LEGAL SERVICES CORPORATION
TIG FINAL EVALUATION REPORT

Grantee name: Legal Aid Society   **TIG grant number:** 11094
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I.   Project Goals and Objectives

As stated in the approved evaluation plan, the goal of this project has been to "[d]evelop and implement automated form screening tools using mobile technologies for Legal Aid Society's (LAS) medical/legal partnerships that (1) enhance clients' access to relevant benefits, legal information and services and (2) partners' awareness of potential legal issues affecting patients and their ability to refer patients to LAS for legal assistance." To achieve this goal, LAS set the following two objectives.

- Objective 1: To create and pilot an automated screening questionnaire form for patients of LAS's medical/legal partner that identifies for LAS' medical-legal partner pertinent civil legal issues that potentially affect patients (including benefits to which patients may be entitled).

- Objective 2: To increase (1) clients' access to relevant legal information and services and (2) the ability of LAS' medical-legal partners to readily identify potential legal issues and make referrals to LAS by developing and implementing mobile technologies that electronically transfer relevant information from the automated questionnaire forms to LAS and to LAS's medical-legal partners.

No significant changes were made to our goal and objectives during the course of the project.

II.   Evaluation Data and Methodologies

This report uses the data and methodologies from our approved evaluation plan to analyze the project's accomplishments, as follows.

Objective 1:

- A description of automated screening questionnaire form's software and hardware components, functionalities and capacities (including how system provides appropriate protections for patient privacy);

- A description of automated questionnaire form's testing protocols, significant test results and notable changes made based on test results;
- Usage data;
- Field observation data;
- Open-ended interviews with medical-legal partnership staff conducted by Eileen Ordover concerning the utility of the screening questionnaire, and its impact on their ability to identify, understand and provide information re: potential civil legal issues; and
- Administrative data re: number of medical-legal partner referrals to LAS based on automated screening questionnaire results and number of clients seeking LAS services based on use of automated screening questionnaire.

Objective 2:
- A description of software and hardware components of the mobile technologies and their functionalities and capacities;
- A description of the mobile technologies' testing protocols, significant test results and notable changes made based on test results;
- Open-ended interviews with medical-legal partnership staff conducted by Eileen Ordover concerning the effectiveness and efficiency of mobile technology data transfer, utility of system, recommendations for improvement, system impact on ability/willingness to participate in partnership, etc.; and
- User survey results: usability and usefulness of data transfer, suggestions for improvement, etc. problems, ability to more easily identify patients with legal problems, suggestions.

III.   Summary of Major Accomplishments, Recommendations and Future Steps

LAS created and implemented an automated "law and health screening tool" that uses mobile technologies and electronic information transfer to assist Louisville's pediatric medical-legal partnership ("MLP") in identifying and addressing patients' health-related legal needs. It has been successfully piloted at the University of Louisville Pediatrics Children and Youth Clinic, a high-traffic urban clinic with a high poverty, diverse patient population.

The law and health screening tool consists of an iPad application and companion survey administration website, which allows us to modify the survey, track usage and collect data. The tool has four component functions:

- A "law and health survey," which parents/guardians of patients complete using a tablet. This is a quick legal screen meant to be easily completed by parents while waiting to be seen at the clinic. The survey uses question branching, so that the response to one question determines the next question posed. It may be taken in English or Spanish.

- An "alert" function, which electronically notifies MLP staff when a survey response indicates a possible health-related legal need. MLP staff may then retrieve contact information from the administrative website for follow-up.

- A "resource" function, whereby a "yes" response to certain questions triggers an offer of a relevant resource, such as information about utility assistance, foreclosure prevention services or free tax-preparation assistance and the earned income tax credit.

- A data collection and reporting function, which aggregates survey answers for reporting and monitoring purposes. These metrics provide insight into the legal needs of the clinic's patient population and how MLP resources might be tailored to address them effectively.

LAS has established a demonstration website explaining this project and featuring an opportunity to "test drive" the law and health survey at http://logicurrent.net/demo/.

