



Avoiding **Big Risks** for **Small Kids**

Results of the 2008 NC Child Care Pest Control Survey

By Jean Strandberg,
Billie Karel, and Katherine Mills, MSPH
Toxic Free North Carolina, April 2009
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Executive Summary



In the summer of 2008, Toxic Free NC surveyed 89 child care providers from across the state about pest control in their facilities in an effort to learn more about their safety and effectiveness. Three key findings emerged from our survey results:

- 1) The majority of responding child care providers said broadcast pesticide application methods that carry a high risk for exposure to children and staff are regularly used at their facilities. Providers who employ professional pest control contractors, or Pest Control Operators (PCOs), were more likely to report that high-risk methods are used in their facilities than those who handle pest control in-house.
- 2) Around one quarter of responding child care providers are using least-toxic pest control methods, known as Integrated Pest Management (IPM). IPM is a safer approach to pest control that is widely used in NC public schools. It relies on preventative measures and uses pesticides only minimally, and in a targeted fashion that all but eliminates the risk for human exposure. Child care providers in our survey who use IPM appear less likely to have serious pest problems than those using conventional, high-risk practices.
- 3) Responding child care providers who use a PCO for pest control are less likely to be using IPM than those who use in-house staff for pest control.

These findings are troubling, because research has connected pesticide exposure to increased risk for many types of health problems. For most, young children are at the greatest risk for health damage because of their small size and rapid growth and development.

Additional survey findings confirm that many of the people employed and served by child care facilities are at elevated risk for health damage from pesticide exposure because of their age or health conditions, and also reveal some other serious pesticide exposure risks in their daily lives. Our survey also showed the most common pest problems faced by child care providers, which include ants, mosquitoes, fire ants, weeds, and flies. Some of these pest problems are more serious than others, but all can be managed safely and effectively with least-toxic IPM methods.

Based on the findings of this survey, the authors recommend:

- Training and certification for pest control contractors in least-toxic IPM methods for child care facilities and other sensitive environments. Child care providers need a reasonable guarantee that when they hire a professional pest control contractor, that person will provide the safest possible pest control for the vulnerable women and children in their facility.
- Training for child care providers on least-toxic IPM. For providers who do their own pest control, training will enable them to do so as safely as possible. For providers who contract with a professional, training will teach them what to ask for from a contractor, and how maintenance and sanitation in their facilities can best support a least-toxic pest management program.

I. Introduction



In the summer of 2008, Toxic Free NC conducted a survey of pest control practices in North Carolina child care facilities. The primary goal of the survey and report is to investigate pest control in NC child care and provide insight into the most common pest challenges, the pest management practices employed to meet them, and their relative effectiveness and safety for the population served by child care providers. Toxic Free NC contacted 592 child care providers in thirteen counties across the state, which resulted in our collecting 89 completed surveys.

We found that pest management practices with a high risk of exposure for children and staff, such as baseboard spraying and fogging, are used in a majority of surveyed child care facilities. This stands in contrast to pest management in NC public schools, which have made significant progress in safety and effectiveness of pest management over the past several years.¹ The improvement can most likely be attributed to two primary factors:

- Training in least-toxic pest management that NCSU Cooperative Extension and the NC Department of Public Instruction have made available to public school systems and the pest control operators (PCOs) who serve them.
- The NC School Children's Health Act, adopted in 2006, which requires parent and staff notification of pesticide use at public schools and a shift away from higher risk pest management practices to safer "Integrated Pest Management" programs for public school buildings and grounds.

Because of their smaller size, higher metabolic rate, and rapid growth and development, babies and small children are more vulnerable than older children and adults to long-term health harm from exposure to pesticides and other chemical pollutants. *A mother and child at Moore Square Park in Raleigh, NC. Photo by Ana Duncan Pardo.*



II. Background



What is Integrated Pest Management (IPM)?

Integrated Pest Management, or IPM, is cost-effective, common sense pest management that does not rely on pesticides. It is the preferred system for pest control in schools, child care and other sensitive environments because it reduces or eliminates the risk of harm to children from exposure to pesticides. IPM uses pro-active monitoring, sanitation, and facility maintenance to prevent pest problems, and uses least-toxic chemical pesticides sparingly if at all, and only with very targeted application methods.

Main Principles of IPM:

- 1) Cleaning and sanitation:** Pests can't survive if there is nothing for them to eat or drink. By cleaning thoroughly – especially in pest-prone areas used for food preparation and storage – and fixing leaky pipes and other sources of moisture, most pest problems can be prevented.
- 2) Building maintenance and upgrades:** Many problems can be prevented by blocking pests' points of entry into a building. A thorough inspection will identify the holes where pests are entering a building. Installing or repairing door sweeps, screens, and other seals can often eliminate the problem.
- 3) Sparring use of least-toxic pesticides:** While we do not want toxic chemicals in our child care facilities, we don't want them crawling with pests either! In some situations, IPM may use least-toxic pesticides applied directly to pest activity areas, and only to out-of-the-way places where children will not be exposed. "Least-toxic" means both selecting the product with the lowest toxicity available, and using products formulated as baits, traps, or crack & crevice gels instead of broadcast sprays.
- 4) Notification:** IPM in child care means letting parents and staff know when and where treatment will take place if pesticides are used. This information allows parents and staff to better prevent children's exposure to chemicals, as well as their own.
- 5) Record Keeping:** By recording pest problems and the actions taken to solve them, patterns can be identified that enable staff and pest control operators to better anticipate, prevent and address future problems.

One of the toughest choices that working parents with young children have to make is selecting a child care provider. Parents want their little ones to be in a loving, stimulating environment that is clean and safe. Many excellent resources provide parents with guidance on evaluating prospective child care providers.^{2,3,4} Good hygiene and prevention of infections are commonly stressed in these guides, but safe pest management is rarely mentioned. However, safe and effective pest control in child care settings is of critical importance, because young children are vulnerable to health damage from exposure to some common pests, as well as from hazardous pesticides commonly used to control them.

Pesticides are intentional poisons, designed to repel, inhibit or kill weeds, insects, rodents, or other pests. Many pesticides are poisonous to humans in much the same way as they are to pests, since our bodies share many of the same building blocks. Children are the group most likely to suffer accidental pesticide poisoning in the United States. Over half of all pesticide poisonings reported in the US each year involve children under six years of age.⁵

Babies and small children are also among the most likely groups to suffer long-term health harm from exposure to chemical pesticides.⁶ There are two main reasons for this: higher exposure risk and greater vulnerability.

