Guide to Low Cost Electronic Data Capture Systems for Clinical Trials Supported by the Institute for Translational Health Sciences, Seattle, WA

Paul OldenKamp

Seattle Children's Research Institute

and Institute for Translational Health Sciences,
University of Washington

Seattle, WA

ABSTRACT

There are many ways to use computer systems to record the information generated during the course of clinical trials. The Electronic Data Capture, or EDC, systems have a range of features from a simple basic functionality to sophisticated and complex specialty systems. The costs of these systems also vary from very expensive proprietary products to a recent trend of Open Source software that is distributed without a license fee. Traditionally, academic projects have made use of existing software resources like spreadsheets and Microsoft Access databases. This guide will present information on the low cost options using existing software or Open Source systems that are supported by the Institute for Translational Health Sciences. The description of the features of each option is intended to help an investigator select appropriate software. Additional proprietary and free software options will be described on in future reports.

INTRODUCTION

There are many ways to collect data while conducting clinical trials. Traditionally, paper forms, likely multi-part paper to produce multiple copies, are completed by clinic or study staff and sent in for batch data entry. This has worked well for many studies but has usually been very time consuming. Investigators have been looking for technology to improve the process in terms of speed, accessibility for real-time study management tasks and quality control to assure the data's integrity. Switching to a web based electronic system is one strategy. This paper will provide a survey of four low cost systems for collecting and managing clinical trial data: 1) standard office applications, Microsoft Excel and Access, and Open Office Calc, 2) Catalyst, a University of Washington application that contains survey development tools that can be used for surveys and other aspects of clinical data collection, 3) REDCap (Research Electronic Data Capture), a simple proprietary system that is available at low cost to academic institutions, and 4) OpenClinica™, an Open Source clinical data management system.

Rebecca Kush[1] and her co-authors have provided a good summary of the goals and objectives in converting from paper based clinical trials to the use of computer systems to collect clinical data in their book eClinical Trials Planning & Implementation. The ultimate objective they describe is the conduct of eClinical trials (eCT). The EDC systems described in this report are an intermediate solution in the evolution toward a complete computer based eCT. An EDC system should have as many as possible of the characteristics of the optimal eCT's:

- Built-in Quality, both in software reliability and features that improve the quality of collected data

- Facilitation of Site Processes

- Facilitation of Monitoring Processes

- Facilitation of Data Management Processes

- Improved Communication and Coordination

- Improved Project Management

- Standardization

The 'Built in Quality' aspect takes many principles from the Lean Manufacturing movement to improve the process of developing systems and collecting data. To the extent we can directly enter data into the final system where it will be stored and used, we decrease the opportunities to introduce errors through multiple entry and transcription.

KEY FEATURES FOR CLINICAL TRIALS EDC SOFTWARE

This section will discuss the features of EDC systems in a general way, and then separate sections on each of the four low-cost systems will describe the functionality of each in these areas.

FUNCTIONALITY Below are a list of major features that we would expect to find in clinical trial data collection and management software.

- **CRF design and set-up** How easy and efficient is it to create the forms used to collect study data?

  The form creation process should be relatively fast and require only a moderate amount of manual effort. It should be intuitive and simple. A "what-you-see-is-what-you-get" graphical editor is preferred to other methods of form creation and editing.

  The system should have a way of storing forms or form specifications in a library where they can be selected when needed in a study. Forms created for one study can then be reused in subsequent studies. Libraries of forms that follow standards from previous studies or from organizations developing industry standards should be distributed with the software or be made available on the web. Users should be able to add to the form library with new forms as they are developed locally.

  A variety of standard widgets, text, radio buttons, check boxes, etc., should be available in the software. It should be possible to arrange the elements on the screen to facilitate logical and error free data entry.

- **Visit based data collection** The ability to enter data that is collected at or associated with a patient visit should be supported for both visits scheduled within a study visit window and for sequential visits not scheduled in a specific study timetable.

  All of the CRF's for a specific patient visit should be easily accessible at one time through a common portal.

- **Event based data collection** Events that are not necessarily connected with a patient visit, such as adverse events, important clinical events (e.g. relapse) and initiation of new concomitant medications, need to be entered and stored sequentially without complicated work-a-rounds.

- **Data entry/editing functions** There are several features that facilitate the entry of new data and the identification and correction of errors in the data:

  The ability to define study events in the software to organize study activities should be available. Activities that can be set up as components of an event would include screening, enrollment, treatment visits, follow-up visits or activities, and study termination. Each event creates a hierarchy of forms and possibly sub-events to group together data collection in a logical form.

  Both single and double entry styles of input should be supported with an easy way to identify and correct discrepancies in double entry.

  The software should initialize fields to default values as specified during study setup.

  While entering data, skip patterns should identify the fields to be entered based on previous data entry.

  Simple range checking should occur during data entry and be flagged for immediate correction.

  More complex cross field or cross form checks should be efficient to set up and operate whenever the data is changed. Mathematical functions and logical expressions should be supported in the edit check mechanism.

  All errors beyond the simple keying errors should be clearly flagged and referred to study monitors for investigation. Monitors should be able to query sites for information and possible correction of errors.

  The nature of errors discovered and information on the error resolution should be easily documented in the database.

- **AE and medication auto coding** Standard dictionaries like MedDRA for coding adverse events and the WHO Drug Dictionary should be integrated into the application.

- **Import/export and easy transfer to other applications** The process of extracting data from the study database for use in other analysis and reporting applications and importing data from external sources should be easy to use. A variety of data formats should be supported. Support for other low cost Open Source databases and applications is particularly desirable.

- **Multi-site support** There are several tasks the software should carry out that facilitate the operation of a study at one or many sites:

  Administrative and personnel contact information is tracked in the database.

  Access to data should be on a site-by-site basis so that the staff of a site can only access data relevant to their site.

  Reporting of enrollment and other metrics should allow for site specific reports as well as aggregate reporting.

  Event scheduling and other operational tasks should be supported at each site. This scheduling function should be oriented to scheduling internal study activities and is usually separate from patient visit and procedure scheduling of routine patient care.

- **Definition and operation of study reports** Some routine and common operational reports should be provided in the system but one would not expect that statistical analysis and complex reporting would be a part of the data collection software.

- **Compliance with standards** Conformance to industry standards like the CDISC data models and regulatory compliance with the FDA's CFR21, Part 11 and HIPPA requirements are important because it will allow the more widespread use of the systems.