Use of the law and health screening tool has dramatically increased the capacity our medical-legal partners to identify patients who might have unaddressed health-related legal needs, and to offer them legal assistance. Other LSC grantees contemplating a similar initiative would be well advised to carefully consider their capacity to respond to these needs, and to adjust their use of the survey accordingly. Insofar as implementation issues specific to a particular MLP and clinical setting are sure to arise, grantees would also be well-advised to engage in a rigorous planning and design process with their medical partner at the very outset, so that the screening system can be smoothly, effectively and efficiently integrated into clinic operations . Among other topics, this process should examine the feasibility of linking the screening tool to the medical partner's electronic health records system.

IV.   In-Depth Analysis of Accomplishments

LAS achieved the project's above-stated overall goal of developing and implementing automated form screening tools using mobile technologies for use by Louisville's medical-legal partnership, as well as both underlying project objectives. Our "Law and Health Screening Tool" is an iPad application and companion survey administration website, developed for use by a medical-legal partnership in a pediatric setting. It has been piloted at the University of Louisville Pediatrics Children and Youth Clinic, a high-traffic urban clinic with a high poverty, diverse patient population. Below is an in-depth discussion of the law and health screening tool; its software and hardware components, functionalities and capacities; patient privacy protections; survey testing, deployment and results; and the application's information transfer system.

Law and Health Screening Tool
The Law and Health Screening Tool has four components:

- A "law and health survey," which parents/guardians of patients complete using a tablet. This is a quick legal screen meant to be easily completed by parents while waiting to be seen at the clinic. It is adapted from the **"I-HELP"** (**I**ncome supports, **H**ousing and utilities, **E**ducation, **L**egal status, **P**ersonal and family stability) scheme of topics developed by Medical-Legal Partnership|Boston and now used by partnerships around the country to identify potential legal needs. The survey uses question branching, so that the response to one question determines the next question posed. It may be taken in English or Spanish. In order to share the survey with the medical-legal partnership and legal aid/legal services communities, we've developed a demonstration version, which can be found and taken at http://logicurrent.net/demo/.

- An "alert" function, which electronically notifies MLP staff when a survey response indicates a possible health-related legal need. The survey remains anonymous until a response suggests a possible legal need. In that case, the survey asks whether the parent would like to speak with an attorney and, if so, to enter contact information. Once contact information is submitted, the application sends an electronic alert (we've chosen e-mail, but the application could also be configured to send an alert to a cell phone or pager) such as the below to partnership staff for follow-up.
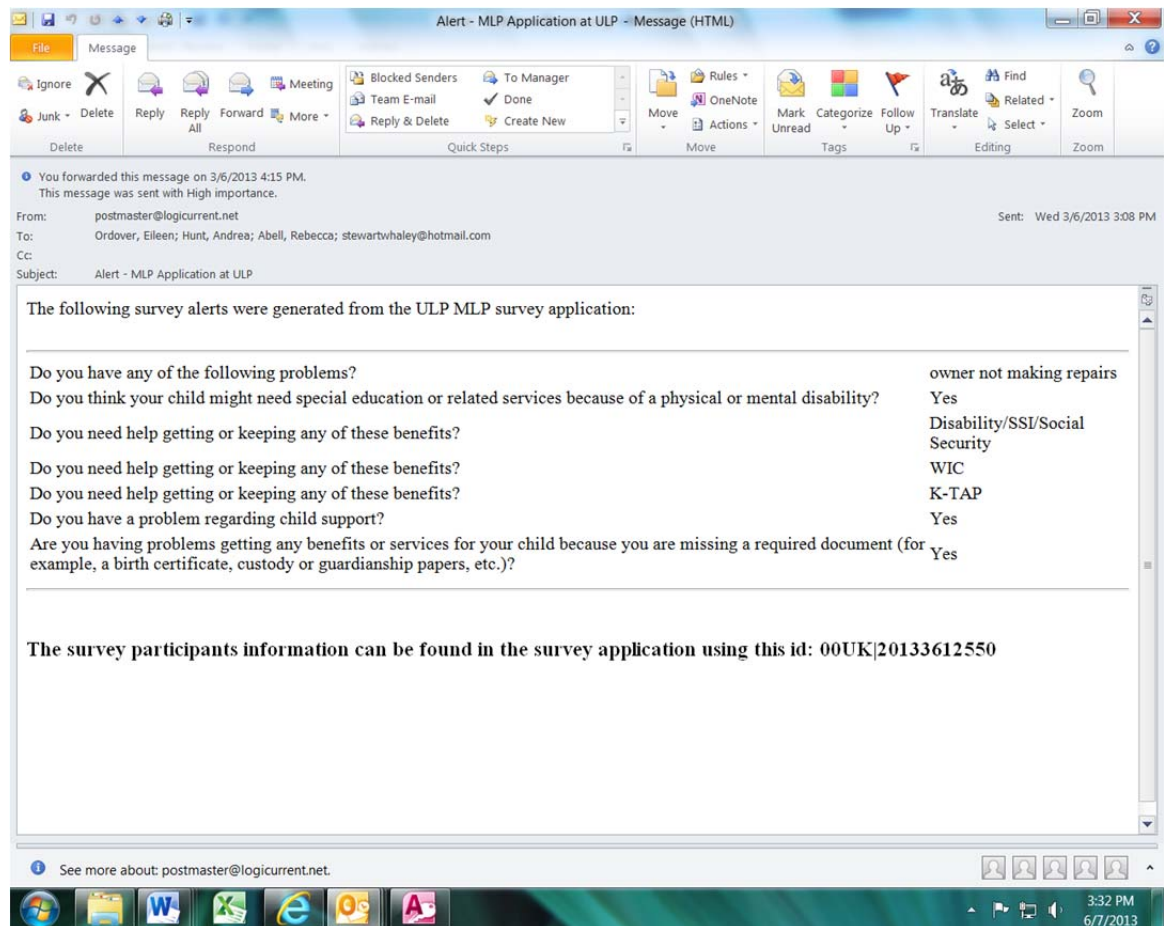
Staff can then access the administrative website for the survey and, using the unique id number assigned in the alert, retrieve the patient's contact information for follow-up.