Studies of pesticide metabolites in human blood and urine have found high levels in young children.⁷ For each pound of body weight, children breathe more air, consume more food and water, and have more surface area – in other words, more skin – than adolescents and adults. Therefore, in the same environment children take in more pesticides than adults from indoor and outdoor surfaces, air, food, and water.⁸

Pesticide exposures are also higher for children than adults because infants and young children are smaller, and spend most of their time closer to the ground where most pesticides are used and tend to concentrate. For example, pesticides applied by baseboard spraying reach levels 4.5 times higher in the air ten inches from the floor – air a crawling child breathes – than in the air 39 inches from the floor where a seated adult breathes, and remain high for a

longer period – in many cases over 24 hours.⁹

Pesticides used outdoors can easily be tracked inside by people or pets. One study showed that pesticide use on residential lawns and gardens doubled the amount of pesticide metabolites found in the urine of small children.¹⁰ Once indoors, there is no wind, rain or sunlight to break down pesticides or move them away, so they can linger for days or weeks. Indoor and outdoor pesticides can contaminate stuffed toys, pillows, and other soft indoor surfaces and remain present for at least two weeks.¹¹

The youngest children are often the most vulnerable to pesticide exposure. Babies and children undergo rapid growth and development of vital organs and complex systems. Even small chemical exposures during critical periods of development can disrupt normal development and result in permanent damage and lifelong health problems.¹² Exposure to low-levels of pesticides in utero or during early childhood has been linked to increased risk for many health problems, including miscarriage, birth defects, some childhood cancers, asthma, and abnormal brain development.¹³ Early exposure to pesticides and other toxic pollutants can disrupt and permanently change the structure and function of organs and systems, and scientists do not know how much exposure is too much for children. Reducing or eliminating pesticides from children’s environments is the most reliable way to protect them from harm.

III. Methods



In summer 2008, Toxic Free NC developed a survey for child care providers, which asked about facility size, children served, location and characteristics of the area, pest problems, and pest control methods. The complete survey form appears in Appendix II. Toxic Free NC contacted 592 child care providers in 13 counties across the state in August and September of 2008, with the ultimate goal of collecting 100 completed surveys from child care providers throughout the state. Providers were initially contacted by telephone, and had the option to complete our survey over the phone, by mail or over the Internet. In some cases, follow-up phone calls were used to verify responses that were unclear or incomplete.

Selection of the survey population

Toxic Free NC chose a survey population approximately representing our state’s child care population as a whole. We selected for regional representation using NC census data to determine the percentage of the state’s total population living in each region of the state, and then applied those percentages to the total number of providers we needed to contact.

Toxic Free NC then selected 13 target counties from which to draw survey participants. We used census data to choose counties from each region that, taken together, approximate the racial, socioeconomic, and rural/urban proportions of the region’s population. We then used the NC Division of Child Development’s list of licensed child care providers, which is searchable by county, to randomly select child care providers from each of the 13 counties to contact.

In the end, a total of 89 child care facilities of various types and sizes responded to the survey. Child care providers from the Coastal Plain, Western Mountain and Central Piedmont regions all participated in the survey. *See Table 1. A more detailed explanation of survey methods appears in Appendix I.*

Table 1: NC Child Care Pest Control Survey Contacts & Responses

Region	County	Contacted	Responded
COASTAL PLAIN REGION			
	Johnston	67	14
	Pasquotank	45	2
	Pender	34	4
	Robeson	11	2
	Wilson	19	4
Total Coastal Plain		176	26
CENTRAL PIEDMONT REGION			
	Chatham	40	6
	Gaston	55	8
	Guilford	115	14
	Rockingham	25	7
	Wake	115	19
Toal Central Piedmont		350	54
WESTERN MOUNTAIN REGION			
	Buncombe	22	2
	Caldwell	22	4
	Cherokee	22	3
Toal Western Mountains		66	9
TOTALS - ALL REGIONS		592	89

There are 8,869 regulated child care facilities in North Carolina serving 271,193 children,¹⁴ ages six weeks to 12 years.¹⁵ Of the 8,889 regulated facilities, 43% are child care homes (child care located in a provider’s private home), while 57% are child care centers (located in a dedicated child care building or within a church, school, or other facility).¹⁶ Among our survey respondents, 44% are in-home child care providers, and 56% are child care centers, very similar to the proportions statewide.

Responses were received from child care providers in rural, urban, and suburban areas throughout North Carolina, serving children spanning the range of ages served by registered child care facilities, and from the predominant racial and ethnic groups in our state. *See Table 2.* Most survey respondents (78 out of 89 providers) were the director or owner of the child care facility. Other types of respondents were administrative assistants (three responses), maintenance staff (three responses), and teachers (three responses). Two additional respondents did not answer the question.

Table 2: Characteristics of Child Care Providers in the NC Child Care Pest Control Survey

