Opening Remarks:

There are several features that set this conference apart from other conferences. It is invitation-only. All sessions are plenary, and there is a heavy emphasis on discussion. All attendees are active participants in the conference. The conference takes place in an out of the way location to ensure that all participants can focus on the topics at hand. Finally, the conference enjoys strong government presence. Williamsburg fits all of these dimensions perfectly.

This conference goes all the way back to 1975. Looking at the timing of previous conferences, one can see that in the past they generally took place every 3-4 years. The gap between the last conference (which occurred in 2011) and this conference is the longest gap we have ever had. The reason for this is that the old business model of funding, which previously involved a lot more government support, no longer worked. The organizers had to identify additional source of funding and forge a hybrid business model in order to make this particular conference possible.

What were the objectives of the very first conference in 1975?

- Identify methodological issues and problems areas for health survey research
- Identify the types of research problems that could be a high priority for research funding
- Identify policy issues that can be advanced with research funding
- Communicate the results to health researchers who use survey methods to government agencies and to others in the health research community

These objectives continue to motivate the research community today.

Keynote speaker 1: Robert Furberg

Wearable technology is becoming increasingly integrated into our daily lives. In fact, it is developing faster than regulatory context for this technology. All these wearable devices create a feedback loop with the user: they collect data, which in turn becomes contextualized and articulated to the user against a stated goal. The user can then either take action based on this information or not.

Advances in sensor technology are changing what it possible when it comes to individualized health prevention strategies and public health prevention. For example, items such as temporary disposable sensors on teeth and sensors that are swallowed would allow to definitively ascertain adherence to various protocols. Overall, personal sensor data collected using these items enable distributed, low burden and longitudinal measurement of human behavior and physiology. This makes passive data collection a thing of the past.

Currently, wearable devices come in 3 flavors:

- Consumer devices: These devices are low-risk and can be used for observation only. They are effectively unregulated.
- Research, or Class II, devices: All devices that are neither consumer nor clinical devices fall into the Class II category. Unlike consumer devices, Class II products can use sensor data to contextualize what is being observed. As a result, one can use them to assess effectiveness of various interventions (e.g., effectiveness of stress reduction techniques).

- Clinical, or Class III, devices – these are medical devices, which are regulated and require premarket approval. These devices can utilize artificial intelligence to predict various responses in the population based on what is being observed.

Looking at different devices currently on the market, the lines between consumer and professional devices are becoming blurred. All devices are increasingly precise and connected to other devices and the cloud. What are the implications of this?

The history of the GPS is instructive for answering this question. GPS was developed by Department of Defense. However, by the end of 1990s, we began to see real diversification of spatial data and how the data were used. Between 2007 and 2017, GPS was credited with 218 billion of returns on private investment. Currently, private companies are pulling spatial user data and selling it, which is a widely prevalent practice.

This is instructive for technological advances related to wearables. Wearables technology has a lot of promise to improve collective health outcomes. We could potentially detect that someone will come down with a flu hours before they develop any symptoms. We could similarly use information from a group of individuals to predict a flu outbreak in a particular geographic area. However, the infrastructure necessary to support distributed data collection is currently being built by private data collection companies, which may not share our values in terms of protecting human subjects. Just like GPS is being used for spatial data collection, physiological and health data can also be used in ways that people are not cognizant of. We as a society have to change how we relate and respond to this in order to both utilize the promise of this technology and ensure that our data are used in accordance with our collective values.