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NATIONAL
PESTICIDE ● INFORMATION
CENTER

-2019-

Environmental & Molecular Toxicology



**Oregon State
University**

The National Pesticide Information Center (NPIC) is a service that provides a variety of pesticide and related information to the general public and professionals across the United States and its territories. NPIC is a cooperative agreement between Oregon State University and the US Environmental Protection Agency. The 2019 Annual Report covers the period of February 15, 2019 - February 14, 2020.

DISCLAIMER

Material presented in this report is based on information as provided to NPIC by individuals who have contacted NPIC for information or to report a pesticide incident. None of the information reported to NPIC has been verified or substantiated by independent investigation by NPIC staff, laboratory analysis, or any other means. Based on the information provided, NPIC qualifies the information by assigning a certainty index (CI) and a severity index (SI). NPIC makes no claims or guarantees as to the accuracy of the CI, SI, or other information presented in its reports, other than that NPIC has done its best to accurately document and report the information provided to NPIC.

Submitted To:

US Environmental Protection Agency
Office of Pesticide Programs

Submitted By:



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NPIC 2019 Annual Report

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INTRODUCTION / DELIVERING OBJECTIVES

NPIC provides objective, science-based information about pesticides and related topics to enable people to make informed decisions about pesticides and their use. In this, the first year of the project period under cooperative agreement #X8-83947901, Oregon State University (OSU) provided information to millions of people by phone, email, social media, data-sharing, mobile web apps, and/or web content.

NPIC supports the U.S. Environmental Protection Agency (U.S. EPA)'s 2018-2022 Strategic Plan Goal 1: Core Mission, and Objective 1.4: "*Ensure Safety of Chemicals in the Marketplace*," which states: "Effectively implement the Federal Insecticide, Fungicide, and Rodenticide Act to ensure new and existing chemicals and pesticides are reviewed for their potential risks to human health and the environment and actions are taken when necessary." NPIC also supports the mission of the OSU Extension System, conveying research-based knowledge in a way that is useful for people to improve their lives, their homes, and their communities.

The complete record of NPIC accomplishments for the operational year includes this annual report, four quarterly reports, and a quality assurance report. Quarterly and supplemental reports were submitted to the Project Officer within 30 days of the reporting period's closure.

The 12-month reporting period began on February 15, 2019, and ended February 14, 2020.
This period will be referenced as "2019" in this report.

The cooperative agreement between OSU and the U.S. EPA includes five strategic project objectives. Those objectives are listed below with a summary of measures taken to meet or exceed the goals in our work-plan.

1. Serve as a source of factual, unbiased information for diverse audiences including the agricultural and pest control community, healthcare providers, educators, consumers, and the public.

- NPIC maintained open hours with multilingual capabilities from 8:00am to 12:00pm Pacific Time, Monday-Friday, excluding holidays, with no closures due to technical or staffing issues.
- NPIC responded immediately to 99% of calls received during open hours. Occasionally when call volume is high, people may choose to leave a message.
- NPIC responded within one business day 99% of the time when inquiries were received via voicemail, email, and/or social media.
- NPIC recruited three pesticide specialists this year, retaining four highly qualified pesticide specialists total.
- NPIC developed and sent a marketing plan to the EPA Project Officer this year. The marketing plan was developed to ensure the widest-possible utilization of NPIC program outputs, maximizing the public and professional benefit of funded activities.
- NPIC collaborated with 18 organizations this year to provide outreach and expert risk communication instruction to pesticide applicators, regulators, and educators, including:
 - NPIC provided expert risk communication instruction to the American Mosquito Control Association, City of Tualatin-Oregon Parks and Recreation recertification course, Idaho State Department of Agriculture, NW Mosquito Control Association, Oregon Agricultural Chemicals and Fertilizers Association (OACFA), Oregon Farm Bureau recertification training, Oregon Pesticide Safety Education Program, Pesticide Regulatory Education Program (PREP), Pesticide Stewardship Alliance annual meeting, South Carolina Department of Pesticide Regulation, Tribal Pesticide Program Council (TPPC), WA Pesticide Safety Education Program Applicator recertification courses, and Western Pesticide Risk Management group monthly meeting.
 - NPIC shared label data with faculty of Oregon State University Extension.
 - NPIC worked with Texas A&M Extension to share NPIC School and Daycare Poison Safety materials in Texas A&M School IPM Newsletter.
 - NPIC worked with University of Arizona to share NPIC School and Daycare Poison Safety materials in the Supporting Healthy Living and Learning Environments newsletter.
 - After meeting to discuss services and referrals, NPIC and 211info collaborated to share NPIC's information with 211 services nationwide. Subsequently, several 211 regional offices contacted NPIC directly to verify services.
 - NPIC partnered with the American Association of Poison Control Centers (AAPCC) to create a **Rodent Bait Safety** infographic for the general public and public service professions, including schools.

DELIVERING OBJECTIVES

2. Provide information on a wide variety of pesticide-related subjects including, but not limited to, pesticide products, toxicology, environmental chemistry, safety practices, pesticide regulation, enforcement, risk assessment, risk management, environmental effects, clean-up and disposal, understanding the label, recognition and management of pesticide poisonings, and integrated pest management (IPM).

- In order to stay current, NPIC staff members monitored 20 relevant publications and publication indexing services, including federal register notices (pest), affiliated dockets, newsletters, listervs, and selected journals of relevance.
- NPIC exceeded this year's goal of evaluating 1,000 articles, documents, and websites in order to maintain and expand up-to-date, reputable, immediately accessible and optimized information about pesticide science and regulation. This year NPIC evaluated 2,269 relevant articles, documents, and websites.
- NPIC updated eight active ingredient (AI) files and created 12 new AI files. Through monitoring activities, NPIC added 757 new documents to AI files, including 493 new documents added to existing files, identified through regular monitoring activities.

New AI Files

- 1,2-Hexanediol
- Bixafen
- Cinnamon oil
- Calcium Phosphite
- Clonostachys rosea
- DTEA-HCl
- Flutianil
- Mefentrifluconazole
- Menthol
- Organic esters of phosphoric acid
- Pydiflumetofen
- Valifenalate

Updated AI files

- Atrazine
- Azadirachtin
- Bacillus amyloliquefaciens
- Beauveria bassiana
- Cypermethrin
- Mints
- Nonanoic acid
- Silicon dioxide
- Trimethoxysilyl quats

- NPIC staff members attended 48 events for continuing education (CE) this year, including 16 webinars, 15 on-campus events, 12 off-campus events, and five in-house presentations.
- NPIC tracked certain elements in order to quantify risk-reduction activities. In conversations with callers, pesticide specialists discussed ways to minimize exposure 2,536 times, following the label 2,306 times, IPM concepts 713 times, and environmental protection (including pollinator protection) 114 times.
- NPIC maintained storage capacity in order to ensure continuous access to NPIC resources by stakeholders, documenting and reporting milestones to inform future efforts for secure, long term data storage and hosting capacity.

