

Resource ID # 5717

**Pesticide Laws and Michigan's Migrant
Farmworkers: Are They Protected?**

**PESTICIDE LAWS AND MICHIGAN'S
MIGRANT FARMWORKERS:
ARE THEY PROTECTED?**

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Research Report No. 12

¹ For this report, the author gratefully acknowledges the helpful information provided by Manuel F. Gonzalez, Director of the Migrant Services Division, Michigan Department of Social Services; Paul Peninger, Philip R. Riley, Esq. and Gary N. Gershon, Esq., Michigan Migrant Legal Assistance Project, Inc.; Baldemar Velasquez, Farm Labor Organizing Committee; Dr. Larry G. Olsen and Sandra Perry, Pesticide Education Coordinators, Pesticide Research Center, Michigan State University; Dr. Kenneth Rosenman, College of Human Medicine, Michigan State University; Dr. Charles Cabbage, Brian C. Rowe, Antonio Castro-Escobar and Polly Kapala, Pesticide and Plant Pest Management Division, Michigan Department of Agriculture; Donald Baumgartner, U.S. Environmental Protection Agency, Region V; Craig Anderson, Regulatory Compliance Assistance Program, Michigan Farm Bureau; and Janice R. Morgan, Esq., Migrant Legal Action, Washington, D.C.

Abstract

Until very recently, little attention has been paid to the occupational safety of the huge migrant and seasonal workforce which provides our nation with fruits and vegetables. This paper describes the new Worker Protection Standards. These are federal regulations put into effect in 1995, which are intended to provide an increased measure of safety to farmworkers against pesticide poisoning on the job, by mandating employer-provided training in pesticide safety. This paper explores the complex issues surrounding state implementation of these federal pesticide laws, and how that interaction works in Michigan. Finally, this paper looks at what is known and what is not known about the condition of the farmworker population in Michigan, focusing on the dearth of information on the occupational injury and illness rates of farmworkers.

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I. Introduction

A growing body of evidence indicates that the burdens of environmental degradation fall disproportionately on Latino and other minority populations. (Bryant and Mohai, 1992; Bullard, 1994, 1993; U.S. Environmental Protection Agency, 1992).¹ This is most notably the case in the agricultural industry, where environmental dangers abound, and where the vast majority of workers are Latino. (Martin and Martin, 1994:137). Each day these mostly Latino farmworkers labor in fields where they will come into close contact with some of the 24,000 pesticidal products currently on the market in the United States. (McKenna & Cuneo, 1993:1).

Whether state and federal safety laws have been followed or ignored, there appears to be little doubt that farmworkers' health suffers as a result of constant exposure to pesticides. Effects range from rashes, nausea, dizziness and gastroenteritis, to chronic illnesses such as cancer, kidney disease, adverse reproductive outcomes, and neurological disease. (Baker and Wilkinson, 1990; Goldsmith, 1989; IARC, 1991; Johnston, 1985; Moses, 1993, 1989a, 1989b; Wasserstrom and Wiles, 1985; World Health Organization, 1990).

Despite these negative health effects, until very recently federal pesticide laws focused on regulating the registration, tracking and labeling of the pesticides which are on the market, and paid little attention to the occupational safety of those people who provide us with the food -- farmers, pesticide applicators and migrant farmworkers. However, in 1992, the U.S. Environmental Protection Agency ("EPA") began to promulgate specific Worker Protection Standards (or "WPS"), intended to provide a greater measure of safety against pesticide poisoning for workers in the agricultural industry, by providing farmworkers with actual training in how to avoid injury from pesticides. As Dr. Lynn Goldman (Assistant Administrator for Prevention in the Pesticides and Toxic Substances section of the U.S. EPA) put it in a recent and stunning understatement, "These basic workplace protections afforded by WPS are long overdue." (U.S. Environmental Protection Agency, 1995:1).

In an attempt to take stock of this legislation, this paper describes the farmworker population of Michigan, and the significant state and federal laws which govern pesticide safety and occupational exposure to pesticides among farmworkers in Michigan. It will also look at the legal remedies potentially available to a Michigan farmworker who has become sick as a result of exposure to a pesticide. Finally, it will attempt to examine how the state bureaucracy is going about implementing these laws, and to identify areas where both regulators and the population they serve could benefit from further dissemination of information. In the absence of such information, it is difficult to tell whether current pesticide laws are adequately protective of farmworkers' health.

¹ The works referenced in the text discuss general issues and specific instances of environmental racism effecting Latinos in various areas of the nation. Unfortunately, here in Michigan, studies of instances of environmental racism relying on surveys often drop the "Hispanic" classification due to the small number of reported responses, lumping these responses into either "non-white" or "other." (See Bryant and Mohai, 1992:97, 103).

II. Michigan's Farmworkers And Their Role In The State's Economy

Michigan has a migrant agricultural labor force of approximately 45,000 workers, making it the nation's fourth largest employer of migrant labor. (MSD/MDSS, 1994). Ninety-five percent of these workers are "Mexican-American," and migrate from Texas and Florida. Id. Looked at another way, the Michigan Census of Agriculture reports that in 1992 almost 84,000 seasonal agricultural workers were employed for 150 days or less, and 20,500 agricultural workers were employed in Michigan for 150 days or more. (U.S. Department of Commerce, 1992:128; Rochin and Siles, 1994). Hence, this brings the total to over 100,000 migrant and seasonal farmworkers.

The average Michigan farmworker's family size is 4.3 persons, and average annual income for a family of four is \$7200. (MSD/MDSS, 1994). The average Michigan farmworker's education stops at the sixth grade for adults and the eighth grade for youths under eighteen. Id. While 95% of Michigan's farmworkers are Latino, only 2.3% of all agricultural enterprises in Michigan are Latino owned. (Rosenbaum, 1994:11).

Michigan is the nation's number one producer of ten different crops, including several types of beans, cherries, pickling cucumbers, and summer potatoes. Michigan ranks second nationally in production of apples, and third in production of such staples as celery, carrots and tomatoes for process. (MSD/MDSS, 1994). In contrast to crops like wheat, corn and soybeans, many of Michigan's crops require hand harvesting.

The total value of Michigan's top 42 crops, direct from the field, is approximately \$1.5 billion. Id. Gross Farm Income for Michigan was approximately \$3.8 billion in 1992, and Net Farm Income was \$581,000,000 that year. (U.S. Dept. of Commerce, 1994:673). In producing those 1992 crops, 33,010 Michigan farms spent \$149,282,000 on agricultural chemicals (excluding commercial fertilizers), deployed on approximately five million acres of Michigan farmland. (U.S. Dept. of Commerce, 1992:21).