  The value of the software's support of these standards depends on the nature of the clinical trial being conducted and the compliance of the studies' technical and administrative procedures.

- **User Accounts w/ roles and security permissions** Management of user accounts is necessary to provide adequate security for the study data.

  The password and security features of user accounts should meet internal organizational requirements and external requirements like the FDA's regulations for clinical trials systems.

  User accounts are assigned to each individual user according to different roles that they have in the study. Different roles have access to specific functionality and data access permissions that are appropriate to their role.

  Approvals and electronic signatures should be recorded by the software.

  User accounts have expiration limits and require periodic changing of the user password.

- **Training and user documentation** Users of the EDC system need to learn how to use the software and documentation to look up instructions on how to do tasks and troubleshoot their systems.

  Training can be either through on-line tutorials or traditional classroom instruction.

  User documentation is usually provided through a wiki page. If the software has an active discussion forum, often the forum archives are the user documentation.

IMPORTANT ATTRIBUTES THAT ARE NOT A PART OF THIS EVALUTION

The attributes discussed above can be determined by researching written descriptive material and by hands-on experience with small test systems. Some important additional attributes: cost, support, maintenance/longevity, reliability, performance, usability, interoperability, scalability, and legal/licensing issues, require more extensive experience with the software and a more extensive evaluation. Some of the above attributes and two others, security and flexibility/customizability, require special expertise for an evaluation. Both of these later characteristics require an examination of the system source code to measure the security reliability and how easy it would be for our local staff to modify the code to meet some unique local needs of a trial.

PRODUCT SPECIFICS

The following sections will provide information on the attributes of the four systems that are included in this guide: Office systems, either Microsoft Office or Open Office, the Catalyst WebQ system at the University of Washington, an Open Source systems designed specifically for collecting and managing data in clinical trials, OpenClinica™, and the free to use proprietary system, REDCap, from Vanderbilt University.

<u>OFFICE SOFTWARE</u>

Many studies use spreadsheets, either OpenOffice.org Calc or Microsoft Excel, or Microsoft Access to collect and manage their clinical data. This can work fine for suitably small and simple studies but has a number of drawbacks for more complex studies.

FUNCTIONALITY

Flexibility of table design. Spreadsheets provide great flexibility in defining the rows and columns to be collected in a clinical trial. It is probably too much flexibility to work well for clinical trials in general. There are no clinical trial specific constraints to help a study do things right or extended functionality to help in managing the study.

Table relationships. One situation where the flexibility of spreadsheets can lead to difficulties is in linking the several spreadsheets with different types of information together for analysis. It is too easy to set up the different tables in ways that have inconsistent columns and so that they do not have the needed key values to combine the data together.

Simple edit checks. Spreadsheet columns can be set-up with functions to perform simple checks of data to ensure it is the right form and is within defined ranges. Two web sites that offer data validation tips for Excel are listed in the web reference section at the end of this report.

When to use spreadsheets. Spreadsheets can be used successfully on small projects for collecting simple data. If data must be collected over time on subjects or if there are many data elements to collect a spreadsheet is less likely to work well

Top two best things about Office spreadsheets

- Microsoft Office software is almost universally available at academic research institutions and therefore can be used without additional license costs. OpenOffice Calc is an Open Source application that is available for use without a license fee.

- Knowledge of how to use spreadsheets in general is very common and therefore it is easy to find staff with these skills. OpenOffice Calc has functionality that is very similar to Microsoft Excel and therefore knowledge of its use is widely available.

Top two worst things about Spreadsheets

- There are no low cost applications based on Office software that are already set-up for clinical trials work. The project must create all of the clinical trials structure itself.

- Functionality to facilitate data entry must be adapted to the spreadsheet structure or Excel macros or a Visual Basic application must be programmed.

UW CATALYST

UW Catalyst Common View Study Front Page
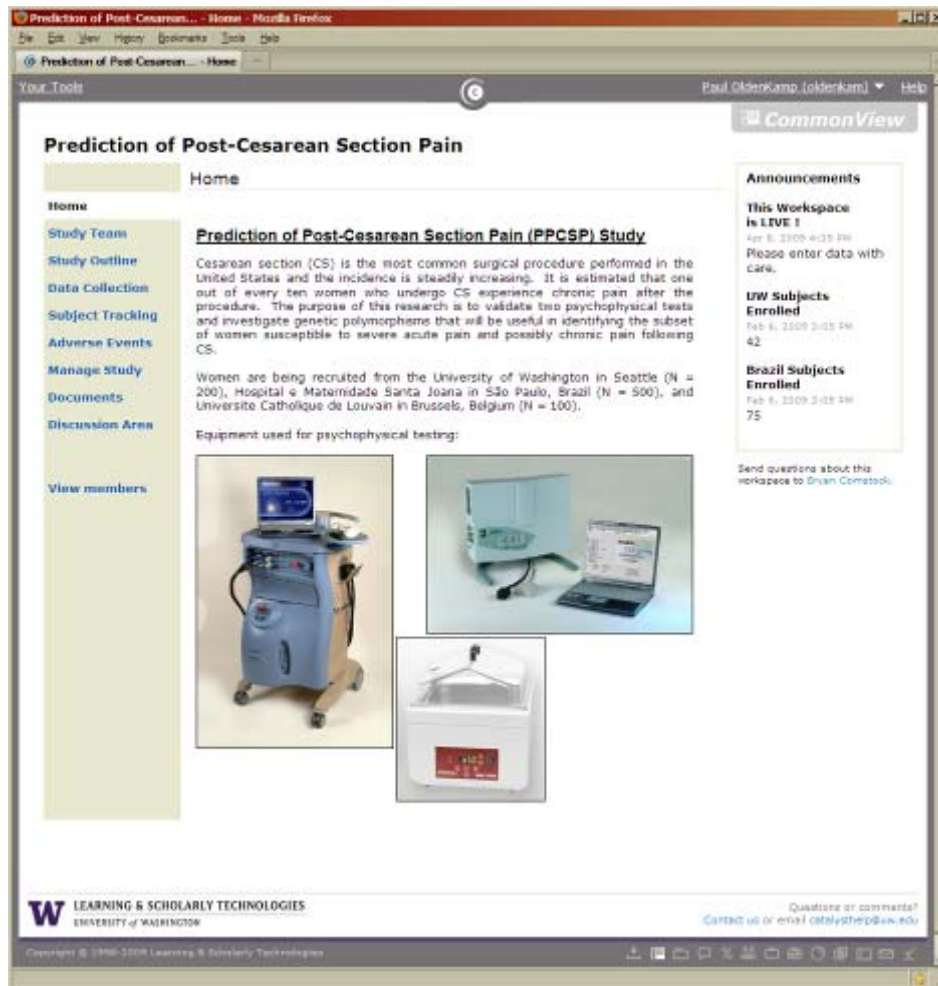
FUNCTIONALITY The use of University of Washington Catalyst software for collecting data in clinical trials is based on it's survey software, WebQ, and the content management module, Common View. As one would expect then, the Catalyst approach is strong of features found in survey systems but does not have specific functionality to support clinical trials processes. One must set up the clinical trials elements oneself.

