Summary statement: This is an extension project.
Our goal is to reduce risks to young children by increasing the capacity of educators, facilities managers and pest management professionals to teach and implement IPM in early educational settings. Such settings include public and private elementary schools, childcares, Head Start, and faith-based early learning programs. Successful IPM implementation in educational facilities requires a partnership between multiple individuals including:
• *extension educators* who provide information and programming to school communities;
• *childcare/early education professionals* who manage classrooms and children daily;
• *facilities managers* who assure building safety
• *pest management professionals* who provide pest management services
The project develops innovative, targeted IPM programming for each of these groups, utilizing existing networks to reach new audiences.

We will work with partners and stakeholders to:
1) Adapt IPM modules for inclusion in existing professional development programs for childcare professionals and facilities managers;
2) Deliver IPM education via pre-existing early education and facilities networks;
3) Develop train-the-trainer materials for Cooperative Extension to include IPM in community programming;
4) Work with pest management professionals to articulate IPM protocols and sample contracts for accounts in sensitive environments.

This project contributes to NERIPM goal: Reduce risk of pests and pesticides to people and the environment and NERIPM School Working Group 2008: Education/Outreach: *Conduct outreach to all stakeholder groups; Coordinate education efforts with parallel efforts; Develop and utilize educational methods appropriate for the audience; improve linkages between regulatory agencies and extension; Educate policy-makers about the needs and benefits of IPM in terms of dollars, health, academic performance.*

Project Narrative

Problem statement: Multiple studies document the fact that the 16.6 million young children inhabiting childcare and early educational environments in the US today are not consistently protected from indoor pests nor pesticide exposures. General awareness of the relationship between pests, pesticides and children's health remains low. IPM education, protocols and policies are proven to mitigate these situations, but the ability of traditional Land Grant IPM programs to provide IPM education and training to this vast and diverse audience is insufficient. IPM topics are not currently included in the many existing networks that routinely reach educators of and decision-makers in educational environments. These target audiences include Cooperative Extension Educators charged with Children, Youth and Family / Health programming, childhood and early education professionals, facilities managers and pest management professionals. IPM implementation must be a team effort between these potential agents of change, yet because coordination and programming is lacking at all levels, IPM awareness and adoption by schools of all types remains unacceptably low. The economic impacts of improving IPM awareness and adoption in these environments include reduced costs of *effective* pest control; reduced incidence of asthma in children and the associated costs of emergency health care and absenteeism; increased reach of IPM education efforts per dollar spent, and increased marketability of IPM-specific contracts for pest management professionals.

Background: Address the specific needs ID by stakeholders & NE Center.

The proposed project addresses multiple priorities identified over several years in the National Roadmap (2004) and the Northeast Regional Working Groups on Community and School IPM.

• National IPM Road Map (2004) *"Reduce potential human health risks from pests and related management strategies."*

• Community IPM 2007, #3 *"Develop Pest Management Strategic Plan for structures*;

• School IPM 2008 All objectives of the proposed project address one or more priorities.

Education/Outreach: *Conduct outreach to all stakeholder groups; Coordinate education efforts with parallel efforts; Develop and utilize educational methods appropriate for the audience; improve linkages between regulatory agencies and extension; Educate policy-makers about the needs and benefits of IPM in terms of dollars, health, academic performance.*

Local and regional stakeholder priorities: The project addresses specific needs for IPM education and training for childcares, facilities managers, pest management professionals and extension agents, identified by PA IPM Program stakeholders in the state, region and the Philadelphia School and Community IPM Partnership. Our regional asthma partners are particularly invested in increasing IPM understanding and adoption to improve health outcomes. (See content in letters of support, Appendix A).

Relevant ongoing or completed work:

• PA IPM Program Efforts: PA IPM Program staff have been involved in developing the Pest Management Strategic Plan for Schools 2015. This document provides a platform from which to undertake the proposed project. In addition, the PA IPM Program recently completed a 4-module educational series on "IPM in Childcare" in Spanish and English targeting childcares servicing primarily Latino communities funded by EPA Region III PESP. This product was developed and piloted in the Philadelphia area. These materials are flexible; deliverable as one overview session or as a series of four. Modules were extremely well-received, resulting in requests from many

more childcares and regional organizations, building a significant stakeholder foundation ready to participate (see letters of support). Pilot evaluations of education efficacy showed large changes in awareness after a single presentation and significant intent to make changes in practices in those facilities completing the series.

• Relevant national studies and information:

Risks to Children: Pesticides Exposures: Negative health effects of pesticides are well documented, and children are at particular risk of both acute and chronic exposures (Ma, et al., 2002; Calvert, G.M, 2004). Yearly data from the American Association of Poison Control Centers consistently show that children are at risk of *acute exposures* to pesticides. Pesticide exposures typically rank 8th in cause of childhood poisonings each year. In 2007, children under 6 yrs old comprised 12,422 cases (83%) of the poisonings due to rodenticides and 19,973 cases (38%) of those due to insecticides (Bronstein, et al., 2008). Meantime, *chronic exposures* to pesticide residues are provided to children by past, continued and repeated use of pesticides by parents, caregivers, teachers, facilities managers and pest management professionals. Studies have verified that there are diverse and ubiquitous pesticide residues on surfaces in homes and childcare centers (Whitmore et al., 1994; Wilson and Lyu, 2001; Morgan et al., 2002). Even when label directions are followed, use of common pesticides indoors can leave significant residues on toys and surfaces handled by children (Gurunathan et al., 1998). In homes, recent national studies show most residences had multiple pesticide residues including permethrin (89%), chlorpyrifos (78%), and chlordane (64%), running the gamut of pesticide classes and history (Stout et al., 2009).

In another national study of 168 childcare centers, staff were interviewed regarding pests and pesticide use. Sixty-three percent of the centers collectively reported using 375 different pesticides products. Frequency of use was from 1-107 times/year. Of the 38 different pesticide active ingredients (a.i.) sampled, residues of 21 were routinely detected. Some childcare centers had residues of 10 different pesticides. Chlorpyrifos and diazinon were present in a high percentage of the facilities on floors (89% and 93% of centers respectively) and tabletop surfaces (93% and 60% respectively). Of the 375 products reportedly used by childcare personnel, only 107 contained the 38 active ingredients included in the study. Only 18% of centers reported that they did not use pesticides (Tulve et al., 2006).

Pests and Asthma: The scope and frequency of pesticide use indicates that there must also be chronic presences of pests in indoor environments. These pests can also present unacceptable risks to children. Cockroach and rodent proteins are strong allergens and asthma triggers. Asthma is the number one cause of school absenteeism in the nation and has become epidemic, in some areas afflicting as many as 34% of children under age 18 (Akinbami, 2006). Children in substandard housing suffer disproportionately from asthma and the presence of cockroach allergens (Wang, et al., 2008; Cohn et al., 2006). Children exposed during their first year to cockroaches were at a 2-fold higher risk of developing asthma while infants exposed to herbicides and insecticides were at a 4.6 and 2.5 fold increase in asthma risk respectively. There is also a positive correlation between childcare center attendance at young age and early onset asthma (Salam et al. 2004).