- A "resource" function. A "yes" response to certain questions triggers an offer of a web-based resource, such as information about utility assistance, foreclosure prevention services or free tax-preparation assistance and the earned income tax credit. Patients then enter an e-mail address and are automatically sent a link to the relevant resource. Patients who indicate they do not use e-mail are told how they may obtain the resource.

- A data collection and reporting function, which allows us to gather various usage and other data. Anonymous survey answers, requests for resources and attorney contact requests are aggregated for reporting and monitoring purposes. These metrics provide insight into the legal needs of the clinic's patient population and how MLP resources might be tailored to address them effectively.

Hardware Components

1. Apple iPad III WI-FI enabled devices
2. Server(s) running the Microsoft Internet Information Services (IIS) web server and Microsoft SQL Server (database) for hosting the survey website and store application data. This hardware has been secured via 3rd-party hosting for a recurring monthly fee.
3. Each iPad is enclosed in a metal case that covers the iPad "Home" button and power switch. The case provides protection for the device, adds bulk to reduce the likelihood of theft and reduces an end-user's ability to reset the device and/or use it for non-survey activity.

Software Components

The survey is presented on the iPad via a custom iPad application written in Objective-C, the native programming language for iPad/iOS development. The application acts as a portal that loads the device's web browser control and allows the user to interact with the web-based survey application housed on a remote web server. The iOS application dramatically limits all end-user functions to ensure the device and application are not used for other purposes and to finely control how the survey is rendered and navigated.

A separate, mobile configuration file is installed on each iPad. The configuration file locks the device into "kiosk" mode and allows it to only run the first application loaded after the device is started. Combining the configuration file, metal iPad enclosure and iOS application creates a system that cannot be used for non-survey purposes under normal conditions (i.e., without removing the device from the healthcare facility).

The survey web application, installed on the web server, provides survey creation and management, usage reports, and renders the survey to the iPad. This application was developed on the Microsoft ASP.NET web framework and utilizes the Microsoft SQL Server platform as the backend database management system.

Functionalities and Capacities

The application consists of two main components: the iPad application and the survey administration website.