- **CRF design and set-up**

  o **Form library**   Forms can be copied from one project to another and in principle a library of forms could be created to be used as starting points in study set-up.

  o **Standard widgets supplied/supported.** Since Catalyst WebQ is primarily designed for creating on-line surveys, it has a variety of single and multiple answer question styles. Catalyst does not have calculated field types or the special file and SQL types of REDCap.

1. Short response

2. Long response

3. Multiple choice - one answer (button)

4. Multiple choice - one answer (menu)

5. Multiple choice - multiple answers (check)

6. Multiple choice - multiple answers (menubox)

7. Matrix - one answer per row (button)

8. Matrix - one answer per row (menu)

9. Matrix - multiple answers per row (check)

10. General content

o **Set-up efficiency.** There is an on-line facility for creating and editing data collection forms. This is a manual process that requires selection of the type of question from the list above and then typing in the text information used in the item. Each form is created independently. This is good for the flexibility it provides but makes it more difficult to link together several forms together, when they all should be completed at a particular study event.

- **Visit/Event based data collection** There is no clinical trials functionality in Catalyst to use in orienting forms for visit based collection or collection based on independent events. Each form collects an independent set of data elements.

UW Catalyst Data Collection Elements Page
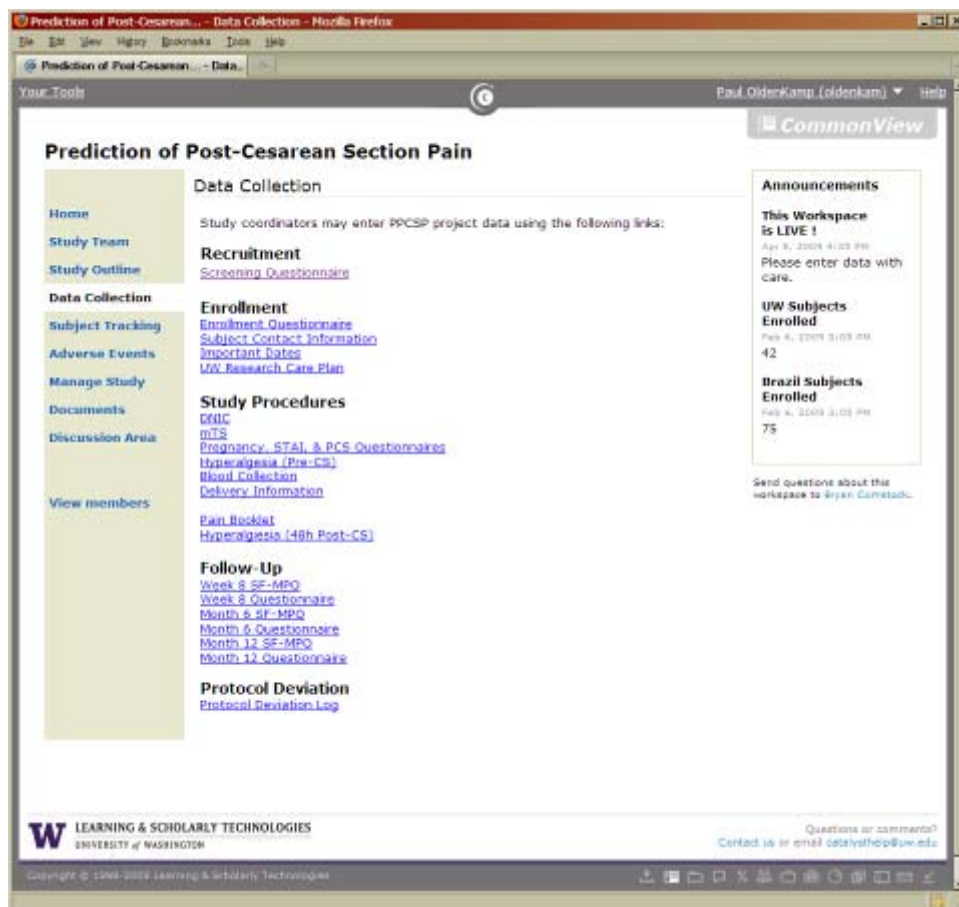
https://catalysttools.washington.edu/workspace/ppcsp/2811/12092 Accessed January 5, 2010
© 2009-2010 University of Washington

- **AE and medication auto coding**   There is no mechanism to look up coding values for adverse events or medications without considerable programming.

- **Import/export and easy transfer to other applications** Catalyst WebQ has an option to download data in Excel, comma separated, or SPSS formats.

- **Multi-site support**   There is no built-in support for multi-site clinical trials

- **Definition and operation of study reports.** Standard reports in Catalyst WebQ are designed for traditional surveys. As mentioned above there is a good capability to export the data to other software systems for clinical trial operational reports and for analyzing results.

- **Compliance with standards.**   Catalyst has been approved for human subject research by the UW Human Subjects Division and the UW IRB.

- **User Accounts w/ roles and security permissions**. There is no clinical trial role differentiation IN Catalyst. There are general access security controls on who can fill out SPECIFIC forms.

- **Training and documentation.** Catalyst has good on-line tutorials and some instructor classes through the UW Scholarly Technology at the U organization on the basic functionality to support its main purpose of on-line surveys. There is no training or documentation on the clinical trials specific features and techniques.

Top two best things about Catalyst

- The University of Washington has committed to further development and support of the underlying applications for its own teaching and research activities. There is an active local support organization to maintain the software

- The University of Washington IRBs/Human Subjects Review Committee has approved the use of Catalyst for research it regulates.

Top two worst things about Catalyst

- Because Catalyst is local to the University of Washington, there are few opportunities to collaborate with other organizations outside of the Seattle area. There are no reusable resources from other institutions.