Data collected on six targeted fruit crops in 1993 shows that a total of 82 different active ingredients were applied as agricultural chemicals to Michigan's apples, blueberries, grapes, peaches, sweet cherries and tart cherries. For example, in 1993, Michigan's apples received about 12 pounds per acre of Captan (a fungicide) and 39 pounds per acre of petroleum distillate (an insecticide), along with 36 other chemical herbicides, insecticides and fungicides. (Michigan Department of Agriculture, Michigan Agricultural Statistics 1994:35-40). That year, Michigan's blueberries received about 4 pounds per acre of Malathion (an insecticide) along with 14 other chemicals, and grapes received about 5 pounds per acre of Mancozeb (a fungicide) along with 20 other chemicals. Id.

While some work is being done by the state to foster Integrated Pest Management ("IPM") in Michigan, IPM has so far made small inroads into affecting typical pest management practices. It is estimated that in 1994 nearly 4000 Michigan growers were using some type of IPM practice, although that may simply mean rotating crops. While Agricultural Extension agents estimate that the use of IPM meant a reduction in pesticide expenditures of about \$962,500 in 1994, this is only about 0.7% of total expenditures, using the U.S. Department of Commerce data cited above.

III. The Occupational Protections Provided By Pesticide Laws

A. Federal Law

1. The Federal Insecticide, Fungicide, and Rodenticide Act

a. Background

Agricultural pesticide use in the United States is primarily governed by a sweeping federal law known as the Federal Insecticide, Fungicide, and Rodenticide Act ("FIFRA"), first enacted in its present form in 1972, and amended several times since then. 7 USC § 136, et. seq.; 40 CFR Parts 150-189. FIFRA sets out the requirements for registration, labeling and packaging of all "pesticides" sold or distributed in the United States. FIFRA is essentially a labeling law, and most of the public health protections built into FIFRA, such as they are, are tied to the labeling requirement.²

Given the well-known power of the agribusiness lobby, FIFRA has an interesting legislative history, to say the least. The first federal regulation of pesticides was contained in the Insecticide Act of 1910, which was simply a misbranding law, intended to protect consumers from insecticides which did not perform as described on the label. This remained the state of pesticide laws until 1947, when FIFRA was first enacted and first contained a requirement that pesticides be registered with the Secretary of Agriculture before their sale or distribution. The 1947 Act also contained the first requirement that certain pesticides place warnings on their labels for safe use.

Registration of all types of pesticides remained relatively easy until 1972, when FIFRA was overhauled. Recognizing that the historical pesticide registration process had not focused on human health or the environment, Congress amended FIFRA to direct the EPA to reregister all currently registered pesticides within the next five years, taking into account a new statutory standard for registration. The new standard stated that a pesticide could be registered only if it did not cause "unreasonable adverse effects" on human health or the environment.

The reregistration process (post-Rachel Carson's Silent Spring) was intended to make up for the obvious failure to focus on public health which had characterized the original registration process. In addition, two years earlier in 1970, pesticide registration and regulation had been shifted from the U.S. Department of Agriculture to the newly-created EPA.

Looking at subsequent amendments to FIFRA, it is clear that the reregistration requirement turned into a political nightmare. In 1975, responding to complaints from agribusiness about an environmental bias against pesticide usage, Congress amended FIFRA

² It is important to remember that the entire legal scheme for regulating pesticides, whether framed as a food safety issue or an occupational disease issue, is only as good as the initial decision by EPA to register a pesticide and let it enter the marketplace. The troubled history of the pesticide registration requirement can be covered only briefly here. In addition, this paper does not attempt to cover the adequacy of the risk assessment process used to set pesticide tolerances and determine pesticide label contents. For more information on these important aspects of FIFRA the reader may refer to U.S. General Accounting Office, 1986 and Moses, 1993.

to make cancellation of any pesticide registration more difficult to accomplish, and to give the Secretary of Agriculture a greater role in the decisions that EPA would be making in the reregistration process.

Congress loosened things up a bit more in 1978. Seeing that EPA had made little headway in the reregistration process at the end of five years, Congress amended FIFRA to grant "conditional registration" to all originally registered products without the full supporting data required, and ordered EPA to finish the reregistration "in the most expeditious manner practicable."

In 1988, however, Congress flip-flopped a bit again. Describing the reregistration process as "exceedingly slow," Congress finally set a specific timetable for reregistration, to be done in a three-to-nine year timeframe, and to be funded by fees from the chemical companies seeking reregistration.

Currently, manufacturers must register a pesticide with the EPA before placing it on the market, and recordkeeping requirements essentially establish an identifiable chain-of-custody for all registered pesticides from production to application (or other disposal). 7 USC § 136a, 136f. In order to register a pesticide, EPA must determine that, among other things, the pesticide "will perform its intended function without unreasonable adverse effects on the environment; and ... when used in accordance with widespread and commonly recognized practice it will not generally cause unreasonable adverse effects on the environment." 7 USC § 136a(c)(5)(C), (D).

After registration, EPA must make this same determination whenever a "substantial question of safety" has been raised about the pesticide. Environmental Defense Fund, Inc. v. Ruckelshaus, 439 F.2d 584, 593 (D.C. Cir. 1971). EPA may suspend the registration of a pesticide if it determines that the pesticide presents an imminent hazard to human health. Id. § 136d(c). However, only EPA can initiate an investigation into whether a pesticide registration should be canceled -- private citizens cannot do so. 7 USC § 136d(b).

b. Labeling Requirements

Pesticides are registered for either general or restricted use, and restricted use pesticides may be bought and applied only by state certified applicators. Id. § 136a(d). The label on all pesticide containers must indicate the classification and contain specific directions for use, precautionary warnings, and a list of the active ingredients (inactive ingredients do not have to be listed). 7 USC § 136(p), (q), (ee). The proposed label is part of the registration process, and must be approved by the EPA.

Labels must include use directions "which can be easily read and understood by the average person likely to use or to supervise the use of the pesticide." 40 CFR § 156.10(i)(1)(i). Label text must be legible and conspicuous, and must appear in English; however, "the Agency may require or the applicant may propose additional text in other languages as is considered necessary to protect the public." 40 CFR § 156.10(a)(2)-(3). Despite this requirement, very few labels include Spanish-language information.