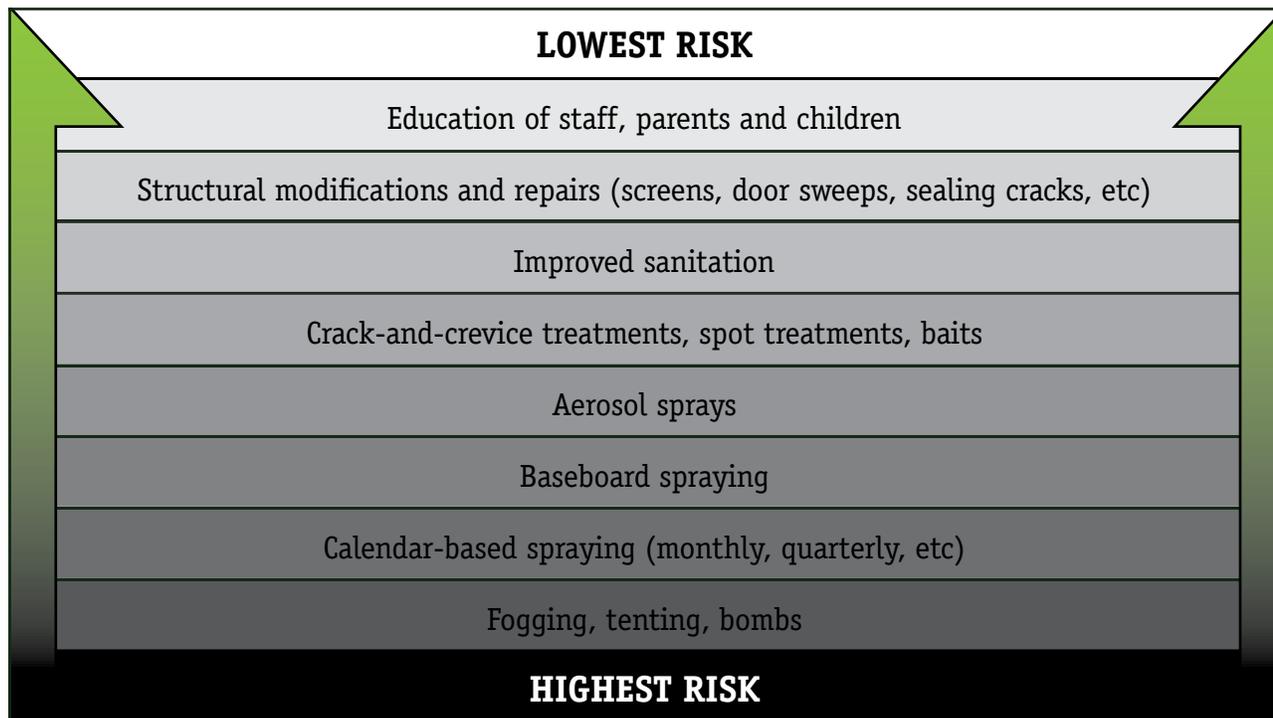
Regional Characteristics	Number of Respondents	Children’s Racial and Ethnic groups	Number of Respondents*
Urban	10	white or Caucasian	52
Rural	14	black or African American	25
Suburban	15	Hispanic or Latino	3
Small cities & towns	36	Native American	1
Mixes areas: urban/suburban/rual	12	Asian American or Pacific Islander	0
Not classified	2	Multi-racial	1
		Preferred not to answer	7
Total	89	Total	89

*Represents the number of responding child care providers who reported that half or more of the children they care for are of a particular racial or ethnic group.

Pound for pound, children breathe more air, drink more water and eat more food than older children and adults. That means they take in proportionately more of pesticides and chemical pollutants in their food, water or environment.



Figure 1: Relative Risk of Common Pest Management Practices



Low-risk pest management methods are the safest choice for child care facilities and other children's spaces. *Children coloring at Toxic Free NC's information and activity booth during the Wilmington Juneteenth Festival. Photo by Billie Karel.*

IV. Findings & Discussion

A. Key Findings

1. High-risk pest control practices are used in the majority of child care facilities in our survey, and are more commonly used in facilities that have a professional pest control contractor.

Use of high-risk pest control methods in child care. 53% of all respondents (47 out of 89 providers) reported that pump sprayers and/or foggers are used in their child care facility. These are broadcast pesticide application methods that carry a high-risk for human exposure. *See Figure 1.* Of the 58 responding providers who contract with a PCO, 62% (36 providers) reported the use of pump sprayers or foggers, compared with 35% of responding providers who do not contract with a PCO (11 out of 31 providers).

Prevalence of PCOs in child care. 58 of the 89 child care providers in our survey, or 65%, reported using a PCO for all or part of their pest control programs. Of the 58 PCO users, 74% (43 providers) reported regularly scheduled visits from their PCOs, with frequency ranging from once per year to twice per month. This means that about half of all survey respondents receive regular visits from PCOs. Child care centers in our survey were more than twice as likely to report they contract with a PCO than in-home child care providers; 65% of the 49 child care centers in our survey reported using a contractor for at least part of their pest control, compared with only 28% of the 40 in-home child care providers.

Common absence of adequate safety precautions for pest control. Of the 58 child care providers who reported using a PCO, only 24% (14 providers) said their PCO gives them options for pest control. 43% (25 providers) reported that their PCO tells them what chemicals, if any, are being used in their facility, 22% (13 providers) said the PCO provides the pesticide product label and 17% (10 providers) said he or she provides the Material Safety Data Sheet (MSDS). Very few providers reported that their PCO posts warning signs around treatment areas: only one did so for indoor treatments, and four providers did so for outdoor treatment areas, representing 2% and 7% of the sample, respectively. Meanwhile, 19% of the 58 respondents who reported contracting with a PCO (11 providers) said they don't know what their PCO does for pest control, and 14% (8 providers) said they don't about their PCO's safety precautions. This does not necessarily mean the PCO is using unsafe practices, but it does indicate that he or she is not communicating with the child care facility's staff to ask questions, give options, or provide safety information.

The majority of child care providers in the NC Child Care Pest Control Survey reported that broadcast pesticide applications are used at their facility, which have a relatively high risk for exposure to children and staff.



2. Child care providers using safer pest control methods appear less likely to have serious pest problems. Around one quarter of NC child care providers we surveyed reported they use least-toxic pest control methods, known as Integrated Pest Management (IPM), in their facilities. Though the number of respondents in this category (20 providers) is small, and may be skewed by factors discussed below, it is interesting that those using IPM were about half as likely to report having serious pest problems as those who use conventional, higher-risk pest control methods.

Use of Integrated Pest Management (IPM). Six NC child care facilities in our survey group are housed in NC public schools and were therefore excluded from the analysis of IPM usage in this section.¹⁷ Among the 83 other survey respondents, 24% (20 providers) reported using pest control practices that, for the purposes of this analysis, we considered to be Integrated Pest Management (IPM). These providers had three important elements in place:

- 1) Least-toxic methods. The provider reported that their staff and/or contractor use cleaning and sanitation, building maintenance and upgrades, baits and traps, or products that they consider to be “green” or eco-friendly products for pest control.
- 2) Safety: the provider reported that their staff and/or contractor take appropriate precautionary, preventative, and notification measures whenever pesticides are used at their facility.
- 3) No broadcast pesticide application. The provider reported that neither staff nor PCO use pump spraying or fogging, broadcast pesticide application methods considered high-risk for human exposure, and generally unnecessary.

43% of survey respondents (36 providers) were considered to be “not using IPM” since they did not meet the above qualifications. They reported using high-risk pesticide application methods without taking important safety precautions. For example, nine providers in this category reported use of one or more pesticide sprays at their facility (aerosol, pump, or other), and did not report that they only do pest control when children are not present. This is troubling because most pesticide labels prohibit allowing children to come in contact with the product before it is completely dry, and many prohibit the product’s use while a room is occupied.