Effectiveness of IPM: Numerous studies clearly show that, compared to "conventional" pesticide based pest management approaches, using IPM protocols in schools and homes can effectively eliminate pests, reduce asthmagens, reduce or eliminate more hazardous pesticide formulations and is cost effective (Wang and Bennett, 2006; Williams et al., 2005; Miller and Meek, 2004; Kubista-Hovis and Lame, 2004; Green and Breisch 2002). Yet, the fact remains that the vast majority elementary schools, kindergartens, childcares, Head Starts and other early educational facilities in the US are not operated under any IPM policy or reduced-hazard pesticide policy. Thus, millions of children are impacted negatively and unnecessarily by pesticide residues and pests throughout their school-attending years.

Effectiveness of Laws: National bills to require IPM in schools have been introduced to Congress unsuccessfully since 1999 (Green, 2008). As of December 1, 2009, the School Environmental Protection Act has been reintroduced to the House and referred to the Committee on Agriculture. Schools are defined as public schools or schools receiving federal funding including elementary, secondary, kindergarten or nursery schools**.** Although 35 states have some form of legislation pertaining to pesticide use in schools, there is little oversight or enforcement of these laws. Only 15 of the 35 include language mandating IPM policies (Green, 2008).

Numbers Potentially Affected / Impacted: There are approximately 21 million children in the US under 5 yrs old, and 74 million total under age 18 (US Census a, 2008). National statistics of school enrollment of children 3-6 yrs old estimate that 16.6 million are enrolled in public or private nursery schools, kindergarten and elementary schools (US Census b, 2008). For the youngest group, Head Start alone involved 2,500 facilities and had enrollment of 908,412 in 2007 (USDHHS 2006).

Justification

Improving awareness, understanding and implementation of IPM in childcare and early learning facilities will have multiple beneficiaries in the Northeastern Region. Indoor environmental health conditions will be improved as IPM practices and policies begin to be adopted, positively impacting all inhabitants of facilities (children, staff, teachers, custodians). Cooperative Extension Service educators will have more educational programs relevant to regional stakeholders in the quest for improved health, which in turn benefits all citizens participating in CES programming. Childcare and early education professionals (C/EEP) will learn new ways to create healthy environments for children, potentially impacting hundreds of thousands of children over time. Facilities managers will become better equipped to meet state and pending national regulations for high-performance in reduced-risk pest management, reduce complaints due to pests, implement true IPM contracts with PMP, improve communication with parents on pest management issues and save costs in the long run. Pest management professionals (PMP) will gain new, marketable products to better provide IPM services to sensitive environments, thus improving both their bottom line and their expertise in IPM. Currently, none of these audiences are being served with a consistent, coordinated, science-based IPM education and training program, yet all must function in cooperation to implement IPM.

This project can serve as a model for novel and efficient use of diverse networks to begin to improve IPM awareness, knowledge, skill and implementation across these sectors. Even over the short 2 years of the project, with 6 educational products delivered to target audiences, we

expect to be able to easily reach 500 childcare and early education professionals, 80 extension educators, 40 facilities managers, and 5 pest management companies operating within the Northeast region. By extension, thousands of children may be impacted in the short term, with many more over time. Without this project, this model for broad engagement of childcare/early educational audiences will not exist and thus important audiences will not be consistently reached.

Objectives and Anticipated Impacts

As a direct result of this project, we expect to forge key new alliances to maximize IPM information extension to broad audiences serving childcare and early educational environments. We will develop and deliver 2 new programs to educators through Better Kid Care reaching at least 500 educators; 2 new programs to facilities managers through the Association of School Business Officials reaching 40 managers; 2 new programs to Cooperative Extension Service Children Youth and Family educators reaching 80 individuals and collaborate with 5 pest management companies to develop IPM contracts for sensitive environments. These activities will directly impact the ability of new audiences to educate others and implement IPM practices and thereby also impacting the many thousands of children who are dependent upon these decision-makers to assure healthy learning environments. All objectives and impacts are itemized in the logic model at the end of the narrative section. Details are discussed below.

Objective 1: Adapt IPM modules for incorporation into existing regional, state and national professional development programs for childcare professionals and facilities managers.
Impacts of these activities use the "soft" science of building networks to identify and accomplish common goals. New strategic partnerships become established and learn how to function together, new content modules become available for previously difficult to reach audiences, and IPM concepts become incorporated as significant component of ongoing efforts to promote "healthy environments/healthy schools" for children. Partners also are impacted in that they increase the diversity of educational offerings available and/or their ability to make change.

Objective 2: Deliver IPM education via pre-existing networking systems across the region
Impacts of these activities are measurable gains in awareness and actionable knowledge of many individuals within diverse audiences. We expect to reach at least 200 childcare/early education professionals (C/EEP) educators in the first offering of the IPM module and 300 or more in the second. We will be able to track these numbers and the associated number of children under the jurisdiction of these individuals by queries embedded in the pre-post evaluation tools. In addition, many more people are expected to be reached over the lifetime of the project and beyond given that Better Kid Care (BKC) turns initial modules into archived lesson plans that can be completed at any time by participants. BKC programming to C/EEP routinely reaches over 40,000 individuals across Pennsylvania and 40 other states, and indeed, around the world. Educators in 180 countries have accessed BKC satellite programming. (See Appendix B for matrix of BKC programs, audience and reach). Because BKC is a licensed provider of continuing education for C/EEP audiences, they can track the number of participants completing the modules via credit verification. We expect to be able to quantify steps that individuals will take risk due to pests and pesticides.

Objective 3: Develop Train-the-Trainer materials for Cooperative Extension to add IPM to community programming on health and well-being

Impacts of activities under this objective include maximization of "the power of extension" to reach into all communities through county-based programming, and creating synergy through new cooperative relationships between states in the region. By creating a new programming platform, with tools appropriate for CES Children, Youth and Family audiences, we will foster a regional "community of practice" network, and provide for new ways for extension to interact with new clientele. University of Maryland CES has already identified IPM as an important component of their strategic plan to form "Action Teams" as part of new HealthSmart programming (See Appendix C).

Objective 4: Work with Pest Management Professionals (PMPs) to articulate IPM protocols and sample contracts for accounts in childcare/early education (C/EEE) and other sensitive areas

Impacts of including PMP in the process of improving IPM performance in schools are many-fold. We will learn about the practical constraints and level of engagement in IPM of our PMP partners. New IPM partnerships formed with PMP businesses will assure that programs developed are actually in tune with what PMP are able to deliver at a reasonable price. PMP in turn will increase their capacity to gain advantage in C/EEE market and be a visible player in helping promote healthy environments for children. Finally, the project will help facilities managers increase their ability to recognize, require and access IPM services.

Approach and Procedures

The specific approach to each objective is outlined below and summarized in the Logic Model.

1a) Adapt IPM modules for incorporation into existing regional, state and national professional development programs for *childcare professionals.*

Our pre-existing "IPM for Child Care" modules must be condensed, formatted and adapted to a 2-hour program incorporating diverse media to be "mass-marketed" to childcare and early educational professionals (C/EEP). Our experienced partners in BKD will lead us in this activity. As the module is developed, we will seek continuing education credits from relevant entities. In Pennsylvania, early educational professionals and administrators are required by the PA Department of Public Welfare (DPW) to be licensed and undergo initial orientation for operating a childcare facility. DPW and the PA Department of Education (PDE) require these staff and administrators to have continuing education in multiple aspects of operating a childcare facility, and there is a constant need for diversity of programming to fill this need. This same approach will be taken in Maryland with the help of UMD Cooperative Extension professionals familiar with such requirements in MD. Integral to module development will the development of evaluation and learning assessment tools (see evaluation section).

