

# UT IPM program records decreased volume of indoor pyrethroid applications in TN demonstration schools

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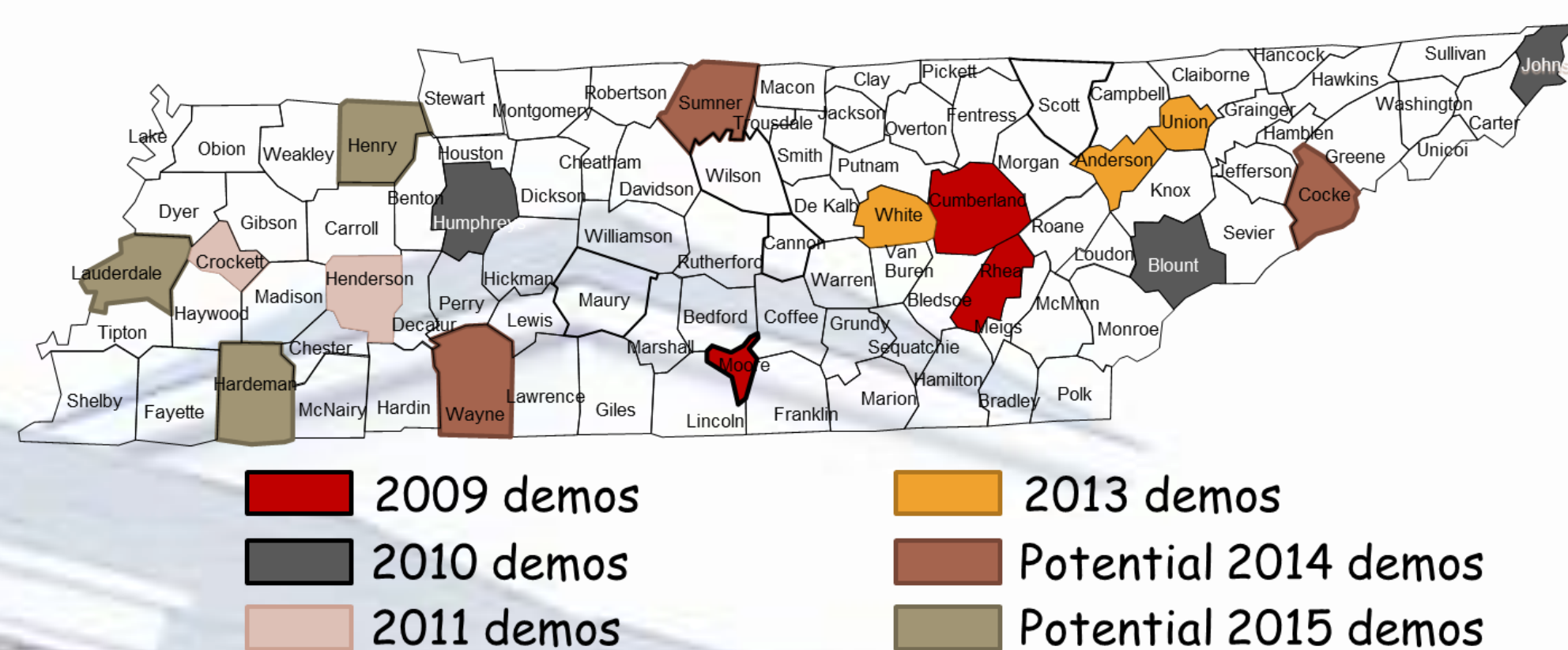


Figure 1. Tennessee counties in which school IPM programs have been, or plan to be, conducted.

