



Solving Physicians' Research Theories with Meaningful Data



How Health Data Compass is tapping into broad factors such as Census data, elevation, altitude, and more to deepen healthcare research insights

Today's medical researchers are armed with data, with better-than-ever resources helping clinicians steadily improve patient diagnosis, treatment, and outcomes. Going beyond data related to the human body makes a difference too, accessing insights around external factors such as living conditions, census coding, and geographic and demographic characteristics. Does elevation or altitude have impact on microtia in newborns? Physicians can now theorize these factors and readily access the data to determine the validity of their hypotheses.

THE CHALLENGE

- Health Data Compass supports a number of research projects at any given time
- A principal investigator's research variables of interest can be diverse and disconnected

- Sourcing clean, correct, and standardized data is difficult; enhancing that data to serve research demands requires sophisticated tools and expertise
- Do elevation and altitude impact the occurrence of microtia in newborns? These physicians' theory required additional data that would meaningfully answer the research hypothesis
- HIPAA compliance must be applied at all points in the data chain, ensuring the privacy and security of protected health information

THE SOLUTION

- Melissa's fine-grained data quality tools enabled seamless integration of elevation and altitude data with patient records
- A 'finder file' which uses key identifiers to ensure accurate patient linkage between Compass data and Melissa data.
- Data is multi-sourced and consistently available, synthesized into the Health Data Compass enterprise data warehouse through ETL processes

THE BENEFIT

- Including elevation and altitude data allows Compass partners to easily query location data with deep detail
- With enhanced data, researchers can address questions not previously given consideration
- Data enhancements are delivered in compliance with Compass' data use agreements, featuring end-to-end compliance with HIPAA and HITECH regulations for privacy and security
- Overall quality of data improves, as standardization completes missing data records and reduces the inconsistencies inherent in manual data entry in the field
- New opportunities to apply data are on the horizon, such as improved specificity of patient geographic information which lends to identification and analysis of rurality and the subsequent impacts on healthcare

THE CUSTOMER: HEALTH DATA COMPASS

Health Data Compass is a Google Cloud based enterprise health data warehouse located in the Research Informatics Office at CU Anschutz. Compass integrates patient data from electronic medical records, provider billing data, and omics data to empower its partners with advanced health data analytics. Compass is funded by and collects patient data from UHealth hospitals, Children's Hospital Colorado, and the University of Colorado Medicine physicians group. In its role as data steward and honest broker of the research done on campus, Compass creates enriched single-source data records. Data delivery is available to partners through a variety of options, ranging from self-service de-identified cohort analyses to IRB approved fully-identified, line-level datasets suitable for advanced analytics. Compass' cloud analytics infrastructure provides partners with the computational environments necessary to service advanced analytics requirements including statistics and visualizations for bioinformatics, natural language processing, and more.

THE CHALLENGE: IMPROVE PATIENT DATA FOR WIDER RESEARCH USE

Health Data Compass traditionally takes on projects instigated by a principal investigator – meeting with faculty to identify project needs as well as the variables required to answer specific research questions. Once variables are defined, the team extracts and reports the data, creating a final data product for analysis.

Supplemental data enhancements from Melissa are commonly applied to Compass data, helping it become more meaningful to the research process. "Our mandate is to ensure data is the most valuable asset it can be – clean, up to date, and accurate before it is shared with any of our faculty researchers," said Tacker Patton, Research Assistant at Health Data Compass.

“Melissa broadly supports our mission to bolster patient information and, in turn, strengthens our ability to serve broader research demands across campus.”

– TACKER PATTON, DATA
PROJECTS MANAGER, MPH BIOSTATICS
HEALTH DATA COMPASS

In this case, a group of ENT physicians was interested in the potential impact of elevation and altitude on the development of microtia in newborns. Microtia is a congenital abnormality, in which a child is born with an underdeveloped or malformed external ear. Based on observations in previous literature, in campus healthcare facilities as well as their own clinic, these clinicians formed a hypothesis and wanted to apply Compass data to its analysis. The Compass team was tasked with developing a dataset with supplemental elevation and altitude data along with electronic medical record (EMR) data.

THE SOLUTION: ELEVATION AND ALTITUDE DATA SEAMLESSLY INTEGRATES WITH PATIENT RECORDS

Health Data Compass' staff includes expertise in cloud engineering, data engineering, security and compliance, and developers who can code the datasets required for research. "It's the need on campus that drives us to seek out additional data sources," added Patton. "In Melissa, we have found broad expertise supported by fine-grained data tools that allow us to integrate datasets of priority value to research at hand."

Melissa supplied additional information on elevation and altitude data, garnered from the company's multi-source public and proprietary datasets, and its deep expertise in global address validation and enhancement. Melissa's data quality and enrichment tools pair robust consumer data with a spectrum of third-party datasets, empowering researchers with identity cross-matching that closes gaps in data profiles and delivers a full, single view of the customer.

Variables spanned a set of inclusion and exclusion criteria for the patient cohort, focusing on factors such as children below the age of two, born in certain geographic regions of Colorado, the presence of underlying co-morbidities, and gender. Coupled with elevation and altitude data, raw data was synthesized through an ETL (extract, transform, load) integration process and then ingested into the Compass data warehouse. The Compass team developed SQL code to pull all the required data, formatted as a patient demographics table. This structured subset was delivered to the principal investigator, supported by a statistician's comparative analysis of the varying elevations and altitudes.

THE BENEFIT: BETTER DATA BREATHES LIFE INTO DEEPER RESEARCH

By including elevation and altitude data provided by Melissa, Compass can query patient data based on the elevation of selected clinics, or the altitude of a patient's residence. Data can be broken up into much smaller strata of one altitude versus another, efficiently guiding the principal investigator to compare the prevalence of microtia in different altitude groups.

“The microtia study is a good example of how Melissa's data enhancements were critical to completing the research. Their data allows us to fulfill research projects in ways that we haven't previously been able.”

– TACKER PATTON, DATA PROJECTS MANAGER, MPH BIOSTATICS HEALTH DATA COMPASS

Data from Melissa is co-hosted in Compass' Cloud alongside the clinical data warehouse. Compass uses a 'finder file' which contains specific identifiers recognized by Melissa which ensures accurate linkage of the two data sets. These identifiers may be fields such as a patient record or member number, phone number, or social security number. And while identifiers are the smartest way to make sure patient data matches record by record, they also illustrate the sensitive nature of working with healthcare data. Melissa meets the security requirements that support protected health information – a critical factor in meeting compliance regulations even as data is enhanced for ideal research value. Melissa follows all data security standards outlined in HIPAA and HITECH legislation, protecting data security and privacy as required by law.

Melissa is also supporting Compass with additional data enhancements, for example, in the VISION network validating COVID-19 vaccine efficacy in partnership with the Centers for Disease Control (CDC). Compass and Children's Hospital Colorado are one of nine sites selected to provide data to support the evaluation of vaccine effectiveness, sharing data with the CDC team bi-weekly. Melissa is providing Census tract data, and other geographic information as part of this project.

About Melissa:

Melissa is a leading provider of data quality, identity verification and address management solutions. Melissa helps companies to acquire and retain customers, validate and correct contact data, optimize marketing ROI and manage risk. Melissa has been a trusted partner in improving customer communications for companies such as Mercury Insurance, Xerox, Disney, AAA and Nestlé since 1985. For more information, see www.melissa.com