Objective 1b Approach to adapting IPM modules and reaching and engaging *facilities managers*.

The PA IPM Program has already developed and delivered a day-long workshop on IPM for facilities managers held at the Pittsburgh Public School District in April of 2009. We will adapt these materials into a shorter, 2 hr module that can be offered either through Better Kid Care for childcare administrators and/or through local, state or regional organizations such as the Association for School Business Officials (ASBO). In Pennsylvania, the PA IPM program has established a good working relationship with the Pennsylvania Association of School Business Officials (PASBO). The majority of school facilities managers in the state belong to this

organization. PASBO estimates that at least half of their facilities also house early childhood education of various types. PASBO also has a credentialing process for continuous quality improvement for facilities managers. We will investigate the possibility of inclusion of IPM trainings developed for this project into this accreditation system. The PA IPM Program has also previously established a listserve for communication with school facilities managers, thus we have begun to build a regular communications network with this audience.

Objective 2: Deliver IPM education via pre-existing networking systems across the region.
We will create, format and deliver IPM educational products by joining forces with Penn State Cooperative Extension's Better Kid Care Program (BKC). BKC hosts an interactive web site, satellite workshops, web-based training workshops, video distance education units, on-site training and a toll-free telephone mentoring help line. They have methods in place for producing resource and reference materials, developing marketing materials for instructors, and marketing to target audiences including C/EEP, regional C/EEE organizations, radio and print media. Our collaborative efforts will build on their existing efforts and utilize their expertise and network to incorporate IPM concepts into their programming as part of new health-based education efforts. Together we will organize and deliver 4 training "events" (exact formats /delivery media to be decided); 2 for C/EEP and 2 for facilities managers. Where appropriate, we will facilitate credit delivery to participants and archive distance delivery sessions. As outlined in the evaluation section, we will compile evaluation results and incorporate feedback to revise the educational content.

Objective 3 Develop train-the-trainer materials for Cooperative Extension to include IPM in community programming on health and well-being
Project managers constructing train-the-trainer materials will solicit input from individuals in diverse fields including regional and state school health officials, asthma mitigation groups, healthy homes experts, BKC staff, and Cooperative Extension CYF professionals. Cooperative Extension personnel are already involved at varying levels in USDA Healthy Homes programming, especially University of Maryland (again, see Appendix C). We aim to strengthen the IPM components of these efforts and develop more substantial IPM materials around which to build trainings. New materials for CES agents to use with their audiences will be developed and delivered along with 2 extension training sessions, one of which will be executed via distance education. To help facilitate a new "community of practice" around IPM/healthy schools, we will set up regional list-serve for exchanging information on this topic.

Objective 4: Work with Pest Management Professionals (PMPs) to articulate IPM protocols and sample contracts for accounts in C/EEE and other sensitive environments.
PA IPM has ongoing relationships with several regional and local pest management companies. We will begin by using these relationships to enlist PMP partners to discuss contract terms and language for IPM protocols in C/EEE. Under discussion will be PMP' challenges to providing IPM services to schools, "less-toxic" pesticide uses and cost constraints. We hope to expand this discussion into the larger PMP community or venues with contacts with the Pennsylvania Pest Management Professionals Associations. To help facilities managers and PMP "find each other", we will create a list of PMP companies that can provide IPM contractual services

A timetable for engaging in these activities is attached on the following page.

Objectives	Outputs (actions)	Timeline
1) Adapt IPM modules for inclusion in existing professional development programs C/EEP & FM	• Discuss format, content, number of modules and target audiences • Identify accreditation incentives for various audiences' needs • Build IPM modules to meet accreditation standards • Develop evaluation and learning assessments for modules	7/1/10 – 12/31/10 July July August-November October-December
2) Deliver IPM education via pre-existing early education and facilities networks	• Create diverse delivery formats from core modules • Identify upcoming venues for education /training • Advertise, recruit /reach out to C/EEP and facility mgrs • Organize and deliver **4 trainings** = 2 for C/EEP, 2 for facil mngr • Administrate credit delivery to participants • Archive distance delivery sessions • Compile evaluation results & incorporate feedback	1/1 – 10/31/11 January-March January February-March March-July July-August August August-October
3) Develop train-the-trainer materials for Cooperative Extension to include IPM in community programming on health and well-being	• Develop relationship with CES MD, PA and MA partners • Discuss ways to strengthen /incorporate IPM into USDA Healthy Homes (HH) materials • Develop training materials to accompany IPM for C/EEE • Plan extension training sessions • Deliver **2 extension training** sessions (1via distance education) • Evaluate both training effectiveness and learning • Set up regional list-serve for exchanging info on IPM-HH	7/1/ 10 – 3/31/12 July July August-November October-December February-June August-October July
4) Work with PMP to articulate IPM protocols and sample contracts for accounts in sensitive environments (C/EEE)	• Enlist PMP partners • Hold meeting with core group to discuss issues, "less-toxic" pesticide uses • Come to consensus on which practices = cost-effective, least hazardous for C/EEE • Share generic IPM contract information with C/EEE/ school facilities managers • Create a list of PMP companies that can provide IPM contractual services	11/1/10 – 12/31/11 November December March-June June-November

Evaluation Plans

The goal of the project is to increase the capacity of decision makers in childcare and early educational environments to understand and take action to improve IPM practices. Our methods for so doing are also, in part, goals unto themselves: to bring new partners into the IPM sphere; and to assure that IPM messages / methodologies become part of partners' education and/or quality improvement programs. Measurement and evaluation of progress towards these goals and methods fall into three general categories.

- knowledge, capacity and intentions gained by each of four target audiences
- integration of IPM educational materials developed
- establishment of effective partnerships and extended networks

Monitoring and evaluating the impact of activities under each category will require different approaches. From the beginning, we will work to build the appropriate evaluation tools into each phase of the project by working with Cooperative Extension evaluation experts from Penn State (Ms. Nancy Ellen Kiernan and Dr. Claudia Mincemoyer), the University of Maryland (Dr. Elisabeth Maring) and the University of Massachusetts (Dr. William Coli).

• Knowledge and capacity gained by target audiences

1. Childcare/Early Education Professionals (C/EEP)

The core objective of this project is to increase the capacity of individuals in daily contact with children in classrooms, to understand, gain motivation for action and take individual action to improve pest management and pesticide safety in children's environments. For evaluating progress towards this objective, we will use a form of pre-post query at the time of program delivery to measure qualitative and quantitative changes in participants' Knowledge, Attitude, Skills and Aspirations (KASA) with regard to pest management and pesticide safety. This tool will identify type of person/facility being served, how many children are under their care/tutelage, pre-education practices and understanding; and increase in understanding and changes they expect to make as a result of the session(s). This same evaluation method can be built in to subsequent formats the IPM modules take (eg. archived credentialed module that can be accessed on-line at any time; webinars; in-person deliveries). For evaluation beyond the initial delivery/use of the module, an IPM space will be set up on the Better Kid Care (BKC) website, where C/EEP can post follow-up information, ask questions and report in any subsequent changes beyond the information provided at the post-delivery questionnaire.