Labels are required to include specific directions regarding target pests, dosage rates, methods and frequency of application, worker protection cautions to be taken, limits on reentry to treated areas, and storage and disposal directions. 40 CFR § 156.10(i)(2). Use of a

registered pesticide "in a manner inconsistent with its labeling" is a violation of federal law. 7 USC § 136j(a)(2)(G). This is how FIFRA is enforced.

2. The Worker Protection Standards

Although they were first proposed in 1988 and finally enacted in 1992, the WPS did not come into effect until this year. Part of the reason why occupational safety standards have been so long in coming to the agricultural industry has to do with a turf battle between the U.S. EPA and the U.S. Occupational Safety and Health Administration ("OSHA") -- a battle which OSHA lost, to the detriment of farmworkers. OSHA is the federal agency responsible for worker safety, and is empowered to make and enforce regulations in that area in all types of industries. OSHA, of course, is the agency with the most experience in the area of worker safety and the broadest enforcement authority.

However, in 1974 EPA promulgated a set of workplace safety standards covering pesticide use on farms, which established the first reentry restrictions for 12 pesticides, and provided that warning should be given to workers of impending applications, either orally or by posting signs. 39 Fed. Reg. 16888 (May 10, 1974). These regulations were challenged by farmworker groups shortly thereafter, who wanted to see OSHA carry the burden for such regulations because of OSHA's greater experience and tougher enforcement powers.

The court disagreed with the farmworkers. In Organized Migrants in Community Action, Inc. v. Brennan, 520 F.2d 1161 (D.C. Cir. 1975), the appellate court held that Congress had given EPA broad statutory authority under FIFRA to regulate farmworker safety. The court acknowledged that the Department of Labor (where OSHA resides) had broad enforcement powers, but found that, by the sweeping language used in FIFRA, Congress must have intended for EPA to preempt OSHA in this arena. This view has now been codified in OSHA's own regulations. See, 29 CFR § 1910.1200(b)(5)(i).

In 1992,³ EPA promulgated the first worker protection standards requiring that farmworkers receive training in how to avoid pesticide poisoning. 57 Fed. Reg. 38151 (Aug. 21, 1992)(codified as 40 CFR Part 170). These requirements are accompanied by parallel regulations requiring worker protection information to be provided on the label of the pesticide container. This is the hook which allows for enforcement of the protections -- failure to properly implement the worker protection requirements constitutes "use of a registered pesticide in a manner inconsistent with its labeling." 40 CFR § 170.9(a); see, also, 40 CFR § 156.10(i)(2). Pesticides produced after April 1994 must comply with the new labeling provisions, but the older pesticides can continue to be sold until October 1995. 40 CFR § 156.200(c). (For a description of how to read a pesticide label see Appendix A.)

Giving agribusiness more than enough time to become familiar with the new standards, Congress delayed the effective date of most of the protections until January, 1995. Hence, implementation of the standards is very recent, and there has not been time to test their effectiveness. In addition, the standards have undergone five amendments in 1995 thus far,

³ Just to provide a chronological point of comparison, EPA developed a program to protect endangered species from harmful exposure to pesticides six years earlier, in 1989.

most of these becoming effective only on July 17, 1995. See, 60 Fed. Reg. 21948-21965 (May 3, 1995). (Descriptions of the five amendments are attached as Appendix B.) Hence, the three year old standards are still in a state of flux.

Two kinds of employers are subject to the worker protection requirements. The first is agricultural employers, which includes "any person who hires or contracts for the services of workers ... to perform activities related to the production of agricultural plants, or any person who is an owner of or is responsible for the management or condition of an agricultural establishment that uses such workers." Id. § 170.3. This is a broad definition, pulling in farm owners, farm managers, and labor contractors working on farms, forests, nurseries and greenhouses. (It does not apply to dairies or any animal farms.)

The second category of covered employers are handler employers, defined as "any person who is self-employed as a handler or who employs any handler..." Id. A "handler" is any person employed to handle, apply or assist in the handling or application of pesticides in any manner. Id. The protections do not apply to the employers themselves or to their immediate family members working at their own establishment. Id. § 170.102(c).

These employers are now responsible for seeing that workers receive the protections required by the rules; that all pesticides are used in a manner consistent with their labeling; and that all supervisors know how to implement the protections and are doing so. Id. § 170.7. Employers are explicitly prohibited by the law from taking retaliatory action against any farmworker for attempting to comply with the regulations or for using the protections, and employers are prohibited from doing anything which has the effect of discouraging compliance. Id. Employers are responsible for the acts or omissions of their agents and employees. Id. Hence, if a farm manager decides to ignore a protection requirement, both the manager and the farm owner can be fined.

The specific safety standards covering farmworkers have several aspects:

- (1) Employers may not allow or direct workers to enter or remain in a treated area during application of a pesticide, except for appropriately trained and equipped handlers;
- (2) Employers must consult the pesticide label to determine the restricted-entry interval ("REI") for each pesticide application, and may not allow or direct any worker to enter or remain in any treated area during the REI;
- (3) Employers must provide notice to workers of pesticide applications, in language that is understandable to the workers -- the notice will usually consist of specified signage (PELIGRO/PESTICIDAS/NO ENTRE in red) which must be posted at entrances to the field before the application (it may be right before the application) and stay up throughout the REI, although some pesticides require oral advance notice as well;
- (4) Workers must be provided with specific information about any pesticides that have been applied within the last thirty days, including such things as the product name and its active ingredients;
- (5) Employers must provide workers with pesticide safety training within the first 15 days of employment (unless the worker has previously been trained at another farm and is in possession of his or her training verification card), and must retrain workers every five years;

(6) Employers must post within certain areas specific pesticide safety information regarding how to prevent exposure and what to do if one occurs, including how to obtain emergency medical care;

(7) Employers must provide a decontamination site at the nearest place of vehicular access, with enough clean water for routine washing and eyeflushing, soap and single-use towels; and

(8) When a pesticide poisoning occurs, employers must make available immediate transportation to an emergency medical facility, and provide the medical personnel with any available information on the pesticide, the application and the circumstances of the exposure. 40 CFR § 170.110-170.160. (For a quick-reference guide to the worker safety precautions that are taught and the employers' duties under WPS see Appendix C.)

Certain newly-minted exceptions to these general requirements are worth noting. First, the REI provision has recently been weakened by several exceptions for activities considered to require "limited contact" with treated surfaces and for irrigation activities. Hence, "early-entry" farmworkers may be directed to enter pesticide treated areas during the REI for up to eight hours of work in any 24 hour period, as long as they are wearing personal protective equipment ("PPE"), which must be provided by the employer. 40 CFR § 170.112(b)-(e) and 60 Fed.Reg. 21948-21965 (May 3, 1995). (See Appendix B for a description of these exceptions.)