3. Address current and emerging pesticide-related issues and provide federal, state, and local resources on the topics in Objective 2.

- NPIC specialists were polled about trends and discussed 100% of cases flagged as "important and interesting" as a team. Specialists discussed 47 cases during the year.
- NPIC discussed potential trends and data with EPA Office of Pesticide Programs (OPP) including:
 - Callers expressing concern or confusion over label instructions, professionals seeking risk communication techniques, FIFRA questions from Amazon retailers, and questions about converting farmland to hemp.
 - Incident and inquiry trends for GY5 of the prior project period (2018-2019) during the annual site visit to EPA on June 19, 2019. In addition, NPIC highlighted call trends related to mothballs, glyphosate litigation and glyphosate on cereal, converting farmland to hemp, and professionals seeking communication techniques from NPIC.
 - As a follow up to label misinterpretation and misuse data discussed during the site visit with the Communication Services Branch (CSB) of Field and External Affairs Division (FEAD), NPIC and CSB agreed to have NPIC flag narratives where callers report "false or misleading information" on their labels.
 - NPIC and OPP Health Effects Division (HED) discussed expanding criteria for noteworthy incidents sent to EPA to include more childhood cases.
 - Trends in active ingredient questions from callers, including the popularity of glyphosate and mothballs, as well as incident queries about dicamba drift incidents and reasons for boric acid inquiries to NPIC.

DELIVERING OBJECTIVES

3. Address current and emerging pesticide-related issues and provide federal, state, and local resources on the topics in Objective 2 (continued).

- NPIC shared 56 noteworthy cases with the Project Officer during the 2019 grant year period.
- NPIC compiles summary statistics about inquiries received on a quarterly and annual basis. All quarterly reports were submitted within 30 days of the quarter's closure, along with an annual report, quality assurance report, and project closure summary for the 2014-2019 grant period.
- Veterinary professionals submitted 20 incident reports using NPIC's Veterinary Incident Reporting Portal. Twenty-five incident reports were submitted using NPIC's Ecological Incident Reporting Portal. All of these are included in supplements to this annual report.
- NPIC provided 25 special reports this year including data requests from:
 - EPA Office of Pesticide Programs (OPP), Health Effects Division (HED) (10)
 - EPA OPP, Field and External Affairs Division (FEAD)
 - EPA Region 9 (2)
 - Pesticide Educational Resources Collaborative—medical (PERC-med) (2)
 - New York State Department of Environmental Conservation (4)
 - Wisconsin Department of Agriculture, Trade, and Consumer Protection
 - Michigan Department of Agriculture and Rural Development
 - Oregon Department of Agriculture (2)
 - Oregon State University
 - One public records request
- NPIC promoted the availability of NPIC inquiry data to state lead agencies, US territories, and tribes. States and territories were contacted directly and the chairperson and vice chairperson of the Tribal Pesticide Program Council were provided with the information about data requests to distribute to tribes. In addition, NPIC promoted data availability to state lead agency attendees at The Pesticide Stewardship Alliance annual meeting.
- NPIC continued to monitor and improve its working relationship(s) with the American Association of Poison Control Centers (AAPCC) and the Oregon Health & Science University (OHSU), ensuring that baseline expectations were met and/or exceeded. NPIC and AAPCC released an infographic about **Rodent Bait Safety** as part of annual deliverables. AAPCC shared the infographic through social media and a targeted press release to partner agencies.
- Referrals from NPIC to state and local resources are evaluated annually. This standard was measured using formally graded Log Assessment Reviews for each specialist. All evaluated referrals were deemed timely and appropriate with 0% margin of error.

4. Provide reputable, science-based information in a manner understandable to a lay audience to help people make informed decisions.

- NPIC created/updated 15 new web pages this year titled:
 - **Adjuvants in Pesticides**
 - Atrazine **introduction page, fact sheet, and references**
 - **Biochar and Pesticides**
 - **Daycare & School Poison Safety**
 - **Mites**
 - **Non-Chemical Pest Control Devices** (update)
 - **NPIC Outreach Materials** (update)
 - **Pesticide Home Remedies**
 - **Pesticides: An Introduction for Poison Control Centers**
 - **Petroleum Distillates in Pesticides**
 - **Treated Seeds**
 - **Wood Boring Beetles**
 - **Writing NPIC Fact Sheets**
- NPIC developed four new infographics, titled:
 - **Neem Oil**
 - **Personal Protective Equipment**
 - **Rodent Bait Safety**
 - **Systemic Pesticides**

DELIVERING OBJECTIVES

- 4. Provide reputable, science-based information in a manner understandable to a lay audience to help people make informed decisions (continued).**
- NPIC developed three new fact sheets titled:
 - **Atrazine**
 - **Pesticides: An Introduction for Poison Control Centers**
 - **Writing NPIC Fact Sheets**
 - NPIC continued to update procedures for selecting references in fact sheets. After these procedures were evaluated and revised during Year 1, NPIC created a publicly-available webpage about selecting scientific references called "**Writing NPIC Fact Sheets**".
 - NPIC posts new items in social media venues (Facebook and Twitter) promoting safe use practices, IPM, and pesticide label comprehension. This year NPIC uploaded 283 total posts, averaging 5 per week.
 - NPIC developed and delivered a webinar on February 13, 2020 titled, "**Using NPIC's Veterinary Portal for Pesticide Incidents**." NPIC communicated with OPP about the webinar during the QCM on January 22, 2020.
 - NPIC reviewed 100% of web content and removed or replaced 394 broken links.
 - In order to provide the best referrals when appropriate, NPIC actively verifies/updates contact lists on a routine basis. This year NPIC updated more than 650 contacts, including:
 - EPA Regional Offices
 - Pesticide Safety Education Program Coordinators
 - Soil and Water Districts
 - State Environmental Agencies
 - State Health Agencies
 - State Pesticide Regulatory Agencies
 - University/State Extension
 - NPIC ensured continuous access to NPIC web apps by stakeholders, maintaining and expanding software applications, tools, and mobile apps. NPIC's Product Research Online (NPRO) was updated within one week of all publications to the Pesticide Product Label System (PPLS) and the Pesticide Product Information System (PPIS) datasets.
 - NPIC coordinated and communicated with OPP frequently throughout the year including:
 - Discussions with OPP FEAD about outreach to US Customs & Border Protection officers, for which NPIC compiled an internal contact list.
 - Notifications to EPA about occupational exposures, professional applications resulting in incidents, peanut allergies related to bait products, Seresto flea collar incidents, and reports of dead or missing bees. Other priorities included creating materials related to pool chemicals and pollinator protection.
 - A 2-hour training presented by NPIC during the site visit on risk communication for OPP and the Office of Chemical Safety and Pollution Prevention (OCSPP) staff.
 - A follow-up discussion with the FEAD's Communication Services Branch about details of caller confusion or concerns about pesticide labels. This information was expanded and provided for presentation at OPP's Labeling Consistency Committee meeting in July. In collaboration with OPP, NPIC began flagging complaints about labels that have false or misleading information.
 - Language updates to NPIC's Ecological Pesticide Incident Reporting Portal with suggestions from OPP's Environmental Fate and Effects Division (EFED).
 - Sending summary reports of childhood exposures when there are symptoms of moderate or greater severity to the OPP Health Effects Division.
 - Discussions with the Registration Division (RD) about possible changes to pest and site combinations resulting from future use of the Office of Pesticide Program Electronic Label (OPPEL) system.
 - Communications about a new NPIC fact sheet, Atrazine, for which EPA OPP Pesticide Reevaluation Division (PRD) provided comments.
 - OPP's Communication Services Branch (CSB) working with NPIC about updates to an EPA "Contact Us" webpage and social media post discussing NPIC services and referrals to NPIC.
 - OPP staff providing feedback for NPIC's updated webpage "**Non-Chemical Pest Control Devices**".

