Executive Summary

The answers we need are all around us[1].

Litmus Health is research-ready infrastructure for real life data.
We help our customers understand patient behavior and environment in multiple dimensions.

Technology

The usefulness of your data is determined by its quality and lineage. Our hallmark at Litmus is top-notch data engineering. We validate and position data collected from wearables, smart devices, and home sensors **at the point of experience.**

With Litmus there is no wrangling, no pipeline, and no drama. You type in simple Python commands into your notebook of choice and get access to all your data in one system - ready to be further analyzed and visualized. Alternatively you can download all or part of your data anytime in JSON, CSV, or other structured format.

Data provence and device IDs are accounted for system-wide, a key requirement for 21 CFR Part 11 compliance. Requirements for HIPAA compliance are also baked in from the start. All Litmus data are aligned with FDA-required CDISC standards and are fully auditable.

What kind of data you collect matters too — the more raw and less processed, the better. Most electronic data capture systems can't handle the high velocity, volume, and variety of data necessary to conduct remote patient research at scale.

Our streaming data analytics engine was built from the ground up specifically for these data, with no limitations on the device or data you wish to accommodate.

Specifically, the Litmus platform is fault tolerant and horizontally scalable. Using a modern microservices architecture, we continuously monitor and diagnose each subsystem. Data are kept in multiple stores to facilitate many simultaneous read and write access patterns. This in turn allows for multi-dimensional and interactive retrieval of all collected data.

Rigorous test coverage, continuous integration, and both end-to-end acceptance and automated regression testing ensure total code quality. SSL, strict identity and access management procedures, and cryptographic best practices throughout mean your data stay secure at every step.

In its default configuration, the Litmus platform is deployed into a fully-compliant Google Cloud environment. All sub systems are Dockerized and are Kubernetes-ready. This means we can also deploy in custom environments such as a private cloud or custom hardware on premises.

Products

TRIAL BUILDER

Our drag-and-drop trial building software allows us to implement your protocol in minutes. We can get a new study or trial online in production in 2 days or less. Litmus is a true platform; there is no custom development necessary. Draw on our free validated survey library, or license your own instrument. Litmus is also pre-integrated with more than 200 devices and sensors; new ones can be easily accommodated, provided their data structures are well-architected.

STUDYHUB

Using our StudyHub dashboard, you can also slice and dice your data as it comes in, using faceted persistent search to find and track cohorts of particular interest. Individual drill-downs help you understand who is not adherent and why. Notifications can alert you to any event or threshold you set. Part or whole data can be pushed to your notebook of choice or downloaded in .CSV or JSON format with the click of a single button.

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[1] http://www.pharmatimes.com/magazine/2016/september/track_record

TRIAL COMPANION

Our Trial Companion mobile app for iOS and Android delivers validated surveys based on whatever schedule your protocol describes. The apps can also collect accelerometer and GPS data for added value, in addition to any other data streams captured by a device or sensor. Trial Companion is easy to use, and every gesture and action is exactly the same on both platforms. Patients can be enrolled in one trial or in multiple simultaneous studies.

LITMUS ML

Our growing library of machine learning modules helps accelerate the pace of research by modeling baseline device errors, for example. Specific analysis solutions for new digital endpoints like fall incidence detection will launch in early 2019. We also offer elite data science professional services to help cover the talent gap that many of our customers experience.

Use Cases

Litmus helps research directors and clinical operators describe the full value of their research, whether that means developing a new digital biomarker, or evidencing a higher price point to a payer. Litmus data can even help make better go and no-go decisions to move between trial phases by illuminating side effects and quality-of-life issues early in the process.

From small observational studies to large scale registries, Litmus helps unlock fundamentally new insights from patient data. Litmus is device and disease agnostic.

Our work with Takeda Pharmaceuticals is a great example of Litmus in action. Principal Investigator Dr. David Rubin is studying 500 enrollees over three years at the University of Chicago's Digestive Diseases Center [2]. We're gathering data from smartphones and Fitbits to better understand the relationship between sleep, activity, heart rate and flares in patients with Crohn's disease and ulcerative colitis. Our ultimate research goal is to use the models to accurately predict the onset of flares.

Get In Touch

Litmus is research-ready infrastructure for real life data.

We'd love to hear from you early in your process to show our platform and products firsthand. We are happy to consult as needed on protocols and overall trial design.

Please drop us a line at: *hello@litmushealth.com* or visit *www.litmushealth.com*.

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[2] https://sciencelife.uchospitals.edu/2016/05/17/tracking-real-time-data-to-personalize-treatment-for-ibd/