- Clinical trials specific functionality has to be built manually.

REDCAP

The Research Electronic Data Capture, REDCap, software distributed by Vanderbilt University is currently distributed as two separate applications. There is a REDCap Survey product for conducting on-line surveys and REDCap EDC designed specifically for data collection in clinical trials. REDCap is provided without a fee for non-commercial research projects. It is not Open Source software since it is distributed under Vanderbilt's proprietary license agreement instead of a recognized Open Source license.

FUNCTIONALITY

- **CRF design and set-up**

  - **Form library – copy from study to study**   At the beginning of 2010, the REDCap Consortium had a sub-project, REDLOC, underway to create a library of re-usable forms for REDCap users. At that time there were only about 10 sample forms in the library. The library and functionality to search the library and download specific forms is planned for a software release

- o **Standard widgets supplied/supported** There is a basic set of widgets to use on CRF's in REDCap. There are few options for customizing the objects or for arranging the objects on the web page. The widgets appear on the web page a vertical list in the order that they appear in the database definition spreadsheet.

     1. text   Text is the most general Field type , a blank field for alpha-numeric data such as last name, height, phone number, or email. Any character can be used.

     2. notes   The field type "Notes" provides a large space for a text entry. While the field type "Text" is limited to no more than 255 characters, field type "Notes" can contain thousands of characters, entire pages of text.

     3. dropdown The "Dropdown" field type is one of two data types that displays a list of acceptable values, and allows selection of **one** value.

     4. radio   The "Radio" field type is one of two data types that displays a list of acceptable values, and allows selection of **one** value. There is a reset option displayed if all items need to be set back to blank.

     5. calc   REDCap has the ability to make real-time calculations on a data-entry form.

     6. file   REDCap has the ability to attach any file to a specific record in the database using the field type "file", or to attach files to the database in general

RedCap fields appear on the screen as a vertical list of elements and there are few options to arrange the data on the screen into an horizontal orientation.

REDCap Project Home Page

- o **Set-up efficiency** CRF forms for use in REDCap can be created using either an on-line facility to add data fields to a newly created or existing form or one can enter the information about the form elements into a specifically defined Excel spreadsheet that is referred to in REDCap as the study Data Dictionary. It is easy to try out form specifications and undo steps if they need to be changed. REDCap has a distinct development state when changes are easy to make, and test data can be erased easily. When set-up is completed the system is moved to production status. The production status prevents making changes to the forms and protects the data from accidental erasure.

- **Visit based data collection** REDCap has a scheduling and calendaring system for organizing study activities. It is easy to define a study visit as an event and to include several forms as required or optional at that visit. Use of the scheduling system is required to reuse forms multiple times throughout the study. The study events defined in the schedule system have to be set-up prior to beginning the production use of the system.

- **Event based data collection** If items cannot be planned and scheduled at the beginning of the study, such as adverse events or concomitant medications, then it is harder to set-up multiple occurrences of these elements. The REDCap project plans to add support for this in the future.

- **Data entry/editing functions**

  - o **Simple field checking indicates errors on input** REDCap has built-in functionality to check a data field for correct formatting as a number, integer, date, phone number, or email. The numeric fields of number, integer, or date can be checked to ensure that they are between a minimum and maximum value.

  - o **Complex cross field/cross form validation checks** There is no support for checks with complex logic or cross-field/form checks.

  - o **Data correction query/request function** This has been discussed as a future enhancement in REDCap.

  - o **Ease of error correction** A completed form can be called up and changed until it is locked.

- **AE and medication auto coding** This has been discussed as a future enhancement to REDCap.

- **Import/export and easy transfer to other applications** Currently REDCap allows the input of information to the system through Excel spreadsheets. Exports are comma separated files with associated syntax files generated from the REDCap data dictionary that will read the csv files and produce datasets for use in SPSS, SAS, R, and Stata.

- **Multi-site support** REDCap has a function for creating 'Data Access Groups' to give a person access to parts of the study. Setting up different sites to use this function may require duplication of study elements for each group.

- **Definition and operation of study reports** A report builder is provided for the creation of simple tabular reports that can be exported as PDF files.

- **Compliance with standards.** Some aspects of the CRF21, part 11, compliance are being added to REDCap in the next few major releases. Studies at many institutions have received approval from their IRB's for the use of REDCap in human subjects research.

- **User Accounts w/ roles and security permissions.** One can specify access permissions to REDCap functions and CRF forms on a user by user basis.

- **Training and documentation** REDCap training consists of a series of on-line videos on the

Top two best things about REDCap

- Because of its simplicity, it is quick and relatively easy to build a REDCap system.

- There is an active national Consortium of users to turn to with questions and support.

Top two worst things about REDCap

- Screen design is relatively fixed and inflexible.

- Compliance with industry standards and regulatory requirements is somewhat immature.

OPENCLINICA™

OpenClinica™ Home Page

http://openclinica.org/   Accessed January 5, 2010
© 2003-2010 Akaza Research

Here is the OpenClinica™ overview provided on the OpenClinica.org website:

> OpenClinica™ is a freely available, open source web-based software platform for managing clinical research studies. It has features for protocol configuration, design of Case Report Forms (CRFs), Electronic Data Capture (EDC), retrieval, and clinical data management. OpenClinica™ is designed to support regulatory guidelines such as 21 CFR Part 11, and is built on a modern architecture using leading standards.

Primary application modules include:

- **Manage Study**: Facilitates configuration and management of clinical trial protocols, sites, CRFs, users and study event definitions. You can define data elements, CRFs, and protocol events without any custom programming.

- **Submit Data**: Provides a user-friendly web-based interface for subject enrollment, electronic data submission, and data validation.

- **Extract Data**: Enables definition, filtering, and extraction of study datasets.

- **Administer System**: Allows overall system oversight, auditing, configuration, user account management, and reporting by administrators.

Shown below is a sample screen from OpenClinica™ version 3.0.1:

Export Data Screen, OpenClinica™ Application   Accessed January 5, 2010
© 2003-2010 Akaza Research

As of Winter 2010, the current version of OpenClinica™ is 3.0.1.

FUNCTIONALITY

CRF design and set-up The overall process of creating and modifying CRFs is somewhat difficult to learn and is time consuming. The information to be used to create a form is entered in an Excel spreadsheet template, stored locally, and then uploaded through the OpenClinica™ application to the database underlying the application.