DELIVERING OBJECTIVES

5. Collect and disseminate quality pesticide incident data via a rigorous and well-defined data collection system.

- NPIC specialists were able to document demographic information for 100% of human incidents, including age and/or gender. Callers occasionally decline to provide personal information such as age.
- "Incident information" includes information such as symptoms, time to onset of symptoms, and circumstances surrounding reported exposures. Among 1,363 reported incidents involving humans or animals, NPIC specialists were able to capture the symptom/scenario information in 93% of cases.
- NPIC specialists were able to collect product information for 92% of reported incidents.
- NPIC specialists were able to document the location for 94% of reported pesticide incidents.
- Among the 1,363 reported incidents involving humans or animals, NPIC specialists were able to capture the exposure route in 84% of cases.
- NPIC used standard operating procedures and rigorous quality control to classify reported signs/symptoms in terms of severity (severity index) and in terms of their relationship to the reported exposures (certainty index). NPIC assigned a severity index 100% of the time when signs/symptoms were described (1,574 times). NPIC assigned a certainty index 100% of the time when signs/symptoms were described, and they could be compared to published reports about the active ingredient(s) involved (669 times).
- NPIC responded to user feedback by updating/ improving the Eco-Portal and VIRP, as needed, including suggestions by OPP staff during the site visit.
- NPIC produced internally routed human and animal incident reports in coordination with OHSU, highlighting any changes in coding that were made in the QA process. Additionally, 100% of records were evaluated using automated QA protocols and all cases with symptoms were manually inspected/verified.
- The QA/QC facilitator led nine training exercise(s) during staff meetings to facilitate consistency in data quality.
- Log Assessment Reviews (LARs) were conducted as part of regularly scheduled annual staff evaluations (see Objective 6), including quantifiable measures of data completeness and coding consistency. Deliverable upon hiring new staff, formally graded LARs were completed for three new specialists, twice, in order to establish consistent habits in coding and data entry, including timely and appropriate referrals with less than 5% margin of error.

6. Provide exceptional customer service by integrating professionalism, teamwork, integrity, accountability, and a strong commitment to the public, as well as to the professional and medical communities.

- NPIC recruited and hired two highly qualified pesticide specialists this year, in addition to hiring a highly skilled former Pesticide Specialist for summer help. All training materials were updated, including the NPIC training manual, "stop points," exercises, and mentored practice scenarios. All NPIC staff participated in training and mentoring new hires.
- Annually, NPIC completes one evaluation event through 3rd-party assessment of NPIC services or by conducting website usability testing. NPIC evaluated customer service skills through use of 3rd-party professional assessment, conducted by BestMark, Inc. NPIC worked with BestMark, Inc. to develop a customized assessment questionnaire for shoppers and received comprehensive reports for each Pesticide Specialist. Shoppers evaluated Specialists on customer service skills, including the ability to determine caller's needs, provide customized information, professionalism, efficiency, and overall effectiveness. Final reporting is included as a supplement to this annual report.
- NPIC comprehensively evaluated each staff member in Q3, including quantified measures of data collection skills (see Objective 5), referral appropriateness, customer service skills, and continuing education measures.
- Key personnel from NPIC visited OPP in Q2 on June 19, 2019, including the Director, Assistant Director, and Project Coordinator.

Trends in NPIC Data

- During this period, NPIC received 9,970 inquiries.
- About 84% of the total inquiries were addressed over the telephone.
- About 16% of NPIC inquiries in 2019 were incidents. A pesticide incident is defined as: 1) any unintended exposure to humans or animals, 2) an exposure with an adverse effect, 3) a spill, and/or 4) a misapplication. See page 22.
- Two human deaths and 39 animal deaths were reported to NPIC. See pages 32 and 34.
- The following active ingredients were involved in the most incident reports: naphthalene (190), boric acid (129), bifenthrin (106), permethrin (94), and paradichlorobenzene (85). See page 29.
- There were 2,396 entities involved in incidents reported to NPIC: 52% were human, 19% were animals, and 28% were structural or environmental. See page 35.
- Among the 1,128 single humans in incidents for which the age was captured, 8% were children (ages 4 and younger) and 32% were seniors (ages 65 and older). About 37% of all people reported no symptoms. See page 37.
- Questions related to health/risk (3,626) and pest control (1,379) were most common. See page 26.
- The NPIC website received 7,698,384 page views during this period. There were more than 3.5 million unique visitors, and 172,154 visitors stayed for more than 15 minutes. See pages 23 and 24.

Foreign Language Capabilities

Under an agreement with LanguageLine Solutions, NPIC is capable of responding to inquiries in more than 240 languages. Translation services are provided immediately during calls, at no cost to NPIC customers, and language identification is available through this service.

NPIC responded to 218 inquiries in Spanish, three in Tagalog, two in Quichua, two in French, one in Italian, one in American Sign Language, one in Marathi, and one in Gujarati.

Noteworthy Inquiries

Mothball Products – NPIC received 638 inquiries about mothballs, flakes, and bars. Of these, 361 (57%) were incidents. Many reports involved off-label use of mothballs to repel animals or insects in and around the home.

Bed Bugs – NPIC received 445 inquiries related to bed bugs this year. About 13% of these (57) were pesticide incidents. Many of these inquiries were related to the difficulty of pest control and the potential health effects of pesticides.

Bees – NPIC received 196 questions about bees or reports of bee deaths. The majority of bee calls were informational only (88%). NPIC Specialists have experience discussing pollinator protection, including ways to prevent pesticide exposure for beneficial insects and how to compare pesticide products for bee toxicity. NPIC immediately notifies the EPA Project Officer when bee deaths are reported.

Resources & Facilities

NPIC maintains an extensive collection of hard copy and electronic information. NPIC specialists have access to the full resources of OSU's Valley Library, which includes electronic access to thousands of academic journals, databases, and indexing services. NPIC's library includes a comprehensive Active Ingredient (AI) file collection with detailed scientific and regulatory information for more than 1,130 active ingredients. This collection has been scanned/saved and indexed for desktop access, using software developed by NPIC.

