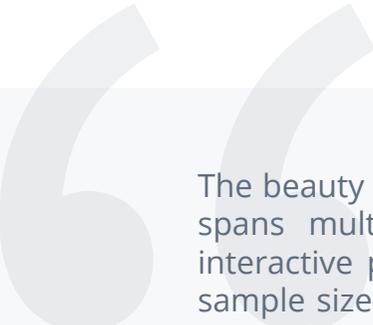




Singapore Institute for Clinical Sciences Enables More Open Sharing of Health Research with Interactive Data Vault Platform

Executive Summary

- A Singapore national research institute shares more than a decade of longitudinal cohort data with the global research community by deploying data catalogs, analytics, and published research to an **interactive data vault platform**.
- Receiving around 5,500 unique visitors in a year, the platform enables research and collaboration in an audience spanning Asia, Australia, Europe and North America.
- Dash Enterprise helps teams of clinicians, domain experts, and data scientists work together, faster, to build, deploy and maintain the data apps for the data vault platform.



The beauty and strength of the GUSTO study is that it spans multiple health domains. Having an open, interactive platform that showcases all the data and sample sizes that are available allows us to empower researchers to collaborate and form hypotheses linking multiple phenotypes.

Mukesh Kumar

Data Science Manager at Singapore Institute for Clinical Sciences

Introduction

Since 2007, the Singapore Institute for Clinical Sciences (SICS) has pursued a vision to build an evidence base for positive health in Singapore and globally. The national research institute launched two longitudinal cohort studies that have spanned over a decade's worth of maternal and child health data — Growing Up in Singapore Towards healthy Outcomes (GUSTO) & Singapore Preconception Study of Long-Term Maternal and Child Outcomes (S-PRESTO). SICS is building digital, interactive ways for the research community to leverage those data in the design of future studies, with help from Python and Dash Enterprise.

Challenge

The study objectives require a comprehensive, multi-domain approach to gain insight into the long-term health impacts of conditions during pregnancy and early childhood. There was also a need to enable SICS researchers and collaborators to build their own research questions from the data. Several hurdles complicated these goals:

Data complexity: The two cohort studies, **GUSTO and S-PRESTO**, have followed over 1,000 subjects across more than ten years, gathering data from demographics and health history down to molecular and biospecimen levels.

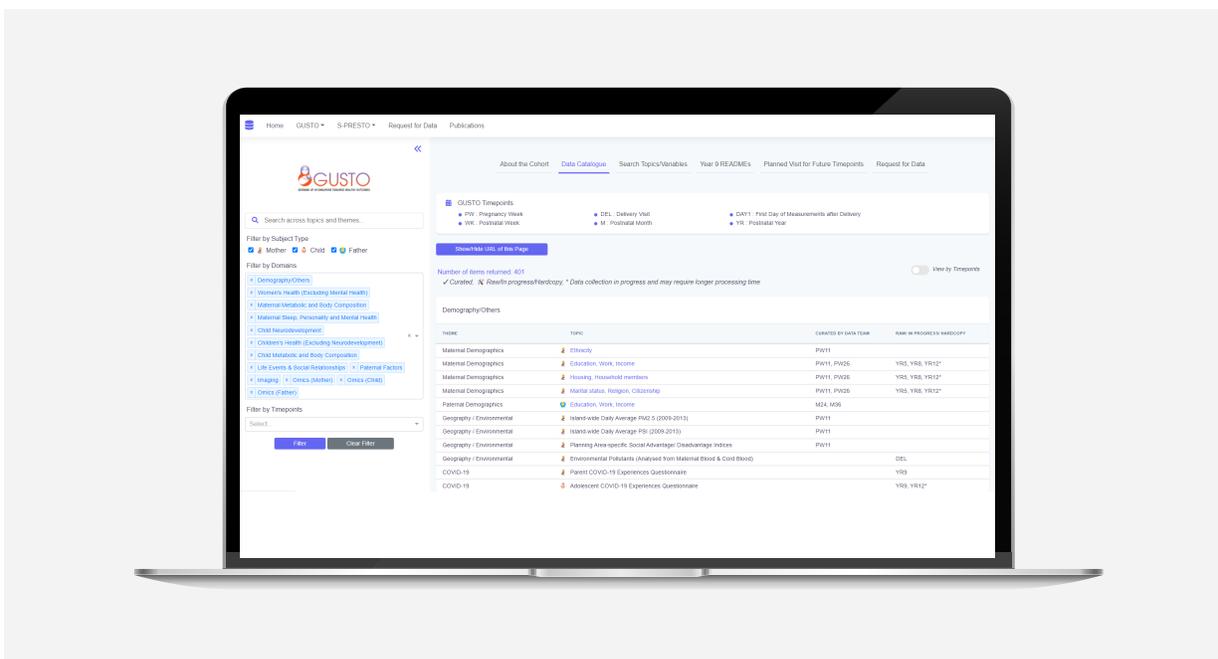
Data silos: The objectives require an integrated approach to the data and the research questions, but the data were siloed. A single, cross-domain source of truth did not exist.