- *Form library* The collection of Excel spreadsheets stored locally constitute a reusable library of forms that can be modified and uploaded to other studies. After a spreadsheet is uploaded to OpenClinica™, it can be downloaded in the future and used for modifications to the current study or to be reused in additional studies. Akaza Research, the firm that is leading the OpenClinica™ development effort, is developing a library of forms for distribution.

- *Standard widgets supplied/supported* Several standard objects for data collection are available for use on OpenClinica™ forms:

    1. text(a single line text box)
    2. textarea(a larger multi-line text entry field)
    3. single-select(drop-down box), multi-select(drop-down box)
    4. radio(button)
    5. checkbox
    6. calculation(derived from other values)
    7. group-calculation for calculations within an OpenClinica™ group definition

- *Set-up efficiency* One never gets it right the first try but after the initial setup of forms and events in a study, one is required to go through an awkward process to undo previous work before a corrected form can be loaded. Making changes difficult may be good for a study after the setup process is completed and study operations are under way, but it makes setup very inefficient.

Event and Visit based data collection OpenClinica™ provides very good flexibility in the styles of data entry organized around events and study visits. All data collection is organized as events. Study visits are then defined as a particular type of event. The visit events can be either scheduled or unscheduled.

OpenClinica™ is the only system to allow one to add an event occurrence, such as unscheduled visits and adverse events, for an individual participant during the course of a study.

Data entry/editing functions Overall the navigation from form to form within an event works smoothly and the navigation from field to field on a form also works well. It is difficult to skip an optional form and still mark an event as completed.

> **Simple field checking indicates errors on input** Simple range and value checks are implemented with Java style regular expressions and a few simple range and value functions in one of the columns of the Excel spreadsheet that defines the form.
>
> **Complex cross field/cross form validation checks** More complex edit checks are specified in an XML file that is difficult to write and edit because one has to specify elements with exacting internal id codes and names.
>
> **Data correction query/request function** This functionality is present in OpenClinica™ but has not been tested yet.
>
> **Ease of error correction** When errors are flagged in the data a query can be automatically sent to site staff for a correction or explanation of the issue. It is possible to change data simply by pulling it up for viewing and entering a different value. Corrected data is not validated with automatic edit checks as it was on initial data entry.
>
> **AE and medication auto coding** No features in the software link to the standard dictionaries used for adverse event classification or the WHO Drug Dictionary for the facilitation of coding of adverse events and concomitant medications. Programming support for these classification libraries is scheduled in the future.

- **Import/export and easy transfer to other applications** OpenClinica™ data can be exported as a comma delimited file, an SPSS format file, and an XML file that follows the CDISC Operational Data Model (ODM), version 1.2. or 1.3 standard. Data can be imported to the OpenClinica™ database from an ODM XML file. The ODM XML file is difficult to format with the required object identifiers that must be extracted from OpenClinica™ and included in the XML file in exacting specifications.

- **Multi-site support** OpenClinica™ has good support for multiple sites in a study. Each site is set up as separate study with staff specific to that sub-study. Staff at a particular site have access only to the data at their site. Data can be separated and tracked for each site or combined across site for combined reports and analysis of all sites.

- **Definition and operation of study reports** There are few built-in reports in the OpenClinica™ system. The application is set-up for export to external applications for reporting and analysis.

- **Compliance** with standards OpenClinica™ enables compliance with regulatory guidelines such as 21 CFR Part 11. Features include differentiated user roles and privileges, password and user authentication security, electronic signatures, SSL encryption, de-identification of Protected Health Information (PHI), and comprehensive auditing to record and monitor access and data changes.

- **Training and documentation** Akaza Research offers an instructor based training on an approximately monthly basis in Cambridge, MA. There is a three day Intensive End-user Class for a fee of $3698 and a one day advanced eCRF class for a fee of $1850. The manual that is distributed at the class is the only traditional written documentation.

The best way to learn OpenClinica™ for most users in the ITHS is to view a set of video tutorials available on the OpenClinica™ website, http://www.openclinica.org/page.php?pid=362 or the demonstration video at http://www.openclinica.org/page.php?pid=378 . A demonstration version can be tried out at http://www.openclinica.org/page.php?pid=112 .

Top two best things about OpenClinica™

- OpenClinica™ is the most functional and flexible system considered in this report.

- OpenClinica™ has the most professional support and development team and largest worldwide user base.

Top two worst things about OpenClinica™

- Learning OpenClinica™ is more difficult than the other systems and there are few easily available resources to assist in learning.

- Initial set-up and development of a study is difficult because there is no distinct set-up mode without all the controls appropriate for production operations. It is cumbersome to undo and replace things during set-up.

FUTURE DIRECTIONS FOR EDC SYSTEMS EVALUATION IN THE ITHS

The systems discussed in this guide are frequently changing and releasing new versions with major and minor new features and changes. In addition, staff in the ITHS is learning more about the software as they assist projects implementing these systems.

It will continue to be important for investigators and project staff who are interested in these systems to contact the ITHS to obtain the most current advice on the specific needs of their research.

COMMERCIAL SERVICES

The ITHS continues to investigate all software options that may be useful for ITHS members. Commercial clinical trials systems have more functionality and may be an option for studies with sufficient funding.

Starting in 2009 and continuing into 2010, the National Cancer Institute is negotiating a contract for a commercial clinical trials software license and plans to make this software available for use in cancer studies. The ITHS will continue to monitor this activity and provide information on it to the ITHS membership.

ADDITIONAL SOFTWARE FOR CONSIDERATION

There are some additional Open Source systems that may be studied in the future and added to this report.

Caisis, an Open Source system that has been developed under the leadership of the Memorial Sloan-Kettering Cancer Center for cancer research is one candidate. While Caisis was originally developed for cancer studies it has been expanded and could be adapted for many types of studies.

In addition, the National Cancer Institute caBIG program has developed a set of Open Source applications that are used for the conduct of clinical trials. The installation and support resources required for the caBIG software is extensive though.