Second, in a move protective of farmworkers, the regulations have recently been amended to require that workers receive pesticide safety training within the first five days on the job (rather than the first fifteen), beginning January 1, 1996. 60 Fed.Reg. 21944 (May 3, 1995).

There are several requirements which apply to the safety training, the keystone of worker protection. First of all, employers themselves must be trained by EPA-approved trainers in how to do the safety training (the "train the trainer" requirement). 40 CFR § 170.130(c). The training itself must convey understandable information (that is, in the language of the audience) regarding the hazards of pesticides, acute and chronic effects of exposure, delayed effects, sensitization, how pesticides enter the body, signs of common types of poisoning, how to get emergency medical care, how to decontaminate, hazards from chemigation and drift, hazards from pesticide residues on clothing, how to avoid taking residues home, and an explanation of the REI and the required signage. *Id.*

The training itself takes about 20-25 minutes. Although training materials include videos, there must be a certified trainer present at all trainings to answer questions. At the conclusion, a training verification card may be issued by the certified trainer, although such cards are not currently mandatory in Michigan. (Some states, including Wisconsin, Ohio and Minnesota, are not making the issuance of cards a part of the program at all.)

The Pesticide Education Center at Michigan State University has been actively involved in getting safety training materials approved and in getting pesticide handlers certified. Training of trainers is available from MSU and the Michigan Department of Agriculture ("MDA"), and employers may also receive assistance with bilingual training from the Michigan Migrant Legal Assistance Project. It is important, however, that the recent availability of Spanish-language written and videotaped training materials not be used as an

...the bilingual on-site trainer out of the picture. (Lists of training materials from MSU and EPA are attached as Appendix D.)

...farmworkers have some mixed reactions to the pesticide safety training. Mr. Antonio Castro-Escobar, an official with the MDA responsible for the implementation of the safety training in Michigan, farmworkers are very interested in the information on the dangers of pesticides, and many are shocked that they are learning these things only now, after many years in this industry. On the other hand, based on the experience related to their immigration status, some farmworkers are concerned that the training verification card will be used as a reason not to hire them (although the card is not mandatory in Michigan).

In addition, farmworker groups such as the Farm Labor Organizing Committee (FLOC) point out that the WPS still leave a significant number of workers unprotected. The problem of drift of airborne pesticides onto adjacent fields where people may be working, or onto adjacent work camps where people may be living, is not adequately covered by the WPS. Although warning signs are required to be posted, they may be removed immediately before a pesticide application, and the required locations of the signs are not always the best to target the workers on the farm being sprayed. There is no mechanism by which workers in an adjacent field are ensured that they will be warned prior to the spraying of an adjacent field. If a slight breeze is blowing in their direction those workers will be subjected to a significant exposure, despite the fact that all relevant laws have been followed. As a result, the Worker Protection Standards still need significant work.

Pesticide Residue Tolerances

...an area which periodically receives tremendous media attention, resulting in a great deal of confusion. Although this is viewed as essentially a consumer-oriented issue, pesticide residues are even more important for farmworkers as an occupational health issue.

...responsible for regulating the presence of pesticide residues in food and animal products. "tolerances," under the Federal Food, Drug, and Cosmetic Act ("FFDCA"). (21 USC § 348). EPA will not register a pesticide under FIFRA unless the registration applicant has received the necessary tolerance (or exemption from tolerance) under the FFDCA. 40 CFR § 152.112(g). The tolerance set (usually in parts per million) is the maximum level of a pesticide residue that may be present when it leaves the field. The two federal schemes are intended to work together: if a pesticide is applied in accordance with its EPA approved label, the residue on the food will fall within the tolerance limit, which itself has been set as a result of an EPA approved scientific risk assessment. However, in setting residue tolerances, EPA is not the only factor. The FFDCA requires that EPA consider as "relevant" factors in setting a tolerance the need for an "economical" food supply and the "usefulness" of the pesticide. 21 USC § 346a(b). Thus, EPA is required to engage in one of its many balancing acts.

...tolerances must be established for raw agricultural commodities treated with pesticides. Separate tolerances may be established for raw and processed foods, and often

this is necessary as the processing concentrates the pesticide. 21 USC § 348; 40 CFR Parts 177-79.

The so-called Delaney Clause, which has received much attention recently, prohibits EPA from establishing a pesticide tolerance in processed foods for any substance which has been found to "induce cancer in man or animal." 21 USC § 348(c)(3)(A). This means that any pesticide known to be a carcinogen of any strength cannot be present in processed food at any level above the tolerance level set for the food in its raw form. 21 USC § 342(a)(2)(C), 348(c)(3)(A). There is no "Delaney Clause" for raw foods.

Largely due to what it viewed as the impossibility of enforcing such a law, and the purported widespread agreement of the scientific community that the Delaney Clause does not represent rational public policy, the EPA explicitly stated that it would adopt a "de minimis" interpretation of the clause, and would set processed food tolerances higher than the raw food tolerances as long as the pesticide presented only a "negligible" risk. 53 Fed. Reg. 41104 (October 19, 1988). This regulatory wordsmithing was struck down by the Ninth Circuit a few years later, and the U.S. Supreme Court declined to review the case. Les v. Reilly, 968 F.2d 985 (9th Cir. 1992), cert. denied, 113 S.Ct. 1429 (1993). Legislative efforts to repeal the Delaney Clause have thus far been unsuccessful. Recently, as a result of the Ninth Circuit's decision, EPA has begun the process of reviewing and revoking processed food tolerances previously set. 60 Fed. Reg. 3607 (January 18, 1995). However, EPA policy on how this should be done is changing rapidly. See, 60 Fed. Reg. 31300 (June 14, 1995).

The impending loss of the Delaney Clause will be important because it will open the door for processed food tolerances to rise and, with them, raw food tolerances. While the clause stays in place -- and EPA is required by the courts to enforce it -- it provides an incentive for food manufacturers to keep the processed food tolerance at the level of the raw tolerance, allowing for concentration of the residue. This, in turn, causes the food manufacturer/buyer to put pressure on the grower/seller to keep the raw food residue below even the allowable levels, forcing the grower to curtail pesticide use. See, 60 Fed. Reg. at 31303 (June 14, 1995). If processed food pesticide tolerances become disconnected from raw food tolerances, there remains no incentive to do any more than the container label, which is keyed to the raw food tolerance, requires.