1. *iPad Application and Mobile Configuration File*

The iPad application is essentially a container that displays webpages exactly like the built-in iPad Safari web browser. However, this application is configured to connect to a specific, secured website address and provides no user controls. This ensures a proper website request is made to the secured web address and it prevents users from freely browsing the internet (which they could do with the built-in iPad browser). A separately-installed mobile configuration file is loaded onto the iPad application and runs in parallel with the application. Upon installation of the file, only the first program accessed after a device reboot will be able to run. Users cannot stop this application or load subsequent applications. The device must be manually turned off and restarted before any other feature of the device can be used. The addition of a metal iPad case (which cannot be removed without tools or a key) ensures that the device cannot be restarted by end users. In other words, the device can only be used for the MLP survey.

2. *Survey Administration Website*

The survey website provides a central point for creating and editing the patient survey, generating and extracting report data and serving the patient survey to the iPad devices running the iOS application

- Creation of customized surveys: The website provides an interface for creating and modifying the patient survey.
  - Language support -- The survey administration feature currently provides a dual language function that allows survey questions, and responses to be written in English and/or Spanish. Survey participants are prompted to pick their language of choice and the survey delivers questions and responses based on this selection. Additionally, separately configured closing screens that request contact information and suggest additional resources are delivered in the target language. Email correspondence sent post-survey also leverage the selected language choice.

  - Question branching -- Each survey question may display up to 7 responses that may be grouped (Do you have any of the following?) or independent

(Which of the following education issues is most important to you?). These responses can be mapped independently to follow up questions. For example, if the participant responds that they do not have a housing problem, they can be directed to a branch of questions that does not include housing-related content (no questions related to housing are delivered for the remainder of the survey). This mapping is a achieved by the survey administrator, who maps each question response to the immediately following question. At each point in the question sequence, the administrator determines how the current responses are mapped to follow-up questions. This structure allows survey participants to easily skip questions or blocks that are never rendered to the screen if they are not appropriate. A patient with no issues might answer a maximum of 5 questions and a patient with several areas of concern may be presented with 20 or more questions.

- Survey Alerts: Each question response can be flagged as an MLP referral alert. If the participant selects one of these response, the following events occur:
  o The question and response for this patient account is marked as an alert event that can be reported from the database.
  o At the end of the survey, all question/response combinations and the patient's account id are emailed to the MLP staff for subsequent follow up. There is no patient-identifiable information in the email, it simply contains the patient key that MLP staff can use to query the patients contact information within the secured website. (Of course, the patient may choose to provide no contact information, but the alert event is still generated and can be queried for reporting purposes).
  o At the end of the survey the patient is prompted to enter contact information allowing the MLP to reach them for follow up consultation.

- Survey Resources: Each survey response can be mapped to a "survey resource." These resources are website addresses containing content relevant to issues identified through the participants responses. These resources are offered to the participant during the survey's closing screens. For example, indicating trouble making mortgage payments might render a description of a state-run mortgage help program, display the web address for this resource and prompt the user for an email address. If an email is provided, the user receives an email from the MLP with the resource information, a link to the resource and contact information that allows the user to reach MLP staff.

- Reporting: All user question/response combinations are time stamped and stored in the system database for later analysis. The occurrence of alerts or survey resource events are also recorded on a per survey basis. Patient contact

information (if provided by the patient) is stored and linked to the survey responses that elicited the request for contact information. The system provides a standard reports but reporting and analysis can be easily extended by administrators/ developers competent with SQL (Structured Query Language) or a combination of SQL and the Microsoft Report Definition Language Client (RDLC) tools.

Patient Privacy Protections

Patient privacy and application data is secured by three measures. First, all web traffic is encrypted via Secured Socket Layer (SSL) installed on the survey website located at https://logicurrent.net.   This encryption method provides two benefits:

(**a**) Data transmitted between the iPad and web application are secured via 256-bit encryption technology. If transmissions between the device and web application are intercepted, they are unreadable on-their-face and significant processing time and hardware resources would be required to break this encryption (256-bit SSL encryption is routinely used across the internet for secured electronic transactions such as e-commerce and electronic banking).

