Tracker is an internal tool used by SHOW administrative staff to capture contact information on survey subjects and monitor the completion of each aspect of the survey, follow up communications, and payments to subjects. Previously this database operated in Microsoft Access. The current Tracker database is built with common web technologies.

Core technology in Tracker:

* *Database:* The database backend is managed by DoIT in their cluster of secure databases. It runs on Oracle 10. All updates, patches, and backups are handled by database professionals at DoIT.
* *Web Server:* Tracker code is run on a DoIT secure web hosting account. The account is set up with completely separate testing and production environments. The web server is a common Linux/Apache/MySQL/PHP configuration. Note, the web server has a built-in MySQL database, but Tracker uses a secure Oracle database (housed on a different machine) to hold the subject data.
* *Code:* Tracker code uses well-known, mature code libraries for PHP and JavaScript whenever possible. The site is built with the [flourish PHP framework](https://github.com/flourishlib/flourish-classes) on the backend, uses portions of [PHPOffice](https://github.com/PHPOffice) for data exports, uses the [jQuery library](http://jquery.com/) throughout the site, and the [bootstrap front-end framework](https://github.com/twbs/bootstrap) makes it all look nice.
* *Authentication:* All of the code in the web server's /tracker folder requires [UW WebISO authorization](https://kb.wisc.edu/helpdesk/page.php?id=19750), which is managed through UW DoIT and UW System federated ID. Users log in with the NetID user and password they use for a majority of campus services.

Benefits of the new Tracker database:

* Accessible through any modern web browser. This alleviates any version conflicts with different installations of Microsoft software, and makes sure that security is implemented consistently across all users.
* Ability to add, remove, update, and archive multiple addresses, phone numbers, emails, and project consent forms for every participant. The legacy database sometimes limited the number of data points for each subject.
* Tracker tracks every single edit or addition of data by the NetID of the authenticated user. In the future this will allow administrative staff to answer questions like, "When was this subject's address changed? And who made the change?"
* Tracker's code base also serves to document all the steps in data manipulation [create, read, update, delete] for future data users. As compared to much of the functionality in the legacy database that was done with the point-and-click MS Access GUI, and did not leave an audit trail.
* Reports can still be generated in Microsoft formats like Excel, which can be easily integrated into the legacy MS Word mail merge documents.
* The data in Tracker can be more easily integrated with the contact information collected during in-home surveys. The SHOW data coordination center is accustomed to using the SAS statistical program and Oracle for data storage. Now, Tracker will also conform to the data coordination center's normal workflow.
* Now that Tracker is running as a web service, it can be integrated into other databases that SHOW may develop in the future. E.g. biorepository inventory systems, data collection tools for environmental health (e.g. WASABE, ANEWC), and monitoring aspects of Human Subjects consent for outside data requests (e.g. DNA analysis).
* User-level authentication is managed by UW Shibboleth. There will never be any shared passwords accessing Tracker data.
* There are two layers of firewalls in place. First, the web server will only allow requests from the range of IP addresses assigned to the SHOW subnet or to the IP addresses in the dynamic range of the WiscVPN service. Second, the database server only allows connections from the web server or from SHOW's IP range.
* All traffic between a user's device and the web server is encrypted with standard [DoIT SSL certificates](https://kb.wisc.edu/webhosting/page.php?id=35535).
* The most important parts of the codebase are in freely-available, standard languages like PHP and JavaScript, which means it will be easier to hire qualified staff to work on Tracker, there are more resources available at UW to assist with maintenance and development, and SHOW's software costs may be decreased.