4. Federal Enforcement of FIFRA and the Worker Protection Standards

Like most federal environmental laws, FIFRA offers EPA the full range of enforcement options, from administrative warnings to criminal sanctions. However, FIFRA allows EPA to delegate enforcement authority to the states, and in most states, including Michigan, the state agency is the lead agency for performing inspections and carrying out enforcement activities. In Michigan, the designated lead agency is the Michigan Department of Agriculture ("MDA").

A violation of any provision of FIFRA can subject the violator to penalties. 7 USC § 136j, 136l. The enforcement options available to EPA inspectors are notices of warning; civil administrative penalties; stopping the sale or use of a pesticide or removing it from the market; seizures; injunctions; and criminal sanctions. 7 USC § 136k, 136l. FIFRA requires that a first offense by a private applicator result in a written warning only -- civil penalties

may be imposed for subsequent violations. 7 USC § 136l(a)(2). EPA is required to take certain considerations into account when deciding which type of penalty to impose and how large the monetary penalty should be. Factors like the toxicity of the pesticide, the severity of the injury to human health or the environment, the compliance history of the violator, the size of the business, and the ability of the violator to continue in business are all considered in determining penalties. 7 USC § 136l(a)(4).

EPA may not assess a monetary civil penalty without notice and an opportunity for a hearing in the county or city in which the person resides. 7 USC § 136l(a)(3). In general, under federal law, civil penalties under FIFRA are \$500 for the first violation, and \$1000 for subsequent violations. *Id.* § 136l(a)(2). Intentional violations can result in criminal fines from \$1000 to \$50,000 per violation and imprisonment for up to one year. *Id.* § 136l(b). As previously stated, however, the federal enforcement options rarely come into play because the vast majority of FIFRA enforcement is done by the state agency pursuant to state laws.

FIFRA differs from most pollution control laws in that it has no enforcement provision available to the public. This type of public enforcement option is known as a "citizen suit." It allows members of the public to bring suit in federal court against the EPA to force the agency to enforce environmental laws which are being ignored. Some "citizen suit" provisions also allow members of the public to directly sue polluters who are known to be violating environmental laws (sometimes referred to as "private attorney general" suits because the plaintiff is stepping into the shoes of a government prosecutor). This is a major weakness within FIFRA. Unlike the Clean Air Act, Clean Water Act, and the major hazardous waste control acts, members of the public (including farmworkers) cannot use the courts to force the EPA (or the state) to perform the task of enforcing FIFRA, nor can they sue a known violator.

B. State Law

1. The Relationship Between FIFRA and State Law

a. Regulatory Enforcement

FIFRA gives the federal government extensive authority to regulate pesticide distribution and use, which is preemptive of state law in most areas. However, as discussed above, FIFRA's provisions are meant to be carried out by the states. States take the lead role in implementation and enforcement of FIFRA, including the certification of applicators. 7 USC § 136u-136w-1. Hence, many of FIFRA's provisions are "unfunded mandates" -- the federal statute does not provide for the use of federal funds to cover 100% of the cost of enforcing the law.⁴ While EPA and the Michigan Department of Agriculture have overlapping authority to enforce FIFRA, as a practical matter, all certification and enforcement is carried out by the state. States provide quarterly reports to their regional EPA office showing the number of inspections done and enforcement actions taken each year to ensure compliance with FIFRA.

⁴ See, 7 USC § 136u, which provides that the federal government may enter into agreements with states whereby it will contribute up to 50% of the cost of training state personnel to carry out the law and implement certification programs for pesticide applicators.

FIFRA sets the floor -- the minimum -- of what states can and must require in the area of pesticide use and distribution. States can enforce more stringent requirements in some areas of the law. FIFRA denies states the power to regulate pesticide labeling either more or less strictly than the federal government, but allows states to regulate pesticide use more (but never less) strictly. 7 USC § 136v(a), 136v(b). Hence, states can make laws placing additional restrictions on the use of a particular pesticide, but they cannot pass a law requiring that the label on that pesticide contain information on the additional restrictions.

b. Personal Injury Claims

It is important to note how Michigan courts have played a key role in using the preemptive aspects of FIFRA to limit not just state and local authority to impose stricter requirements, but also a private citizen's ability to bring personal injury claims for pesticide poisoning.

The Supremacy Clause of the U.S. Constitution (art. VI, cl. 2) establishes the dominance of federal law over state law. However, going back to the American tradition of states' rights, courts will begin with the presumption that Congress did not intend to preempt state law, particularly where Congress did not choose to put a statement to that effect into the federal law at issue. See, Silkwood v. Kerr-McGee Corp., 464 U.S. 238, 248 (1984).

Although FIFRA makes it clear that state legislation cannot be used to alter pesticide labeling requirements, the statute itself is silent as to whether state tort claims based on inadequate warning (where the labeling complied with FIFRA) can be brought to recover for personal injuries sustained, for example, by a farmworker poisoned by a pesticide while on the job. Courts were allowing such claims, until this issue reached a Michigan court. The background is instructive.

For a long time, the leading case on this issue was Ferebee v. Chevron Chemical Co., 736 F.2d 1529 (D.C. Cir. 1984), cert. denied, 469 U.S. 1062 (1984). In that case, the widow of a USDA chemist brought an action against Chevron for failure to adequately warn her husband of the effects of long-term skin exposure to paraquat, causing him injury. Chevron argued that since its paraquat label was approved by EPA under FIFRA, the widow was precluded from bringing any state-law personal injury claims based upon a failure to warn.

The court rejected Chevron's arguments and the widow was allowed to bring her personal injury claims. Id. at 1540. The court even opined that successful state damages actions might lead pesticide manufacturers to petition the EPA to allow more detailed labeling of their products. Id. at 1541.

A long line of cases followed the reasoning of the Ferebee case, until a greenskeeper at a Michigan golf course was injured as a result of an accidental exposure to a mercury-based fungicide. In Fitzgerald v. Mallinckrodt, Inc., 681 F.Supp. 404 (E.D. Mich. 1987), the court acknowledged the Ferebee case, but decided to follow the line of cigarette labeling cases instead, holding that "If a [pesticide] manufacturer's warning that complies with [FIFRA] is found inadequate under a state tort theory, the damages awarded and verdict rendered against it can be viewed as state regulation: the decision effectively compels the manufacturer to alter its warning to conform to different state law requirements as 'promulgated' by a jury's findings ..." Id. at 407. On this basis the greenskeeper's injury claims against the pesticide

manufacturer were disallowed. Subsequent appellate and Supreme Court cases have adopted this rationale as well. See, Cipollone v. Liggett Group, Inc., 112 S.Ct. 2608 (1992); and Papas v. Upjohn Co., 985 F.2d 516 (11th Cir. 1993) (per curiam) (Papas II), cert. denied, 114 S.Ct. 300(1993). See, also, Moody v. Chevron Chemical Co., 201 Mich.App. 232 (1993), appeal denied, 447 Mich. 878 (1994).