2. Facilities Managers (FM)

Evaluation tools utilized for measuring impact of IPM educational modules for FM will follow a similar strategy to that used for the C/EEP, but with the inclusion of questions on more technical components of school IPM with attention to identifying barriers to IPM adoption, cost/benefit analyses and current contractual arrangements with PMPs and intended changes, if any. Key gains we hope to see are the increase in the number of facilities instituting IPM policies and utilizing/requiring PMPs to use IPM contracts. These results will provide an estimate of number of children protected under these policies.

We will also work to establish a new IPM presence on the state and regional Association of School Business Officials (ASBO) website that will include Pest Management FAQs and timely topics such as Pest of the Month that link to the PA IPM website IPM in Schools page. These

hits can be monitored for traffic, most commonly asked questions and possibly also function to query the type of visitor (staff, facilities manager, teacher, etc). Visitors will be invited to join the Pennsylvania IPM in Schools Network (PASIN) listserve. Data will be collected on changes to Knowledge, Awareness, Skills and Aspirations (KASA), intent to make specifically-identified changes in the facility and/or pest management contract; numbers joining the listserve and hits on BKC/ASBO/IPM websites.

3. Extension Agents

Development and delivery of IPM training materials to Cooperative Extension Service, Children, Youth and Family (CYF) agents currently providing Health, Nutrition and Well-being programming is a key objective. Impact will be evaluated via survey of all participants at the end of the project. By this time, an estimated 80 CYF agents will have been trained in the IPM module. Adaptations to standard program evaluation questionnaires can be used to determine how effective the module was for these agents. Agents will also be trained in how to incorporate and deliver the IPM module within a Healthy Homes / Healthy Schools/ Healthy Indoor Environment program to their clients. By the end of year 2, some subset of these agents will have completed such programming with their clients. A detailed questionnaire will be provided to these agents to evaluate how effective the components of the training were "in the field".
For the three audiences above, specific evaluation questions will be designed to provide an estimate of the total number of children impacted by improved pest management knowledge.

4. Pest Management Professionals (PMP)

We aim to increase the capacity of PMP to understand how IPM might be applied to sensitive environments and their ability to develop and market contract language to that effect. To evaluate this activity, we will document the effectiveness of the approach to engaging PMP in this conversation. Pest management is a highly competitive environment, making cooperation towards mutual benefit a challenge. Questions = Does working with individual PMP companies lead to a) their willingness to work together on such language b) their adoption of such language into a pre-existing or newly constructed contracts and c) does working a relationship network with a subset of PMP lead to a larger dissemination / interest of other companies to be involved? This project will help answer these questions in order to improve collaborative relationships with PMP.

• Integration of the educational materials developed

Integration of IPM education into partners' networks assures both reaching these important new audiences and the sustainability of the materials beyond the life of the project. Quality, well-targeted educational materials and programming are accepted by educators and/or participating clients and thus incorporated into their offerings for the future. Evaluation of the success of IPM materials and trainings developed by this project for all audiences (except PMP) will be by documentation of the extent to which they have been incorporated into C/EEP programs, ASBO trainings and websites, and partners' Cooperative Extension CYF Healthy Homes / Healthy Schools offerings. Currently there are no substantive IPM materials in any of these, so any progress will be useful. Other measures of success include number and type of new accreditations acquired for IPM education/training modules. Accreditation assures demand in that the trainings provide content for participants needs for professional development.

• Establishment of effective partnerships and extended networks
Evaluation of this goal/methodology will be a descriptive measurement of the dynamics, challenges and accomplishments of our new partnerships. Once functioning, the synergies between new partners typically produce more measureable outcomes than can be predicted at the outset, e.g. ideas and plans for new fact sheets, new forums for education and outreach, new ways to present materials to diverse audiences, and new avenues for leveraged funding or support. We will enumerate and evaluate the impact of these outcomes and identify any new active collaborative subprojects.

(v) Key Personnel
The project will be directed by Dr. Edwin Rajotte and co-directed by Dr. Claudia Mincemoyer and Ms. Lyn Horning at Penn State University.

Dr. Rajotte is Professor of Entomology and the PA IPM Coordinator. He provides extensive relevant skills to the project including experience building strategic relationships with school business officials, providing IPM planning and programming expertise to schools, working with pest management professionals and developing and delivering technical training in IPM to multiple audiences. Dr. Rajotte has a team of experienced staff members upon whom he can call to participate. Specifically, PA IPM will hire a technician to carry out the mechanics of the proposed project. Also Ms. Michelle Niedermeier, MS, will contribute expertise and part-time hours to help formulate the specific IPM content for early education professionals and facilities managers. Ms. Niedermeier has extensive experience delivering IPM programs to diverse audiences and produced and delivered the 4 module set “IPM for Childcares” in Spanish and English in Philadelphia.

Co-director Dr. Mincemoyer is Associate Professor of Agricultural and Extension Education and Director of the Better Kid Care Program. Dr. Mincemoyer is experienced in all manner of extension outreach education programming, the educational approaches that are effective with early learning audiences and the specific programming opportunities offered by Better Kid Care. Ms. Lyn Horning, MS, is Assistant Program Director for Better Kid Care and knowledgeable in the mechanics of distance education and credentialing through the Better Kid Care program. The co-directors roles will be to provide program oversight, strategic planning and coordination of efforts. Better Kid Care will also enlist the time of their staff to complete the duties assigned.

Partners/Collaborabors: Dr. Elisabeth Maring
Dr. Maring is an Extension Specialist in Healthy Homes with a joint appointment in the School of Public Health. Her involvement is key to fulfilling the Objective #3, to develop train-the-trainer programming for extension agents working in community and children, youth and family. Her training in public health and expertise in program evaluation, risk communication and Healthy Homes compliment and complete the skill set of our team.

In addition, Dr. William Coli, of University of Massachusetts will advise the team on evaluation tools and appropriate measurements of progress for each aspect of the project. He is providing this service gratis, as part of his role as leader of the NE RIPM Evaluation Working Group.

Project: Building IPM Capacity in Childcare and Early Educational Environments
Focus Area: Residential and Public Areas (Schools) **Impact Area**: Human Health (Children)
Road Map Goal: Reduce potential human health risks from pests and related management strategies.

