, Web of Science, various online sources, and the scholar's CV. A wide range of tools and resources, such as Tableau, Excel, the Sci2 tool, and Adobe Illustrator, were used to visualize the data. Visualizations were chosen based on their ease of understanding, relevance to the committee's request, and overall visually appealing nature. The visualizations were presented in PowerPoint to the committee at the end of the project. Additionally, two large posters were created to further highlight the visualizations. These visualization have been included in a larger portfolio of works to demonstrate the services that the library can provide.

Librarians played a key role in the collection of data from the literature databases by providing expert searching skills and knowledge of the limitations of the data and file types available for export, among others. Additionally, the librarians explored different visualization tools, noting which visualizations were possible given the data available and the features of the tool. They noted the tools varied widely in terms of features, cost, and ease of use. Each visualization was accompanied by a short narrative stating the type of visualization, the data source, and the types of conclusions or impacts that could be drawn. Several visualizations were chosen by the committee to be displayed during an awards ceremony.

Moving Forward

The ability to understand the impact of research and clinical activities in the academic environment is difficult. Today's medical libraries provide resources and expertise to their campuses that can be leveraged to accomplish data analysis and visualizations. The role of the librarian in accomplishing and supporting this work is essential, especially given the critical importance of data integrity, and the role that librarians already play as valued team members on significant enterprise-level information projects. Librarians offer the perfect combination of expertise, perspective and resources to support and advise their assessment and visualization of research impact across the peer-reviewed literature and beyond.



Impactful Visualizations of Bibliographic Metadata in Cardiovascular Disease Epidemiology



My personal beginnings [are] intimately related to the beginnings of the whole field...With the years we progressively unraveled relationships in the area of what became known as risk factors...Then from risk factors we went finally much later [to] low risk.

- Jeremiah Stamler during interview with



Early on in his career while working as a Research Fellow for Dr. Louis Katz at Michael Reese Hospital in Chicago, Dr. Stamler did research on the influence of female hormones on diet cholesterol-induced atherosclerosis in chickens.

Ancel Keys Photo Collection "Stamler, Jeremiah", 1950(s) Available at http://www.epi.umn.edu/cvdepi/ photograph/stamler-jeremiah/

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Infographic of career highlights for remiah D. Stamler. MD

From his beginnings at Northwestern University as n Assistant Professor in the Department of ledicine in 1958, Dr. Jeremiah Stamler has given over 50 years of service, served on countless mmittees, and been gifted with numerou onors and awards. In addition he has guided and oht 34 trainees, and mentored countless others.

bus database which is the largest abstract and). Within the 561 eer-reviewed publications. Dr. Stamler has ollaborated with over 843 co-authors, and has generated over 25,185 citations

Dr. Rowland Chang, 2013



Jeremiah D. Stamler, MD Professor Emeritus in **Preventive Medicine-Epidemiology** Feinberg School of Medicine Northwestern University



Timeline of career highlights for Jeremiah D. Stamler, MD from 1949 to 2014

Career highlights were identified from the curriculum vitae of Jeremiah D. Stamler. The events were arranged on a timeline using Adobe Illustrator in September 2014.

> Major research studies for Jeremiah D. Stamler, MD from 1958-2014

Major research studies for Jeremiah D. Stamler were identified through his curriculum vitae and the published literature. These studies were arranged on a timeline using Adobe Illustrator. The visualization was completed in September 2014



This choropleth map shows 209 countries of the world using the equal-area Eckert IV projection. Each country may be color coded in proportion to a numerical vlaue. Minimum and maximum data values are given in the legend.

Publications data of the papers citing the work of Jeremiah D. Stamler's trainees from 1970 -2014 was collected using Elsevier's Scopus and exported into a CSV file. Analysis was performed using the field for author affliation in the Science of Science (Sci2) Tool. The Sci2 Tool creates a choropleth map from the geographical data. The visualization was completed in September 2014.

Top 20 Journal Titles for Jeremiah D. Stamler, MD from 1949-2014

Publication data for Jeremiah D. Stamler fr 1949-2014 was collected from Elsevier's Scopus and exported into a CSV file. The data was imported into Tableau Desktop, and a bubble chart visualization was created using the field for journal title. All of the bubbles (even those in grey) represent journal titles. The visualization was completed in September 2014.

> **Publication Titles** for Jeremiah D. Stamler, MD from 1949-2014

Publication data for Jeremiah D. Stamler from 1949-2014 was collected from Elsevier's Scopus and exported into a CSV file. The publication titles were imported into Tagxedo.com and a visualization was created. The visualization was completed in September 2014.