Funding & Compliance

Funding for NPIC is provided by the U.S. Environmental Protection Agency and Oregon State University.

Throughout the reporting period, NPIC has complied with the requirements of the U.S. EPA regarding Title VI of the Civil Rights Act of 1964 and Section 13 of the FWPCA Amendments of 1972. NPIC has complied with the U.S. EPA Guidelines regarding procurement requirements stipulated in 40 CFR Part 33. NPIC has complied with all requirements specified by the U.S. EPA as part of the funding authorization of this project.

Personnel Update

The NPIC Executive Committee includes the director and two co-investigators.

Five Pesticide Specialists were retained this year. As of February 14, 2019, NPIC staff included five Pesticide Specialists, three supporting staff members, and the Executive Committee.

Standard Operating Procedures

NPIC staff use a variety of SOPs and policies to guide their work and some decision making. This year, 19 SOPs were updated. In addition, two policies were updated instructing staff about scheduling and personnel matters.

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ABOUT US

Who is NPIC?

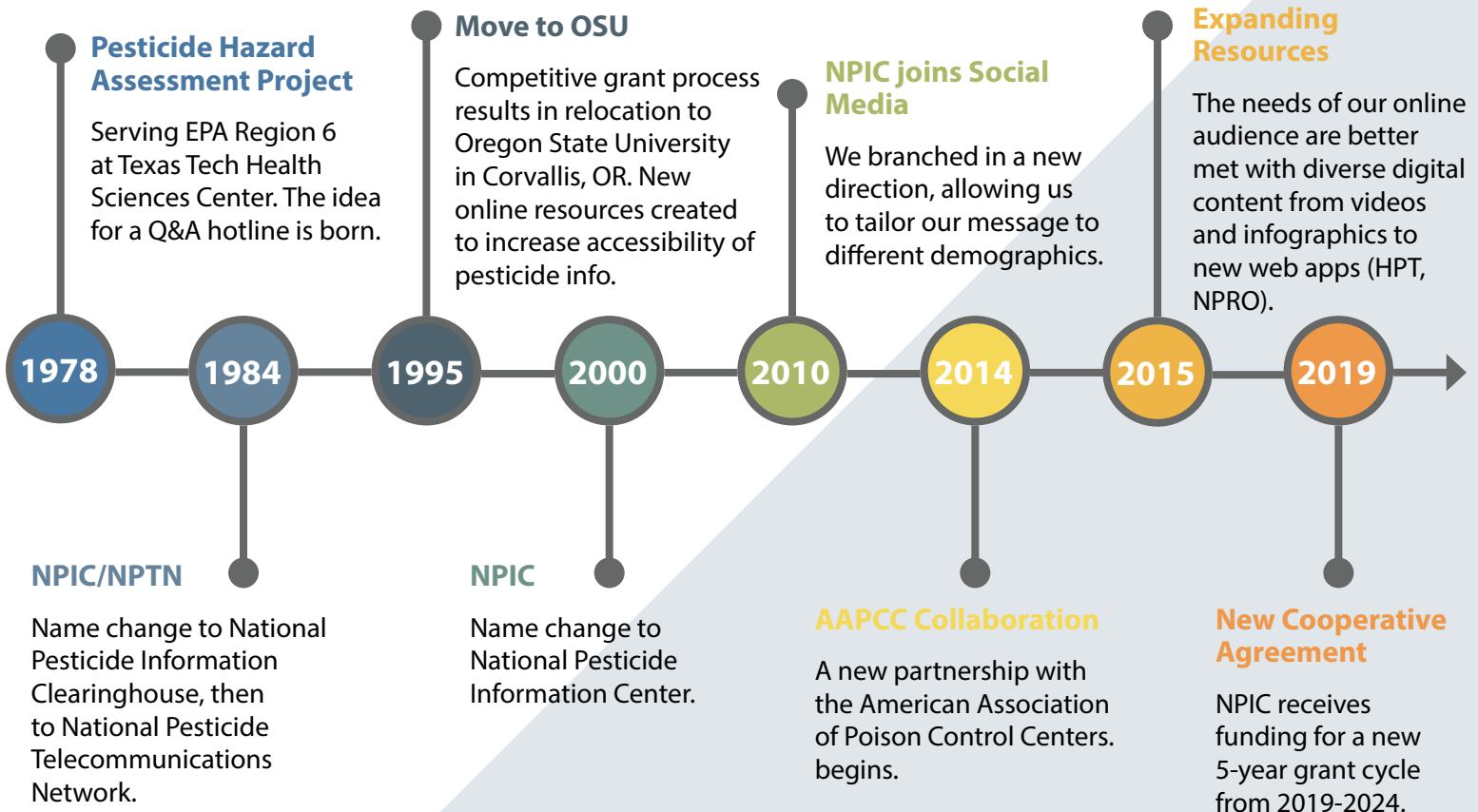
NPIC is a team of well-trained, approachable scientists and talented support staff. We have the knowledge and skill needed to effectively communicate scientific information to anyone who contacts us. If we can't directly answer the question, we'll try to figure out who most likely can.

Our number one goal is to provide objective, science-based information about pesticides and related topics to enable people to make informed decisions about pesticides and their use.

We reliably create accessible, up-to-date, factual materials to communicate complex pesticide information to both the public and professionals.



NPIC: A History



WEBSITE : APPS



Website

The NPIC website, available in both English and Spanish, is the culmination of years of work from every member on our team. We conducted website usability testing to help us better understand how people find information on our site and will guide future updates.

To refresh the look of our website, we've added more pictures and created new ways to find information, like adding topic tabs to improve navigability of our FAQs and pest-related pages.

Web Apps

We've developed web apps for the public and professionals. Available on any browser, apps are mobile- and desktop-compatible for easy access wherever you might be. Because they are web-based, you always get the most up-to-date information. Apps range from NPIC's Product Research Online (NPRO) to find product information, to our Herbicide Properties Tool. This tool helps professionals select low-impact herbicides for targeted plant eradication in the field.



In 2019, NPIC created or significantly updated 15 web pages. Selected examples are listed below.

Web Topics

- Human/animal health and safety
- Environmental protection
- Food safety
- Integrated Pest Management
- How to report pesticide incidents
- Safe use practices
- Local pesticide-related contacts

Web Apps

- Pesticide and Local Services (PALS)
- NPIC's Product Research Online (NPRO)
- Herbicide Properties Tool (HPT)

Web Pages

- Adjuvants in Pesticides
- Biochar and Pesticides
- Daycare & School Poison Safety
- Mites
- Pesticide Home Remedies
- Petroleum Distillates and Pesticides
- Treated Seeds
- Wood Boring Beetles

COLLABORATIONS : OUTREACH

NPIC teams up with national, state, and local groups to increase awareness about pesticide health and safety across the nation. In 2019, NPIC hosted a risk communication workshop for regulators with the Pesticide Regulatory Education Program (PREP).



