



# Implementing an integrated pest management (IPM) program in child care centers: A qualitative study<sup>☆</sup>



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## ARTICLE INFO

### Article history:

Received 27 December 2012

Received in revised form 19 February 2014

Accepted 22 February 2014

Available online 11 March 2014

### Keywords:

Integrated pest management

Child care

Implementation

Qualitative study

Intervention

Environmental health

## ABSTRACT

Pesticide use in and around child care centers is a potential health threat to children and staff. The implementation of integrated pest management (IPM) can reduce these risks yet child care providers receive minimal, if any, education concerning pest management. The objectives of this qualitative study are to: (a) develop a model to describe the process of implementing an IPM program in child care centers, (b) identify the facilitators and barriers to implementing an IPM program in child care centers, and (c) examine congruence between IPM practices identified on an IPM checklist with practices reported in qualitative interviews with child care managers. Interviews and IPM checklist observations were conducted with nine child care center managers in California before and after the introduction of a pilot IPM education intervention program. The qualitative analysis of the interviews revealed a four-stage IPM implementation process, from awareness of IPM, recognizing the importance of IPM and learning how to practice it, motivation and the decision to adopt IPM, to the implementation of IPM. A wide range of facilitators and barriers were identified. There was general congruence between the manager interviews and IPM checklist findings on IPM policies, practices, and management. Understanding the process of how an IPM program was implemented in these child care centers and the facilitators and barriers involved in the process can inform planning efforts for future health interventions in child care.

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## 1. Introduction

Young children in the United States (U.S.) may be exposed to harmful chemicals if they attend child care centers where pesticides are regularly used (Bradman, Dobson, & Leonard, 2010; Lu, Knutson, Fisker-Anderson, & Fenske, 2001; Mir, Finkelstein, & Tulipano, 2010; Shour, 2007). This is a potential public health issue given that the majority of children under six year of age attend child care centers, and a national survey of a

representative sample of child care centers found that 63% of the child care centers used pesticides (Tulve et al., 2006). The policies and practices in child care centers in the U.S. are guided by each state's licensing regulations and national recommendations for health and safety standards (American Academy of Pediatrics, American Public Health Association, & National Resource Center for Health and Safety in Child Care and Early Education, 2011). Caring for our Children: National Health and Safety Performance Standards Guidelines for Early Care and Education Programs, Third Edition, and the U.S. Environmental Protection Agency provide support for reducing the exposure of harmful chemicals in child care by introducing integrated pest management (IPM) as a prevention-based pest management approach (American Academy of Pediatrics et al., 2011; U.S. Environmental Protection Agency, 2012a). For example, an IPM approach emphasizes regular cleaning of facilities, placement of non-toxic sticky traps for insects or rodents, and monitoring for pest problems to prevent problems before they happen. A traditional, non-IPM approach may include routine, monthly spraying for ants, or use of pesticides that linger in the air, such as foggers, to deal with an infestation.

<sup>☆</sup> The authors would like to thank the child care managers, facility managers, child care staff, and research staff who participated in the project. The project was funded by the University of California, San Francisco (UCSF) Dean's Quarterly Grant and the California Department of Pesticide Regulation (Pest Management Alliance Grant; DPR Grant No. 08.PML.G002). The project was administered by the UCSF School of Nursing.

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Pesticide use in child care facilities is concerning because pesticide exposure poses a potential health threat to children, as well as to staff (Baldi, Mohammed-Brahim, Brochard, Dartigues, & Salamon, 1998; Bradman et al., 2011; Horton et al., 2011; Jurewicz et al., 2006; Kass et al., 2009; Makri, Goveia, Balbus, & Parkin, 2004; Morgan et al., 2004, 2007). This is also of concern for the 1.3 million child care center staff in the U.S., 94.5% of whom are women often of child-bearing age, which increases risk for in utero and pregnancy-related pesticide exposure (Bureau of Labor Statistics, 2004).

A 2005 study analyzed national surveillance data and found that 2593 cases of acute pesticide-related illnesses were associated with pesticide exposure in schools between 1998 and 2002 (Alarcon et al., 2005). Although there are no comparable data for child care centers, these exposures would be particularly concerning in child care settings, where children are younger than they are in the K–12 school system, and where large numbers of children spend full days. Nationwide, 63% of all U.S. children 0–5 years old are placed in out-of-home child care for some portion of the workday (Tulve et al., 2006; U.S. Census Bureau, 2009).

Since there is no federal regulation about pest management, 35 out of 52 states and territories developed statewide school pest management legislation (Green, Gouge, & Lame, 2009; Owens, 2009). IPM, a prevention-based approach to pest management, is a component in 21 state's pest management policies (Green et al., 2009).

IPM programs follow a systematic approach to pest control that use pesticides only as a last resort, and focus on prevention, monitoring, identification of pests, and management of pest infestations. The goal of IPM in schools and child care centers is to minimize the risk of pesticide exposure for children, staff, and the environment (Daar, Drlik, Olkowski, & Olkowski, 1997; UCSF California Childcare Health Program, 2011; U.S. Environmental Protection Agency, 1993). Studies have shown IPM to be as or more effective in controlling and preventing pest infestations compared to conventional, pesticide-based practices (Kass et al., 2009; Williams, Linker, Waldvogel, Leidy, & Schal, 2005).

