**A) Significance:** Improving the early detection of child abuse could protect millions of children from harm.

**A.1** Incidence of Child Abuse: At least 680,000 cases of **child abuse** (i.e., physical, sexual, and emotional abuse, as well as neglect and imminent risk) are confirmed annually in the U.S.,[1] with strong evidence that the true incidence is much higher.[2-9] A vast body of research demonstrates the devastating and long-lasting consequences of child abuse –which includes physical disabilities, cognitive impairment and other neurological damage, mental health problems (depression, anxiety, post-traumatic stress, etc.), maladaptive behaviors (alcoholism, drug abuse, intimate partner violence), as well as further victimization of children.[10-16] In short, abuse often has a devastating impact on a child's life and the adult s/he becomes.

Young children (aged 0–5 years) are more vulnerable to victimization, accounting for $\geq$75% of deaths from abuse, and comprise a greater proportion of cases than older children for all categories of maltreatment except sexual abuse.[1] Yet despite 8-12 million American children being under the care of childcare providers (**CCPs** – aka early childhood educators, daycare providers, childcare workers, early childhood professionals),[17,18] CCPs identify fewer than 0.5% (2,500 of 680,000) of all substantiated cases of child abuse in the U.S.[1]

**A.2** Childcare Providers(**CCPs**): Among those who are required to report suspected child abuse (i.e., mandated reporters), CCPs are in a unique position to identify and respond to child abuse, as they may be the only people outside of immediate family to have extended opportunities to observe children on a daily basis. With the opportunity for early detection of abuse, CCPs have the potential to help prevent patterns of abuse from taking hold, and can act as key supports for children and families involved in child protection systems.[19] Yet CCPs face considerable obstacles in reporting child protection concerns, with some CCPs stating that "reporting possible abuse" is the most troubling ethical issue they face in their workplace.[20,21]

Studies of CCPs' reporting of child abuse are relatively few compared with the volume of studies undertaken on other mandated reporters with high levels of contact with children (e.g., teachers, nurses, doctors). One comparative study found CCPs less likely to have ever reported child maltreatment compared to other professionals who work with children,[22] due in part to the minimal education most have received regarding the level of concern and/or circumstances that warrant reporting.[23-25] The small body of quantitative and qualitative research examining reporting experiences of CCPs (including kindergarten and pre-school teachers)[26,27] has revealed high levels of uncertainty about the decision to report, perceived "conflicts of loyalty,"[28] and complexities that have been described as "dancing on the edge."[29] Such themes encapsulate CCPs' desire to preserve relationships with families and/or avoid causing harm, while at the same time meet their legal, professional, and ethical responsibilities. One consequence of such uncertainty and conflict is report latency, with one study finding an average time of 14 months between CCPs having suspicion and making a report[26] –a situation that, if left unaddressed, risks dire outcomes for many young children.

Professional training has been the chief mechanism for trying to improve CCPs' awareness of child abuse and their obligation to report it —it being widely assumed that increasing knowledge about child maltreatment will promote its being reported. However, due to the lack of rigorously evaluated interventions,[25,30] little is known about the actual effect of different kinds of education on CCPs' reporting behavior, or how to best prepare them to meet their responsibilities to protect children.[31] What research does show is that there is broad variability in how people define "reasonable suspicion" of child abuse[31-24] (i.e., the threshold for when mandated reporters must take action to protect children). Studies also show that CCPs are ill-prepared for their role as mandated reporters,[35-37] which leaves pre-existing biases (e.g., parents who seem nice would never hurt their child) and beliefs (e.g., there must be proof before reporting is warranted) free to undermine the opportunity CCPs in particular have to protect children from abuse.[38] Moreover, CCPs' lack of education about what should be reported contributes to their reports of suspected abuse having a lower yield –with substantiation rates of just 14%, compared to 32% for other mandated reporters.[39]

**A.3** Need for Training: Any intervention to help CCPs meet their professional, ethical, and legal responsibilities as mandated reporters must take into account the widely recognized need to take a systematic approach to educate the broad diversity of CCPs. In the U.S., this includes approximately 1 million *center*-based CCPs, 1 million licensed *family* CCPs, and 2.7 million paid, but *unlisted and unregulated* family CCPs who take care of children $\leq$5 years old.[40,41] Moreover, the intervention must be prepared to deal with the significant and well documented challenges of providing effective professional development for CCPs:[42-45] wide variability in the entry level training of CCPs;[46] variability in the quality and intensity of subsequent professional development opportunities;[47] logistical barriers to providing professional development during working hours;[46,48,49] bureaucratic challenges to ensuring quality education across settings ranging from mom/pop daycares to corporate chains to church-based and state-run facilities;[50] as well as short-staffing and annual turnover rates

of 20-40%.[51] These factors raise the degree of difficulty for success in helping establish childcare environments that are well prepared to protect young children –especially infants and toddlers– from harm.[52,53]

That said, well designed training programs for CCPs can succeed, provided they include some means for longitudinal reinforcement of learning,[54] account for differences in CCP work settings (e.g., rural vs. urban, home-based vs. centers, etc.),[55,56] and deliver standardized, high quality curricula.[57,58] *Online* educational programs have particular advantages for meeting the needs of CCPs, and for overcoming some of the key challenges previously mentioned. Specifically, they lend themselves to standardization; provide ready, low-cost access to multi-media learning; can readily employ interactive exercises to promote experiential learning (see Section B.2);[59,60] have been shown to be as effective as in-person training at enhancing CCPs' knowledge, skills, and professional competencies;[60,61] and provide ready means for both tracking results and providing follow-up reinforcement (including gamified strategies, see Section B.5). As such, an effective, evidence-based tool to help CCPs accurately report child abuse has the potential for nationwide impact.

**A.4** Summary: In sum: 1) children ≤5 years-old are particularly vulnerable to being abused; 2) despite being uniquely positioned to detect and report suspected abuse in young children, childcare providers (CCPs) currently identify and report <0.5% of substantiated cases of child abuse; 3) CCPs are not adequately prepared to identify at-risk children and protect them from abuse; 4) reports of suspected abuse from CCPs are less likely to be substantiated (compared to other mandated reporters); 5) evidence-based interventions are needed to help CCPs better serve their crucial role in child protection; and 6) online interventions have particular advantages for standardization, follow-up reinforcement, and tracking of outcomes.

**B) Innovation** –What Makes *iLookOut* Different and Potentially Transformative

**B.1** Overview of *iLookOut*: This study will address the need to better protect young children using an intervention designed for childcare providers (CCPs), *iLook Out for Child Abuse* (**iLookOut**). Having already been shown in a Pennsylvania-based randomized controlled trial to improve CCPs' knowledge and attitudes about reporting suspected child abuse (see Section C)[62] the next step is to examine whether *iLookOut* actually changes behavior –specifically, whether CCPs make more "high yield" reports of suspected child abuse, and fewer "low yield" reports (see Section D.1). This requires enrolling CCPs in another state because Pennsylvania CCPs have been exposed to *iLookOut*, and Pennsylvania's system for tracking reports of suspected abuse does not provide the necessary study data (see Section D.3 for why Maine was chosen).