REFERENCES

1. Kush, Rebecca D., 2003. eClinical Trials: Planning & Implementation. Thomson CenterWatch. Boston, MA

WEB RESOURCES

Excel Data Validation: http://support.microsoft.com/kb/211485 ,   http://www.contextures.com/xlDataVal01.html

Catalyst: http://www.washington.edu/lst/web_tools

OpenClinica™:   http://www.openclinica.org/

REDCap: http://project-redcap.org/

CONTACT INFORMATION (HEADER 1)

Your comments and questions are valued and encouraged. Contact the author at:

Name:	Paul OldenKamp
Enterprise:	Seattle Children's Research Institute
Address:	1900 Ninth Avenue, Suite 683
City, State ZIP:	Seattle, WA 98101
Work Phone:	206.884.7539
Fax:	206.884.1047
E-mail:	paul.oldenkamp@seattlechildrens.org
Web:	http://www.seattlechildrens.org/research/cores/ogs/

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Appendix A

REDCap CDASH Standard CRF Screenshots

Registration Form

© 2010 Seattle Children's Hospital, Research, and Foundation   REDCap software © 2010 Vanderbilt University

Model Study Clinical Trial - Mozilla Firefox

File   Edit   View   History   Bookmarks   Tools   Help

Model Study Clinical Trial

REDCap

🛡 Logged in as **oldenkam** | Log out?

🔴 My Databases
🏠 Database Information

Data Entry Forms

▦ Data Entry

Event: **_Enrollment**
Data Entry Forms:

Registration
Informed Consent
Demographics

🔒 Lock all forms

Applications

📅 Calendar
📥 Data Export Tool
📤 Data Import Tool
📋 Data Comparison Tool
📊 Logging
🗂 File Repository
👤 User Rights
👥 Data Access Groups
📑 Report Builder

Database Setup / Design

📥 Online Form Editor and
    Data Dictionary Upload
    - Add or modify database fields using the
      online and offline methods
🕐 Define My Events
    - Set up events for re-using data entry forms
📋 Designate Forms for My Events
    - Select data entry forms to be
      utilized for each defined event
🔧 Control Panel & Settings
    - e.g. move to production, enable scheduling,
      change database title, archive database

🌐 Help & Information

▫ General Help
▫ Video Tutorial Library

If you are experiencing problems, please
contact your database administrator.

ITHS
Institute of Translational Health Sciences

UW Seattle
Institute of Translational Health Science (ITHS)

Model Study Clinical Trial

📖 Informed Consent

🔴 Download page as PDF   🔴 PDF with saved data

🟢 Adding new subject Study ID. **"99999900020"**

Event Name: **_Enrollment**

subject Study ID.	99999900020
I affirm that a signed informed consent form exists on file for this subject. * must provide value	⚪ Yes ⚪ No reset value
Verification Affirmation Initials: * must provide value	[_____]
Today's date: * must provide value	[_____] 📅 YYYY-MM-DD

Form Status

Complete?	Incomplete ▾
Lock this record for this form? If locked, no user will be able to edit this record on this form until someone with Lock/Unlock privileges unlocks it.	☐ 🔒 Locked
	Save Record Save and Continue Save and go to Next Form
	-- Cancel --

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Done

Model Study Clinical Trial - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Model Study Clinical Trial

REDCap

🔒 Logged in as **oldenkam** | Log out?

🔴 My Databases
🏠 Database Information

Data Entry Forms

🔲 Data Entry

- - - - - - - - - - - - - - - - - -
Event: **Adverse Event 0**
Data Entry Forms:

Adverse Event

🔒 **Lock all forms**

Applications

📅 Calendar
📤 Data Export Tool
📥 Data Import Tool
📋 Data Comparison Tool
📊 Logging
📁 File Repository
👤 User Rights
👥 Data Access Groups
📄 Report Builder

Database Setup / Design

📋 Online Form Editor and
Data Dictionary Upload
- Add or modify database fields using the online and offline methods

⏱ Define My Events
- Set up events for re-using data entry forms

📋 Designate Forms for My Events
- Select data entry forms to be utilized for each defined event

🔧 Control Panel & Settings
- e.g. move to production, enable scheduling, change database title, archive database

🌐 Help & Information

▫ General Help
▫ Video Tutorial Library

If you are experiencing problems, please contact your database administrator.

ITHS
Institute of Translational Health Sciences

UW Seattle
Institute of Translational Health Science (ITHS)

Model Study Clinical Trial

📄 Adverse Event

📄 Download page as PDF   📄 PDF with saved data

🟢 Adding new subject Study ID. "**99999900020**"

Event Name: **Adverse Event 0**	
subject Study ID.	99999900020
Adverse Events	
Were any Adverse Events Experienced?* * must provide value	⦿ Yes ○ No reset value
What was the date the AE started?*	[____] 📅 YYYY-MM-DD
Time?	[_____]
Ongoing?*	○ Yes ○ No reset value
What is the Adverse Event Term?* **(In most cases, the verbatim term (i.e., investigator-reported term) will be coded to a standard medical dictionary such as MedDRA, WHO ART, after the data have been collected on the CRF.)**	[text box] ↓ Expand
What is the severity of the AE?*	○ None ○ Mild AE ○ Moderate AE ○ Severe AE ○ Life-Threatening or Disabling AE ○ Death Related to AE reset value
What is the relationship to Study Treatment?	○ Not Related ○ Unlikely Related ○ Possibly Related ○ Related reset value
What action was taken with the study treatment in response to this AE?	○ Dose Increased ○ Dose Not Changed ○ Dose Reduced ○ Drug Interrupted ○ Drug Withdrawn ○ Not Applicable ○ Unknown reset value

The REDCap Consortium | Citing REDCap | ITHS BMI | University of Washington | Fred Hutchinson Cancer Research Center | Seattle Children's

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Done

Model Study Clinical Trial - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Model Study Clinical Trial

REDCap

Logged in as **oldenkam** | Log out?

🔴 My Databases
🏠 Database Information

Data Entry Forms

📋 Data Entry

Event: **Concomitant Medications 0**
Data Entry Forms:

Concomitant Medications

🔒 Lock all forms

Applications

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📤 Data Export Tool
📥 Data Import Tool
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   - e.g. move to production, enable scheduling,
     change database title, archive database

🔵 **Help & Information**

▫ General Help
▫ Video Tutorial Library

If you are experiencing problems, please
contact your database administrator.