Our reach has continued to grow through a collaboration with the American Association of Poison Control Centers (AAPCC). Together, we work to raise awareness about pesticide poison prevention and best use practices, through social media and annual publications.

American Association of Poison Control Centers

Starting in 2014, NPIC partnered with AAPCC to raise awareness about pesticide poisoning. Our annual outreach materials focus on topics for parents, schools, and the general public.

“Read the Label”
2016 Infographic

Back-to-School
2017 poison
prevention webpage

Rodent Bait Safety
2019 Infographic

Lawn and Garden
2018 Safety Brochure



NPIC Presentations

NPIC has **more than 25 years** of experience engaging the public in science-based conversations. We’re excited to share our pesticide and science communication expertise at public and professional events.

18 Speaking events in 2019, including:



Professional Webinar

Using NPIC’s Veterinary Portal for Pesticide Incidents

Invited Speaker

City of Tualatin, OR, Parks and Rec

Invited Speaker

American Mosquito Control Association Risk Communication


INFOGRAPHICS

Infographics

We concentrated more of our efforts on visual projects in 2019, including our infographics. Easy to follow, these colorful graphics are perfect for printing or sharing for outreach opportunities.

NEEM OIL

Neem oil can be used in pesticide products to control common pests like aphids and mites.



There are three typical forms of neem oil. Each could be an active ingredient in a pesticide.

NEEM OIL (COLD PRESSED)
Neem tree seeds are used to produce cold pressed neem oil

AZADIRACHTIN
Further processing of neem oil separates azadirachtin from the mixture

CLARIFIED HYDROPHOBIC NEEM OIL
Remains after azadirachtin and other parts have been separated out

While neem oil is low or very low in toxicity to people, health risks may vary among products.

Some products like toothpaste or soap contain neem oil but are not pesticides. Products that claim to control insects or disease must be evaluated for safety.

Different parts of neem oil may work better against certain pests.

Always follow label directions. Check labels for the pests you want to control.



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In 2019, we introduced four new infographics titled:

- **Neem Oil**
- **Personal Protective Equipment (PPE)**
- **Rodent Bait Safety**
- **Systemic Pesticides**

Systemic Pesticides

Some herbicides, insecticides, and other types of pesticides are systemic. Systemic pesticides may be more effective against certain pests. Whether an ingredient is systemic or not may affect the exposure to humans, animals, and the environment.

Systemic	Non-Systemic
	
Taken up through plant roots or leaves and may move within the plant	Does not move within a plant

In some cases, a systemic pesticide may be more effective for pest control. Other times, a non-systemic may be a better choice. Pest habits and biology can help you decide if one is better than the other.

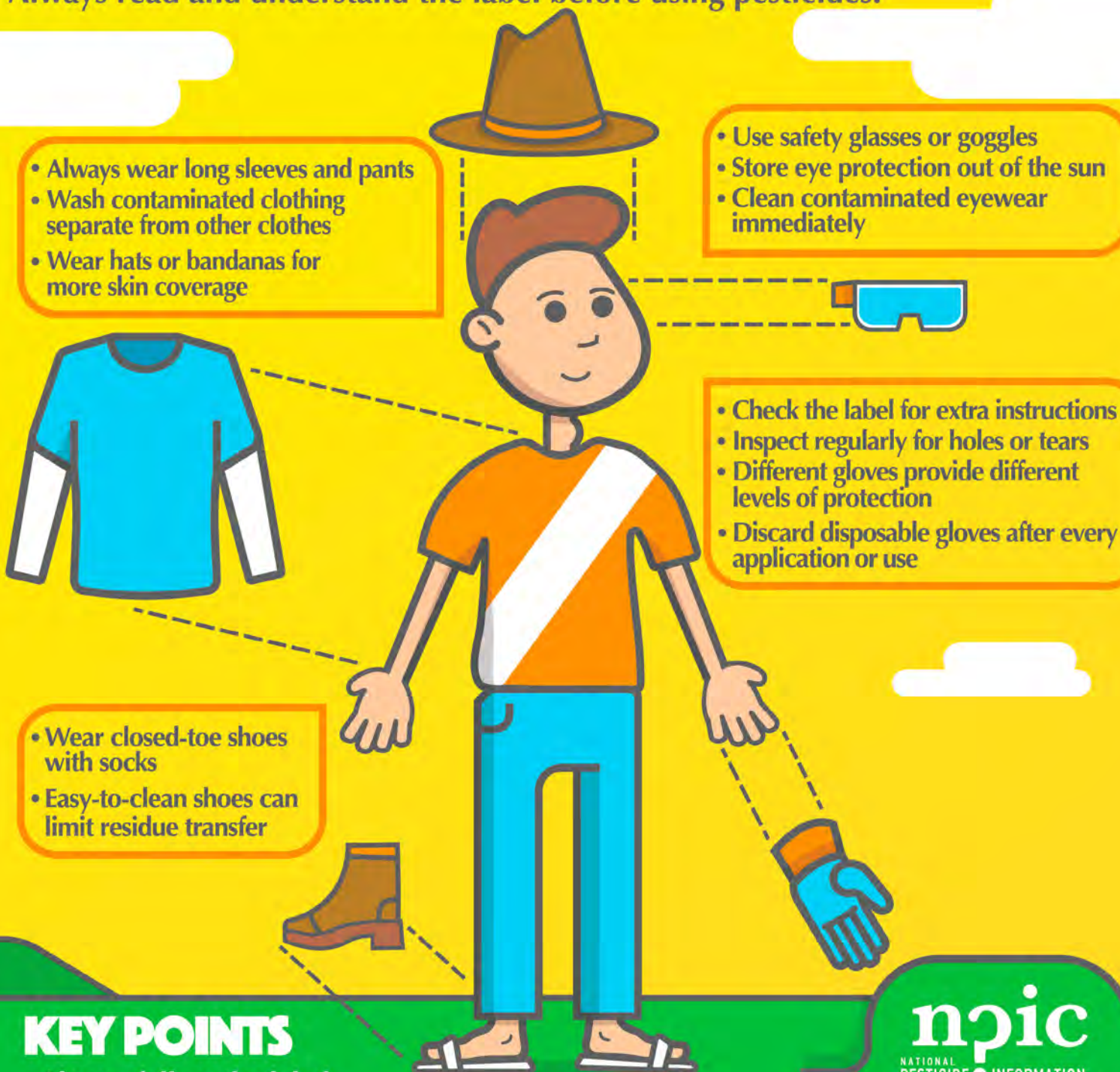
The way a pesticide moves in a plant can affect the potential for human exposure. For example, a non-systemic ingredient applied to soil is not likely to be taken into edible parts of a plant.

Some systemic products may move from soil into flowers visited by pollinators. "Other" or "Inert" ingredients can affect how well it is taken into leaves or roots.

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AVOID PESTICIDE EXPOSURE WITH PROTECTIVE CLOTHING

Even a “natural” or low toxicity product can cause harm if a person is exposed to it. Minimize your risk by using personal protective equipment (PPE). Different products may need different PPE. Always read and understand the label before using pesticides.