Objectives	Outputs (actions)	Outcomes (Impacts)	Performance Measures	Timeline
1) Adapt IPM modules for inclusion in existing professional development programs for childcare/early ed professionals (C/EEP) and facilities managers (FM)	• Discuss specifics of format, content, number of modules and target audiences • Identify accreditation incentives for various audiences' participation • Build IPM modules to meet accreditation standards • Develop evaluation and learning assessments for modules	• New strategic partnerships established and functioning • New content modules for new audiences • IPM concepts incorporated as component of "healthy environments" • Increased diversity of educational offerings available through BKC	• # of new active collaborative subprojects • # of new audiences identified and being served • # of new accreditations acquired for IPM ed/training modules • # of new websites with IPM presence / listing education modules	Begin July 1, 2010 Complete Dec. 31. 2010
2) Deliver IPM education via pre-existing early education and facilities networks	• Create diverse delivery formats from core modules • Identify upcoming venues for education /training • Advertise, recruit /reach out to C/EEP and facility mgrs • Organize and deliver **4 trainings** = 2 for C/EEP, 2 for facilities managers • Administrate credit delivery to participants • Archive distance sessions • Compile evaluation results & incorporate feedback	• New audiences gain awareness and actionable knowledge • New educational modules exist as archived materials • New information on current knowledge and practices generated • Childcare environments reduce risk due to pests and pesticides	• # of new outreach vehicles in use • # of new accreditation credits obtained by participants • # of participants reached • # and types of changes participants pledge to make • # facilities managers reached through ASBOs • # facilities managers joining IPM listserve	Begin: Jan 1, 2011 Complete: Oct. 31, 2011

3) Develop train-the-trainer materials for Cooperative Extension to include IPM in community programming on health and well-being	• Develop relationship with CES Maryland, Pennsylvania and Massachusetts partners • Discuss ways to strengthen /incorporate IPM into USDA Healthy Homes(HH) materials • Develop training materials to accompany IPM for C/EEP • Plan CES training sessions • Deliver **2 extension training sessions** (1via distance ed) • Evaluate both training effectiveness and learning • Set up regional list-serve for exchanging info on IPM-HH	• New cooperative relationships between states in region • New regional "community of practice" network • New programming platform with tools for extension agents • New/tools ways for extension to interact with new clientele	• # of agents participating • estimate of # of clients potentially reached by these agents • measurement of increase of awareness & knowledge of training participants • # and type of additions to extension programming	Begin: July 1, 2010 Complete: March 31, 2012
4) Work with PMP to articulate IPM protocols and sample contracts for accounts in sensitive environments; C/EEE (Childcare/ EarlyEducationEnviro.)	• Enlist PMP partners • Hold meeting with core group to discuss issues, "less-toxic" pesticide uses • Come to consensus on which practices = cost-effective, least hazardous for C/EEE • Share generic IPM contract information with C/EEE/ school facilities managers • Create a list of PMP companies that can provide IPM contractual services	• New IPM partnerships with PMP businesses • Increased potential for PMP to gain advantage in C/EEE market • Increased ability for C/EEE facilities access IPM services	• Achieve consensus on what constitutes cost-effective, least hazardous IPM for C/EEE • Progress/completion of new contract language specific to C/EEE • # of participating PMP • # of PMP listed as providers of such service • # of facilities reporting use of IPM contracts	Begin: Nov. 1, 2010 Complete: Dec. 31, 2011

BIBLIOGRAPHY

Akinbami, L. J. (2006). "The State of Childhood Asthma, United States, 1980-2005." Advance Data From Vital and Health Statistics, US Department of Health and Human Services, CDC, National Center for Health Statistics **Number 381**.

Bronstein, Alvin C., Spyker, Daniel A., Cantilena JR, Louis R., Green, Jody L., Rumack, Barry H. and Heard, Stuart E. (2008) "2007 Annual Report of the American Association of Poison Control Centers, National Poison Data System (NPDS): 25th Annual Report", Clinical Toxicology, 46:10, 927 — 1057

Calvert, G. M. (2004). "Health effects from pesticide exposure." Am Fam Phys **69**(7): 1613-6,

Cohn, R. D., S. J. Arbes, Jr., R. Jaramillo, L. H. Reid and D. C. Zeldin (2006). "National prevalence and exposure risk for cockroach allergen in U.S. households." Environ Health Perspect **114**(4): 522-6.

Green, T. (2008). "IPM in Schools: IPM Standards Available for Schools", retrieved from the IPM Institute of North America at http://www.ipminstitute.org/school.htm."

Greenberg, S. (2003). Cockroach Allergen Reduction Using Precision-Targeted IPM and the Lead Dust Cleaning Protocol. Cleveland Environmental Health Watch**:** 1-39.

Greene, A. and N. L. Breisch (2002). "Measuring integrated pest management programs for public buildings." J Econ Entomol **95**(1): 1-13.

Gurunathan, S., M. Robson, N. Freeman, B. Buckley, A. Roy, R. Meyer, J. Bukowski and P. J. Lioy (1998). "Accumulation of chlorpyrifos on residential surfaces and toys accessible to children." Environ Health Perspect **106**(1): 9-16.

Hoppin, P., M. Jacobs and L. Stillman (2007). Investing in Best Practice for Asthma: A Business Case for Education and Environmental Interventions. Dorchester, MA, Asthma Regional Council.

IPM Institute of North America, School IPM Pest Mangement Strategic Plan (2009) at http://www.ipmcenters.org/pmsp/pdf/USschoolsPMSP.pdf

Kubista-Hovis, K. and M. Lame (2004) "The Economics of School IPM; An Analysis of the Monroe IPM Model in Bloomington Indiana, National Schools Update US EPA BPPD 1(3): 5-7

Ma, X., P. A. Buffler, R. B. Gunier, G. Dahl, M. T. Smith, K. Reinier and P. Reynolds (2002). "Critical windows of exposure to household pesticides and risk of childhood leukemia." Environ Health Perspect **110**(9): 955-60.

Miller, D. M. and F. Meek (2004). "Cost and efficacy comparison of integrated pest management strategies with monthly spray insecticide applications for German cockroach (Dictyoptera: Blattellidae) control in public housing." J Econ Entomol **97**(2): 559-69.

Morgan, M. K., L.S. Sheldon, C.W. Krogan, J.C. Chuang, R.A Lordo, N.K. Wilson, C. Lyu, M. Brinkman, N. Morse, Y.L. Chou, C. Hamilton, J.K. Finegold, K. Hand and S.M Gordon (2004). "A Pilot Study of Children's Total Exposure to Persistent Pesticides and Other Persistent Organic Pollutants (CTEPP)." **Volume 1 and Final Report Volume 2**: Appendices; EPA /600/R-04/193 USEPA, Washington DC.

Salam, M. T., Langholtz, Y. L. Gilliland, F. D. (2004) " Early-life environmental risk factors for asthma: findings from the children's health study, Env Health Persp. 112(6), pp 760-765

School Environment Protection Act, (2009) H.R. 4159 introduced 12/1/09, downloadable at http://www.govtrack.us/congress/bill.xpd?bill=h111-4159

Stout, D.M., K.D. Bradham, P. P. Egeghy, P. A. Jones, C. W. Croghan, P. A. Ashley, E. Pinzer, W. Freidman, M. C. Brinkman, M. G. Nishioka and D. C. Cox (2009), "American Healthy Homes Survey: A National Study of Residential Pesticides Measured from Floor Wipes", Environ. Sci. Technol. 43 (12), pp 4294–4300

Tulve, N. S., P. A. Jones, M. G. Nishioka, R. C. Fortmann, C. W. Croghan, J. Y. Zhou, A. Fraser, C. Cavel and W. Friedman (2006). "Pesticide measurements from the first national environmental health survey of child care centers using a multi-residue GC/MS analysis method." Environ Sci Technol **40**(20): 6269-74.