*iLookOut* is a multi-media, online educational module that uses an interactive, video-based storyline to engage CCPs emotionally and intellectually, along with a learning management system that tracks pre- and post-test data, as well as CCPs' responses to questions within the *iLookOut* module. *iLookOut* was created by the *Center for the Protection of Children* at the Penn State Children's Hospital, involving a multi-disciplinary team of experts in child abuse, instructional design, pediatrics, early childhood education, online learning, mandated reporter training, law, ethics, and child advocacy. The overarching goal of *iLookOut* is to prepare CCPs to be responsible mandated reporters of suspected child abuse by opening their eyes to the problem, and helping them feel both empowered and responsible for contacting child protective services when there is reasonable suspicion a child is being abused. Completing *iLookOut* provides 3 hours of CCPs' required professional development credit, and can be adapted to satisfy state requirements for mandated reporter training.

*iLookOut* was programmed using responsive web design to allow for mobile access, as well as features to accommodate individuals with sensory disabilities. *iLookOut* is hosted on a secure server by the *Center for the Application of Information Technologies*, which provides tech support for up to 75,000 users annually, and stores all user data (see *Budget Justification*). **iLookOut is available online** (see Appendix 1.5 for link and access instructions), and though Appendices 1&2 provide documentation of *iLookOut*'s content, going through the learning module will give the most accurate picture of the learning experience it provides.

**The premise of *iLookOut*** is that CCPs will do a better job protecting children from abuse if (in addition to becoming better educated about signs, symptoms, and risk factors) they can "identify" with the vulnerability of at-risk children, and also see themselves as part of a system that (however imperfect) is the only system there is for protecting children from abuse. Thus, in the same frame that *iLookOut* educates CCPs about what and how and when to report suspected child abuse, it also provides true experiential learning (see Section B.4).

**B.2** Interactivity: *iLookOut* uses an engaging storyline in which learners take on the role of a teacher in the 4-year old "Beach Room" at a childcare center, events unfold through video interactions, and the learner must decide how best to respond. The videos are shot in point-of-view (i.e., the camera functioning as the learner's eyes), with the learner encountering Beach Room children and their parents, as well as co-workers (all played by actors) as the storyline plays out. Following several of the videos, learners are posed questions and then

(based on their selection) provided didactic responses that educate them about aspects of child abuse (legal definitions, incidence, risk factors, etc., see Appendix 1.1). Other videos are followed by questions where the learner must choose what to do in response to events that have transpired (Appendix 1.2). At different junctures in the story, learners may access resource files (e.g., Facts about Abuse, Red Flags for Abuse), as well as more information (text, video) about the children they have encountered (see Appendix 1.3). As in real life, the more the learner seeks out useful information, the better informed his/her choices will be.

By immersing CCPs into real-life scenarios, *iLookOut* helps them learn and operationalize information, and develop perspectives that can help protect real children from real harm (see Appendix 1.4). Additionally, *iLookOut* reinforces learning by: 1) helping learners practice implementing their knowledge and skills; 2) showing learners their post-test results and requiring them to identify the correct answer for any question they got wrong; 3) concluding the learning module with a video in which the narrators discuss observations and/or information that could (or should) have raised or lowered concern about abuse for each of the children they encountered in the story (see Appendix 1.5); and 4) providing learners with follow-up materials (e.g., case scenarios for discussion, handouts, etc., see Appendix 1.6) to use and share with others.

**B.3** Learning Module Data: In addition to a registration section that records learner demographics (see Appendix 2.1), *iLookOut* includes a validated pre-/post-test that measures learners' knowledge about child abuse and their responsibilities as mandated reporters (see Appendix 2.2) along with attitudes about reporting suspected child abuse (see Appendix 2.3), followed by a questionnaire for individuals to evaluate the learning module (see Appendix 2.5). In a previous randomized controlled trial and an ongoing open study, *iLookOut* has demonstrated significant improvements in knowledge and attitudes, and received very high satisfaction scores from CCPs (see *Preliminary Data*, Section C).  Of note, the current version of *iLookOut* uses Pennsylvania's definitions and requirements regarding child abuse and mandated reporting. The next version will be re-designed so that the learning module can be readily adapted to create versions specific for other states and their respective laws and regulations. Such state-specific adaptations will require textual edits of various pre-/post-assessment items, as well as minor modifications to 2 down-loadable resource documents that use legal language to define abuse and to delineate mandated reporter responsibilities; but state-specific tailoring will *not* require changing the storyline, re-filming, or re-programming *iLookOut*'s functionality.

**B.4** Conceptual Model: *iLookOut* is grounded in an Experiential Learning conceptual model, which is a key feature of adult learning theory. Drawing on the work of Knowles,[63,64] Billington,[65] and Kolb,[60] *iLookout*'s design recognizes that adults learn best when: 1) they know why they need to learn the material, 2) the learning process is experiential, 3) learning is framed as problem-solving, 4) the material learned has immediate value, and 5) the curriculum considers the learner's previous knowledge.[63,64] By interweaving an interactive storyline with didactic information, decision-points, and critical feedback, *iLookOut* reflects best practices for adult learning,[67,68] and thus manifests the key elements of the experiential model for promoting adult development.[66] Specifically, *iLookOut* a) challenges CCPs just beyond their present level of ability –so they are pushed to grow, but not pushed so far that they give up; b) uses exercises to reinforce facts and frameworks (here, regarding suspected child abuse); and c) allows learners to proceed (and therefore digest information) at their own pace. Because *iLookOut* is accessible 24/7 and can be paused/resumed as desired (including across multiple sessions), it also leverages CCPs' preference for "flexibility" in professional development.[59] Additionally, *iLookOut*'s online platform provides an emotionally safe environment for experiential learning, which has been shown to promote increased knowledge acquisition and application among CCPs.[59,60]  Although the learning environment is individual, CCPs are encouraged to talk with colleagues and supervisors about what they learned, which it is hoped will set the stage for a learning community around mandated reporting in their work setting. Additionally, follow-up engagement will provide CCPs opportunities for real-time sharing of responses to learning materials (see Section D.7 and Appendix 1.8).

**B.5** Dramatization and Gamification: *iLookOut* currently uses an interactive story with live actors to help the learner be more invested, and more deeply consider what is actually at stake when concerns about child abuse arise. *iLookOut* also uses game techniques to enhance learning, such as creating individualized learning paths (determined by learner responses at different points in the story), use of a "trick" question to demonstrate the protean presentations of child abuse, and a debriefing video that points out missed opportunities and thereby reinforces the fundamentals of child protection. Though these elements are novel (if not unique) among existing mandated reporter training resources, this project would enhance them even further (see Section D.6).