📑 **Concomitant Medications**   📄 Download page as PDF   📄 PDF with saved data

⊕ Adding new subject Study ID. **"99999900020"**

   Event Name: **Concomitant Medications 0**

subject Study ID.	99999900020

Were any medications taken?*
* must provide value

◉ Yes
○ No
                                                          reset value

What is the term for the medication or therapy taken?*

** Provide the full trade or proprietary name of the drug
or therapy, otherwise the generic name may be
recorded.

** If a medication is used for multiple indications [i.e.,
multiple AE's, and/or Medical History condition(s)], list
the medication again with each indication as a new line
or entry.
                                                          ↓ Expand

What is the reason for taking the medication?*

** Record the reason the medication was taken base on
clinical investigator's evaluation.

** If taken to treat a condition, and a diagnosis was
made, the indication should be the diagnosis.

** If taken to treat a condition, and nodiagnosis was
made, the indication should be the signs and symptoms.

** If taken as prophylaxis, we recommend reporting as
'Prophylaxis for . . . '.
                                                          ↓ Expand

Was this medication/therapy taken prior to the study?

○ Yes
○ No
                                                          reset value

What was the start date of the medication/therapy?*

** If the subject has been taking the medication for a
considerable amount of time prior to the start of the
study, it is acceptable to have an incomplete date.
Medications taken during the study are expected to have
a complete start date.

** Prior medications that are exclusionary should have
both a start and end date

[   ] 📅
YYYY-MM-DD

Ongoing/Continuing?*

○ Yes
◉ No
                                                          reset value

What was the end date of the medication/therapy?

[   ] 📅
YYYY-MM-DD

**What was the individual dose of the medication/therapy?
(Enter in xxxx.xx format)**

[   ]

What was the units of the dose listed above?

○ mg - milligram
○ ug - microgram
○ mL - milliliter
○ g - gram
○ IU - international unit
○ Tablet
○ Capsule
○ Puff
                                                          reset value

○ Oral
○ Topical

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University

Done

OpenClinica™ CDASH Standard CRF Screenshots

Registration Form

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OpenClinica Initial Data Entry - Mozilla Firefox

File   Edit   View   History   Bookmarks   Tools   Help

http://localhost:8080/OpenClinica/InitialDataEntry?action=ide_s&eventDefinitionCRFId=3&studyEventId=1&subjectId=

Google

OpenClinica Initial Data Entry

Initial Data Entry for Verification_of_Informed_Consent v1.0

CRF Info

Verification_of_Informed_Consent v1.0	Discrepancy Notes:	**0 New, 0 Updated, 0 Resolution Proposed,** **0 Closed, 0 Not Applicable**
Study Subject ID: 99999900010	**Person ID:**	00010
Study/Site: Model Study	**Age At Enrollment:**	10 Years - 3 Months - 15 Days
Event: Enrollment(05-Jan-2010)	**Date of Birth:** 16-Sep-1999 **Sex:** M	
Interviewer Name: PaulOK	Interview Date: 05-Jan-2010	

Verific...(0/3)   -- Select to Jump --

Title: Verification Form

Instructions: Please enter information about Informed Consent form. This information is required (*).

Page: ☐ Mark CRF Complete   Save   Exit

I affirm that a signed informed consent form exists on file for this subject.   Yes   *

Verification Affirmation Initials: POK   *

Date:(MM/DD/YYYY)   31-Dec-2009   *

Return to top   ☑ Mark CRF Complete   Save   Exit

Done

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Initial Data Entry for Demographics v1.0

CRF Info

Demographics v1.0

Discrepancy Notes: **0 New, 0 Updated, 0 Resolution Proposed, 0 Closed, 0 Not Applicable**

Study Subject ID: 99999900010

Person ID: 00010

Study/Site: Model Study

Age At Enrollment: 10 Years - 3 Months - 15 Days

Event: Enrollment(05-Jan-2010)

Date of Birth: 16-Sep-1999 Sex: M

Interviewer Name: PaulOK

Interview Date: 05-Jan-2010

| Mandato...(0/4) | Conditi...(0/3) | -- Select to Jump -- |

Title: Mandatory Data Collection Variables

Page: 1   Save   Exit

Record the date of birth to the level of precision known (e.g., day/month/year, year, month/year, etc).

What is the subject's date of birth?   16-Sep-1999

Record the appropriate sex (e.g., female, male).

What is the sex of the subject?
- ○ Female
- ● Male
- ○ Unknown
- ○ Undifferentiated

Study participants should self-report race, with race being asked about after ethnicity. (The FDA guidance suggests "that individuals be permitted to designate a multiracial identity". "Check all that apply" at the time of collection.)

What is the race of the subject?
- ☐ American Indian or Alaskan Native
- ☐ Asian
- ☐ Black or African American
- ☐ Native Hawaiian or Other Pacific Islander
- ☑ White

Study participants should self-report race and ethnicity whenever feasible, with ethnicity being asked about before race.

What is the subject's ethnicity?
- ○ Hispanic or Latino
- ● Not Hispanic or Latino
- ○ Not reported
- ○ Unknown

Return to top   Save   Exit

Done

Initial Data Entry for Demographics v1.0 ❓

CRF Info —

Demographics v1.0 📄	**Discrepancy Notes:** **0 New**, **0 Updated**, **0 Resolution Proposed**, **0 Closed, 0 Not Applicable**
Study Subject ID: 99999900010	**Person ID:** 00010
Study/Site: Model Study	**Age At Enrollment:** 10 Years - 3 Months - 15 Days
Event: Enrollment(05-Jan-2010)	**Date of Birth:** 16-Sep-1999 **Sex:** M
Interviewer Name: `PaulOK` 🏳	Interview Date: `05-Jan-2010` 📅 🏳

Your data has been saved. You may continue entering/editing data now or return at a later time.

◀ | Mandato...(4/4) | **Conditi...(0/3)** | ▶ | -- Select to Jump -- ▾

Title: Conditional/Optional Data Collection Variables

Page: 2 ☐ Mark CRF Complete | Save | Exit | 📄

Country in which the subject participated in the study:	`_____` 🏳
Record the sponsor defined identifier for your site investigator:	`_____` 🏳

Record the date the demographics data were collected in the CDASH-recommended date format (e.g., 08-AUG-2008).

What is today's date?	`_____` 📅 🏳

Return to top ☐ Mark CRF Complete | Save | Exit | 📄

Initial Data Entry for Adverse Events v1.0 ❓

CRF Info —

Adverse Events v1.0	Discrepancy Notes: **0 New, 0 Updated, 0 Resolution Proposed, 0 Closed, 0 Not Applicable**
Study Subject ID: 99999900010	Person ID: 00010
Study/Site: Model Study	Age At Enrollment: 10 Years - 3 Months - 15 Days
Event: Adverse Event(31-Dec-2009)	Date of Birth: 16-Sep-1999 Sex: M
Occurrence Number: 1	
Interviewer Name: PaulOK	Interview Date: 31-Dec-2009

◄ **Adverse...(0/20)** ►   -- Select to Jump --

Title: Adverse Events

Page: 1   ☐ Mark CRF Complete   [Save]   [Exit]

General

Indicate if the subject experienced any adverse events. If yes, include the appropriate details where indicated on the CRF.