(b) Because the iPad-based application is requesting the secured web server's address (https://logicurrent.net) a certificate validation will occur. Attempts to emulate the https://logicurrent.net server will generate a failed authentication message to the web browser utilized by the iPad application. This failure causes a built-in, internal error in the iPad application that cannot be overridden without explicit instructions that must be written into the application's source code.   The application developer has not included these instructions, therefore, the application is unable to connect and transfer data to a host server that fails validation.

Second, the iPad application has no end-user, web browsing controls. Application users are unable to create connections to other web sites or systems. The application specifically requests a connection to the SSL-encrypted domain and this cannot be overridden by users.   A common method of bypassing SSL-encryption is to trick users into ignoring or failing to realize an SSL validation error occurred. The user is then duped into creating connection with a malicious, unsecured website. Because users of the survey application are unable to control what the application does, they are unable to intentionally or accidentally override a failed validation.

Third, No patient-specific data is stored on the iPad device. While a survey is in progress, all patient-related data is passed securely to the web server on the remote website. No patient data resides on the device during or after a survey. A stolen device would not contain any patient-identifiable information because the data is not stored there. Additionally, there are no controls within the survey application that allow users to browse prior screens or retrieve previously entered information (i.e., there is no "back"

button). Finishing the survey and handing the device to another user will not allow the second user to "browse backwards" and view data entered by the original participant.

Survey Testing, Deployment and Results

1. ***One hundred percent of parents testing the survey found it easy to understand and user-friendly, with no changes needed***. The content of the automated screening questionnaire (survey) was developed in consultation with our medical partner at the University of Louisville Pediatrics Children and Youth Clinic and the National Center for Medical-Legal Partnerships. Forty-two parents/guardians of clinic patients were asked to participate in a "usability evaluation" administered by Rebecca Abell, the MLP paralegal, with volunteer help. Participating parents/guardians took the automated survey on an iPad, and were then asked four questions: (1) "Were the questions easy to read?" (2) "Were any of the questions confusing?" (3) "Were there too many questions?" (4) "Is there anything about the survey you think we should change?" (and, if, so, what?). One hundred percent of the participants responded that the questions were easy to read; that none of the questions were confusing; that there were not too many questions; and that no changes were needed. Based upon their observation and interactions with participants, the individuals conducting the evaluation reported that while some users initially needed to be shown how the iPad touch screen functions, all participants were able to successfully use the technology. In light of these results no changes were needed, and the pilot continued.[1]

2. ***The law and health questionnaire dramatically increased the capacity of our medical-legal partners to identify patients who might have unaddressed health-related legal needs.*** In interviews, both the staff attorney on-site at the clinic and the clinic's medical director praised the automated screening tool as an effective method for identifying legal needs and increasing patient access to legal assistance. Data for the period April 1 – May 31 bear this out:

- During this time, the medical clinic had 2,760 patient visits. Clinic physicians referred 24 families for legal assistance. Fewer than 1% of patient visits thus resulted in a legal referral.

- During the same period, 140 randomly selected parents/guardians completed the law and health questionnaire. In 54 of those cases –

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[1] The system itself was tested prior to initial deployment/usability evaluation in the clinic. LAS staff conducted multiple "trial runs" of the survey in order to test three areas of functionality: (1) proper operation of the guided interview question tree, so that all given answers would lead to the appropriate follow-up question; (2) proper operation of the system's "alert" capacity, so that survey answers suggesting a possible legal issue would trigger an e-mail with the appropriate patient- and issue-specific information to medical-legal partnership staff for follow-up; and (3) proper operation of the community resource function, wherein a "yes" answer to certain questions would trigger a prompt offering the patient information about a helpful community resource. LAS notified LogiCurrent of the minor "bugs" thus discovered, and LogiCurrent made the necessary modifications.

approximately 39% -- the screening tool identified at least one potential legal need and offered a consultation with an attorney.[2] (A total of 158 distinct potential legal needs were identified.)

3. *The questionnaire increased the partnership's capacity to help stabilize patient family finances*. The questionnaire was particularly successful in identifying a legal need targeted by project objective 1, i.e. assistance in obtaining or maintaining benefits. During the April - May 31 pilot period, the questionnaire triggered 43 alerts based on such a need.[3] Clinic physicians during this time referred a total of four patients for benefit-related assistance.