Dramatization: The use of trained actors in research, simulation training, and social and community-based theatre and drama initiatives is a well-established practice.[67-71] In contrast to amateurs, the trained actor understands her voice and body as tools of subtle and complex expression; brings enhanced believability and

authenticity to characters and events of scripted scenarios; and thus can provide greater focus on the research and outcomes goals of investigators. Trained actors have been used to help identify the neural substrates underlying primary emotions, distinguish autonomic nervous system activity across different emotions, and to investigate memory, imagination, and empathic response.[72,73] Trained actors have also been effective in promoting socially valuable behavioral change –e.g., improved professional communication (through role play and scripted dramatization),[74-76] as well as interpersonal dialogue about difficult and divisive subjects.[77]

Gamification: Gamification facilitates learning and motivates individuals by using game elements, game mechanics, and game-based thinking.[78] These include interaction with characters, overcoming challenges, and/or receiving badges for performance –as commonly seen in video or mobile games.[79] Gamification is linked to several research-based, learner-centered psychological principles,[80-82] the most fundamental being that effective learning requires engagement. To create and sustain engagement, gamification challenges learners with tasks that involve uncertainty, hidden information, and multiple goals[83] –and in so doing motivates active learning[84-86] and fosters competence.[87] Compared to more passive learning roles,[88] the engaged, interactive decision-making that characterizes gamification improves learning. [89,90]

Another principle of gamification is to design learning environments where learners feel "free to fail." When it is "safe" to explore, examine alternate approaches, and make mistakes, dynamic learning can replace picking "the right answer" as the central focus[78,91-93] –a pedagogical approach whose efficacy is reflected in the growing use of *formative assessment* as an instructional strategy to allow safe failure to reinforce learning.[94]

Another key component of gamified learning is "spaced retrieval" of content as a means to enhance cognitive mapping of new information. The use of Web and mobile technologies, in particular, facilitate delivering instructional content in small pieces over time, using iteration to promote retention and integration of new knowledge.[95] Gamification also employs reinforcement techniques –such as points and badges– to make "learning over time" a more effective means of instruction and behavior change.[88,96,97]  An additional principle of gamification is to use storytelling to connect the learning with real-world concerns[98] –which leverages the power of *stories* to add meaning, provide context, and guide action.[99,100]

The proposed project will enhance gamification within *iLookOut* by creating a more sophisticated and branching storyline to promote engagement. Post-module gamification also will provide a ready and measureable way to reinforce learning –for example, using electronic messaging (a.ka. **ping-ing**, see Section D.7 and Appendix 1.8) to provide practice opportunities. The enhanced version of *iLookOut* will also use ping-ing to query learners about knowledge retention, implementation of best practices, work-place experiences, etc. –all of which can be scored and assigned points to reinforce increased awareness and/or preferred behaviors. Use of such ping-ing techniques has been shown to increase retention of learning.[101,102]

**B.6** Summary: In sum: 1) *iLookOut*'s innovative approach to mandated reporter training applies experiential learning theory by using an interactive storyline to engage childcare providers (CCPs); 2) *iLookOut* has been shown to increase CCPs' knowledge and change their attitudes about reporting suspected child abuse; 3) CCPs report being highly satisfied with *iLookOut*'s content and format; 4) proposed revisions will further optimize *iLookOut*'s efficacy by helping learners practice implementing their knowledge and skills); and 5) *iLookOut* can be easily adapted for other states wishing to provide online mandated reporter training for CCPs.

## C) Preliminary Data

In July 2014, we conducted a randomized controlled trial using a Test/Re-test design, in which **735 CCPs were enrolled over a single 3-week period**. Letters were sent to directors of all licensed childcare facilities in Pennsylvania (via the mailing lists of *Better Kid Care*, which provides online professional development to 1,900 childcare facilities, and the *Pennsylvania Child Care Association*). Childcare facilities were then chosen by sampling respondents (based on region of the state, rurality, and type of facility), and the childcare facility directors provided web-links for their CCPs to access *iLookOut*. All participants completed a Pre-Test, the *iLookOut* learning module, a Post-Test, and an evaluation questionnaire. Half of participants were randomized to complete a Re-Test immediately following the Pre-Test to evaluate reliability and the effect of practice on performance. Measures included validated instruments for 1) Knowledge (n=23 items),[62] which evaluated CCPs' understanding of legal definitions and responsibilities regarding child abuse, manifestations of child abuse, thresholds for reporting suspected abuse, and penalties for failing to report suspected abuse; and 2) Attitudes (n=13 items),[103] which measured how CCPs regarded the duty to report suspected abuse, the utility of reporting, difficulties associated with reporting, as well as potential adverse effects of reporting.

There were no significant demographic differences between CCPs in the re-test group and the remainder of participants. There were no changes between Pre-Test and **Re**-Test in knowledge (composite score p=0.49,

with 20/23 individual knowledge-items having non-significant p values using McNemar's test); and only quite small changes for 9/13 individual attitude-items. <u>Pre-Test to **Post**-Test comparison, however, demonstrated significant increases in knowledge</u> (p<.001, from 64% correct pre-test to 78% correct post-test), as well as <u>significant changes on all 13 attitudinal items</u> (p<.001) in the predicted direction. Participants expressed <u>high satisfaction</u> overall with the learning module (8.7, where 10=Highly Satisfied), and reported that *iLookOut* provided <u>useful information</u> (95% Agree, 4% Neutral, 1% Disagree), <u>helped them learn</u> (93% Agree, 5% N, 1% Disagree), and <u>kept their interest</u> (90% Agree, 8% N, 2% Disagree). Additionally 99% of participants reported <u>greater self-efficacy</u> (for understanding legal responsibilities, recognizing warning signs, and knowing how to report suspected child abuse), and 92% said they <u>would recommend *iLookOut* to others</u>.

Among participants who agreed to be recontacted (n=460/735), follow-up testing 4 months later (n=201, 44% response rate) demonstrated the persistence of significant changes for both knowledge and attitudes, though the knowledge score declined by 7% from its post-test peak. Compared to those who declined re-contact (n=275), follow-up participants were more likely to be above age 29 (p<.0001) and to have children (p=.001).

Subsequent to this randomized controlled trial, *iLookOut* has been made available free-of-charge to CCPs throughout Pennsylvania, and publicized through a variety of professional and public venues. Over 5,000 CCPs have completed *iLookOut*, and Pre- and Post-Test scores for this open phase trial are virtually identical to those for the initial randomized controlled trial, as are CCPs' evaluations of the learning module.

Prior to creating *iLookOut*, study PI (Levi) did extensive work on mandated reporting of suspected abuse. He established a conceptual framework for understanding when suspected abuse must be reported,[34,104] conducted multiple empirical studies on how various populations of mandated reporters understand and implement the threshold of *reasonable suspicion*,[105-110] and developed a website (*[www.LookOutForChildAbuse.org](www.LookOutForChildAbuse.org)*) to help mandated reporters better understand and carry out their responsibilities to report suspected child abuse – which includes Pennsylvania's first online tool for reporting abuse ([https://youtu.be/lrMCLQN5cvs](https://youtu.be/lrMCLQN5cvs)).