U.S. Census: Population & demographic statistics (2008 estimates) http://quickfacts.census.gov/qfd/states/00000.html and historic trends at http://www.census.gov/prod/2001pubs/c2kbr01-12.pdf

U.S. Census: School enrollment statistics (2008 estimates) http://www.census.gov/population/www/socdemo/school/cps2008.html

USDHHS (2006). "US Department of Health and Human Services; Head Start Program Information Report, 2002-2005." retrievable off the web at http://eclkc.ohs.acf.hhs.gov/hslc.

Wang, C., M. M. Abou El-Nour and G. W. Bennett (2008). "Survey of pest infestation, asthma, and allergy in low-income housing." J Community Health **33** (1): 31-9.

Wang, C. and G. W. Bennett (2006). "Comparative Study of Integrated Pest Management and Baiting for German Cockroaches Management in Public Housing." Entomological Society of America **99**(3): 879-885.

Whitmore, R. W., F. W. Immerman, D. E. Camann, A. E. Bond, R. G. Lewis and J. L. Schaum (1994). "Non-occupational exposures to pesticides for residents of two U.S. cities." Arch Environ Contam Toxicol **26**(1): 47-59.

Williams, G.M., H.M. Linker, M.G. Waldvogel, R.B. Leidy and C. Schal (2005) Comparison of conventional and integrated pest management programs in public schools. J. Econ Ent 98: 1275-1283

Wilson, N. K., Chuang, J. C., Lyu, C. (2001). "Levels of persistent organic pollutants in several child cay care centers." J Expo Anal Environ Epidemiol **11**: 449-458.

Penn State Better Kid Care Statistics Report
Fiscal Year July 2008 - June 2009
APPENDIX B -- Page 1 of 2

Certificates Issued

08/09	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals
Mail-based	1,488	970	1,765	1,629	2,220	1,238	2,067	2,444	3,032	2,876	2,012	2,919	24660
Web-based	270	197	328	344	331	256	509	432	724	497	386	457	4731
New Staff Orientation 15 hours	484	392	465	500	627	425	630	646	628	522	472	582	6373
New Staff Orientation Partials (.5 hrs)	-	8	-	-	-	22	-	-	4	-	-	-	34
New Staff Orientation Refresher (3 hours)	21	4	29	38	35	11	56	52	94	40	37	38	455
Home-based Caregiver Orientation	42	28	51	50	75	44	74	23	84	79	73	145	768
1-hour extra satellite	57	7	1	4	30	60	90	21	7	70	62	128	537
Monthly program totals - certificates	2,362	1,606	2,639	2,565	3,318	2,056	3,426	3,618	4,573	4,084	3,042	4,269	37558

RIPM 2010

Training Hours

08/09	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals
Mail-based (2 hrs)	2,976	1,940	3,530	3,258	4,440	2,476	4,134	4,888	6,064	5,752	4,024	5,838	49,320
Web-based	402	333	530	559	507	418	770	647	1124	736	599	720	7,345
New Staff Orientation (15 hrs)	7,260	5,880	6,975	7,500	9,405	6,375	9,450	9,690	9,420	7,830	7,080	8,730	95,595
New Staff Orientation (.5hrs) partials	-	4	-	-	-	11	-	-	2	-	-	-	17
New Staff Orientation Refreseher (3 hrs)	63	12	87	114	105	33	168	156	282	120	111	114	1,365
Home-Based Caregiver Orientation	144	76	120	158	198	156	192	68	268	256	218	412	2,266
1-hour extra satellite	57	7	1	4	30	60	90	21	7	70	62	128	537
Monthly program Totals -Training hrs	10,902	8,252	11,243	11,593	14,685	9,529	14,804	15,470	17,167	14,764	12,094	15,942	156,445

posal

Penn State Better Kid Care Statistics Report
Fiscal Year July 2008 - June 2009
APPENDIX B -- Page 2 of 2

ORDERS SENT OUT

08/09	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals
Mail-based	602	550	629	654	578	379	927	865	989	795	789	940	8,697
New Staff Orientation (NSO)	53	50	115	118	71	84	94	80	71	70	44	35	885
NSO Spanish	0	2	0	1	0	2	0	2	1	1	1	1	11
NSO Refresher	20	24	34	42	11	15	25	21	27	14	18	9	260
Home-Based Caregiver Orientation	47	38	37	56	47	31	59	62	69	59	52	58	615
H-BCO Spanish	1	1	1	0	0	0	0	0	1	0	2	4	10
Child Care Job for Me?	0	61	24	3	1	0	0	2	2	31	0	1	125
CC Job for Me?-Spanish	0	0	3	0	0	0	0	0	0	0	0	0	3
BKC Introductory Kits	238	176	204	226	220	150	231	254	211	240	167	207	2,524
BKC Intro. Kits - Spanish	0	0	0	1	0	0	1	0	0	0	0	0	2
Basics of Caring for Children... Notebooks Requested	139	127	120	121	115	73	105	130	97	88	82	111	1,308
Mentoring Telephone Calls Received	25	15	29	18	13	8	20	17	20	22	25	13	225
CDA Mentoring Contacts	118	214	76	472	70	30	68	64	55	39	27	40	1,273
Public Service Announcements	245		245		232		232		212		205		1,371
News Articles	261		261		261		261		231		203		1,478
Public Service Announcements - Spanish	3		3		2		2		2		2		14
News Articles - Spanish	29		29		28		28		30		28		172

Web Lesson Registrations

08/09	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals
Web Lesson Registrations	309	285	415	547	314	383	738	688	919	527	487	363	5,975
New Web Lesson Participants	71	78	83	138	77	84	180	139	149	127	113	68	1,307

Web Site Report

08/09	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals
Web site Average Visits per Day	1,201	1,202	1,580	1,380	1,304	945	*Data not available		1,722	1,579	1,383	1,201	13,497
# of Monthly Visitors	37,252	37,278	47,411	42,793	39,145	29,298			44,390	47,376	42,878	36,054	403,875
# of Viewed Documents	40,810	41,657	58,555	53,629	46,310	36,895			46,805	42,791	41,956	42,691	452,099
# Documents (PDF Download)	54,534	56,626	62,443	75,422	65,919	44,690	due to software issue		104,967	89,224	86,883	75,559	716,267

APPENDIX C

HEALTHSMART IMPACT TEAM STRATEGIC GOAL #3: HEALTHY HOMES

Situation: Increase awareness of healthy homes, workplaces, and schools by improving indoor air quality and applying appropriate safety measures; reducing harm from lead paint, smoke, chemicals, and other poisons.

Measures of Success from UME Strategic Plan: By 2013, more than 20,000 Maryland residents will participate in Healthy Homes education, resulting in: 1) increased awareness and the knowledge necessary to implement improvements that result in healthier built environments, including homes, workplaces, and schools; 2) improved indoor air quality through reducing impact from lead paint, smoke, chemicals, radon, pests, and other poisons.