Divergent skill sets: SICS has a big pool of researchers and a much smaller data science team.

Solution

The data science team at SICS was tasked with building a full-service data vault from which researchers could search the cohort data catalogs, read published research, and explore the data through **interactive visualizations**.

To accomplish this, the data science team would develop multiple data apps, accessible in the web browser to enable wider access for the research community. The team already worked with Python and the Dash Open Source framework, so they could build the data apps themselves without web development technicalities. But managing all the data apps for a full-service platform with global reach became technically challenging and time-consuming, detracting from the actual data science work. Committed to creating this resource for the research community, the team licensed Dash Enterprise to further streamline and accelerate their work to build and manage the data vault platform.



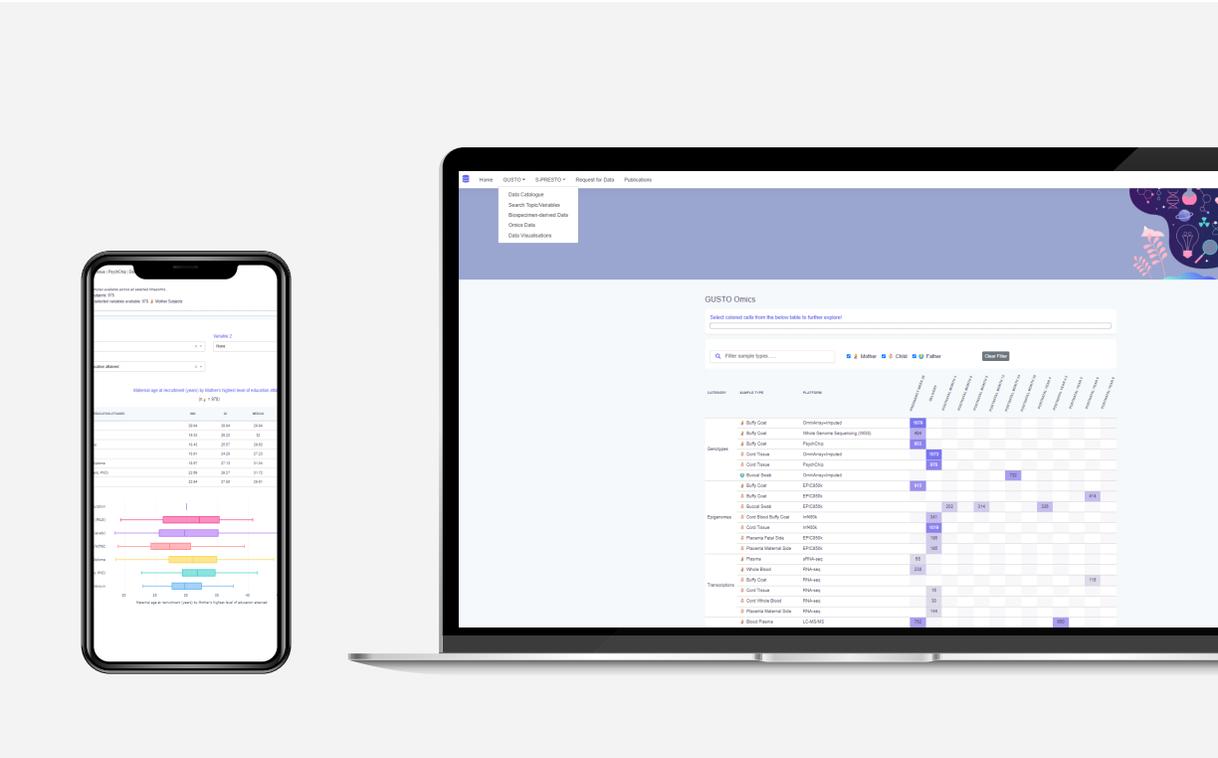
Results

Collaboration and speed: Within one month, the data science team can ideate and iterate on a new data app in collaboration with SICS clinicians and domain experts, test the app, and deploy it to their **data vault platform**. Dash Enterprise provides control over user accesses, permissions and app management, helping teams work together, faster.

Engaged research community: User analytics in 2022 suggest the data vault sees around 5,500 unique visitors in a year, mostly from Singapore, although 20% are based in countries across Asia, Australia, Europe, and North America. These viewers spend an average of 20 minutes at a time on the platform, suggesting that the platform is promoting engagement with the cohort data.

Furthering global research: The platform is a rich, interactive means of accessing and exploring the GUSTO and S-PRESTO cohort data, encouraging curiosity and prompting further questions. Functionality like a sample size calculator enable researchers to see what samples are available before building a research question and cohort on that knowledge.

The platform indexes over 300 publications, including articles in Nature and Oxford University’s Human Reproduction, and has garnered interest from leading research groups around the world, as well as other institutions within the Agency for Science, Technology and Research (A*STAR).



***GUSTO’s Omics data app** allows researchers to visually explore the availability of different biosamples and select those of interest. Selections trigger a sample size calculator to help researchers understand the profile of the subjects overlapping across their selections, creating possible new research cohorts.*

About the Singapore Institute for Clinical Sciences (SICS)