Data from Elsevier's Scopus Data span from 1949-2014.

Visualization narrative

Fopical analysis of ublication titles from emiah D. Stamler, MD from 1949 to 2014

Timeline of career highlight for Jeremiah D. Stamler, MD from 1949 to 2014

topical trend analysis of publication titles from D amler's works show when topics "burst" inf over time. An algorithm truncates and stems word which is why some terms on this visualization are hortened to their root form.

Early on in Dr. Stamler's publishing history we see th ocus on atherosclerosis in animal models through erms such as "atherosclerosis", "chick" and "doo

eginning in 1959 and lasting through the early 70's, terms such as "primary", "preventive" art disease", "coronary" and "epidemiology" take ne stage, along with "atherosclerosis." This is also the ime period when Dr. Stamler began his work at Northwestern University Medical School and with the Chicago Department of Health.

n the 1970's and 1980's we see the results of D amler's work with several large and importan studies which were fully underway: The Chicago eople's Gas Company Study, The Chicago Wes lectric Study, and The Chicago Heart Association idies is apparent in publication titles bursting with erms such as "Chicago", "heart", "therapy" hypertension", "epidemiology" and "coronary.

As we work our way into the 1990's we see the results of the large "International Cooperative Study on Salt Other Factors, and Blood Pressure" or INTERSAL Study which comprised of 10,000 men and women rom Africa, and North and South America. NTERSALT bursts into the publication titles, along with terms such as "long term" "baseline" and

n the mid-1990s we see the Multiple Risk Facto ntervention Trial (MRFIT) to study multifactor risk-modification to reduce the death rate from CHD bursting into publication titles with terms such as 'risk factor" "intake" "intervention" and "food"

Finally in the early 2000's to present we see the large International Population Study on Macronutrients and Blood Pressure" or INTERMAP Study with over 4,600 participants China, Japan, UK, and the US, oursting into the publication titles with terms such as 'metabolism", "intake" "nutrients" and "Japan"

Major research studies for Jeremiah D. Stamler, MD from 1958-2014

Dr. Stamler was a key person in designin plementing, and analyzing major research studies i eventive medicine for cardiac health. These studies iround cardiovascular epidemiology. Dr. Stamlei borated with countless numbers of researchers nese studies and his mentorship provided th uidance and support so that others would be successful and productive in their own endeavors

Global Influence of Trainees for Jeremiah D. Stamler, MD from 1970-2014

Dr. Stamler's Trainee's peer-reviewed publica ions have been influential and far-reaching, as hey have been cited by authors from over 78 ountries of the world. This map displays the nber of times a country was affiliated from citations to the trainee's publications, ir shades of color based on a logarithmic scale Most notably here are the 2,349 affiliations from the United States, 482 from the UK, 380

Top 20 Journal Titles for Jeremiah D. Stamler, MD from 1949-2014

Dr. Stamler has published in many highly ranked ournals, including those known for their broad overage such as the Journal of the American Medical ciation, and the Lancet, and in journals known fo eir cross disciplinary approach, such as Preventiv edicine, and the Journal of Chronic Diseases litionally, he has published in more specialize urnals, such as the Journal of Human Hypertensior vpertension and so on.

Based on data from Elsevier's Scopus, he has 43 ublications in Hypertension, 39 publications in culation, and 35 publications in the American ournal of Epidemiology. These journal titles represen diverse audience of readers, including those terested in dietetics and nutrition, treatment o iovascular diseases, and preventive medicine

Publication Titles for Jeremiah D. Stamler, MD from 1949-2014

The titles of Dr. Stamler's publications are shown here in a word cloud in which the words are sized based on the number of times they are used.

Dr. Stamler's work with several large and important studies: The Chicago People's Gas Company Study The Chicago Western Electric Study, and The Chicago Heart Association Detection Project in Industry, are evident in terms such as "Chicago", "study", "heart 'therapy", "hypertension", "risk", and "coronary.'

erms such as "risk", "prevention", "factors nsumption" and "dietary" come from the Multiple Risk Factor Intervention Trial (MRFIT) to study multifactor risk-modification to reduce the death rate from CHD.

Finally we see the large "International Population Study on Macronutrients and Blood Pressure" or NTERMAP Study with over 4,600 participants China apan, UK, and the US, in terms such as "metabolism intake" "nutrients" and "Japan".