*Integrated Pest Management (IPM) in Schools* programs aim to reduce and balance risks from pests and pesticides. From 2009 to 2012, UT Extension conducted nine school IPM demonstrations in eight Tennessee counties (Figure 1) through funding from USDA, NIFA, Extension IPM Coordinated & Support Programs and grass root support from county Extension agents with the objective to increase school IPM adoption in rural areas. Prior to demonstration initiation, cooperating Extension agents worked with local school administrators to select a school. A 500-point inspection is conducted and a meeting is held at each demonstration school preferably with the school employees (maintenance, kitchen and custodial staff, principals, school nurses) that will play a significant role in the program and with the pest management professional. A designated activities form describes the responsibilities of UT Extension, the school and the pest management professional. School IPM logbooks are given to each school in the system, although data are only collected from the demonstration school. Pest sighting logs and pesticide application records from the previous year are requested. The logbook overseer sends monthly the current year's pesticide application records and pest sighting log as the demonstration progresses. Site visits by the UT Urban IPM Team are conducted three to four times a year.

Table 1. Mean monthly school pyrethroid volume applied prior to and during school IPM demonstrations and percentage decrease in volumes during IPM implementation.

School (1 <sup>st</sup> yr in demo)	Mean volume (fl. oz) of pyrethroid applied indoors per month Year 1 (before IPM demonstration)	Mean volume (fl. oz) of pyrethroid applied indoors per month Year 2 (during IPM demonstration)	% decrease in volume of pyrethroid used during IPM
John Sevier Elem. ('10)	106.24	4	96.2
Waverly Elem. ('10)	284	45.7	83.9
Roan Creek Elem. ('10)	179.6	0	100
Shady Valley Elem. ('10)	177	5.5	91.4
Maury City Elem. ('11)	79.6	5.3	93.3
Caywood Elem.* ('11)	2.8*	1.83*	34.6*
<b>Mean</b>	<b>138.2</b>	<b>10.4</b>	<b>83.2</b>
<b>Mean without Caywood</b>	<b>165.3</b>	<b>12.1</b>	<b>93.0</b>

\*Caywood Elementary was using IPM prior to demonstration.

In the first year, we did not consistently receive records for the year prior to IPM. We were more persuasive in subsequent years. In the table above we document the reduction in diluted pyrethroid applied per demonstration school. If we include schools that were not using IPM prior to the demonstration in the analysis, pyrethroid volume was reduced by 93%. If we include the school conducting IPM before we started (Caywood Elementary), this school reduced the volume of diluted pyrethroids by only 34.8% and pyrethroid volume applied for all schools was decreased by 83.2%.



Figure 2. Presentation of EPA's PestWise IPM Innovators Award to personnel from John Sevier Elementary (left, Maryville City Schools, Blount County) and Shady Valley Elementary (right, Johnson County Schools).

We presented the EPA's 2012 PestWise IPM Innovators Award to active participants in the four 2010-2011 demonstration schools (Waverley Elementary, John Sevier Elementary, Shady Valley Elementary, Roan Creek Elementary) which further promoted the IPM program and rewarded the schools through various media attention.