Also included in the “not IPM” category are four providers who reported contracting with a PCO, but did not know what that person does at their facility. While that does not necessarily mean the PCO is using high-risk practices, it does mean he or she is not taking important safety precautions, such as talking to the provider about where pests have been seen and options for pest control, notifying the provider of pest control measures are being taken and any pesticides used, and posting warning signs in treated areas.

The remaining 33% of respondents (27 providers) reported something in between the two categories above; we classified these as “some IPM.” Providers in this category either reported taking some but not all necessary safety and pest prevention measures, or reported the use of many IPM practices and safety precautions but also used high-risk pump spraying and/or “bug bombs.”

It is possible that the rate of IPM use indicated by this analysis is inflated. Anecdotally, several of the in-home providers we spoke with said that they had never had a pest problem that required any pest management measures, least-toxic or otherwise. They reported that they don't use any pesticides because they prevent pests by keeping their homes clean and teaching the children they serve to clean up after themselves. This sort of vigilance is a critical part of an IPM program, and may be easier to maintain in an in-home setting. Some of these in-home providers are counted among users of IPM in our survey, though they may not have made a conscious choice to reduce pesticide use and implement safety precautions, as would be the case in a true IPM program. This difference would become important if those providers encounter pest problems in the future. Someone who has chosen to use IPM would find ways to handle the problem without high-risk pesticide applications, whereas someone who simply has not had a pest problem before might not hesitate to use a high-risk pesticide application should such a problem arise.

Prevalence of serious pest problems. For the purposes of this analysis, we defined a “serious pest problem” as having consistent infestations of rodents, cockroaches or mold, with “consistent” meaning monthly, weekly or daily. Among the pest issues our survey asked about, these three are the most likely to indicate more serious problems with building sanitation, and to contribute to health problems, including asthma.¹⁸ Under this definition, 17% of all survey respondents (15 providers) reported having a serious pest problem.

Child care facilities with IPM programs appear less likely to have a serious pest problem than facilities that do not use IPM. Only two of the 20 child care providers with IPM programs reported a serious pest problem, representing 10% of that group. 19% of surveyed providers who do not use IPM at all (seven of 36 providers), and 19% of child care providers in the “some IPM” category (five of 27 providers) reported serious pest problems. *See Table 3.* Though the sample sizes are quite small, this finding may indicate greater effectiveness of least-toxic IPM in preventing serious pest problems.

Table 3: IPM use and reports of serious pest problems.

Pest Control Category	Percent of responding providers*	Reported serious pest problems
IPM	24%	10%
Some IPM	33%	19%
Not IPM	43%	19%

**Does not include six responding providers housed in North Carolina public schools.*

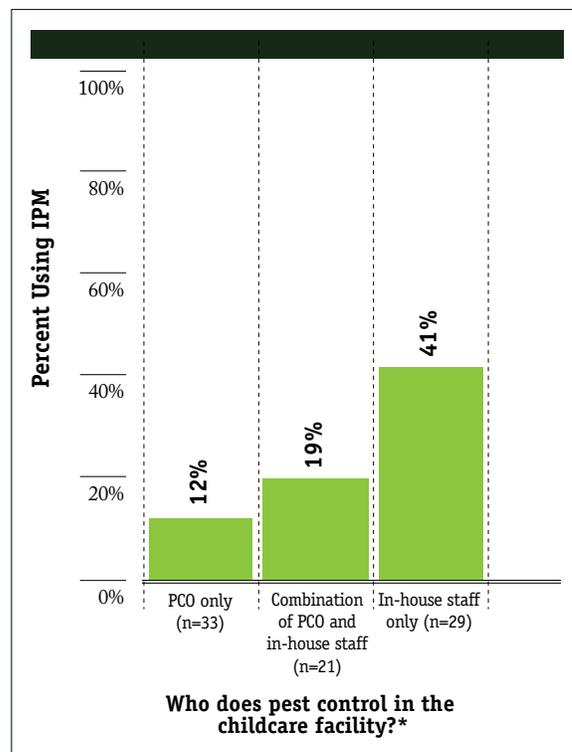
Serious pest problems reported by survey respondents did not appear to be strongly related to other factors, including the size and star rating¹⁹ of a child care facility.

- **Size** of a child care provider did not appear to correlate with reports of serious pest problems in any apparent trend. 15% of the smallest providers serving less than 10 children (six out of 39 providers) reported serious pest problems, as did 14% of providers serving between 50 and 100 children (two out of 14 providers). Meanwhile, 29% of medium-sized child care providers serving between 10 and 50 children reported serious pest problems (five out of 17 providers), and the largest centers serving more than 100 children were the least likely to report serious pest problems at just 11% (two out of 19 providers).
- **Star license ratings** did not appear to correlate with incidence of serious pest problems. One-star and five-star facilities had similar rates of serious pest problems (five out of 16 providers and five out of 19 providers, respectively), while none of the 14 two-star-rated respondents reported any serious pest problems.

3. Child care facilities that use a PCO are less likely to be using IPM. Child care providers that reported using a PCO for pest control rarely also reported that IPM practices were used at their facility. Larger child care facilities were more likely to report contracting with a PCO, and less likely to report using IPM. Pesticide exposure risks associated with large centers and PCOs may affect facilities which are non-profits or located in urban areas more than others.

IPM use is less common in child care facilities that have a pest control contract. Of the child care providers in our survey who used only a contractor for pest control, 12% reported using IPM (four out of 33 providers). Of the facilities who reported using some combination of contractors and in-house staff for pest control, 19% reported using IPM (four out of 21 providers). In contrast, 41% of the facilities doing all their own pest control reported using IPM (12 out of 29 providers). *See Figure 2.*

Figure 2: Rate of IPM Use among NC Child Care Providers Who Contract with Pest Control Operators (PCOs) and Those Who Do Not.



**Does not include six responding providers housed in North Carolina public schools.*

The larger the child care facility, the more likely they are to employ a PCO, and the less likely they are to be using IPM. Among our survey population, use of a PCO for pest control and use of IPM related clearly to the type and size of the child care facility. Child care centers in our survey were about twice as likely as in-home child care providers to report using a PCO, and about half as likely to be using IPM. The larger the child care facility, the more likely they were to report using a PCO, and the less likely they were to report using IPM. See Figures 3 and 4.

Certain types of child care providers and children may be affected more than others.