Were any Adverse Events Experienced?   ⦿ Yes ○ No *

Details

Record the date that the AE began using the CDASH-recommended date format (e.g., 08-AUG-2008).

What was the date the AE started?   31-Dec-2009   Time? [   ]

Check the box if the adverse event has not resolved at the time of data collection; leave the End Date blank.

Ongoing?   ○ Yes ⦿ No

Record the date that the Adverse Event ended. If the AE is ongoing, leave the space blank.

End Date of AE: 31-Dec-2009   Time? [   ]

Using accepted medical terminology, enter only the diagnosis (if known); otherwise enter a sign or symptom.

What is the Adverse Event Term?   Elevated tempature   In most cases, the verbatim term (i.e., investigator-reported term) will be coded to a standard medical dictionary such as MedDRA, WHO ART, after the data have been collected on the CRF.

Either AESEV or AETOXGR must appear on the CRF. Some studies may mandate the collection of both.

What is the severity of the AE?   ○ None
○ Mild AE
⦿ Moderate AE
○ Severe AE
○ Life-Threatening or Disabling AE
○ Death Related to AE

Did the AE result in death?   ○ Yes   ○ No

Record if the "serious" adverse event resulted in an initial or prolonged hospitalization for the patient.

Did the AE result in an initial or prolonged hospitalization for the patient?   ○ Yes   ○ No

Record if the "serious" adverse event is life threatening.

Is the AE Life Threatening?   ○ Yes   ○ No

Record if the "serious" adverse event is associated with other serious or important medical events which may be defined in the protocol or in the Investigator Brochure.

Is the AE associated with other serious or important medical events?   ○ Yes   ○ No

Indicate if the cause of the adverse event is related to the study treatment and cannot be reasonably explained by other factors (e.g., subject's clinical state, concomitant therapy, and/or other interventions).

What is the relationship to Study Treatment?   ○ Not Related
● Unlikely Related
○ Possibly Related
○ Related

Record changes made to the study treatment resulting from the adverse event.

What action was taken with the study treatment in response to this AE?   ○ Dose Increased
○ Dose Not Changed
○ Dose Reduced
○ Drug Interrupted
○ Drug Withdrawn
● Not Applicable
○ Unknown

Record all other action(s) taken resulting from the adverse event that are unrelated to study treatment dose changes.

What other action(s) was taken in response to this AE?

Record the appropriate outcome of the event in relation to the subject's status.

What was the outcome of the AE?   ○ Fatal
○ Not Recovered/Not Resolved
○ Recovered/Resolved with Sequelae
● Recovering/Resolving
○ Unknown

Record if the AE caused the subject to discontinue from the study.

Did the AE cause the subject to discontinue from the study?   ○ Yes   ● No

Return to top   ☑ Mark CRF Complete   Save   Exit

Done

Was this medication/therapy taken prior to the study? ● Yes ○ No

Record the date the medication or therapy was first taken using the CDASH recommended date format (e.g., 08-AUG-2008).

What was the start date of the medication/therapy?   `31-Dec-2009`   ◦ If the subject has been taking the medication for a considerable amount of time prior to the start of the study, it is acceptable to have an incomplete date. Medications taken during the study are expected to have a complete start date.
◦ Prior medications that are exclusionary should have both a start and end date

Record the medication or therapy as ongoing if the subject has not stopped taking the medication or therapy at the time of data collection and the end date should be left blank.

Ongoing/Continuing?:   ○ Yes
                       ● No

Record the date the subject stopped taking the medication or therapy using the CDASH-recommended date format (e.g., 08-AUG-2008).
If the subject has not stopped taking the medication leave this field blank.

What was the end date of the medication/therapy?   `31-Dec-2009`

Record the dose of medication taken per administration (e.g., 200).

What was the individual dose of the medication/therapy?   `2`   Enter in xxxx.xx format.

                    ○ mg
                    ○ ug
                    ○ mL
                    ○ g
                    ○ TI l
                    ● Tablet
                    ○ Capsule
                    ○ Puff

Record how often the medication or therapy was taken. (e.g., BID, every other week, PRN).

With what frequency was the medication/therapy administered?
                    ○ BID
                    ○ TID
                    ○ QID
                    ○ QOD
                    ○ QM
                    ○ PRN
                    ● Unknown

Provide the route of administration for the drug.

What was the route of administration of the medication/therapy?
                    ● Oral
                    ○ Topical
                    ○ Subcutaneous
                    ○ Transdermal
                    ○ Interaocular
                    ○ Intramuscular
                    ○ Respiratory (Inhalation)
                    ○ Intralesional
                    ○ Intraperitoneal
                    ○ Nasal
                    ○ Vaginal
                    ○ Rectal

Return to top   ☑ Mark CRF Complete   Save   Exit

Done

Catalyst WebQ - Preview - Mozilla Firefox

washington.edu https://catalysttools.washington.edu/webq/preview/?solstice_selected_button=btn_1aa3e515a9758cd7db33506eed281791_0&sol_bu

This is only a preview of the survey. Responses will not be saved. Close

PREGNANCY QUESTIONNAIRE
PPCSP Project

Page **1** of 1

a. Subject ID:

b. Phone Number for follow-up calls:

c. Date:

Month

Select one...

Day

Select one...

Year

2008

1. What is the country of origin of your four grandparents?

1a. Paternal Grandfather

1a. Paternal Grandmother

1b. Maternal Grandfather

1b. Maternal Grandmother

2. What is your general state of health?

Select one...

3. Have you had chronic pain that started before this pregnancy?

○ Yes
○ No

3a. If yes, please describe where your pain is and whether it is a specific pain condition:

4. Were you taking daily pain medications before this pregnancy?

○ Yes
○ No

4a. If YES, please list the medicines and amounts:

5. Do any members of your family (parents, brother or sister, uncle, aunt, or close cousins) have a problem with chronic pain that causes them to see a doctor regularly?

○ Yes
○ No

5a. If YES, Relation:

5b. If YES, condition name (if known):

4/23/2010