## D) Approach

**D.1** <u>Overview of Study Design:</u> This 5-year study will use a randomized controlled trial design to evaluate the efficacy of an innovative educational intervention, ***iLook Out for Child Abuse*** (***iLookOut***), for improving childcare provider (**CCP**) reporting of suspected child abuse. <u>Year 1</u> of the grant period will be spent establishing necessary infrastructure and completing development of study materials (see Section D.5). Geographically distinct regions in the state of Maine (see Figure 1) –which were matched, based on demographics and reporting patterns– will be randomized (see Section D.10) to *Innovation*, *Standard*, or *Control* arms. *Standard* arm CCPs will be asked to complete Maine's existing online mandated reporter training (see Appendix 3), and *Innovation* arm CCPs will be asked to complete *iLookOut* (which includes follow-up engagement activities, see Sections D.4 and D.7). During <u>Years 2-4</u> the study arms will be sequentially enrolled to receive the target intervention (*iLookOut*) –a uni-directional crossover design referred to as a "stepped wedge design" (see Figure 3). During <u>Year 5</u> *iLookOut*



Figure 1

will be made available (free-of-charge) to all CCPs in Maine, and outcomes data will continue to be collected for analysis. To estimate uptake/penetrance of the *iLookOut* and *Standard* training in each arm, surveys will be administered at the end of years 2-4 (see Sections D.9 and D.11).
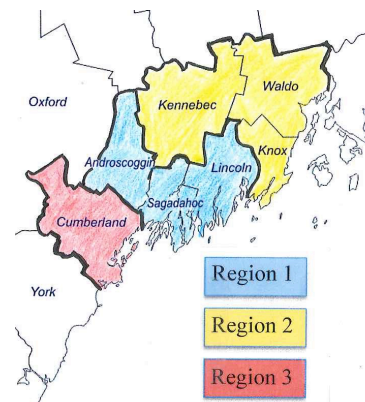
Data from Maine's Office of Children and Family Services will be used to compare baseline and post-intervention outcomes for each of the 3 study arms, and over time. In this examination of reporting behaviors of CCPs, the **Primary Outcomes** are 1) <u>child abuse confirmation rates</u> among CCP-reported cases; 2) <u>rates of social services recommended</u> for children/families who were reported; and 3) <u>costs associated with intakes and investigations</u> of reports in which abuse is not confirmed *and* no social services are recommended. **Secondary Outcomes** are 4) <u>changes in the number of CCP reports</u> of suspected abuse; 5) number of CCPs in each study arm who complete *iLookOut* and *Standard* training; 6) CCP knowledge and attitudes regarding reporting suspected child abuse; and 7) CCPs' evaluation of the *iLookOut* and *Standard* training. The **SPECIFIC AIMS** for the study are as follows:

**AIM 1:** <u>To evaluate the impact of *iLookOut* on the incidence of "High Yield" reports of suspected child abuse.</u>

**Hypothesis 1:  The incidence of "High Yield" childcare provider reports of suspected child abuse will be greater** for regions in which childcare providers have been recruited to complete *iLookOut*, where a "High Yield" report is defined as a report for which:

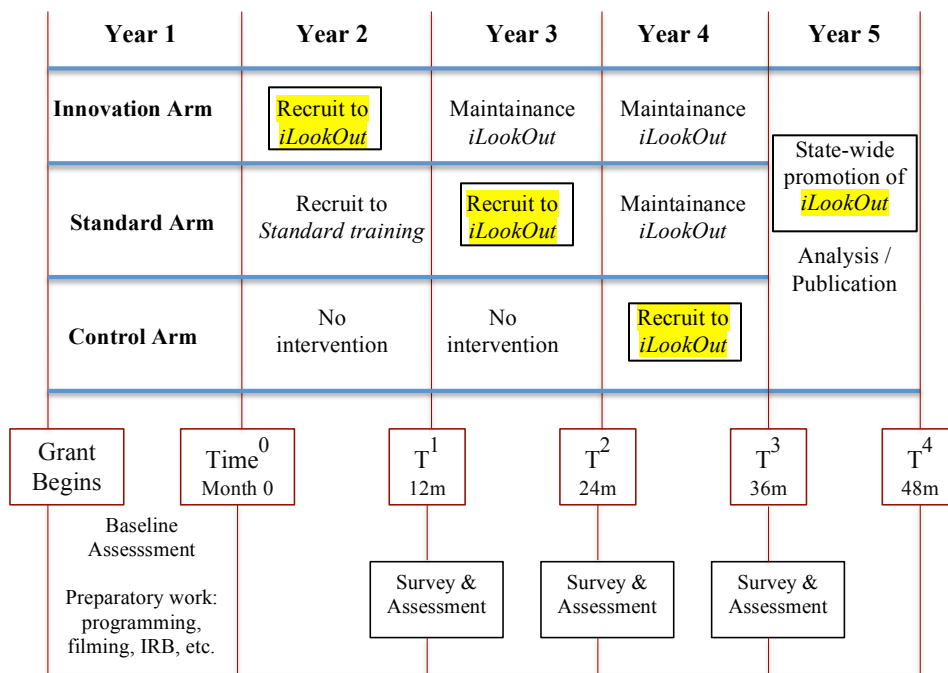|  | Child Abuse *Confirmed* | Child Abuse *Not* Confirmed |
|---|---|---|
| Figure 2 | | |
| *Social Services Recommended* | **High Yield** | **High Yield** |
| *No Social Services Recommended* | **High Yield** | **Low Yield** |

1.  Child abuse was confirmed (i.e., substantiated or indicated);
    *OR*

2.  Social services were recommended for the child/family.

**AIM 2:** To evaluate the impact of *iLookOut* on the costs to the state from "Low Yield" childcare provider reports of suspected child abuse.

**Hypothesis 2:**  For state costs associated with "intake" and investigation of childcare provider reports of suspected abuse, **the proportion spent on "Low Yield"** (versus High Yield) **reports will be reduced** for regions in which childcare providers have been recruited to complete *iLookOut*, as measured by:

1.  The cost to the state (in dollars) for intake calls and subsequent investigations related to "Low yield" reports
    –where "Low Yield" is defined as any report for which child abuse was not confirmed (substantiated or indicated) *and* no social services were recommended (see Figure 2 and Appendix 4.2);

2.  A comparison of costs associated with "Low Yield" versus "High Yield" reports of suspected abuse.
    –where "costs" are calculated based on the dollars spent on *Intake* and *Investigation* of reports of suspected abuse (see Appendix 4.4).

### I L O O K O U T   R - 0 1   S T U D Y   T I M E L I N E



**Figure 3.**  *Stepped-wedge design* entails sequential enrollment until all study arms receive target intervention

**D.2** Rationale for Study Design: **1)** The rational for defining "High" and "Low" yield reports as noted above is that reports of suspected child abuse that are either confirmed or result in social services being recommended to the child/family, arguably, have the potential to benefit an at-risk child. By contrast, when a report does not identify abuse *and* does not result in any social service being recommended, it is not at all clear what benefit counterbalances the financial and psychological costs incurred by a report. *Recommended* (rather than *received*) social services is the focus because there are many impediments to successful delivery of valuable social services that should not detract from the appropriateness of a report having been made. Relatedly, the

focus on *reports* of suspected child abuse reflects it being beyond the scope of this study to assess for missed opportunities to report child abuse. Still, by comparing the number of CCP reports pre- and post-intervention, we will gain insight on the impact that *iLookOut* might be having on previously missed cases of abuse.