- Non-profits.** 100% of the 20 non-profit child care providers in our survey reported they have a contract with a PCO to come at regular intervals for pest control. Responding non-profit child care providers were less likely to be using IPM than for-profit providers: 10% of non-profits (two out of 20 providers) reported using IPM, compared with 24% of for-profits (13 out of 54 providers). This is a worrisome finding, because it indicates that children from low-income families, typically served by non-profit child care providers, may be at greater risk of exposure to pesticides while at child care.
- Urban.** Of child care providers who responded to our survey, only ten reported they are in an urban area, a small sample size from which to draw conclusions. That said, it is interesting to note that those located in urban areas were larger, more likely to be using a PCO, and less likely to be using IPM than providers located in other areas. Responding urban child care providers are larger on average than those in other areas: 60% of urban providers (six out of ten providers) serve more than 50 children, compared with 27% for suburban (four out of 15 providers) and 21% for rural providers (three out of 14 providers). Of the nine facilities that identified their location as urban and are not housed in a public school, none use IPM, and eight contract with a PCO for pest control. While the sample size is small, this figure still stands out, since providers in all the other categories - rural, suburban, small-town, and mixed - reported using IPM at rates ranging from 17% to 36%.

Figure 3: Using a Pest Control Operator (PCO) and Using Integrated Pest Management (IPM): Comparing In-Home Child Care Providers and Child Care Centers.

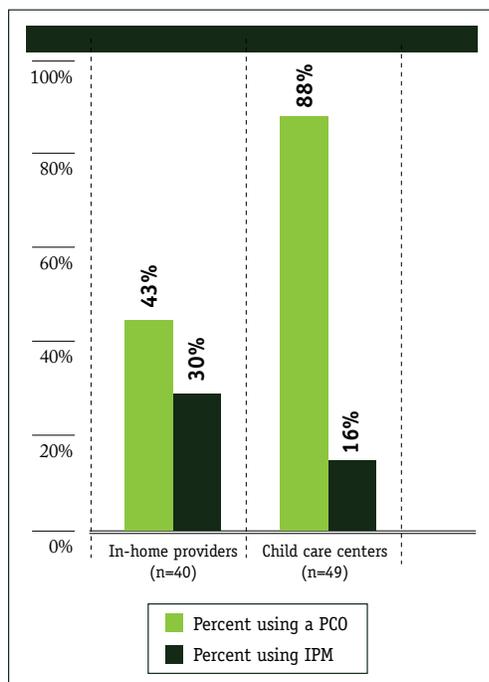
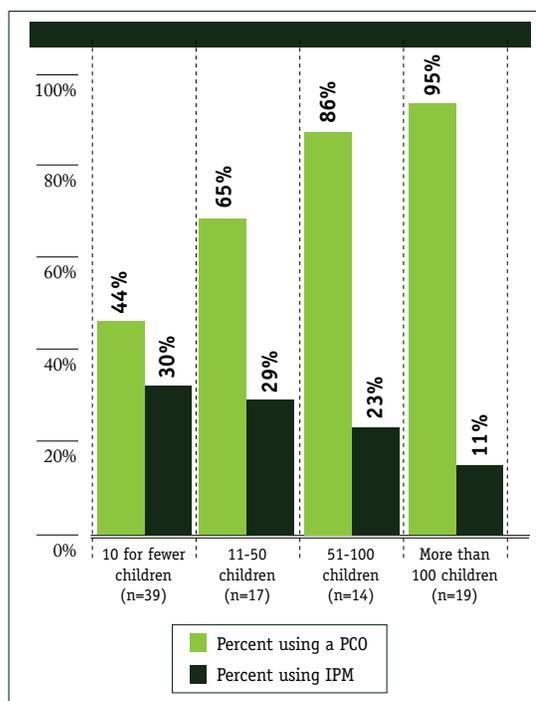


Figure 4: Using a Pest Control Operator (PCO) and Using Integrated Pest Management (IPM): Comparing Child Care Providers of Different Sizes.



B. Other findings

1. The population served and employed in NC child care is particularly vulnerable to pesticide exposure. NC child care providers both serve and employ groups of people whose age, pregnancy or pre-existing health conditions make them more susceptible to health damage from exposure to pesticides or other chemical pollutants than the population at large. These include the following groups.

Young children. 63% of child care providers we surveyed (56 providers) care for children under the age of one, while 97% (86 providers) care for children under the age of five. Because of their small size, high metabolic rate and rapid growth and development, infants and young children are more vulnerable than adults to a wide range of health risks from exposure to toxic chemicals, including pesticides.

Pregnant women. 34% of providers in our survey (30 providers) reported that at least one of their staff members was currently pregnant or had been pregnant in the past year. Exposure to pesticides during pregnancy has been linked to higher risk for miscarriage, birth defects and other reproductive problems.²⁰ Some types of pesticides can also be transferred from a new mother to her child through breast milk.²¹

Asthma and allergies. Over half of our survey respondents (49 out of 89 providers) reported caring for at least one asthmatic child, with numbers ranging from one to 30 children in a facility. Over a third of survey respondents reported having at least one child with respiratory allergies, ranging from one to 20 children with allergies in any given facility. 22% reported having at least one staff member with asthma, and another 22% reported having staff who suffer from respiratory allergies. Many pesticides are known to be respiratory irritants,²² and as such can trigger asthma and allergy attacks. There is also some evidence that early exposure to pesticides may contribute to the development of early childhood asthma: one 2003 study found that children in Southern California were 2.5 times as likely to develop asthma by age five if exposed to pesticides during the first year of life. The same study also found that child care attendance during the first four months of life increased a child's chances of developing asthma by a factor of 2.4.²³

2. Other pesticide exposure risks in NC child care. A considerable number of providers we surveyed reported other potential sources of pesticide exposure for children and staff at their facilities, beyond their own structural pest control programs. Those potential sources of exposure include:

- Parents of children work on farms that use pesticides (15%, 13 providers) or in a nursery or landscaping business that uses pesticides (21%, 19 providers), and are therefore at high risk of transferring pesticide residues from work to home on their hair and clothing;
- Regular use of pesticides at a farm (3%, three providers) or on lawns or landscaping (8%, seven providers) adjacent to the child care facility;
- Presence of wood structures installed before 2004 at their facility (8%, seven providers); and
- Use of insect repellants containing DEET on children (6%, five providers).