Inputs	Outputs		One-Year Outcomes & Indicators	
What we invest *to include specialist/educator time, research base, technology, curricula, other resources*	**Activities** What we do (including grant proposals)	**Participation** Who we reach	**Outcomes**	**Indicators**
• Field Faculty • State extension specialists • Center for Health Literacy (SPH) • Technology Support (AGNR) • UME Healthy Homes Website • Educational materials • Marketing efforts • Evaluation planning	• Conduct existing workshops, train-the-trainer, and professional development opportunities for UME faculty and other professionals and practitioners	• UME faculty, other faculty and students • Professionals/Practitioners	• UME faculty demonstrate knowledge and awareness of healthy environments that are part of a Healthy Homes program	• # of UME faculty who can identify 3 or more environmental hazards affecting indoor home environments • # of UME faculty who increase knowledge of how to minimize indoor environmental hazards • # of UME faculty who plan to train clientele using healthy homes programming
• Field Faculty • State extension specialists • Center for Health Literacy (SPH) • Technology Support (AGNR) • UME Healthy Homes Website	• Market and evaluate existing community programs for youth and families to meet the standards of health literacy (e.g., Safe Kids	• Professionals/Practitioners • Childcare providers • Youth/4-H • Families with specific health hazards • Older adults	• UME faculty demonstrate knowledge and understanding of existing materials and ways to incorporate them in programming	• # of UME faculty submitting NIFA Educator data evaluation forms • # of clientele reached in Healthy homes programs in 2010

• Educational materials • Marketing efforts • Evaluation planning	Days, Progressive Agricultural Foundation Safety Days, GreenFest) • Disseminate information at Health fairs, Home and garden shows, Maryland Day and other university showcase events • Submit data quarterly	• Military families • General audiences	• Maryland residents demonstrate knowledge and awareness of healthy environments and safe practices that are part of Healthy Homes programming	• # of clientele who increase knowledge of how to minimize indoor environmental hazards
• Field Faculty • State extension specialists • Center for Health Literacy (SPH) • Technology Support (AGNR)	• *Establish action teams with specific goals*. For example: ➢ Signature program development/Curriculum Development ➢ Healthy Homes and Agricultural Safety ➢ *Integrated Pest Management (IPM) for indoor environments*	• Extension Faculty • University-wide faculty • Community Partners • Federal/State Partners	• Signature Program Development/Curriculum Action Team will seek Extension faculty members with expertise in curriculum development from across disciplines. Funding from NIFA, USDA will be used to support this action team. • Healthy Homes and Agricultural Safety Action Team which will be led by Sharon Pahlman will develop list of key partners in 2010 • *IPM Action Team will develop list of key partners in 2010*	• *# of UME faculty who join a Healthy Homes action team* • *# of individuals/agencies that agree to partner with UME to implement action team specific Healthy Homes programs*
INTERNAL FOR CORE MEMBERS, ACTION TEAM & AFFILIATES • Field Faculty • State extension specialists • Center for Health Literacy (SPH) • Technology Support (AGNR) • Educational materials	• Conduct needs assessment/environmental scan of Healthy Homes lessons, activities, workshops conducted by UME to date *Measures – NIFA quarterly reports, internal surveys, analysis of needs assessment/environmental scan*	• UME faculty, other faculty and students	• UME faculty **contribute to the development of** a Healthy Homes Signature Program	• # of core team, affiliate, and action team members who provide information for review • # of UME faculty who complete surveys or other assessments of Healthy Homes program needs

INTERNAL FOR CORE MEMBERS, ACTION TEAM & AFFILIATES • Field Faculty • State extension specialists • Center for Health Literacy (SPH) • Technology Support (AGNR)	HealthSmart team members will seek and apply for grant/contractual funding to support curriculum development, training, and/or programming	• Extension Faculty • University-wide faculty • Community Partners • Federal/State Partners	• HealthSmart programs are sustainable	• A minimum of one grant proposal is accepted
Evaluation Methods and Indicators **Focus - Collect Data - Analyze and Interpret – Report**				

(iii) Relevance Statement

a. Names and Institutions of PD and major cooperators

• Dr. Edwin Rajotte, PA IPM Program Coordinator, Penn State University (PI)
• Dr. Claudia Mincemoyer, Director, Better Kid Care, Penn State University (Co-PI)
• Ms. Lyn Horning, Assist Director of Programs, Better Kid Care, Penn State (Co-PI)
• Dr. Elisabeth Maring, Extension Specialist Health Homes/Public Health, University of Maryland (Collaborator)
Dr. William Coli, IPM Coordinator, University of Massachusetts (Evaluation partner)

b. Project Title: "Building IPM Capacity in Childcare and Early Educational Environments"

c. Project Type: Extension

d. Project Summary:

Our overall goal is to reduce environmental health risks to young children due to pests and pesticides. We will do this by building new programs to increase the capacity of educators, facilities managers and pest management professionals to understand, teach and/or implement IPM in early educational settings. Targeted settings include public and private elementary schools, childcares, Head Start, and faith-based early learning programs. To create sustainable programming with a wide reach, IPM subject matter will be incorporated into existing networks,

Successful IPM implementation in educational facilities requires a partnership between multiple individuals. These include:
• *extension educators* who provide information and programming to school communities;
• *childcare/early education professionals* who manage classrooms and children day-to-day;
• *facilities managers* who assure building safety
• *pest management professionals* who provide pest management services
All these groups must work together to make IPM work; each has a role to play. Thus, the project will develop innovative, targeted IPM programming for each of these groups.
Our specific objectives are:
1) Adapt IPM modules for inclusion in existing professional development programs for childcare professionals and facilities managers;
2) Deliver IPM education via pre-existing early education and facilities networks;
3) Develop train-the-trainer materials for Cooperative Extension Family Living agents to include IPM in community programming on health and well-being;
4) Work with pest management professionals to articulate IPM protocols and sample contracts for accounts in sensitive environments.
Regional Goals: The proposed project contributes to the NERIPM goal to reduce risk of pests and pesticides to people and the environment and the School IPM 2008 Education/Outreach: *Conduct outreach to all stakeholder groups; Coordinate education efforts with parallel efforts; Develop and utilize educational methods appropriate for the audience; improve linkages between regulatory agencies and extension; Educate policy-makers about the needs and benefits of IPM in terms of dollars, health, academic performance*. The project also responds to PA IPM educational stakeholders. Regional asthma education and children's health partners, pest management firms and school business officials are also on board. This willingness to participate in promoting children's health through IPM is reflected in our many, diverse letters of support for this project.

Brief description of the problem, background and justification

Our nation's 16.6 million children 3-6 yrs old enrolled in public or private nursery schools, kindergarten and elementary schools face unacceptable and unnecessary exposures to pests and pesticides in their schools. Pesticides are commonly and repeatedly used as the primary form of pest management in and around childcare and early educational settings. Significant numbers and amounts of **pesticide residues** persist inside the rooms in which children eat, sleep, learn and play. In a national study of 168 childcare centers, staff interviews regarding pests and pesticide use revealed that 63% percent of the centers reported collectively using 375 different pesticides products from 1-107 times/year. Of the 38 different pesticide active ingredients (a.i.) sampled in the centers, residues of 21 were routinely detected. Some childcare centers had residues of 10 different pesticides. Also, the scope and frequency of pesticide use indicates that there must also be a chronic **presence of pests** in these indoor environments. Such pests can also present unacceptable risks to children. Cockroach and rodent proteins are strong **allergens and asthma triggers**. Asthma has become epidemic in the country, costing over $13 billion in health care, medication and work loss. It is the number one cause of school absenteeism in the nation.