Founded in 2007, the Singapore Institute for Clinical Sciences' (SICS) mission is to promote health and human capacity in Singapore, Asia, and globally. The first institute within the Agency for Science, Technology and Research (A*STAR) to focus on clinical sciences and translational research, SICS posits that health has its origins in good beginnings and continued interactions between our physiological makeup and environment. To fulfil our vision of building gateways and an evidence base for positive health, our institute strongly promotes clinical research that supports the understanding of metabolism, neuroscience and how they impact human development. To take our research into the real world, we launched seminal nationwide birth cohort studies such as Growing Up in Singapore Towards healthy Outcomes (GUSTO) and Singapore PREconception Study of long-Term maternal and child Outcomes (S-PRESTO). By paving the way for scientific research to make a difference to the social and economic fabric of our communities, we are committed to 'Changing Tomorrow's Health, Today'.

About the Agency for Science, Technology and Research (A*STAR)

A*STAR is Singapore's lead public sector R&D agency. Through open innovation, we collaborate with our partners in both the public and private sectors to benefit the economy and society. As a Science and Technology Organisation, A*STAR bridges the gap between academia and industry. Our research creates economic growth and jobs for Singapore, and enhances lives by improving societal outcomes in health-care, urban living, and sustainability. A*STAR plays a key role in nurturing scientific talent and leaders for the wider research community and industry. A*STAR's R&D activities span biomedical sciences to physical sciences and engineering, with research entities primarily located in Biopolis and Fusionopolis. For ongoing news, visit www.a-star.edu.sg. Follow A*STAR on [Facebook](#), [LinkedIn](#), [Instagram](#) and [YouTube](#).

About Plotly

Plotly is a software company whose mission is to enable every company to build data apps. Our product, Dash Enterprise, is a platform of best-in-class development tools to quickly and easily analyze and visualize data with Python from virtually any data source. With customers across the Fortune 500, Plotly is a category-defining leader in enabling data-driven decisions from advanced analytics, machine learning, and artificial intelligence. For more information, visit <https://plotly.com>.