Development of a Dynamic Online Mobile Inspection Tracking and Follow-Up System

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Introduction
The semi-annual inspection cycle at Brigham & Women's Hospital (BWH) takes place over 16, 2 hour inspections and covers approximately 58,000 ft² of housing and support areas for around 180 principal investigators (PIs). With an Excel and Outlook-based system, an excessive amount of time was being spent on inspection setup, follow-up, and data analysis, follow-up and resolutions were disjointed, and analytical power was extremely limited.

Objective
Develop and implement a time-saving, standardized electronic inspection platform with data analysis, automated reminders, and concise finding records.

Desired Upgrades
Spreadsheet and email-based inspections and follow-up was bulky, inefficient, and time-consuming; whereas a database approach is dynamic, streamlined, and dramatically faster from inspection to resolution.

Development

SYSTEM SELECTION
Many out-of-the-box inspection systems exist, but they didn’t meet our requirements and were expensive.

DEVICE SELECTION
Microsoft Surface tablet chosen based on availability of multiple user accounts and backwards compatibility.

EFFORT & INSTITUTIONAL INVESTMENT
Approximate effort: 1 FTE for 1 year at approximately 7.5% effort. REDCap software and support are available at no charge.

SYSTEM BUILD STRUCTURE
Decisions had to be made on how best to categorize findings and organize data to facilitate follow-up and identify trends.

Pre-populated with:
- PI Names
- Room Numbers
- Protocol Numbers

Also includes space for:
- Ad hoc questions as needed
- Scrapable moments

Field Testing and Implementation

FIELD TESTING
System developer attended approximately 6 inspections to ensure system met needs of live inspections.

INSPECTOR ORIENTATION
System developer trained inspectors for 90 minutes each prior to rollout and attended first 3 inspections with each inspector to provide live support and collect feedback.

IACUC REVIEW
To prepare reports for IACUC review, inspection data is exported from REDCap to Excel and a macro is employed for formatting, along with some manual formatting.

COMPLETION CHECK
At-a-glance dashboards allow inspectors to quickly see outstanding finding responses.

Timeline

**Initial Meeting with REDCap Administrator**

System Development Included:
- Defining parameters
- Learning REDCap
- Optimizing data export & macros
- Creating user interface
- Perfecting end-user facing correspondence

**Testing for One Full Inspection Cycle**

Fully Operational November 2018

**December 2017**

**March 2018**

**May 2018**

**September 2018**

**Assessment**

IACUC office time saved, research staff reported ease of use, and reporting power were metrics used to determine effectiveness.

Office Time Saved

<table>
<thead>
<tr>
<th>[per semi-annual cycle]</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setup</td>
<td>0.5 hours</td>
<td>0.25 hours</td>
</tr>
<tr>
<td>Inspection</td>
<td>2 hours</td>
<td></td>
</tr>
<tr>
<td>Input</td>
<td>0.75 hours</td>
<td>0 hours</td>
</tr>
<tr>
<td>Follow-Up</td>
<td>3 hours</td>
<td>0.5 hours</td>
</tr>
<tr>
<td>Formatting</td>
<td>0 hours</td>
<td>0.25 hours</td>
</tr>
<tr>
<td>Above 36 inspections</td>
<td>100 hours</td>
<td>48 hours</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>16 hours</td>
<td>1.5 hours</td>
</tr>
<tr>
<td>TOTAL</td>
<td>116 hours</td>
<td>49.5 hours</td>
</tr>
</tbody>
</table>

Lab Reception
“The REDCap inspection system was very clear, straightforward and it made the process very easy.”

“Very user friendly and I definitely give it a thumbs up.”

Current Reporting Features
The following reports can now be run on demand to track focus areas for pre-approval monitoring:
- Isolator vaporizer locations and calibration dates
- Correct-by-date tracking
- View all significant findings at a glance

Challenges/Future Improvements

WiFi Survey: Map out and address deficiencies in wireless internet service across the program

Emailing Multiple Users: REDCap currently does not support CC’ing for emails to follow-up on findings; emails must be sent one email per user

Basic Understanding of Data Collection Required

Tracking Inspection Finding Trends Across Institutions

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