**2)** The choice to assess *iLookOut*'s impact on "cost" reflects the goal of minimizing child welfare expenses that have little or no benefit. Thus, whether *iLookOut* <u>in</u>creases or <u>de</u>creases the absolute number of CCP reports, "return on investment" can be assessed by measuring the <u>proportion</u> of expenditures for "low yield" reports.

**3)** The decision to measure <u>population-based</u> outcomes (confirmation rates, cost, etc.) when the intervention targets *individuals* is due to "reports of child abuse" being a low base-rate event –on average, just 124 cases/year from <u>all</u> CCPs in Maine (see Appendix 4.7).  Hence, even with a very effective intervention, the likelihood that any given CCP will report suspected child abuse is going to remain very low. That said, because Intake staff at the state will identify which reports come from CCPs, whether those CCPs are from one of the regions that make up the 3 study arms, and whether they have in fact completed *iLookOut*, *Standard*, or no training (see Section D.9), we will be able to assess the effect of training individual CCPs –while still avoiding the ecological fallacy of inferring individual changes from group data. Additionally, we will be able to track and analyze for "spill-over" effects in those regions not yet recruited to complete *iLookOut*, since Maine's Intake workers will be tracking all reports by geographic region (see Section D.9).

**4)** The choice to compare *iLookOut* to *Standard* training (in addition to *Control* –i.e., no intervention) is to assess whether incentivizing completion of <u>any</u> educational intervention (through professional training credit and a small gift certificate) influences the target outcomes. Online training is increasingly common, and often involves little more than a web-based compilation of written materials. Such *Standard* training is already offered through Maine's Office of Child and Family Services (see: http://www.maine.gov/dhhs/ocfs/cps/ & Appendix 3), and surveys at the end of Years 2, 3, and 4 will assess the percentage of CCPs who have completed this *Standard* online training.

**5)** Sequential enrollment until all study arms receive the target intervention (i.e., the **stepped wedge design**) is intended to assess for accrued changes <u>over time</u> in CCPs' reporting behavior. The reason for choosing this design is that we anticipate that by changing individual CCPs' awareness, knowledge, and attitudes, *iLookOut* will change the culture within childcare facilities, fostering greater vigilance as well as open discussion about child protection.  To capture this community effect, it is important to <u>evaluate for changes in reporting behaviors not only pre- to post- completion of *iLookOut*, but also over time</u>. In cities and towns within the *Innovation* study arm, the time-frame for this change will be 3 years, in the *Standard* arm it will be 2 years, and in the *Control* arm it will be just 1 year (see *Timeline*, Figure 3 above). In our analysis, then, we will compare the changes in reporting behaviors between regions, *and* over time.

**6)** To assess **uptake/penetrance** of the study interventions, we will conduct brief surveys at the end of Year 2, 3, and 4 to measure how many CCPs in each study arm have heard of and/or completed *iLookOut* and *Standard* training. In addition to estimating the "uptake" of study interventions, these surveys will assess the incidence of CCPs who have completed *iLookOut* and subsequently relocated to an (as yet) uninitiated community within a different study arm (i.e., inadvertent exposures).

<u>**D.3**</u> Choice of Maine: Given the study outcomes, data collection requires partnering with a state that tracks reports of suspected abuse 1) geographically, and 2) by type of reporter (including CCPs).  Also needed is the ability 3) to track whether a child/family is recommended *social services* consequent to being reported, and 4) to link the outcome of reports (i.e., *screened out* vs. *unsubstantiated* vs. *confirmed*, and whether social services were recommended) with i) the geographic origin of the report, and ii) whether the person who reported was a CCP. The logistical and bureaucratic challenges associated with <u>county</u>-based child protection systems also necessitates choosing a state with centralized data collection and administration.

Because Pennsylvania CCPs have already been exposed to *iLookOut*, inquiries were made by email and phone to the other 49 states (using contact information from the annual DHHS *Child Maltreatment* report). Five states were identified that did (or could) meet all data requirements. Of these, Maine had the most well-integrated system in terms of data collection, inter-departmental collaboration, and (per conversations with senior scholars at Chapin Hall, University of Chicago) the ability to assess financial costs related to child abuse evaluations. Subsequent interactions with multiple state agencies in Maine not only confirmed this assessment, but evidenced great interest by key Maine stakeholders to collaborate on this project (see *Letters of Support*). As such, Maine's infrastructure and enthusiasm to implement *iLookOut* provides an excellent opportunity to rigorously evaluate the actual impact of *iLookOut* on child abuse reporting.

**D.4** Timeline (see Figure 3): During **Year 1** of this grant, the infrastructure (see Section D.5) for all study activities will be put in place, including 1) procedures for recruitment and data collection, training, and MACWIS programming; 2) revisions to the *iLookOut* learning module; 3) revisions to the *iLookOut* database (see Section D.6); and 4) development of follow-up materials (i.e., "ping-ing" –see Section D.7). During **Year 2**, childcare providers (CCPs) will be recruited to participate in the *Innovation* (*iLookOut*) and *Standard* arms of the study; provided "professional development" credit plus a $10 gift certificate for completing their respective mandated reporter training; and those in the *Innovation Arm* will also receive follow-up messages (ping-ing) and learning materials (see Section D.7). Additionally, at year's end, surveys will be distributed to CCPs in all 3 study arms to estimate exposure to/completion of *iLookOut* and *Standard* training –which also will help identify CCP migration and/or inadvertent exposure.

During **Year 3**, *Innovation Arm* participants will continue receiving follow-up messages and learning materials, and recruitment efforts will continue to enroll CCPs (in *Innovation Arm* areas) who are either newly hired, or have yet to enroll. Additionally, CCPs in the *Standard Arm* will be recruited to complete the *iLookOut* intervention, and afterwards sent follow-up messages (ping-ing) and learning materials; and again at year's end surveys will be distributed to CCPs in each of the study arms to identify exposure to/completion of the *iLookOut* and *Standard* interventions. During **Year 4**, both *Innovation Arm* and *Standard Arm* participants will continue receiving follow-up messages (ping-ing) and learning materials, and recruitment efforts will continue to enroll CCPs (in both *Innovation Arm* and *Standard Arm* regions) who are either newly hired, or have yet to enroll. Additionally, CCPs in the *Control Arm* will be recruited to complete the *iLookOut* intervention, and afterwards sent follow-up messages and learning materials; and at the year's end surveys again will be distributed to CCPs in each of the study arms to identify exposure to/completion of the *iLookOut* and *Standard* interventions. During **Year 5**, formal enrollment in the trial will cease. However, the *iLookOut* learning module will be made available free-of-charge to CCPs throughout Maine. **Cost analyses** for Year 1 (baseline) through Year 4 will be completed annually, after Maine's Office of Child and Family Services compiles each year's annual report on child abuse reporting and investigation.