We mention these other risk factors for two reasons. One, they indicate a need for provider education on preventing pesticide exposures from several sources, beyond pest control at their facility. These include pesticide drift, proper treatment and/or disposal of CCA-treated wood structures,²⁴ and safer alternatives to insect repellants containing DEET for children.

Secondly, these additional pesticide exposure risks serve to highlight the importance of reducing pesticide use in NC child care. A significant portion of children served by our child care community are already at elevated risk for pesticide exposure in their daily lives. Some important sources implicated in the responses to this question are “secondhand” occupational exposures from the skin or clothing of family members who work with pesticides, and pesticide drift from pesticide use in close proximity to child care. Other likely sources of pesticide exposure not captured by this survey are home use of high-risk pesticide products (such as sprays, foggers, and pet flea treatments), or living very close to farms or landscaping where pesticides are used, especially if they are applied by aircraft or blowers. Switching to least-toxic IPM in child care could especially benefit these children, who are already at elevated risk for pesticide exposure, by reducing their total exposure to pesticides from all sources.

3. Common pest problems in NC child care. Ants, mosquitoes, fire ants, weeds, and flies are the most common pests problems for the 89 child care providers we surveyed.

Ant infestations were by far the most common complaint; 54% of surveyed facilities (47 providers) reported having a problem with ants, ranging from daily to less than yearly occurrences.

37% of facilities statewide reported a mosquito problem (32 providers), and the same percent reported a problem with fire ants, tying the two for second most common pests. However, because fire ants are not present in Western NC and some westerly parts of the Central Piedmont, they are a somewhat more frequent problem in Central and Eastern NC than our figure indicates.

Weeds (cosmetic only, does not including prickly or poisonous plants) and flies came in third and fourth place for pest problems, with 28% (24 providers) and 26% (22 providers) reporting these problems at their facilities, respectively.

None of these most-common pest species should require high-risk pesticide application. Least-toxic IPM solutions are available to treat each of these common pests at reasonable costs.²⁵

Many children in child care in North Carolina are already at elevated risk for pesticide exposure in their daily lives from many sources. Switching to least-toxic Integrated Pest Management (IPM) in child care facilities could especially benefit these children. *A child coloring at Toxic Free NC's information and activity booth at the Festival of Fun in New Bern. Photo by Billie Karel.*



Comparison: Pest management cost and health risks in two different child care facilities

Child care A

Child care A is a large child care center serving 91 children in a dedicated facility. The director of Child care A has been going back and forth between two pest control companies with little satisfaction from either. While one is very expensive, the other isn't very effective; both use high-risk practices.

Between the two companies, a PCO treats the center monthly, with costs ranging from \$65-\$100 per visit, working out to between \$8.57 and \$13.19 per child yearly. Though the PCOs serving Child care A use some precautions associated with IPM, use of a pump sprayer and fogger indicate a relatively high level of risk for pesticide exposure to children and to staff.

In spite of frequent and extreme measures taken to control pest problems, Child care A continues to have pest problems (mice, rats, ants, cockroaches) in both indoor (classroom, kitchen, and office) and outdoor areas on a regular basis.

Child care B

Child care B is registered as a three-star rated child care provider, serving infants (starting at four months) and toddlers, as well as school-aged children up to the eighth grade (400 children in total).

The maintenance director takes care of all pest control, with the exception of semi-annual contractor visits for termite prevention and treatment using outdoor baits. The maintenance director uses preventative and least-toxic measures to control pests, including snap-traps and building maintenance and sanitation.

At the time the survey was taken, the school spent \$170 semi-annually on a contract for termite prevention and control, and an estimated \$250 per year on additional pest control supplies. Excluding the price of building maintenance (most survey responders did not provide this estimate), Child care B spends around \$1.48 per child yearly. Even if the total cost of all building maintenance were factored in (\$2,000 annually), the price per child is still lower than that for Child care A, at \$6.48 per year.

Child care B does experience some seasonal pest problems. The maintenance director reports that they are easy to control, and pest problems have dropped considerably since switching from a conventional pest control program to a prevention-based IPM program.



Pests are a frequent challenge for child care facilities, and some carry serious health risks. Pest problems can be handled safely and affordably with least-toxic Integrated Pest Management practices instead of conventional pest control.

V. Recommendations



The North Carolina General Statutes for Child Care Facilities state the following:

“Recognizing the importance of the early years of life to a child’s development, the General Assembly hereby declares...(t)he state should protect children in child care facilities by ensuring that these facilities provide a physically safe and healthy environment.”²⁶

In order to make this “physically safe and healthy environment” a reality, Toxic Free NC urges the state of North Carolina to ensure the widespread adoption of Integrated Pest Management (IPM), and the end of high-risk pest management practices in child care centers. Toxic Free NC recommends the following steps to meet this goal:

- **PCO Training & Certification in Least-Toxic Integrated Pest Management.** One of this survey’s clearest findings is that Pest Control Operators (PCOs) are not commonly using least-toxic IPM practices in North Carolina child care facilities. We know that the populations that most often occupy a child care facility – young children and women of child-bearing age – are especially vulnerable to health damage associated with pesticide exposure, yet this survey suggests that pesticide application methods that present high risk for human exposure are widely used by PCOs in child care facilities.

Contract professionals should be trained to approach pest control in child care facilities with prevention based, least-toxic IPM methods. Furthermore, child care providers need a reasonable guarantee that the professional with whom they contract for pest control services is trained to provide the safest possible pest management for the vulnerable women and children in their facilities. The state of North Carolina should therefore develop a certification program for licensed pest management professionals who wish to perform pest management in child care facilities, schools and other sensitive environments.

- **Provider education.** While every child care provider interviewed expressed deep concern for the health and safety of the children they served, many believed that they need only worry about the existence of pests in their facilities, and not the means by which those pests were controlled. Providers often did not have much information about pesticide use in their centers. Some providers believed the products used in their centers to be “green” or eco-friendly but did not report the use of other IPM practices. The simple lack of pesticide use reported by some providers in our survey means only that they have no pest problems, and not necessarily that they would handle a pest problem safely if one were to arise. However, 20% of surveyed providers requested information on using fewer pesticides in their facility, indicating a desire to learn and a shortage of available information on the subject. The state of North Carolina should, through its existing channels for training and regulation of child care providers, offer education and training on the important topic of safe pest control to help providers avoid many of the unsafe practices identified by this survey.