- Always wear long sleeves and pants
- Wash contaminated clothing separate from other clothes
- Wear hats or bandanas for more skin coverage

- Use safety glasses or goggles
- Store eye protection out of the sun
- Clean contaminated eyewear immediately

- Check the label for extra instructions
- Inspect regularly for holes or tears
- Different gloves provide different levels of protection
- Discard disposable gloves after every application or use

- Wear closed-toe shoes with socks
- Easy-to-clean shoes can limit residue transfer

KEY POINTS

- Always follow the label
- Do not store PPE with personal clothing
- Do not store PPE and chemicals together
- Wash protective clothing separately from other laundry

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FACT SHEETS | SOCIAL MEDIA

Fact Sheets

As part of our mission to encourage informed decision making, NPIC publishes scientific information in the form of fact sheets. These summarize information about pesticides and related topics like “Is it Safe?”, “What’s my Risk?”, “Antimicrobials”, and “Pesticide Binding Affinity.”

Our chemical (active ingredient) fact sheets answer common questions asked by the public about specific pesticides. They allow people to “dig deeper” for answers. In 2019, NPIC created three new fact sheets:

- **Atrazine**
- **Pesticides: An Introduction to Poison Control Centers**
- **Writing NPIC Fact Sheets**



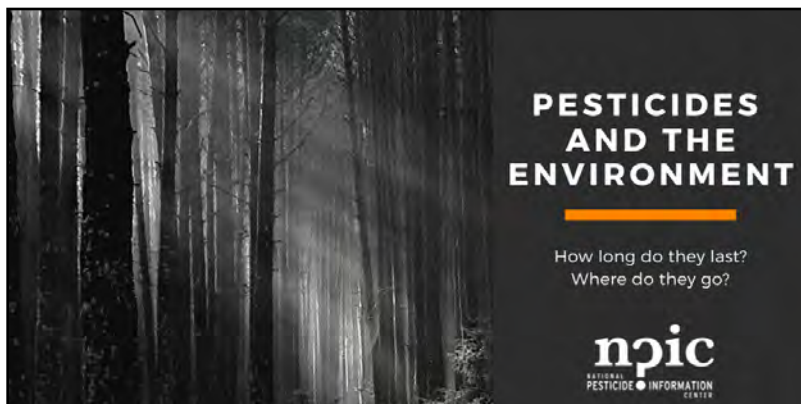
Social Media

At NPIC, we understand that we have to meet people on familiar ground. By staying active on various social media platforms, NPIC is able to further expand our reach to make science-based pesticide information available.

We try to keep our followers in the loop about seasonal pest and pesticide issues, health and safety topics, and the latest resources from NPIC and other reputable organizations.



283 posts this year



CONTINUING ED : AI FILES

Continuing Education

Our Pesticide Specialists and staff make it a priority to keep up with current events, regulatory decisions, and relevant findings in science research. Each year, we devote up to 25% of our time to NPIC's Continuing Education program.

We attend a diverse array of educational events, including webinars, regional professional conferences, expert speaker seminars, and guest lectures. Specialists also regularly monitor scientific journals, daily news articles, social media, and other relevant publications.

In 2019

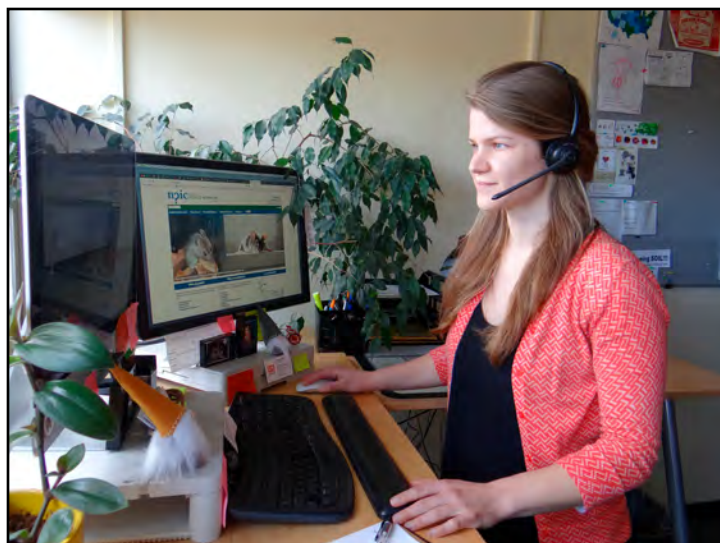
16 web-based events
webinars | recorded events

32 in-person events
seminars | invited speakers

Active Ingredient Files

We answer questions as we get them, with limited time for research. To do this, our team needs to have the best resources at our fingertips. We continually monitor and evaluate a wide variety of peer-reviewed sources for the latest research on toxicology, regulatory information, ecological impacts, and pest management science.

757 new documents
added in **2019**



Documents are uploaded in our searchable collection of Active Ingredient (AI) files for quick reference. The collection now includes more than 17,000 documents in 1,128 AI files. All of these documents are available for Specialists during pesticide conversations.

We invested more than four hours per week monitoring Federal Register Notices, affiliated dockets, newsletters, and selected journals of relevance.

NPIC DATA : STAFF

NPIC's Pesticide Inquiry Database (PID)

When our Specialists get questions over the phone, through email, social media, or other methods, we collect certain pieces of information about the inquiry. We don't collect personally identifiable information, but we do ask questions to paint a better picture of each unique situation. This helps us tailor our resources to each person, making the conversation valuable to individuals, and our data valuable to other organizations, including:

- Pesticide Regulators and Policy Makers
 - EPA
 - Federal, State, and Tribal Agencies
- Researchers
- Universities



9,970 inquiries

2019 Inquiry Types

8,162 informational
1,613 pesticide incidents
30% with unknown active ingredient
195 other (not pesticide related)



Staff Training & Experience

Our team of highly qualified Pesticide Specialists has nearly 30 years of combined experience answering questions at NPIC.

Thanks to our rigorous training program, people can be confident they are speaking with an experienced Specialist. The training process exposes new team members to a variety of topics, scenarios, and challenges.

During training, we take an "all hands on deck" approach, where every team member is invested in training new Specialists.

Our Pesticide Specialists have unique scientific backgrounds, from pollinator health to toxicology, soil, and environmental science. This scientific diversity strengthens our ability to answer diverse questions about pesticides and related topics.

chemistry biology soil science
environmental science botany
anthropology geoscience
food science & technology
microbiology zoology

Introduction to Inquiry Data

Pesticide specialists create a record for every inquiry, which is entered into the NPIC Pesticide Inquiry Database (PID). PID is a relational database, designed and built by NPIC. Custom reports may be available based on many of the items listed below.

There are three types of inquiries received by NPIC:

- Requests for information about pesticides and related issues
- Inquiries or reports about pesticide incidents
- Issues that are not related to pesticides

The type and amount of information entered into the PID depends on the type of inquiry.