**D.5** Maine Infrastructure: During Year 1, the study team will work with Maine's Office of Child and Family Services (**OCFS**) to: 1) establish an intake protocol that OCFS staff will use with *every* report of suspected child abuse to identify whether a) the caller has worked (paid or volunteer) at a childcare facility within the past 3 years; b) if yes, where was the childcare facility located (geographically); c) has s/he received any training on mandated reporting of child abuse; and d) if yes, what was the training. In concert with OCFS, 2) programming to MACWIS (Maine Automated Child Welfare Information System) will create data fields in which OCFS Intake workers will record callers' answers to the above questions. The study team also will 3) develop a quarterly report process to track calls made by CCPs to OCFS *and* their outcomes –i.e., whether they were screened out or investigated, whether child abuse was unsubstantiated or confirmed; and whether social services were recommended for the child/family. The study team will work with OCFS to 4) adapt the *Standard* state-approved online training to include the demographic items present in the *iLookOut* registration section, as well as a user evaluation of the training. Finally, study team members will travel to Maine to work with their *Division of Licensing and Regulatory Services* to 5) establish a recruiting protocol for, and conduct training with, "Community Care Workers" who will be the primary contacts with childcare facilities and their employees and volunteers.  (see Section D.11 and *Letters of Support*).

**D.6** Revision of *iLookOut*: During Year 1, the study team will: 1) revise the *iLookOut* storyline, recruit and rehearse actors, re-film all video segments, and complete editing and post-production of videos; 2) create a revised version of the learning module that a) comports with Maine's laws/regulations, b) generates Maine-specific professional development certificates, and c) can be readily adapted in the future to create other state-specific versions.  This built-in capacity will allow for state-specific certificates (see Appendix 1.7) and tracking/reporting of data, without the need to re-film or do major reprogramming (rather, just wording changes to ensure that the textual content for each state-specific version comports with state law).

The need for these revisions is that, despite its demonstrated efficacy improving knowledge and attitudes, *iLookOut* currently suffers from substandard acting, and lack of variation and subtlety in framing of camera shots and final editing. This was due to budget and time constraints that limited the pool of available actors, prevented *any* formal rehearsal time, and necessitated all acting/filming be completed over a single weekend. The notable exception is the video segment involving testimonials about surviving child abuse. Here, trained actors, rehearsal, and close directing created an impactful, high quality result that is the goal for the entire module (see http://www2.med.psu.edu/humanities/ilookout/). Additionally, because part of the proposed gamification strategy for this intervention is to encourage CCPs to re-visit the learning module, script revisions

are needed to create additional layers of complexity that can support repeat use by a CCP. For these reasons, the present proposal includes script revisions; the use of trained, well-rehearsed actors; a professional director; and new video and post-production.

**D.7** Post-Intervention Reinforcement: During Year 1, the study team will develop materials to reinforce learning after completion of *iLookOut*. These will include augmenting existing case discussion exercises, tips, and best-practice guidelines. But in particular it will involve using the commercially available online tool, *Train by Cell* (see *Budget Justification*), to create an extensive bank of messages that can be sent (ping-ing) to both remind CCPs about key learning points, and engage and challenge them with game-ified questions, quizzes, and cases for reflection and discussion. These follow-up materials (including message pings –see Appendix 1.8 for more explanation of "ping-ing") will be sent to CCPs after they complete *iLookOut*, which means that CCPs in the *Innovation* Arm will receive them during Years 2-4, CCPs in the *Standard* Arm will receive them during Years 3&4, and CCPs in the *Control* Arm will receive them only during Year 4. CCPs will be incentivized to respond to these prompts by opportunities to earn professional development credit, as well as points, badges, and small prizes. During Year 5 (open enrollment to *iLookOut*), follow-up electronic messaging will be sent to all CCPs in Maine who complete *iLookOut*.

**D.8** *Standard* Training: The intervention used to educate *Standard* arm CCPs about child abuse and their responsibilities as mandated reporters will be Maine's current online training (see Appendix 3). Like most state-approved training resources, this training is neither specifically targeted nor tailored for CCPs. In Maine, there is no requirement that CCPs (or any other mandated reporter) complete this training.

**D.9** Measures and Data-Gathering: Data will be collected (see Table 1) from two sources: individual childcare providers (CCPs) and Maine's Office of Child and Family Services (OCFS). **1) Individual CCP Data** will be de-identified, but fully link-able across multiple sources.  These sources will include: **a)** Demographics gathered as part of the registration process for either *iLookOut* or the *Standard* training; **b)** Pre-/post-Test results for the respective training modules; **c)** Evaluations of the respective training modules; and **d)** Responses to pings (sent via *Train by Cell*). Additionally, **e)** Surveys from CCPs at the end of Years 2-4 will provide (de-identified) data on the percentage of CCPs in each of the 3 study arms who have i) heard about, and ii) completed *iLookOut* and *Standard* training (see Appendix 4.1). **2) OCFS Data** will be collected from Maine's Automated Child Welfare Information System (**MACWIS**), which will be adapted in Year 1 to record data gathered by OCFS Intake Workers, who will ask *every caller* i) whether they worked (paid or volunteer) in any form of childcare facility in the past 3 years, ii) what community they reside in, and iii) whether they have had training on reporting child abuse (and if yes, which).  Additionally, OCFS will cross-check names of CCPs who have completed training (*iLookOut* or *Standard*) against individuals who have reported suspected abuse. OCFS will de-identify these data, and then provide the research team the **a)** Number of reports of suspected abuse from CCPs; **b)** Reporting rate among CCPs –at baseline, and annually

Table 1: Measures

| SOURCE | MEASURE | PRE- | POST- | FOLLOW-UP / TIMING |
|---|---|---|---|---|
| **CCP** | | | | |
| | Demographics | √ | | |
| | Knowledge | √ | √ | |
| | Attitudes | √ | √ | |
| | Evaluation of Training | | √ | |
| | Ping messages/questions | N/A | N/A | After completing *iLookOut* |
| | Familiarity with *iLookOut* & *Standard* training | N/A | N/A | End of Y2, Y3, Y4 |
| **OCFS** | | | | |
| | Identification of reports from CCPs* | | | |
| | Completion of *iLookOut* or *Standard* training* | | | |
| | Number of reports from CCPs | | | Baseline, End of year (Yrs 2-4) |
| | Reporting rate from CCPs | | | Baseline, End of year (Yrs 2-4) |
| | Screen-out rate of CCP reports | | | Baseline, End of year (Yrs 2-4) |
| | Confirmation rate of CCP reports | | | Baseline, End of year (Yrs 2-4) |
| | Social service referral rates | | | Baseline, End of year (Yrs 2-4) |
| | Cost of intake/investigation of CCP reports | | | Baseline, End of year (Yrs 2-4) |

CCP = Childcare Provider      OCFS = Office of Child and Family Services

\* Information to be recorded in MACWIS, but de-identified for study purposes.