What Fitzgerald and its progeny mean is that an injured Michigan farmworker cannot sue the manufacturer of the pesticide which caused the injury, as long as the container that the pesticide came from had an EPA-approved label on it. Of course, the federal government is immune from tort liability for approving an inadequate label. Baer v. United States, 511 F.Supp 94 (N.D. Ohio, 1980), aff'd, 703 F.2d 558 (1982). This leaves the farmworker with no recourse against the government or the pesticide manufacturer. And if the injury occurred in spite of proper handling of the pesticide, the farmworker has no recourse against anyone. FIFRA provides all the parties, especially the chemical manufacturer, with a very effective shield.

2. The Michigan Pesticide Control Act

In response to the delegation of authority to the states contained in FIFRA, Michigan enacted the Pesticide Control Act ("PCA") in 1976. MCLA § 286.551, et seq. (since repealed and replaced effective March 30, 1995 by Part 83 of the Natural Resources and Environmental Protection Act, MCLA § 324.8301 et seq., with the substance of the former act unchanged); Mich. Admin. Code R 285.637.1 et seq.⁵ All pesticides offered for sale or distribution in Michigan must be registered with the MDA. MCLA § 324.8307. Unlike the federal law (which contains no such requirement), registrants are also required to pay groundwater protection fees pursuant to state groundwater protection statutes. MCLA § 324.8701 et seq., § 324.8307(1), 324.8715. Michigan groundwater law further provides for the cancellation of a pesticide's registration when its active ingredient is confirmed in

⁵ Other significant farmworker-related laws have only a marginal effect in the area of pesticide exposure. For example, the Agricultural Field Sanitation Rules promulgated under state and federal occupational safety and health laws, which govern the requirements for provision of potable water, toilet and handwashing facilities in the field, do not address the issue of pesticides at all, although the mandate for clean water and handwashing facilities helps in decontamination. See, 29 CFR § 1928.110; Mich. Admin. Code R 325.61751 et seq. Likewise, the state and federal farmworker protection acts, which govern farm labor contracting and migrant worker housing, only indirectly address the issue of pesticides. See, 29 USC § 1801, et seq.; MCLA § 333.12401, et seq. Federal law requires that migrant worker housing comply with state and federal safety and health standards. 29 USC § 1823(a). State regulations require that agricultural labor camps shall not be subject to conditions that create "any ... health and safety hazards." Mich. Admin. Code R 325.3611(2)(e); see, also, Mich. Admin. Code R 325.3617(8). While this extremely broad statement could be useful in keeping pesticides out of labor camps, FIFRA and the PCA provide, such as they are, the only significant protection for farmworkers from pesticides.

groundwater at three or more sites in an amount exceeding the groundwater-resource protection level. MCLA § 324.8307(8). (This cancellation would not effect the sale of the pesticide in other states.)

The MDA has generally the same enforcement options as the EPA. MCLA § 324.8327-324.8333. MDA inspectors may issue written warnings or orders to cease use or refrain from using certain pesticides on the spot; may stop the sale or use of pesticides; may carry out seizures; and may issue civil or criminal penalties after a hearing. MCLA § 324.8327, 324.8329, 324.8333. Administrative civil penalties may not exceed \$1000 for each violation; an intentional violation is a crime (misdemeanor) under state law, and may result in a fine of \$1000 for a private applicator or \$5000 for a commercial applicator. MCLA § 324.8333(1), (4).

The Pesticide Control Act ("PCA") explicitly allows charged persons to plead compliance with the label directions as an affirmative defense. MCLA 324.8321(7). It also provides that, so long as a private agricultural applicator or registered applicator handles a pesticide in compliance with the PCA and the label directions and was not grossly negligent, no civil cause of action may be brought for injuries to any person or property. MCLA § 324.8321(8). This is consistent with the Michigan court rulings discussed above.

Michigan has created a complaint procedure within the MDA, to accept and investigate claims of injury from farmworkers (or anyone else) resulting from the use of pesticides. Claim forms are available from the farmworker's local MDA office and should be filed within 60 days after the injury occurred. MCLA § 324.8321(2). The claimant will be contacted by an investigator from the MDA, and the potentially responsible party will be contacted also. Claims will then be investigated. The injured farmworker must remain in Michigan throughout the investigation -- if the farmworker must leave the state to seek other employment the investigation will be dropped.

Efforts are made to keep the complainant's identity anonymous until the matter reaches the hearing stage, and to this end, MDA will sometimes let Michigan Migrant Legal Assistance Project be the complainant. Filing such an administrative claim is not a prerequisite to bringing a civil or criminal action for the injury as well. MCLA § 324.8321(4).

The MDA maintains statistics on the number of complaints of pesticide misuse made, and the number of violations discovered as a result of these complaints. According to information provided by the MDA, in fiscal years 1993 and 1994 the vast majority of complaints received (and violations found) were from homeowners regarding lawn care pesticide treatments. The MDA received a total of 364 pesticide-misuse complaints in 1993, and, of those, found 192 to constitute a violation of the Pesticide Control Act. Of those 192 violations, 141 resulted in the violator receiving a Warning/Advisory Letter. Two resulted in the issuance of Cease/Desist Orders. Another 27 resulted in informal hearings, and 5 resulted in prosecutions. In 1994, 282 complaints revealed 82 violations. Sixty-seven Warning Letters were issued -- there were 12 informal hearings and no prosecutions.

In the agricultural area specifically, in 1993 a total of 16 complaints were received by the MDA regarding pesticide misuse on field crops, and 8 resulted in some enforcement action being taken. No complaints were received regarding vegetable crops, and only one complaint was received regarding fruit crops. The same was true in 1994 -- 12 total

complaints were received regarding field crops, 4 for vegetable crops, and none for fruit crops. Of the 12 field crop complaints, none was found to be a violation.

This data indicates that the crops which require the most hand-harvesting are correlated with the least number of complaints regarding pesticide use. While one could infer from this data that agriculturally related pesticide complaints do not occur because farmworkers are never injured by pesticides and pesticide handling is completely safe, it is more likely that farmworkers simply choose not to complain for a variety of reasons: most farmworkers are probably unaware that there is a complaint mechanism which is local, free of cost, and will afford them anonymity (up to a point) in the process; migrant farmworkers may decide not to complain because they know they will not be staying in Michigan; many farmworkers may not be able to attribute their injury to an incident of pesticide misuse, and their health care provider may not be able to either; and, farmworkers may simply wish to avoid any action which they fear will have an impact on their ability to maintain employment.