NPIC aims to collect the following information for all pesticide-related inquiries:

- The inquirer's zip code or state
- The type of person (general public, government, medical personnel, etc.)
- The type of question (health risk, regulatory compliance, label clarity, etc.)
- The EPA registration number, product name and/or active ingredient name(s)
- The actions performed (verbal information, referrals, transfers, etc.)
- The way the person found NPIC (web, referrals, etc.)

For pesticide incidents, NPIC makes every effort to collect these additional data:

- The type of incident (exposure route, misapplication, spill, etc.)
- The type of exposed entity (person, animal, building, etc.)
- The location of the incident (inside the home, outside the home, retail store, school, etc.)

If a person or animal was exposed to a pesticide, NPIC specialists attempt to collect additional information. However, they may not ask for all of these items during emergency medical events.

- A timeline describing the exposure duration, symptom onset, and resolution
- The person or animal's age, symptoms, and gender
- The species, breed, and weight of animals

When symptoms are reported and the active ingredient(s) are known, specialists evaluate the relationship between them to assign a **certainty** index. The certainty index is an estimate by NPIC as to whether the reported symptoms were consistent or inconsistent with published reports/materials for the identified active ingredients, in the context of the reported pesticide exposure. Specialists use the following tools when assigning the certainty index:

- A standard set of criteria, defined in NPIC training and procedures
- Published exposure reports and case studies
- Input from Dr. Berman, DVM, for human and animal exposure incidents
- Input from the PID QA/QC specialist

Symptoms are also characterized in terms of their **severity** in the PID. The criteria for defining major, moderate, and minor symptoms were adapted from similar mechanisms used by poison control centers in the National Poison Data System, and by the U.S. EPA in the Incident Data System.

The following pages include details about the incidents and inquiries documented by NPIC from February 15, 2019 to February 14, 2020.

Disclaimers and Explanatory Information:

- Material presented in this report is based on information provided to NPIC by individuals who contacted NPIC, primarily by phone or email.
- None of the information has been verified or substantiated through independent investigation by NPIC staff, laboratory analyses, or by any other means. This is similar to other self-reported public-health-monitoring programs, including the incident data recorded by poison control centers.
- If a person alleges/reports a pesticide incident, it will likely be recorded as an incident by NPIC. To meet the criteria, the person must have sufficient knowledge about the scenario, and it must be reported within two years of its occurrence.
- NPIC defines an incident in terms of public health. The NPIC definition includes any unintended exposure (i.e., child ate a mothball), intended exposures with adverse effects (i.e., illness in pets treated with flea/tick products), spills, and potential misapplications (i.e., a product intended for ornamental plants was applied to vegetables in the home garden.)
- About 1% of the time, callers' main purpose for contacting NPIC was to report a pesticide incident. More often, they contacted NPIC to obtain technical information. See page 20. Regardless, NPIC specialists make every effort to collect complete information about scenarios that meet the NPIC incident definition. Approximately 16% of inquiries to NPIC are coded as incidents.
- NPIC specialists are trained to recognize scenarios that could potentially lead to enforcement actions. In these cases, the standard operating procedure requires a referral to the appropriate State Lead Agency, provided to the inquirer. See page 21.
- NPIC qualifies the information received by assigning a certainty index (CI). The CI is an estimate by NPIC as to the likelihood that the reported signs and symptoms were consistent or inconsistent with published reports/materials for the identified active ingredients, in the context of the reported pesticide exposure. See page 27.
- NPIC makes no claims or guarantees as to the accuracy of the CI or other information presented in its reports, other than that NPIC has done its best to accurately document the information provided to NPIC.
- It is occasionally necessary to collect personally identifiable information (PII) in order to respond to inquiries, for example, by voicemail, email, or mail. Users of web-based incident reporting portals may have the option to submit PII as part of their reports. In all other cases, it is NPIC policy to refrain from collecting/documenting PII from people who contact NPIC through public channels.
- Through its cooperative agreement with EPA, NPIC provides special reports upon request. Special reports may also be provided to other cooperative agreement holders with EPA, such as state-level agriculture and environmental protection agencies. Other entities with interest in special reports should contact NPIC to inquire about the procedure and possible costs.

MONTHLY INQUIRIES

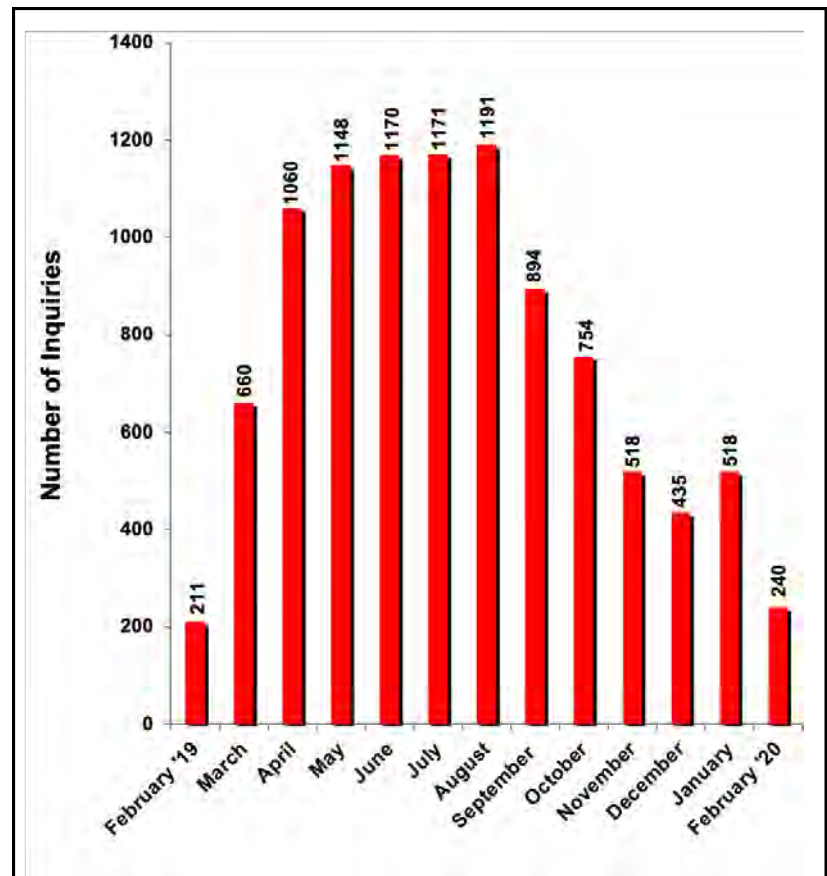
1. Monthly Inquiries

NPIC received 9,970 inquiries during this grant year. Graph 1 shows the number of inquiries received for each month. Seventy-four percent (74%) of the inquiries were received between April and October, concurrent with the part of the year when pest pressures are highest.