for CCPs in the geographic regions comprising the 3 study arms; **c)** Number of screened-out CCP reports of suspected abuse (i.e., reports judged by OCFS to not warrant an investigation); **d)** Number of confirmed CCP reports of suspected abuse (i.e., investigations resulting from CCP reports in which child abuse was substantiated or indicated –see Appendix 4.2 for explanation of OCFS process for handling reports of suspected abuse); **e)** Number of social service referrals (i.e., CCP reports of suspected child abuse for which a social service such as therapeutic services, nutritional assistance, etc. were recommended by OCFS –see Appendix 4.3 for how "social services" will be defined/identified); and **f)** demographic data for each CCP report (including geographic information, exposure to *iLookOut* and *Standard* training, age of child, type of abuse, etc.). OCFS also will provide aggregate data on **g)** Cost –calculated using average costs to OCFS for I) the intake process for handling reports of suspected abuse, and II) investigating reports of suspected abuse (see Appendix

4.4 for cost estimates and methodology). OCFS data will include all reports from CCPs, irrespective of whether the child being reported is cared for at a childcare facility or elsewhere in the community. Likewise, OCFS data will also include CCP reports that concern a child for whom investigation is already underway, even though the CCP report did not trigger the investigation. Of note, *NO INDIVIDUALLY IDENTIFIABLE DATA regarding any child or family will be collected for this research study.*

**D.10** Participants and Study Arms: The target population for this study is individuals in Maine who work as **employees or volunteers at a licensed or certified facility that provides care to children ≤5 years-old** –which includes childcare centers, family childcare programs, nursery schools, Head Start, and public pre-K programs (see Appendix 4.5). In concert with Maine's *Division of Licensing and Regulatory Services* and *Office of Child and Family Services*, we have identified 3 regions (each of which will comprise a single study arm) that have the following characteristics: 1) they are **geographically distinct** (which will minimize inadvertent exposure to study interventions), 2) they have **similar demographics** (in terms of ethnicity and CCP population), and 3) they have **similar CCP reporting rates** of suspected child abuse over the past 5 years (i.e., average number of children per year reported by CCPs). The following counties will comprise the 3 study arms: Arm 1) Androscoggin, Sagadahoc, Lincoln; Arm 2) Cumberland; Arm 3) Kennebec, Waldo, Knox (see Figure 1 and Appendix 4.6). Their size was chosen based on logistic feasibility (i.e., Community Care Workers being able to have routine, in-person contact with CCPs at the individual childcare facilities), and a statistical power analysis for detecting a meaningful change in reporting behaviors (see Section D.14). Taken together, the communities comprising the 3 study arms account for 63% (78/124) of the average annual number of CCP reports of suspected abuse in Maine, and are home to 1,055 licensed childcare facilities. At baseline, we will randomly assign each of the 3 geographic regions to a single study arm, and follow the intervention assignment timeline as indicated in Figure 3.

**D.11** Recruitment: Individuals who work as employees or volunteers at licensed childcare facilities in cities and towns receiving interventions (*Innovation* and *Standard* arms during years 2 and 3; and all study arms during year 4) will be invited to receive online training about mandated reporting of suspected abuse. Initially, a letter describing the study (jointly authored by the study team and Maine's *Office of Child and Family Services*) will be sent to CCPs at all licensed childcare facilities within the geographic regions comprising the active study arms (i.e., *Innovation* and *Standard* arms during years 2 and 3; and all study arms during year 4). Additionally, the study will be described (by *Division of Licensing and Regulatory Services* "Community Care Workers" and supervisors) at regularly scheduled outreach meetings within each region –which provide updates and continuing education to CCPs, and have a track record of being very well attended by CCPs (see *Letters of Support*, cf. Jonathan Leach). Finally, *Community Care Workers* (each of whom has ongoing relationships with a discrete number of childcare facilities) will make in-person visits to each licensed facility to explain the nature and benefits of study participation, and provide recruitment fliers for posting and distribution to employees and volunteers. With the strong support from *Community Care Workers*, and *iLookOut*'s track record of high CCP satisfaction and ease of recruiting (in a prior study, **735 CCPs were successfully recruited in just 3 weeks** to complete *iLookOut* with *no* financial incentive–see Section C), we anticipate being readily able to enroll 1,000 CCPs per arm over the course of 3 years to participate in the present study.

CCPs being recruited to complete *iLookOut* will receive a unique log-in code that allows her/him to register and complete the learning module, revisit the learning module as desired, and provide contact information to receive: a) 3 hours of professional development credit (required for state licensure); b) a $10 gift certificate following completion of *iLookOut*; and c) ongoing opportunities for reinforcement learning (see Section D.7). **Only those CCPs who receive a log-in code will have access to *iLookOut*.** CCPs being recruited to complete *Standard* training will receive information about how to register and complete the *Standard* online training; receive 3 hours of professional development credit for doing so; and obtain a $10 gift certificate by showing their designated *Community Care Worker* proof of having completed the *Standard* training. Demographic questions will be added to the registration section of the *Standard* training to track how many (and which) CCPs in each study arm complete the *Standard* training.

Maine *Community Care Workers* serve both a regulatory and educational role, and often have long-standing professional relationships with licensed childcare facilities. They frequently make CCPs aware of learning opportunities, programs, professional resources, and other materials to help the CCPs do their jobs –such that the present study will be but one of many offerings introduced by *Community Care Workers*. The *Division of Licensing and Regulatory Services* will be reimbursed for the *Community Care Worker* travel and time devoted to this study, and individual *Community Care Workers* will receive meals and their own continuing education credit for various meetings with study staff (see *Budget Justification*). However, *Community Care*

*Workers* will *not* receive individual incentives for enrolling study participants; hence, their role in recruitment is not anticipated to exert undue influence on participants (see *Letters of Support*, cf. Jonathan Leach).

**D.12** Risks of Participation: The study poses no risks beyond those encountered in everyday life, nor does participation impose any expectations (professional, legal, or otherwise) not already incumbent on CCPs. Steps have been (and will continue to be) taken to minimize the possibility of psychological discomfort due to the subject matter. There is no violence nor graphic images in *iLookOut*; scenarios and language were carefully constructed to mitigate any sort of sensationalism; and prior to *iLookOut*'s one emotionally evocative video (in which actors portraying survivors of child abuse discuss the impact of their abuse), learners are alerted that individuals whose lives have been touched by child abuse may find aspects of the video upsetting. With >5,000 CCPs in Pennsylvania having completed *iLookOut*, we have yet to receive a single objection or report of distress related to its content or presentation. Additionally, with <1% of CCPs ever reporting suspected abuse, study participants who do *not* report suspected abuse are not likely to be viewed (or targeted) as having failed in their duties to report at-risk children.

**D.13** Communication with Maine Collaborators: To ensure clear communication and coordinated involvement with collaborators in Maine's *Office of Child and Family Services* and *Division of Licensing and Regulatory Services*, 3 members of the study team will travel to Maine for an in-person working visit during Year 1 (see *Budget Justification*). Additionally, the grant PI will travel to Maine for frequent working visits (6 per year) during Years 1&2; will make quarterly in-person visits during Years 3&4; and also will conduct monthly video-conference meetings with Maine collaborators (who are being paid for their time) throughout the project.