C. Legal Remedies Available To A Poisoned Farmworker

As discussed above, a farmworker suffering from pesticide toxicity may file a complaint with the MDA. The complaint will be investigated and, if a violation of the PCA is found, the responsible party will receive some type of enforcement action. While this remedy addresses the violation, it does not address the farmworker's injury.

Secondly, the farmworker may bring a personal injury action in state court. This type of action has many problems. It may be difficult for a farmworker to identify a lawyer who is qualified to bring such an action, and it may be impossible to pay for. Pursuant to federal regulations, legal aid offices (which do not charge clients) such as the Michigan Migrant Legal Assistance Project cannot accept such tort cases, except under special circumstances which require the farmworker to have visited at least two private attorneys and had the case rejected by them. *See*, 42 USC § 2996f(b)(1); 45 CFR §1609.4(a)(1). In order for a private attorney to be interested in the case, significant damages will need to be involved, as the private attorney will probably be working on a contingency-fee basis.

In addition, there are the medical aspects to consider. Farmworkers often justifiably fear the loss of their jobs if they complain about health problems, or take time off to visit a doctor. Consequently, short-term pesticide related illness may often be ignored or treated with over-the-counter medicines. Migrant worker clinicians may misdiagnose pesticide related illnesses as flu due to the similarity of many of the symptoms, and treat the farmworker accordingly. (Johnston, 1985:85; Moses, 1993:175). More serious chronic illnesses may take months or years to manifest themselves and even longer to be diagnosed as pesticide-related, as little is yet known about chronic health effects associated with long-term low-level exposure. (Moses, 1993:167). By the time the connection is made, anything that could have been used as evidence at a trial is long gone.

Finally, there are the severe legal limitations discussed above. If the injurious pesticide had an EPA-approved label on it, and gross negligence in its application cannot be

shown, the farmworker's claims will be thrown out. For all of these reasons, personal injury actions will not win the war against pesticides.⁶

Another option for an injured farmworker is to make a claim under a Workers' Compensation Insurance policy. The Workers' Disability Compensation Act is applicable to all agricultural employers of three or more regular employees, paid hourly wages or salaries, who are employed 35 or more hours per week by that same employer for thirteen or more consecutive weeks in a year. MCLA § 418.115(d). All agricultural employers of one or more employees, who are employed 35 or more hours per week by that same employer for five or more consecutive weeks, must provide for such employees' medical and hospital coverage for all personal injuries arising out of and in the course of employment. MCLA § 418.115(e). While these requirements may exempt many farms, according to the Michigan Farm Bureau almost 100% of Michigan farmers carry a Workers' Compensation Insurance policy, due to its tremendous benefits in limiting potential liability for on-the-job accidents and relatively low cost. Injured farmworkers should inquire as to whether the grower carries such a policy and, if so, file a claim.

D. The Future Of Pesticide Regulation And Farmworkers

Recent advances in agricultural technology involve the use of recombinant DNA to introduce pesticidal properties into plants themselves. EPA draft policy in this area indicates that EPA will assert jurisdiction over the pesticidal substances produced by the plants and the genetic material coding for those substances. Even so, it appears that the agency will exempt most of them from regulation, on the basis that they do not present a threat to public health or the environment. For example, in May of this year EPA issued its first approval for full commercialization of a plant/pesticide -- a potato registered and produced by Monsanto Co. -- and exempted the product from a tolerance for residues of the active ingredient. 60 Fed. Reg. 21725 (May 3, 1995); 59 Fed. Reg. 61866 (Dec. 2, 1994). Hence, it is possible that growers of these new plants will be exempted from compliance with the WPS.

On the legislative side, as discussed above, the Delaney Clause is likely to be repealed or reformed, perhaps to set out a bright-line threshold of acceptable cancer risk, as is used in some other areas of environmental regulation. Such a threshold could be used to set higher residue tolerances for raw and processed foods allowing pesticide usage to increase, although the REIs should remain unaffected.

Some recent legislative reform packages have attempted to enhance the enforcement provisions of FIFRA (which are noticeably weaker than those in other environmental laws), and to include a citizens' suit provision (which is also common in other environmental laws). See, FIFRA Amendments of 1994, S. 2050, 103d Cong., 2d Sess. § 17, 18, 140 CONG. REC. S4875 (daily ed. April 26, 1994). So far, these reforms have not succeeded.

⁶ A Lexis search revealed no cases for personal injury damages brought by a Michigan farmworker for pesticide-related illness in all published Michigan cases.

Finally, there is still one EPA/OSHA issue which remains unresolved. OSHA regulations (which apply to other industries) typically require the implementation of a "Hazard Communication System." Such a system requires employers to make employees aware of the environmental/occupational hazards that they are likely to encounter on the job. Probably the most familiar hazard communication system is the information provided on material safety data sheets ("MSDS"), which must be made available to any worker who is likely to come into contact with a hazardous material.

Because the OSHA regulations do not cover farmworkers, a hazard communication system for farmworkers has never been devised, despite the fact that farmworkers routinely work around some of the most toxic substances used in any workplace. In addition to the information that is provided now as part of the WPS, a hazard communication system would require that written information on each pesticide encountered be provided to each farmworker who is likely to encounter it.

When the final WPS plan came out in 1992, EPA, at the same time, issued a proposal for a hazard communication system that would become part of the Worker Protection Standards. 57 Fed. Reg. 38167 (August 21, 1992). As proposed, this regulation would require farm employers to provide farmworkers with "fact sheets" (similar to MSDSs), which would explain, in the farmworker's language, specific information as to the type of dangers associated with each separate pesticide contacted. EPA proposed to make this information nontechnical and to use comparative terms to give the reader a better idea of the volatility, toxicity, etc., of the pesticide. EPA also proposed to include information about delayed-onset reactions to the pesticides, as well as the instant reactions to poisoning that can be expected, and to put all of this information into "simplified language" rather than medical terms, "such as: tumor-causing in lieu of oncogenic; birth-defect-causing in lieu of teratogenic; injury to fetus in lieu of embryotoxic..." 57 Fed. Reg. at 38170.