Electronic Information Transfer

As originally conceived, the application developed under this grant was to have electronically transferred information from the automated questionnaire to the patient's electronic health record (EHR) in real time, so that the physician could then discuss a possible legal referral during the clinic visit. This proved untenable in light of subsequent EHR system and IT developments affecting our medical partner. For this reason, as described above, the application has been configured to send an e-mail alert to medical-legal staff when a questionnaire indicates a possible legal need and the patient "accepts" the offer of a future consultation by entering contact information. While this information transfer enables legal staff to contact interested patients in order to provide legal assistance, both the clinic medical director and the on-site staff attorney have indicated that the EHR link originally envisioned, if feasible, would have been more effective and efficient.

IV.a. Information for Multiyear or Multiple Projects

Not Applicable

V. Factors Affecting Project Accomplishments

EHR System/ IT Limitations at Clinic Site

See discussion above in part IV regarding electronic information transfer.

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[2] Approximately one-third of patient families "accepted" the offer by entering their contact information. This comprises a 27% acceptance rate for April 2013 and a 40% acceptance rate for May. For the first two weeks of June, 2013, the acceptance rate stands at 46%.

[3] Specifically, the questionnaire asks whether the patient family needs help getting or keeping any of the following: disability/SSI/Social Security; TANF; veterans benefits; WIC; SNAP/Food Stamps; unemployment insurance; or health insurance.

Safeguarding the iPads against theft proved a significant challenge in light of the clinic's physical layout, the volume and flow of patients and the many demands already made of the clinic's administrative support staff. Our medical partner determined that, due to those factors, there was a high risk of theft, but that it was not feasible for clinic support staff to oversee the distribution and return of mobile devices, to affix the devices in patient examining rooms, to secure them to carts or other devices that could be moved from room to room (but not easily out of the clinic) or to create "kiosks" in the clinic waiting/reception area.

VI.   Strategies to Address Major Challenges

EHR System/ IT Limitations at Clinic Site

See discussion above in part IV regarding electronic information transfer.

Clinic Flow and Device Security

During this pilot phase, a project paralegal and volunteer have supervised patient use of the iPads, distributing the tablets to parents/guardians, monitoring the tablets' whereabouts and then collecting them on a patient-by-patient basis. This has been effective in addressing the security concerns, but reduced the number of patients who can be screened on any given day.

VII.   Major Lessons and Recommendations

Capacity to Address Identified Legal Needs

As the above-discussed data demonstrates, use of the law and health screening tool in a high-poverty, high-traffic clinic will surface myriad potential legal issues, among myriad families, not otherwise identified even by physicians practicing in a medical-legal partnership. Partnerships considering use of a similar tool should carefully consider the capacity of legal staff to respond to these needs, and plan their use of the tool accordingly. For example, a partnership might adjust the application to screen only for housing (or education or benefits) issues or limit the use of the tool to certain days/times/physicians.

Consistency With the MLP Model

A core component of the MLP model is to transform delivery models for healthcare and law through, in part, the training of medical students, residents and practicing physicians to identify their patients' health-related legal needs and make

referrals for assistance.[4] An automated screening tool such as the one developed here can, depending upon how it is used, either support this core MLP value or undermine it. A system that links questionnaire responses to the EHR in real time can support physicians in identifying legal needs and making referrals during patient visits. Where, as unfortunately proved the case for LAS, this is not possible, the metadata collected by the application can be used to teach medical staff about the particular needs of their patient community, and to help shape training for students, residents and physicians in legal-issue identification.

Integration Into Clinic Practice

Perhaps the most significant lesson learned is that while developing the screening tool's content and technology was relatively straightforward, implementing it on the ground was fraught with unanticipated logistical and institutional complications particular to our medical-legal partnership and clinical site, resulting in "work arounds" such as the shift away from EHR linkage and the hand-distribution and supervision of iPads by legal staff. LSC grantees embarking on a similar project should engage in a rigorous planning and design process with their medical partner at the very outset, so that the screening system can be smoothly, effectively and efficiently integrated into clinic operations.

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[4] See www.medical-legalpartnership.org, the website of the National Center for Medical-Legal Partnership.
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