Meanwhile, **IPM protocols** in schools have repeatedly proven to a) more effectively and sustainably eliminate pests b) reduce allergens and asthmagens due to pests and c) significantly reduce pesticides – 90% elimination of pesticides used is not uncommon and d) be more cost effective in the long run because problems are *solved* not just *treated . . and re-treated.* Because of the promise of IPM to protect children, national IPM in schools legislation has been introduced (unsuccessfully) since 1999 and most recently again December 1, 2009. Thirty-five states have enacted their own legislation about pesticide use in schools, 15 of which include requirements that schools adopt IPM policies. Yet, the fact remains that the vast majority elementary schools, kindergartens, childcares, Head Starts and other early educational facilities in the US are not operated under any IPM or reduced-hazard pesticide policy. Thus, millions of children are likely impacted unnecessarily by pests and pesticide residues throughout their school years. In a sense, all our young children are being underserved with regard to mitigating the negative health impacts they face from pests and pesticides.

Novel, interdisciplinary teams are needed to Learn, Teach and Use IPM

If IPM works so well and is cost effective, why has adoption by schools been so low? There are many reasons, beginning with lack of awareness of the connection between pests, pesticides and health by virtually all players; all of whom must cooperate if IPM is to be successful.

Step 1: Work with other educators serving school populations to raise awareness.

Why? IPM educational expertise in the Land Grant Universities has historically focused on technical aspects of agricultural commodity pest management with few staff, resources or networks to meet the educational needs of the "other 98%" of the population, including schools. However, the educational needs of childcare and early educational professionals (C/EEP) are well-served by their own infrastructures. Collaboration between IPM programs and early childhood development and curriculum professionals can vastly increase the reach of IPM information into these environments. The Better Kid Care program at Penn State University is such an organization, with a 20-year track record in the creation and delivery of credentialed programs serving the early learning profession in the region. Each year, thousands of C/EEP participate in multiple educational formats, credentialing programs in "Quality Childcare" and professional development curriculum. Our first step in raising awareness, knowledge, skills and

aspirations of childcare will be to work closely with Better Kid Care to develop and deliver programming on IPM as a components of healthy environments / Quality Care. We will adapt the PA IPM Program's "IPM For Child Care" 4-module series to fit these venues and accreditation criteria. We will then cooperate with state agencies and early learning professional organizations to incorporate IPM resources, education and/or training into formal/credentialed activities and non-formal settings. Such activities may include formal presentations such as professional development classes, webinars, conferences and satellite programming; and non-formal presentations, including incorporation of IPM/reduced-pesticide risk information into websites, list-serves and newsletters. We will carry out at least 6 training sessions (4 total for educators and facilities managers; 2 for CES), which will include on-site and distance formats.

Step 2: Work with other sectors of the Cooperative Extension Service (CES) Network
Why? As previously stated, Land Grant IPM Programs typically have focused on commodities, not kids. But the CES network includes a multitude of staff and programs already reaching into communities. Specifically, Family Living / children Youth and Family programs all have some priority on Health and Healthy Environments as part of their mandate. Providing this CES network with more detailed training on IPM and its contribution to health and well-being will both raise awareness of these educators and increase their capacity to deliver programming to our target audiences. University of Maryland CES is already developing a strategic HealthSmart programming framework that includes Action Teams of educators – one with the topic, IPM.

Step 3: Assist facilities managers and pest management professional service providers
Facilities managers and pest management professionals PMP) must both have similar understanding and expectations of what constitutes an IPM program in childcare and early educational environments. Facilities managers themselves belong to organizations that provide access to professional development opportunities and credentials. Working to include specific, "news you can use" IPM topics for this audience in their professional development network will greatly increase our reach. The PA Association of Business Officials is interested in IPM trainings for facilities managers. For PMPs, new business opportunities will present themselves if companies can develop an IPM contract for sensitive environments such a schools and childcares, with specific protocols spelled out. Our local Orkin franchise is interested in working with us to identify components of such a protocol and contract. Facilities managers will find it more cost-effective to buy quality rather than quantity when it comes to pest management.

Step 4: Evaluate as we go
Because IPM programming crosses so many disciplines, audiences and environments, program evaluation is an on-going challenge. University of Massachusetts evaluation leader has signed on to assist the project team to make sure we build in how to measure success of the project.

The **primary outcome** of this project will be that reduced-risk IPM training will be embedded into existing childcare professional development venues. This will result in sustained impact on the education of childcare professionals at the local, state and regional level. In the process, new credentialed trainings on IPM and risk reduction will be created along with education and outreach materials. New outreach networks will be utilized to spread reduced-risk, IPM information. Large numbers of children will be impacted through education of those responsible for their health and safety.

Project: Building IPM Capacity in Childcare and Early Educational Environments
Focus Area: Residential and Public Areas (Schools) **Impact Area**: Human Health (Children)
Road Map Goal: Reduce potential human health risks from pests and related management strategies.

Objectives	Outputs (actions)	Outcomes (Impacts)	Performance Measures
1) Adapt IPM modules for childcare/early education networks	• Format to target audiences • Seek accreditation • Build modules to meet standards • Develop evaluation and learning assessments for modules	• New strategic partnerships • New content modules for • IPM concepts incorporated into "healthy environments" • BKC content increased	• # of new active collaborative subprojects • # of new audiences identified/ served • # of new accreditations acquired for IPM education/training modules • # of new websites with IPM presence
2) Deliver IPM education via pre-existing early education and facilities networks	• Create diverse delivery formats • Identify venues for education • Advertise, recruit /reach out to C/EEP and facility mgrs • Deliver **4 trainings** = 2 for C/EEP, 2 for facilities managers • Administrate credit delivery • Archive sessions to extend again • Compile evaluation results	• C/EEP& FM have awareness, actionable knowledge • New educational modules exist as archived materials • New information on current knowledge and practices • Childcares reduce risk due to pests and pesticides	• # of new outreach vehicles in use • # of new accreditation credits obtained by participants • # of participants reached • # and types of changes participants pledge to make • # facilities managers reached • # facilities managers on IPM listserve
3) Develop train-the-trainer materials for Cooperative Extension to include IPM in community programming on health and well-being	• Develop relationship with CES MD, PA, MA, partners • Develop training materials to accompany IPM for C/EEE • Plan extension training sessions • Deliver **2 extension training** sessions (1 via distance education) • Evaluate training learning • Set up regional list-serve for exchanging info on IPM-HH	• New cooperation between states in region • New regional "community of practice" network • New programming platform with tools for CES CYF • New/tools for extension to interact with new clientele	• # of agents participating • estimate of # of clients potentially reached by these agents • measurement of increase of awareness & knowledge of training participants • # and type of additions to extension programming
4) Work with PMP to articulate IPM protocols in sensitive environments /contract components	• Enlist PMP partners • Hold to discuss issues, "less-toxic" pesticide uses/IPM • Come to consensus on cost-effective, least hazardous (defined) • Share IPM contract information with C/EEE/ facilities managers • Create a list of PMP companies with IPM contractual services	• New IPM partnerships with PMP businesses • Increased potential for PMP to gain advantage in C/EE market • Increased ability for C/EE facilities access IPM services	• Achieve consensus on what constitutes cost-effective, least hazardous IPM for C/EEE • Progress/completion of new contract language specific to C/EEE • # of participating PMP • # of PMP listed as providers of service • # of facilities reporting use of IPM contracts