Fifteen states have policies that require the use of IPM in schools and six other states have policies that recommend it (Brajkovich, Hanger, Messinger, & Simmons, 2010; Fournier, Gibb, & Oseto, 2010). Also, few state pest management laws extend to child care centers although young children are at an increased risk of pesticide exposure compared to school-age children. For example, information on the Western U.S. states (i.e., Alaska, Arizona, California, Colorado, Idaho, Hawaii, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming) shows that only 5 out of 13 states have pest management legislations inclusive of child care centers (i.e., Arizona, California, Colorado, Montana, and Washington). Only four Western states do *not* have any laws concerning pest management in school or child care centers (i.e., Idaho, Hawaii, Nevada, Utah) (Western Region School IPM Implementation & Assessment Work Group, 2011). Similar to the trend of school-centric pest management policies, pest management education and research have also primarily targeted schools (Brajkovich et al., 2010).

Studies have identified various factors that influence school IPM implementation, including state legislation, trainings and educational materials about IPM, and school-specific “champions” of IPM (Fournier et al., 2010; Piper & Owens, 2002). The lessons learned about implementation in schools can be helpful to child care centers trying to comply with new IPM legislation, however, child care centers have different challenges compared to schools. Child care centers are less stable and more stressed financially than schools (Institute of Medicine & National Research Council of the National Academies, 2012). Child care centers have high annual staff turnover rates, sometimes as high as 40% (Alkon, Ramler, & MacLennan, 2003; Bureau of Labor Statistics & U.S. Department of

Labor, 2011; Fournier & Johnson, 2003; Mir et al., 2010; National Association of Child Care Resource & Referral Agencies, 2011), and minimal staff education (Bureau of Labor Statistics & U.S. Department of Labor, 2011; Institute of Medicine & National Research Council of the National Academies, 2012). There is no explicit regulation requiring child care providers to receive training about pesticide use and pest management (American Academy of Pediatrics et al., 2011).

Due to the unique stresses and characteristics of child care centers, implementation of IPM in child care centers may differ from implementation in schools. Studies have shown positive changes in health and safety policies (i.e., handwashing practices) in child care centers following general health and safety intervention programs (i.e., child care health consultation in child care centers) (Alkon, Bernzweig, To, Wolff, & Mackie, 2009; Kotch et al., 2007). Qualitative studies of child care health consultation have identified the roles and responsibilities of the child care health consultants who provide the intervention (Alkon, Farrer, & Bernzweig, 2004; Isbell et al., 2013) and the facilitators and barriers to implementing general health consultation in child care (Farrer, Alkon, & To, 2007). A quantitative study of an IPM intervention in 892 child care programs over a three-year period showed that IPM training in child care centers increased the use of IPM strategies, reduced pest problems, and increased staff knowledge and understanding of IPM (Mir et al., 2010). Another IPM intervention study in 45 child care centers showed positive changes with a decrease in regularly scheduled application of pesticides and the number of centers using pesticides (Anderson, Glynn, & Enache, 2010). An IPM Star Certification for School Systems was developed by the IPM Institute and implemented in 17 school districts. The program showed an increase in the adoption of IPM policies, record-keeping and notification practices, and safe pesticide use (Green, Gouge, Braband, Foss, & Graham, 2007). A pilot IPM program in Indiana schools and child care facilities showed positive changes in clutter reduction, pest-proofing, and pesticide use reduction (Fournier & Johnson, 2003). Our pilot IPM program in California child care centers also showed positive changes in IPM knowledge, a pre- and post-intervention IPM observational checklist of facilities, and creation of IPM policies (Alkon et al., 2012). The majority of IPM studies in child care show that programs are effective, yet these studies have not explored the motivational factors or facilitators or barriers for child care providers to integrate IPM practices into their child care programs.

This study uses a predominantly qualitative design in a pilot study of nine child care centers participating in an IPM intervention program to identify the process of implementing IPM and the congruence of the child care directors' perception of IPM implementation with quantitative IPM observations. This design draws on the strengths of qualitative research to develop a more complete understanding of IPM implementation in child care by describing the process, facilitators, and barriers (Creswell & Plano Clark, 2011). Previous research has focused on quantitative results (Anderson et al., 2010; Fournier & Johnson, 2003; Mir et al., 2010), and this study strives to describe the process of change in IPM policies and practices to help understand quantitative outcomes.

The objectives of this descriptive, qualitative study conducted with nine child care center managers in California (CA) are to:

1. develop a model to describe the process of implementing an IPM program in child care centers,
2. identify the facilitators and barriers to implementing an IPM program in child care centers, and
3. examine congruence between IPM practices identified on an IPM checklist with practices reported in qualitative interviews with child care managers.

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