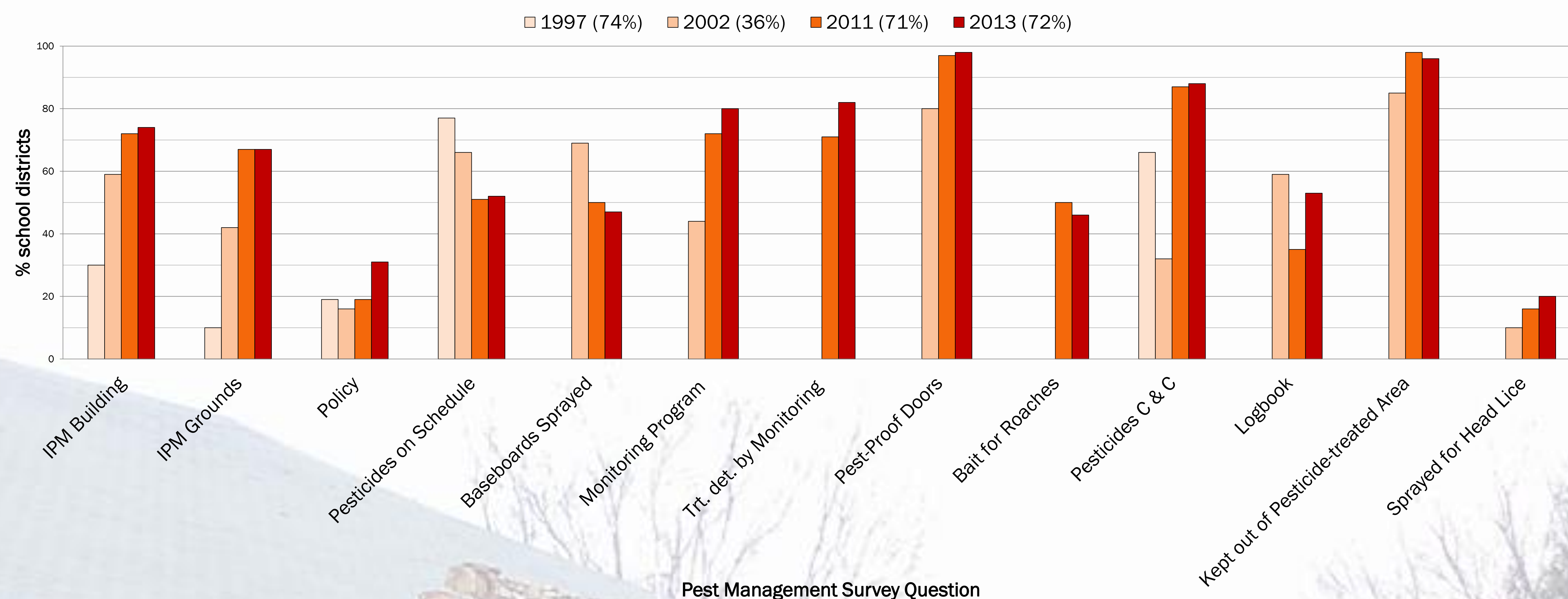


Figure 3. Percentage affirmative school district response to survey questions by year. Response rate or percentage school districts responding is given in parentheses by year in the legend.

We are making progress towards the goal of all schools using IPM by 2015 (Figure 3). Tennessee school pest management surveys conducted in 1997, 2002, 2008, 2011 and 2013 ([http://schoolipm.utk.edu/success\\_results.html](http://schoolipm.utk.edu/success_results.html)) show steady progress towards adopting school IPM. In 1997, indoor school IPM adoption was estimated at 12% (74% return) and in 2002, had reached 25% (36% return). In 2008, only 6.7% of school districts completed the survey, but 54% of the schools were using high level IPM. It appeared the rate of IPM adoption was doubling about every five years, but the low response rate in 2008 called that data into question. Thus, the survey was changed from an online submission to a phone survey, it was reduced and simplified to include 17 questions and was to be completed for the school district and not for each school. The simplified 2011 and 2013 surveys no longer allowed us to collect the detailed data as in the past, but did allow us to discern whether schools were using IPM.

**We are almost there!!!! In 2013, about 80% of the school districts are using most (>70%) of the IPM practices queried about in the survey.** IPM practices included having a pest management policy, using a person trained in pest management to decide whether pesticides need to be applied and to apply pesticides, using a monitoring system or inspections to help determine when and where pesticides should be applied, pest-proofing, using cockroach baits, applying pesticides in cracks and crevices, using a logbook, keeping occupants out of treated areas and not spraying buildings or equipment for head lice. Most school districts are keeping occupants out of pesticide-treated areas overnight (70%) or for the weekend (17%). Seventy-four percent of responding school districts thought they were using IPM; however, we decided they weren't using IPM if they regularly applied pesticides regardless of pest presence. This dropped the school districts using IPM to 46% (Figure 4).

