

Agilent Case Study: Swiss Kidney Stone Cohort

Supporting Clinical Research

Biobank data management within a Swiss kidney stone study

KIDNEY CONTROL OF HOMEOSTASIS
SWISS NATIONAL CENTRE OF COMPETENCE IN RESEARCH

The nationwide research network of the Swiss National Centre of Competence in Research (NCCR) Kidney Control of Homeostasis (Kidney.CH) has set up a long-term initiative to advance knowledge and understanding of the renal homeostatic mechanisms controlling body composition in health and disease.

Within the framework of this initiative, the Swiss Kidney Stone Cohort (SKSC) has been established to collect data of subjects suffering from repeated kidney stone events over a 10-year time period. The goal of this integrated physiological approach is to set up a rational basis leading to the potential development of novel preventive, diagnostic, and therapeutic approaches in subjects with chronic kidney diseases.

For the purpose of this multisite research project, a new multisite biobank storing biological samples, such as urine and blood, was set up. During the collection period, data on nutrition, physical activity, medical, and demographic information is gathered to build the foundation of a well-structured and annotated database of the subject population.



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Coordinating research with Agilent SLIMS

Agilent SLIMS was selected to manage this entirely new biobank and cohort, establishing the continuous observation and follow-up of the chosen subject pool. SLIMS combines the best of a laboratory information management system (LIMS) and an electronic laboratory notebook (ELN) to enable end-to-end solutions and manage all content and all context in the laboratory. Its highly adaptable data and sample management features satisfy a large and diverse set of criteria and enable the long-term observation of the kidney stone subject cohort and the sample collection for its biobank.

SLIMS' features enable the SKSC initiative to:

- Make it easy to enroll subjects and monitor their progression in the cohort;
- Combine subject data with sample management;
- Handle varied subject information, like medical history, results from physical examinations, demographic, nutritional, and other lifestyle information;
- Allow storage of various types of coded subject samples and recording of diverse sets of sample-specific data points, ranging from collection time, metabolic, to other analyses parameters;
- Link diverse sample locations with intuitive handing for all staff;
- Provide adequate user-, group-, and role-specific access;
- Provide easy access across different institutions, yet comply effortlessly with data protection and subject protection needs.

Collecting varied sample parameters

The cohort relies on collections of relatively few specimens per subject (like blood, urine, and derivate). However, due to the complexity of the project, many specific fields are needed, among them analysis values. SLIMS' great adaptability makes it a straightforward task to create a few hundred different fields for the sample parameters or project fields. Not all the data is directly collected in SLIMS: other software is used for certain data entries, such as health questionnaires. Those data points and results are imported into SLIMS as fully searchable, tabulated data points using its automated or semi-automated features.

Supporting compliance with subject data protection regulations

The personnel at each location needs access to the subject data of their own site in accordance with their role in the project. SLIMS' group-and role privileges make sure that the different personnel at the varying sites have access only to the data they are allowed to (e.g., only staff with a very specific role are allowed to see the names of subjects participating in the project). Furthermore, SLIMS' exclusive access control, and chain of custody, guarantees an automatic tracking function that fully records and traces all the data entries.

Simplifying planning of subject visits

Subjects have to visit the site periodically for medical and clinical tests or to fill in lifestyle questionnaires. The built-in module to generate visitation plans integrates newly enrolled subjects into the project. It also helps to merge the newly collected values and information into the existing database. With just a few clicks, SLIMS has laid down when the subject's next visit will be and what kind of investigation needs to be carried out by allocating the necessary entry fields. This automated feature saves a lot of planning time.

Assuring biobank quality

SLIMS is configured to facilitate the activities of the monitoring staff who are able to raise queries directly when questions about source verification arise. Responses and data corrections are also traced in the system. Feedback mechanisms make sure that records can only be marked as complete when all the data is present and verified.

Increasing the knowledge base

The longer the project advances, the more information is loaded into SLIMS. By associating huge numbers of data points to every sample and subject present in the repository, the database grows in value. Every data point gathered about the subject is neatly organized, ready to be interconnected for deeper correlative analyses. With SLIMS' ability to combine sample management with subject data, it is easy to see what kind of samples the biobank contains for every subject, at which location, and which derivative (like DNA) is available for additional investigations.

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