Unfortunately, this regulation has never made it out of the "proposed rule" stage, and farmworkers remain without the hazard communication system which became required for most industries back in 1983. Sources at EPA's Region V office tell me that this proposal may resurface sometime in the next year. Given the current political climate, the new proposal is sure to be a watered-down version of the three- year-old one.

IV. What Do We Know About The Health Of Michigan's Farmworkers?

Often the best way to obtain reliable information on any occupational related illness is through the statistical records kept by government agencies pursuant to state and federal occupational safety and health laws. In 1974, Michigan enacted the Michigan Occupational Safety and Health Act ("MIOSHA"), which provides for mandatory recordkeeping on occupational injuries and illnesses (although reporting to a state agency is not required in most instances). MCLA § 408.1001, et seq., 408.1061; Mich. Admin. Code R 408.22103, et seq. MIOSHA is enforced by the Michigan Department of Public Health ("MDPH"), Division of Occupational Health, and the Michigan Department of Labor, Bureau of Safety and Regulation.

In addition to MIOSHA, Michigan's Public Health Code also requires reporting to the MDPH of occupational diseases by all physicians, hospitals, clinics and employers.

MCLA § 333.5601-333.5639; 333.5611. Hence, Michigan has devised two separate mandates for collecting this data on occupational injuries and illnesses. Unfortunately, neither appears to be working in a meaningful way for farmworkers.

Under MIOSHA, farms employing 10 or more employees must keep a log of all occupational injuries and illnesses, which must be posted in a conspicuous place and thereby available to employees and state inspection personnel. Mich. Admin. Code R 408.22105(2)(g), R 408.22122. All farms are required to report any fatality or multiple hospitalizations occurring as a result of the same incident or type of injurious exposure to the Michigan Department of Labor. *Id.* R 408.22117, 408.22122, 408.22111, 408.22142.

The logs are not collected, so, under this law, the only actual reporting that occurs is with respect to fatalities and multiple hospitalizations. While surveys are distributed annually in order to collect some of the data that is contained in the logs, these surveys do not provide information on pesticide-related injury or illness because that is not part of the survey.

Under the Public Health Code, the reporting requirement applies to all employers, without limitation, and to all physicians, hospitals and clinics "knowing of an individual having a case of occupational disease or a health condition aggravated by workplace exposures" or "knowing of a suspected case of occupational disease or a health condition aggravated by workplace exposures." MCLA § 333.5611(1)-(2). Once a year, statistical summaries of all occupational disease reports are compiled by the MDPH and information is disseminated to appropriate employers to prevent further occurrences. MCLA § 333.5623. Failure to make such reports is a misdemeanor punishable by a \$50 fine. MCLA § 333.5639. Of course, this reporting requirement applies to all migrant health clinics and rural physicians treating farmworkers. MCLA § 333.5611.

Unfortunately, noncompliance with this law is rampant. To illustrate this fact, consider that the State of Michigan, the nation's fourth largest user of migrant farmworkers, has never had one single report of a pesticide-related health problem in a farmworker. Dr. Kenneth Rosenman, a Professor of Medicine at Michigan State University who carries out a contract with the Michigan Department of Public Health to compile statistical summaries of the occupational illness reports, states in a recent article, "[A]lthough the large employers comply with the mandatory reporting law and submit occupational disease reports, less than 1% of all employers report and less than 1% of all physicians report. For example, no occupational disease report has ever been received from a migrant health clinic." (Rosenman, 1995:2).

For the first eight months of 1994, for example, MDPH received a total of three pesticide-related disease reports from all covered Michigan employers, physicians, and clinics, out of a total of 19,611 occupational disease reports for the same period of time, and these were all indoor pesticide applications. *Id.* In fact, the 26 total pesticide-related disease reports received by MDPH since 1989 were all from indoor applications of pesticides. *Id.* Clearly, the occupational disease reporting system is breaking down badly when it comes to farmworkers.⁷ This robs the MDPH, MDA and the Michigan Department of Social Services

of extremely valuable information which could be used to refine state policy on pesticides and help determine where state resources should be allocated.

V. Conclusion

While so much medical evidence tells us that pesticides have serious health effects (Baker and Wilkinson, 1990; Goldsmith, 1989; IARC, 1991; Johnston, 1985; Moses, 1993, 1989a, 1989b; Wasserstrom and Wiles, 1985; World Health Organization, 1990), public health agency data such as that available in Michigan tells us that pesticides have no health effects for farmworkers. On the other hand, the fact that complaints are received by the MDA for investigation of pesticide misuse tells us that some incidents of pesticide exposure are happening. Unfortunately, the small number of complaints does not tell us much, as there are so many disincentives to complaining and steps along the way at which a pesticide-related illness can be chosen to be ignored or simply overlooked. Is pesticide handling as safe as the lack of data makes it look, or are we failing to take the steps necessary to gather adequate information?

Several actions can be taken to improve this situation:

(1) Migrant health clinics and rural physicians can receive enhanced training in diagnosis and treatment of pesticide-related injuries and illnesses, and in documenting the diagnosis and the incident which led to it (preserving the evidence);

(2) Migrant health clinics, rural physicians, and agricultural employers can receive information regarding the existence of the occupational disease reporting law and how to comply;

(3) State personnel can step up efforts to fine hospitals, clinics, physicians and employers who fail to make the required reports, and can include questions on pesticide-related illness in the state's annual survey; and

(4) The newly-mandated pesticide safety training can be used to provide fact sheets to farmworkers on each pesticide contacted, emphasizing how to spot the symptoms of pesticide exposure themselves and the importance of seeking treatment. This step can be taken by Michigan now, in lieu of waiting for the EPA to promulgate a hazard communication system nationwide.

Putting these steps into place on the state level and gathering the data that could be generated therefrom is the only way to determine whether existing state and federal pesticide laws are adequately protective of farmworkers' health. More difficult but equally necessary reforms require lobbying Congress to amend FIFRA to allow pesticide registration cancellation proceedings to be initiated by private persons and to allow for citizen suits. All of the safety regulations in the world will not spare the health of a farmworker or applicator

⁷ MDA, MSU and Wayne State University are currently undertaking efforts to provide training to migrant health clinic workers and rural physicians in how to diagnose and treat pesticide-related illness, according to Mr. Castro-Escobar. As Dr. Rosenman pointed out to me, medical students attending the College of Human Medicine at MSU -- one of the top primary care training schools in the nation -- get 4-6 hours of instruction in occupational illness during their entire four years in school, and this is typical of many medical schools.

in daily contact with chemicals so toxic that a couple of drops can kill a person. Perhaps the registration of all of the most highly toxic pesticides should be investigated.

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