#### Our best results!

- People trained in pest management are making the decisions that pesticides need to be applied and when and where they should be applied.
- More than 80% of school districts monitor or inspect to help decide when and where pesticides should be applied.
- Almost all school districts check exterior doors to ensure they are sealed well enough (i.e., gaps around doors are less than ¼ inch in diameter) to prevent mice from entering.
- Pesticides are applied indoors to cracks and crevices to target the pest and reduce exposure to occupants in 88% of districts.

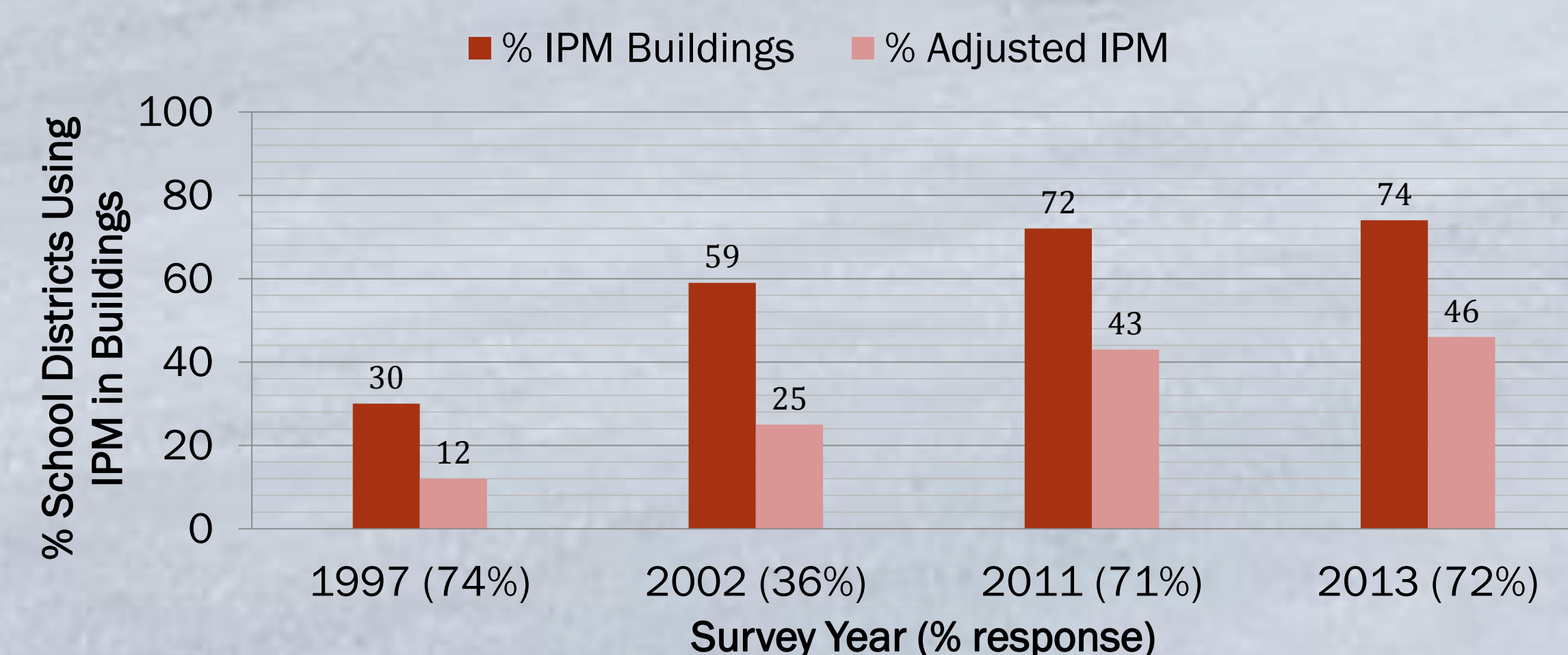


Figure 4. Percentage of school districts indicating they use IPM in the survey. We adjusted the percentage of those using IPM. School districts were considered as not using IPM if they applied pesticides on a scheduled basis regardless of pest presence.

