Critical Public Health Stability Requires a New Kind of Data Science

In our present society, there are substantial increases in disorders and diseases that are debilitating and shortening to lives and detrimental to socioeconomic resilience and stability. These affect all spectra of the population, with slight variations and most of these variations are linked with the presence of other comorbidity conditions, not with underlying ethnic, racial, epigenetic differences.

These increasing conditions include, significantly:

- autoimmune diseases such as MS, Lupus, and several forms of dementia
- inflammatory intensified effects and resulting comorbidities from infectious diseases such as influenza and COVID
- dysautonomia affecting cardiovascular, pulmonary and gastrointestinal systems in particular, and including POTS (postural orthopedic tachycardia syndrome)
- cardiac arrhythmia including tachycardia and AFIB
- immune system strength and resilience to viral infections such as COVID

Most of these conditions are detected only at later stages when symptoms have reached a level that brings persons thus afflicted to seeking medical services. This lack of early attention can and usually does make a significant difference in a person's ability to obtain medical care that leads to rehabilitation and restorative health. Part of the reason is in the subtleties and “masking” of early symptoms and indicators that are ignored by patients and providers alike.

Most of these conditions have causal links to a variety of lifestyle behaviors, prior infectious diseases (e.g., teenage mononucleosis and MS, COVID or Lyme Disease with myocarditis and arrhythmia, nutrition and diet, substance abuse including alcohol and tobacco, and chronically high levels of stress-related psychophysical disorders including anxiety, depression, and elevated cortisol/catecholamine levels from trauma-related and trauma-inducing environmental conditions. These factors often involve life-long or decades-long behaviors and exposures to a variety of toxic substances and stressors of both physical and psychological types.

Medical databases and the growth of sophisticated data metrics and modeling are valuable resources to both medical providers and patients. Improvement in the general area of data science and bioinformatics have been invaluable. The benefits of expanding medical informatics to encompass wider and more diverse segments of the population in any country or geographic region are clear.

However, simply building massive databases of the current general types of data will not be sufficient for addressing what we see as the most rapidly increasing groups of diseases and debilitating conditions, such as those just described. A new approach is needed and this constitutes a “paradigm shift” in attitudes and practices, across the medical community and within the general population, with regard to What Data Really Matters.

More information needs to be collected about personal and family lifestyles and habits, and symptoms that many persons, including today's medical providers, often consider to be either less important or more private. There is a need to collect and organize data that points to the early-stage precursors and indicators, in order that both patients and providers can be aware of what may be a condition in the future. This is where contemporary advances in data science and geo-cultural-spatial informatics can be invaluable for reducing future illnesses from occurring or for reducing the severity of certain illnesses before they reach and across a major threshold in terms of being life-threatening or lifestyle-disabling, including reduction of function in terms of a person's ability to work and to have a comfortable and pleasant life.

We propose to examine critically the types of data that can be beneficial in identifying precursors and probabilities for a variety of inter-related neurological and cardiological diseases. We will develop a set of protocols for public including professional education and cultivation of information-producing and information-sharing practices, in order to develop a public strength for building precisely the type of medical database resources that are needed to address such diseases as described above.

This project begins with assessment and evaluation of the information deficits that exist today, widespread, in many medical practice environments as well as within homes, schools, workplaces and other social environments. This project extends to creation of a robust new form for building such data resources and it extends beyond the conventional patient-provider interface that is usually limited to the office visit or hospital visit, and it incorporates the medium available now with great ease and convenience to the entire population, namely, the social media networks of the internet. Our approach is based upon the principle that when one introduces something new to people which does not appear to be a demand for more work, time, or energy, and which is not seen as threatening to privacy and other concerns, that there will be greater interest and acceptance.

There are definitely avenues which can be pursued to address the roots and the growth of these many very debilitating and life-reducing diseases. They begin with information and education for the entire population, not only for patients, nor for providers, but for both working together in partnership toward the same common goals – healthier, happier, more wholesome and satisfying lives for all.

Dr. Martin Joseph Dudziak
TETRAD Institute of Complex System Dynamics
martinjoseph@tdyn.org
www.tdyn.org