**D.14** Power Analysis and Data Analysis Plan: The **unit of analysis** for this study is reported cases (by CCPs) of suspected child abuse.  Primary dependent variables are 1) the incidence of "High Yield" CCP reports, and 2) the proportion of costs from "Low Yield" CCP reports (as defined in the *Specific Aims* and measured at the 4 time points indicated in Figure 3 and Table 1). Primary independent variables are study arm (Innovation, Standard, Control) and time. Co-variates will include demographics of CCPs (see Appendix 2.1), estimates of intervention penetrance and inadvertent exposure (from end-of-year surveys), and rates of follow-up engagement (i.e., response to ping-ing). We do not anticipate any of the following to be confounders, but will record them and assess for this in the supplementary analyses: rurality, type of childcare setting, CCPs' baseline knowledge, CCP age, type of child abuse reported, and age and ethnicity of the child who was reported.

Sample size estimation for the number of needed reports is based on multivariate analysis of variance (MANOVA) for the 4 repeated measurements of the 2 primary dependent variables, and using the historical data in the past 5 years from Maine (see Appendix 4.7). Assuming a medium effect size of 0.33[111] with regard to MANOVA analysis of the repeated measurements, at alpha level of 0.05, to obtain a statistical power of 80% to detect the effect of intervention and time, 22 reports from each of the 3 arms (66 total), are needed annually. Given the nature of social/behavior research, a conservative drop-off rate of 20% will be expected (to account for CCPs recruited to the study, but who leave before outcomes are measured at year's end). This results in a final sample size estimation of 84 (= 66 ÷ 0.8) in total (28 reports per arm) at the beginning of study.

The primary statistical analysis will be the analysis for repeated measurement of the 2 primary dependent variables as defined in the *Specific Aim*s, using the arm and time as the 2 primary independent variables, through MANOVA. According to recent literature on the stepped wedge design,[112,113] the common linear mixed model (LMM) will be utilized instead of the generalized estimating equations (GEE) or generalized linear mixed models (GLMM), given that the 3 arms have equal size. We will use the PROC MIXED software, version 9.4,[114] including modeling the polynomial trends over time and comparisons of the 2 primary dependent variables among the 3 groups at different time points.[115]

Additional analyses will be performed to explore the relationship between the primary dependent variables and the covariates, using appropriate statistical analyses (e.g., ANCOVA, t-test, non-parametric tests, chi-square, etc.), whose choice will depend upon study outcomes data and their distribution. However, the results from these additional analyses should only be interpreted as exploratory (not confirmatory) because the sample size estimation is not based on these covariates, and therefore these analyses may not have enough power to detect any meaningful effect for these covariates.

Moreover, since individual level data will be collected (e.g., CCPs' knowledge and attitude scores), additional analyses of these data also will be performed (e.g., t-test, chi-square, ANOVA, non-parametric tests, and psychometric analyses), again based upon the data and their distribution –with the results likewise interpreted as exploratory.  The same analytic approaches will be applied to the data on Report Rate, Confirmation Rate, Social Service Rate, and Cost data, as for the supplementary analyses.

**D.15** Anticipated Challenges: 1) To ensure adequate participant recruitment to meet study goals, both the *iLookOut* and *Standard* training interventions will track CCP completion from each of the study arms, thus providing ready measures for tracking enrollment. In the event that enrollment is inadequate, this issue will be discussed during the monthly meetings with Community Care Workers, and additional recruitment strategies will be developed. This may also include convening focus groups of CCPs to identify barriers to their participation. That said, having enrolled 735 CCPs in just 3 weeks to complete *iLookOut* for a prior randomized controlled trial, we are confident that participant recruitment will be successful.

2) Inadvertent exposure to either *iLookOut* or *Standard* training will be identified through data collected i) during the registration section of each intervention, ii) in end-of-year surveys (see Appendix 4.1), and iii) by Intake staff who process reports of suspected abuse –which can then be correlated with CCP reports of abuse.

3) To minimize missing data for individuals, the *iLookOut* and *Standard* training interventions will require individuals to complete all question-items in order to receive professional development credit (which is likely a major incentive for completion). Also, back-end data platforms for each intervention will backed up daily to prevent loss of data. Regarding outcome measures data, Maine's centralized repository for all data collection and documentation (MACWIS) is designed to ensure data integrity, and is recognized as among the best in the country (see: Appendix 4.8).[116]

4) There is much to put in place during Year 1. To get a head-start on these activities, core members of the study team will begin work immediately following submission of this grant application to outline and create a work-flow for all revisions to i) *iLookOut* (including scripting, gamification, web-based modifications, etc.), ii) Maine's current state-approved *Standard* online training, and iii) the MACWIS' data-fields.

**D.16** Sustainability: In Year 5, all CCPs in Maine will be invited to complete *iLookOut*. During this open enrollment, no $10 incentive will be offered to participate. However, educational incentives will continue (e.g., professional development credit), and CCPs who complete *iLookOut* will receive gamified electronic messaging (ping-ing) to reinforce learning and sustain awareness regarding child protection. Continued participation by CCPs under these conditions will provide data on sustainability of this intervention.

In recognition of Maine's partnership on this study, *iLookOut* will remain available free-of-charge to the state of Maine following the completion of the study, at which time the only major cost to maintain it will be costs associated with electronic messaging. As such, during Year 5 we will explore the feasibility of Maine's OCFS setting up their own gamified, electronic messaging platform (i.e., to keep childcare providers aware/engaged). Such "in-house" service could significantly decrease the cost of continued ping-ing, though its feasibility clearly will depend upon the perceived value of gamified engagement, and the *iLookOut* intervention overall.

**D.17** Summary:  This 5-year randomized controlled trial will compare outcomes for matched geographic regions in Maine before and after childcare providers (CCPs) are recruited to complete the *iLook Out for Child Abuse* (*iLookOut*) learning module –versus *Standard* mandated reporter training, or no training at all.

The hypotheses to be tested are: **1)** Regions recruited to complete *iLookOut* will have a higher incidence of CCP reports (of suspected child abuse) for which child abuse is confirmed *and/or* social services are recommended (i.e., "High Yield"), compared to regions not recruited to complete *iLookOut*; and **2)** The proportion of costs related to Intake and Investigation of "Low Yield" CCP reports (i.e., for which abuse is *not* confirmed and *no* social services are recommended) will be lower in regions recruited (versus *not*) to complete *iLookOut*.

Partnering with Maine's *Community Care Workers* (who interact with CCPs on a daily basis) will enable ready recruitment of CCPs to complete the primary study intervention. Partnering with Maine's *Office of Child and Family Services* (which handles all intake and investigation of reports of suspected child abuse, and has one of the nation's top automated child welfare information systems) will ensure access to all data related to reports of suspected abuse and their outcomes, including cost. (N.B.: No individually identifiable data regarding any child or family will be collected for this study, nor will it introduce any new risks or burdens for CCPs.)

As detailed in the *Budget Justification*, the study team has a strong track record of collaboration, along with extensive expertise in online learning, early childhood education, reporting of suspected child abuse, gamification, and evaluation of mandated reporter training. Consequently, the study team is well positioned to evaluate the impact of *iLookOut* on CCP reporting of suspected abuse. If, as expected, *iLookOut* prepares (and motivates) CCPs to better protect young children from abuse, the result will be a powerful, readily exportable tool that promotes the well-being of children, and of society as a whole.