#### What needs improvement?

**1. A schedule is still determining when pesticides are applied in 52% of the school districts.** We would like to see pest sightings, or results from inspections or monitoring devices as the trigger for pesticide applications. But the question posed may be a bit ambiguous. Because the pest management professional is present on the same day of each month, the respondents might have interpreted this questions as the pest management person applying pesticides on a predetermined schedule.

**2. Also, 47% of respondents are still spraying baseboards regardless of pest presence.** Spraying baseboards is often ineffective and not necessary because pests are often hidden in a crack and crevice and not found in an open area such as on a baseboard. We would like to see pest sightings, or results from inspections or monitoring devices that determine where the pest is most active, as the trigger for pesticide applications.

**3. Baiting for cockroaches is only performed in 46% of the school districts.** But this percentage may be greater as 39% of responding school districts were unsure if they had baited for cockroaches. Baiting aids in getting the pesticide into the cockroach harborage site. Bait is placed in or near a crack and crevice where cockroaches have been found on glueboards or have been sited during an inspection. Baiting is a very efficient way to control roaches and has been proven to reduce the cockroach allergen load without other effort. **Based on these first three needed improvements, ~50% may be a better estimate of Tennessee schools using IPM.**

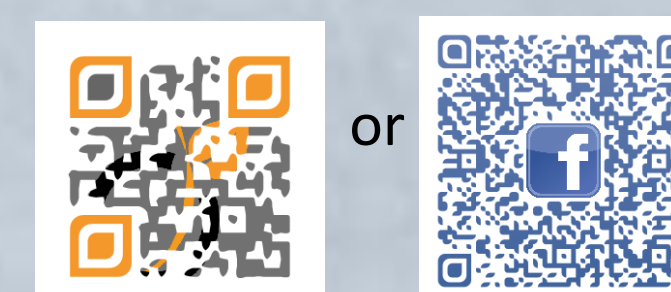
**4. Logbook use should be greater given that we distributed logbooks to each school district for each school in their system.** Occupants should have access to information describing pesticide treatments. If pest control services (monitoring and inspections as well as pesticide applications, etc.) are performed on the same day of each month, concerned individuals could inquire if, when, where and what pesticides were applied before entering the school the next day. In 2011, only 35% were using logbooks and in 2013, 53% reported doing so, but use had been higher (59%) in 2002. Accurate record keeping allows the school to evaluate the results of practicing IPM to determine whether pest management objectives have been met. Keeping accurate records leads to better decision making and more efficient procurement. Accurate records of inspecting, identifying and monitoring can document changes in the site environment (less available food, water or shelter), physical changes (exclusion and repairs), pest population changes (increased or reduced, older or younger pests) or changes in the amount of damage or loss.

**5. We've noted an increase in school districts using a policy statement.** In 2011, 19% had a pest management policy and in 2013, this rose to 31%. A policy statement should be written stating the school administration's intent to implement an integrated pest management program. It should briefly specify the expectations of the program, including the incorporation of existing services into an IPM program and the education and involvement of students, staff and pest manager. A model policy statement is provided online at <http://schoolipm.utk.edu>.

**6. School personnel are still spraying buildings or equipment for head lice in 20% of the responding school districts.** We do not recommend spraying the premises for head lice. Head lice do not live away from the human host for very long (< 2 days), and it is illegal for school personnel to apply pesticides in a school unless they are under the direct supervision of someone licensed by the Tennessee Department of Agriculture to apply pesticides. We will emphasize this during upcoming presentations and social media entries. See the February 2011 newsletter (<http://schoolipm.utk.edu>) for a lengthy discussion of this subject.

Will all Tennessee schools be using IPM by 2015? Stay tuned.

Find more information on the TN school IPM program at



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