Poster Number: 5

Development of a Dynamic Online Mobile Inspection Tracking and Follow-Up System
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Problem Statement:
While semi-annual IACUC inspections are a fundamental cornerstone of the compliance landscape, their role in reducing chronic noncompliance has not been fully elucidated in practice at many institutions. In the past, IACUC inspection findings at Brigham & Women’s Hospital (BWH) were tracked via a series of Excel spreadsheets, and crude trending data was generated and analyzed manually. This process was problematic because it was imprecise, extremely time-consuming, and limited in scope. Moreover, inspection follow-up between labs and the inspection team was conducted via simple email with manual follow-up, which lends itself to missed emails. Additionally, inconsistencies in how findings were identified and grouped presented problems with identifying practical programmatic issues with actionable resolutions. The hypothesis is that tracking inspection findings and follow-up using a combined data collection system and response form will allow for better data collection and analysis, better targeted compliance initiatives, and decreased administrative burden on labs, IACUC staff, and facilities staff.

Description of the research:
Here, we present a system designed to track inspection findings, consolidate their follow-up, and generate dynamic reports of inspection findings to help better identify, target, and remediate programmatic noncompliance. The system chosen for this task was REDCap, which is a browser-based, metadata-driven electronic data capture software solution and workflow methodology for designing clinical and translational research databases that is used at over 3,000 institutions in over 120 countries.

Prior to the development of this inspection system, inspection data was tracked via a series of Excel spreadsheets, one per inspection day and type of space, and findings were broken down into six categories. Type of finding was determined from a list of approximately 25 generic findings, independently of the category, and a description of the finding was included along with a corrective action on the spreadsheet.

This method was transitioned to REDCap and tested for one six-month cycle of semi-annual inspections, approximately 15 days of inspections covering four central vivaria, over 100 use areas, and 10 satellites and incubation areas. Six major categories of findings were preserved in the new system, and the specific finding selection was determined based on IACUC guidelines. Each finding could then be attributed to a responsible party (researchers, engineering, lab safety, etc.) in a grid to allow for the maximum amount of data to be collected.
Features of the REDCap System:
- Available FREE to REDCap consortium members
- Concrete finding categories and triggering to link the finding to the category
- Instantaneous, dynamic reporting based on any field
- Ability to add targeted compliance questions ad hoc
  - Example: One of the first challenges we wanted to address was inconsistency in isoflurane vaporizer calibration, so a question was added to the pilot version of the system that asked if there was a vaporizer in the space, and what the date of the last calibration was. This allowed us to build a database of vaporizers and when they would be due for recalibration so that the IACUC administrative office could notify the labs proactively that the vaporizer was due for calibration.
- Ability to monitor compliance initiatives in the field
- Automatic reminders for incomplete finding responses
- Concise responses to inspection findings
- Ability to use on mobile devices (Microsoft Surface tablet in Google Chrome) via the Internet
- Project designs available for all REDCap consortium members

Limitations:
- Surveys (i.e., inspection finding report) designed to be completed by a single individual; return code required to forward surveys to other responsible party members and edit responses after submission
- App not smartphone compatible for all features (app currently does not support repeating instruments (i.e., one copy of the same form for each space on an inspection report) used extensively here)
- Wi-Fi required for web-based data collection (App can be used to collect data offline)
- Not available to non-REDCap partner institutions (potential users should review guidelines for becoming a partner institution)

Evaluation:
Short-term evaluation will be based primarily on end-user experience and effort reduction by IACUC staff. Preliminary evaluation shows that the end user appreciates the succinct nature of the follow-up process, and one building manager said of the pilot version, "Very user friendly and I definitely give it a thumbs-up," and a satellite manager called it "very clear, straightforward and it made the response process very easy." A survey is currently being compiled to assess the user experience upon rollout for the semi-annual inspection period beginning November 2018. Effort reduction is expected to be significant, considering the inspections themselves take approximately two hours, with follow-up consisting of another three hours (with potential delays due to other responsibilities between the actual inspection being performed and when the report gets completed) and setup of the inspection report typically takes about 30 minutes. By consolidating these processes, it is expected that the total time to set up, complete, and follow-up on an inspection will be reduced to closer to the two hour extent of the inspection itself, though slightly longer due to the ability to research potential findings and compose follow-up emails in the field. Long-term evaluation will be based on overall compliance trends and successful implementation indicated by decreased noncompliance and faster reduction in noncompliance through more efficiently targeted compliance campaigns. Another long-term indicator of success will be a reduction in the time required to address and resolve inspection findings, since requirements and responses are consolidated into a survey format.
Suggestions for Future Implementation at BWH:
A key improvement will be the ability to copy data from the last round of semi-annual inspections to create the inspection reports for the upcoming round of inspections. This copying functionality would also preserve data output logic to ensure consistent reporting at the end of the inspection cycle. The use of longitudinal data (data collected over a fixed number of events, like blood glucose levels over the course of six clinic visits, for example) should also be evaluated, since this feature is useful in many research settings. This consideration was difficult to implement in this application because inspections, findings, and follow-up are not subject to a finite number of repeat instances, as longitudinal data collection is designed to accommodate. Another suggestion for implementation would be increased training for the research labs and IACUC staff. This would give the IACUC staff the ability to match protocol submissions and review with past inspection performance to better inform the review and post-approval monitoring processes. Additional training would also help to ease the transition for the labs who are used to managing inspection follow-up via email rather than a contact form.

Suggestions for Implementation at Other Institutions:
While developing a novel inspection tracking system, using the old system as a guide is extremely helpful for the sake of comparing pre- and post-implementation data and to keep from being overwhelmed by implementing an entirely new system. Furthermore, current methods for categorizing inspection findings should be examined critically to ensure that data can be used most effectively once the data is available in a new system. Many institutions polled do not currently track inspection finding data trends, so this area could be a challenge for some institutions. Considerations should also be made for consistent internet access throughout spaces to be inspected, including basement vivaria, satellites, and, if necessary, agricultural or field areas. REDCap is recommended as the implementation method because it is free to use, allows for easy and rapid sharing of system components between member institutions, and is extremely customizable to suit the needs of diverse programs.