APPENDIX I:

Survey Methods in Detail



In summer 2008, Toxic Free NC developed this survey for child care providers with questions on facility size, children served, geographic location, pest problems, and pest control methods. With a goal of 100 completed surveys from child care providers throughout the state of North Carolina, and an estimated rate of return of one in five, Toxic Free NC contacted 502 child care providers in 13 counties across the state in August and September of 2008. Providers were initially contacted by telephone, and had the option to complete our survey over the phone, by mail or over the Internet. In some cases, follow-up phone calls were used to verify responses that were unclear or incomplete. 90 more providers were added to the survey group in September – 15 from each of 6 counties with lower than expected response rates (Chatham, Gaston, Guilford, Pasquotank, Pender and Wake). As an incentive to participate, survey respondents were entered in a drawing to win one of several prizes from in-kind supporters of the project. Prizes included personal care gift baskets, movie tickets, passes to children’s museums, toys, and a case of baby wipes.

Selection of the survey population. Toxic Free NC chose a survey population approximately representing our state’s child care population as a whole. We selected for regional representation using NC census data to determine the percentage of the state’s total population living in each region of the state, and then applied those percentages to the 500 providers we wanted to contact. This resulted in our contacting 146 child care providers from the Coastal Plain region, 66 from the Western mountain region, and 290 from the central Piedmont region, totaling 502 providers statewide (higher than 500 because of rounding to whole numbers).

Toxic Free NC then selected 13 target counties from which to draw survey participants. We used census data on race and socioeconomics for the region for individual counties to choose a subset of counties and a number of providers to draw from each that, taken together, approximate the racial, socioeconomic, and rural/urban proportions of that region’s population. Then, we randomly selected providers to contact by counting through the NC Division of Child Development’s alphabetical lists of registered child care providers in each of the survey counties, and selecting providers to contact at regular intervals based on the number of providers desired from that county.

We chose to over-sample Robeson County because of its large Native American population by adding 11 providers from this county to our group of initial contacts, which resulted in two returned surveys from that county. This ensured that some child care providers serving the Native American community would be represented in our survey group, although they are a relatively low percentage of the state’s population overall.

A full list of the participating counties and rates of response from each can be found in Table 1 on page 8.



More than half of child care providers in our survey reported they care for children with asthma. Many commonly-used pesticides are respiratory irritants and can trigger asthma attacks.

APPENDIX II:

NC Child Care Pest Control Survey Form



Introduction

Thank you very much for participating in this survey of pest control practices in North Carolina child care! This survey is confidential. We will collect your name and the name of your child care for identification purposes only. We will not publish your name or the name of your child care with the survey results. We will use this survey to better understand the pest problems that child cares face, and how to help them improve child health, by both reducing pest problems and reducing toxic chemicals in child care facilities. We will provide you with a copy of the survey results when they are ready.

As a thank-you for participating in this survey, you will receive a follow-up packet with some information on non/least-toxic ways to deal with your pest problems. You will also be entered in a drawing to win one of our great prizes for you or your child care (see cover letter for list of prizes).

Please answer all these questions honestly and to the best of your knowledge. If you don't know an answer, leave it blank.

1. Name & contact information of person answering survey

Name	
Business Name	
Street address of business	
City, State & Zip	
County	
Phone	
Email	

2. Your role/job title _____

About your child care facility, children and staff:

3. Is yours...

- a dedicated child care facility:
- a child care housed in a school, church or other site; or
- an in-home child care

4. Is it...

a for-profit child care facility;

a non-profit child care;

a Head Start program:

part of a school or larger program? Please explain: _____

5. How many children do you serve? _____

6. What is the age-range of the children you serve? (please provide the ages of the youngest and oldest children you serve): _____

7. Approximately how many of the children you serve are... (place an X in the appropriate box):

	Most or all	More than half	About half	Less than half	Just a few	None
multi-racial						
black or African American						
white or Caucasian						
Hispanic or Latino						
Native American						
East Asian, South Asian, or Pacific Islander						
Any others/ don't know						
Rather not specify						

8. How many staff do you have? _____

8. How many staff do you have? _____

9. Approximately how many of your staff are (place an X in the appropriate box):

	Most or all	More than half	About half	Less than half	Just a few	None
multi-racial						
black or African American						
white or Caucasian						
Hispanic or Latino						
Native American						
East Asian, South Asian, or Pacific Islander						
any others/ don't know						
Rather not specify						

10. Is your center in an area that is ...

- Rural (mostly farmland or forest)
- Urban (large city)
- Smaller city or town
- Suburban (mostly housing)
- Mixed (mix of urban, rural and/or suburban communities nearby)

11. Do any of your children or staff have asthma or respiratory allergies? Fill in approximate numbers below:

_____ Children with asthma

_____ Children with respiratory allergies

_____ Staff with asthma

_____ Staff with respiratory allergies

12. How many of your staff are pregnant, or have been pregnant in the past year? _____

About pest control:

13. Are any of the following insects a pest problem at your child care center?

- (a) daily (1) indoors - classroom or play area
- (b) weekly (2) indoors - kitchen
- (c) monthly (3) indoors - office or other adults-only space
- (d) seasonally (4) indoors - utility room or basement
- (e) yearly (5) outdoors - play area
- (f) less than yearly (6) outdoors - lawn or playing field
- (7) outdoors - landscaping
- (8) other

Ants: Are they a problem? How often? (a-f): _____

yes

no

Where are they a problem? (1-8): _____

Cockroaches: Are they a problem? How often? (a-f): _____

yes

no

Where are they a problem? (1-8): _____

Flies: Are they a problem? How often? (a-f): _____

yes

no

Where are they a problem? (1-8): _____

Mosquitos: Are they a problem? How often? (a-f): _____

yes

no

Where are they a problem? (1-8): _____

Fire Ants: Are they a problem? How often? (a-f): _____

yes

no

Where are they a problem? (1-8): _____

Other: Do you have other insect pests? How often? (a-f): _____

yes

no

Where are they a problem? (1-8): _____

--If you "other" above, please explain: _____

14. Are any of the following small animals a pest problem at your child care?

- (a) daily (1) indoors - classroom or play area
- (b) weekly (2) indoors - kitchen
- (c) monthly (3) indoors - office or other adults-only space
- (d) seasonally (4) indoors - utility room or basement
- (e) yearly (5) outdoors - play area
- (f) less than yearly (6) outdoors - lawn or playing field
- (7) outdoors - landscaping
- (8) other

Mice: Are they a problem? How often? (a-f): _____

yes

no

Where are they a problem? (1-8): _____

Rats: Are they a problem? How often? (a-f): _____

yes

no

Where are they a problem? (1-8): _____

Any others?: Are they a problem? How often? (a-f): _____

yes

no

Where is it a problem? (1-8): _____

--If you selected "other" above, please explain: _____

15. Are any of the following a pest problem at you child care?

- (a) daily (1) indoors - classroom or play area
- (b) weekly (2) indoors - kitchen
- (c) monthly (3) indoors - office or other adults-only space
- (d) seasonally (4) indoors - utility room or basement
- (e) yearly (5) outdoors - play area
- (f) less than yearly (6) outdoors - lawn or playing field
- (7) outdoors - landscaping
- (8) other

Mold: Is it a problem? How often? (a-f): _____

yes

no

Where is it a problem? (1-8): _____

Weeds-unsightly: Are they a problem? How often? (a-f): _____

yes

no

Where are they a problem? (1-8): _____

Weeds-prickly or poisonous: Are they a problem? How often? (a-f): _____
() yes
() no

Where are they a problem? (1-8): _____

Any others?: Do you have them? How often? (a-f): _____
() yes
() no

Where are they a problem? (1-8): _____

16. How do you handle pest problems? Please mark an X in the appropriate space and explain if required.

Contractor comes regularly - how often?	
Contractor, as-needed. Approx. how often?	
Self or in-house staff	
Combination. Please explain:	

If you do not use a contractor to take care of pest problems in your facility, please skip ahead to question 18. If you use a combination of self/in-house and contracted pest control, please answer both 17 and 18.

17. If you use a contractor, what does the contractor do to prevent and get rid of pests? Please check all that apply:

- () cleaning and sanitation
- () building maintenance & upgrades (i.e. screens, caulking cracks, weather-stripping, etc.)
- () "green" or eco-friendly products
- () sticky traps
- () baiting (gels or bait traps)
- () granular product
- () spray - aerosol can
- () spray - pump sprayer
- () spray - other
- () fog or bomb
- () puts down dusts or powders (boric acid, etc.)
- () don't know

other

If you chose "other" or "spray-other", list here along with any other notes:

18. If self or in-house staff takes care of pest problems, what is done to prevent and get rid of pests? Please check all that apply:

cleaning and sanitation

building maintenance/upgrades (i.e. screens, caulking cracks, weather-stripping, etc.)

"green" or eco-friendly products

sticky traps

baiting (gels or bait traps)

granular product

spray-aerosol can

spray-pump sprayer

spray-other

fog or bomb

put down dusts or powders (like boric acid, etc.)

other

If you chose "other" or "spray-other", list here along with any other notes: _____

If you do not use a contractor for pest control in your facility, please skip ahead to question 20.

19. Does the contractor for pest control in your facility do any of the following?

Please check any that apply:

Ask if and where your staff has seen any pests

Inspect the facility thoroughly

Make suggestions to you about how to reduce and prevent pest problems

Give you options for pest control

Tell you what chemicals, if any, they are using

Provide you with a copy of the pesticide label, if pesticides are used

Provide you with a copy of the Material Safety Data Sheet (MSDS) for any pesticides used

Post warning signs around indoor treatment areas

Post warning signs around outdoor treatment areas

Leave a written receipt of everything they've done on the visit

Don't know

If you answered question 19, you do not need to answer number 20.

20. Does the person who takes care of pest control in your facility do any of the following?
Check any that apply:

- Ask if and where your staff has seen any pests
- Inspect the facility thoroughly
- Make suggestions to you about how to reduce and prevent pest problems
- Investigate options for pest control
- Tell staff what chemicals, if any, they are using
- Keep a copy of the pesticide label on hand, if pesticides are used
- Post warning signs around indoor treatment areas
- Post warning signs around outdoor treatment areas
- Keep a record of pest control measures
- Don't know

21. If/when pesticides are used, do you do any of the following? Please check any that apply.

- Remove and/or cover toys and educational supplies from space being treated.
- Notify staff of what/when treatment will take place. If yes, is notification verbal, written or both? Please explain in space provided.
- Notify parents of what/when treatment will take place. If yes, is notification verbal, written or both? Please explain in space provided.
- Treat when children are not present.
- Clean area following treatment.
- Other:

If you selected 'other' or you notify your staff or parents when pesticides are used, please explain here:

22. How much do you spend on pest control (per month, quarter, or year)?

Cost of contract, if any: \$ _____

Cost of any supplies that you purchase: \$ _____

Cost of labor/maintenance: \$ _____

23. Are you satisfied with the quality, cost and effectiveness of your pest control program?

- Very satisfied
- Somewhat satisfied
- Not satisfied

23. Are you satisfied with the quality, cost and effectiveness of your pest control program?

- Very satisfied
- Somewhat satisfied
- Not satisfied

More about children & pesticides:

24. How many of the children you serve fall under these categories? Place an X in the appropriate box.

	None	Few	Some	Most
Parents work on a farm that uses pesticides				
Parents work in a plant nursery or landscaping business that uses pesticides				

25. Are any of the following true of your child care facility?

- pesticides are used on farms next to your center.
- pesticides are used on lawns or landscaping next to your center.
- pesticides are heavily used in the area, but not next to your center.
- wooden playground equipment, picnic tables or landscaping ties at our child care facility installed before 2004.
- insect repellants containing DEET put on children at your facility.

26. Are you interested in learning more about any of the following topics?

- using less pesticides at your child care.
- information for families and staff on using less pesticides at home.
- finding affordable, organic or pesticide-free food for your child care to serve to children.
- information for families and staff on finding affordable, organic or pesticide-free food in your area.
- steps to report pesticide over-spray or drift.
- NC policies on treated wood playground equipment, picnic tables and landscaping ties at child care facilities.
- other. Please explain: _____

27. Are you interested in receiving news letters from Toxic Free NC (3 times per year)?

- no
- by email
- by mail

28. Are you interested in receiving action alerts (monthly emails about taking action on pesticide issues in North Carolina) from Toxic Free NC?

- yes (only available by email)
- no

Thank you so much for taking the time to complete this survey!



End Notes



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17. NC public schools are all required to transition to IPM by 2011 under the School Children's Health Act, adopted by the state in 2006.

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Avoiding Big Risks for Small Kids
 Results of the 2008 NC Child Care Pest Control Survey
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