Table 1. Monthly inquiries

Month	Total
February 2019	211
March	660
April	1060
May	1148
June	1170
July	1171
August	1191
September	894
October	754
November	518
December	435
January	518
February 2020	240

Graph 1. Monthly inquiries



TYPE OF INQUIRY / ORIGIN OF INQUIRY

2. Type of Inquiry

NPIC classifies inquiries as information, incident, or other (not pesticide related) inquiries. A pesticide spill, misapplication, contamination of a non-target entity, or any purported exposure to a pesticide, regardless of injury, is classified as an incident.

The types of inquiries are summarized in Table 2 and Chart 2.

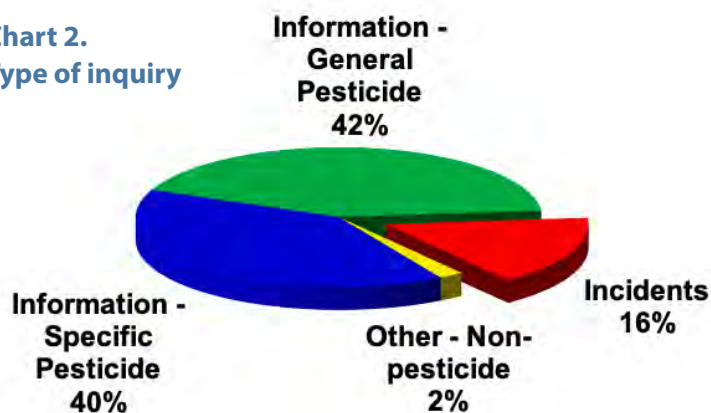
The majority of inquiries (8,162 or 82%) were informational inquiries about pesticides or related topics (Chart 2). NPIC responded to 4,203 (42%) information inquiries about pesticides in general. NPIC responded to 3,959 (40%) information inquiries relating to specific pesticides or active ingredients.

NPIC documented 1,613 incidents involving pesticides (16%). Pesticide Specialists routinely provided requested information, evaluated the need for any referrals, and asked several scoping questions to document the circumstances surrounding the reported incidents.

Table 2. Type of inquiry

Type of Inquiry	Total
Information - Specific Pesticide	3959
Information - General Pesticide	4203
Incidents	1613
Other (nonpesticide)	195
Total =	9970

Chart 2. Type of inquiry



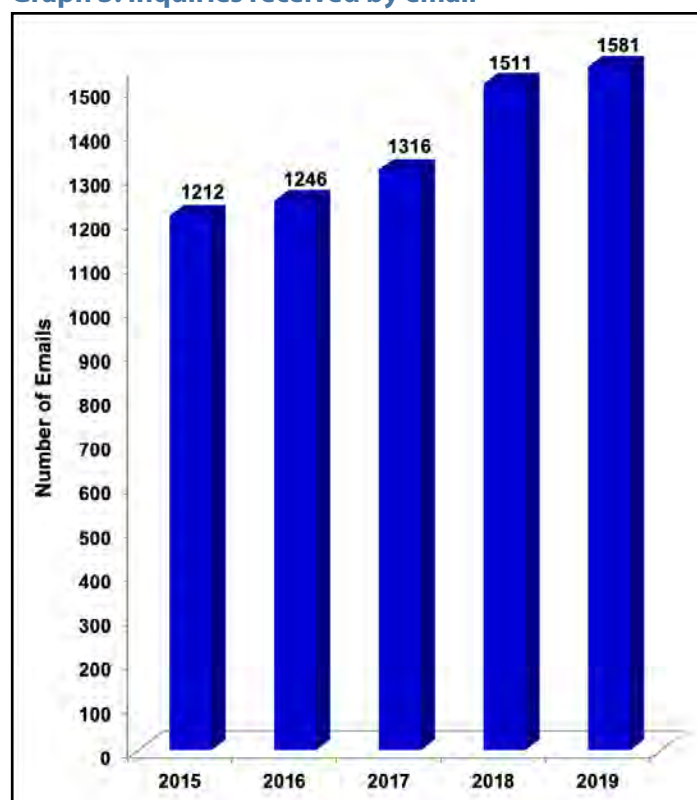
3. Origin of Inquiry

Table 3 summarizes the origin of inquiries received by NPIC. About 84% of inquiries were received by telephone.

Table 3. Origin of inquiry

Origin of Inquiry	Total
Phone	7163
Email/Web	1581
Voicemail	1222
Mail	4
Total =	9970

Graph 3. Inquiries received by email



4. Website Access

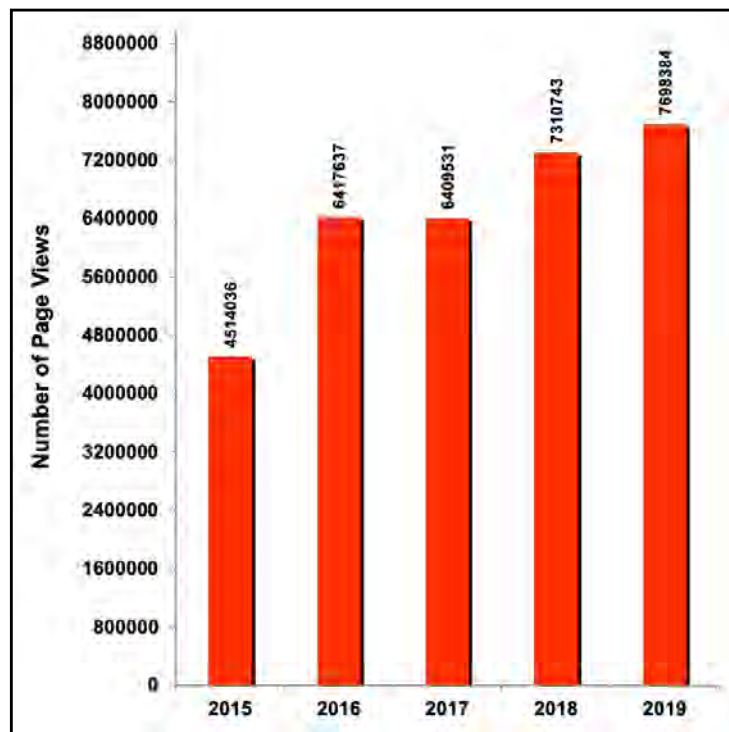
The NPIC website attracted more than 3.5 million unique visitors viewing 7,698,384 pages during this period. Page views of the NPIC website are up 5% from last year.

Most page views originated from queries on popular search sites (54.5%). Others were connected with NPIC from a bookmark (38.6%) or direct link (i.e., shared via email). The most popular search phrases used to reach NPIC were "pesticide," "ARS," and "roach." "ARS" likely refers to the USDA's Agricultural Research Service.

Visits to the website varied greatly in duration, with 172,154 visits lasting longer than 15 minutes. The average visit duration was approximately 2 1/2 minutes.

The most popular pages viewed were the NPIC home page (367,459 views), NPRO (292,989 views), and the glyphosate general fact sheet

Graph 4.1. Page views



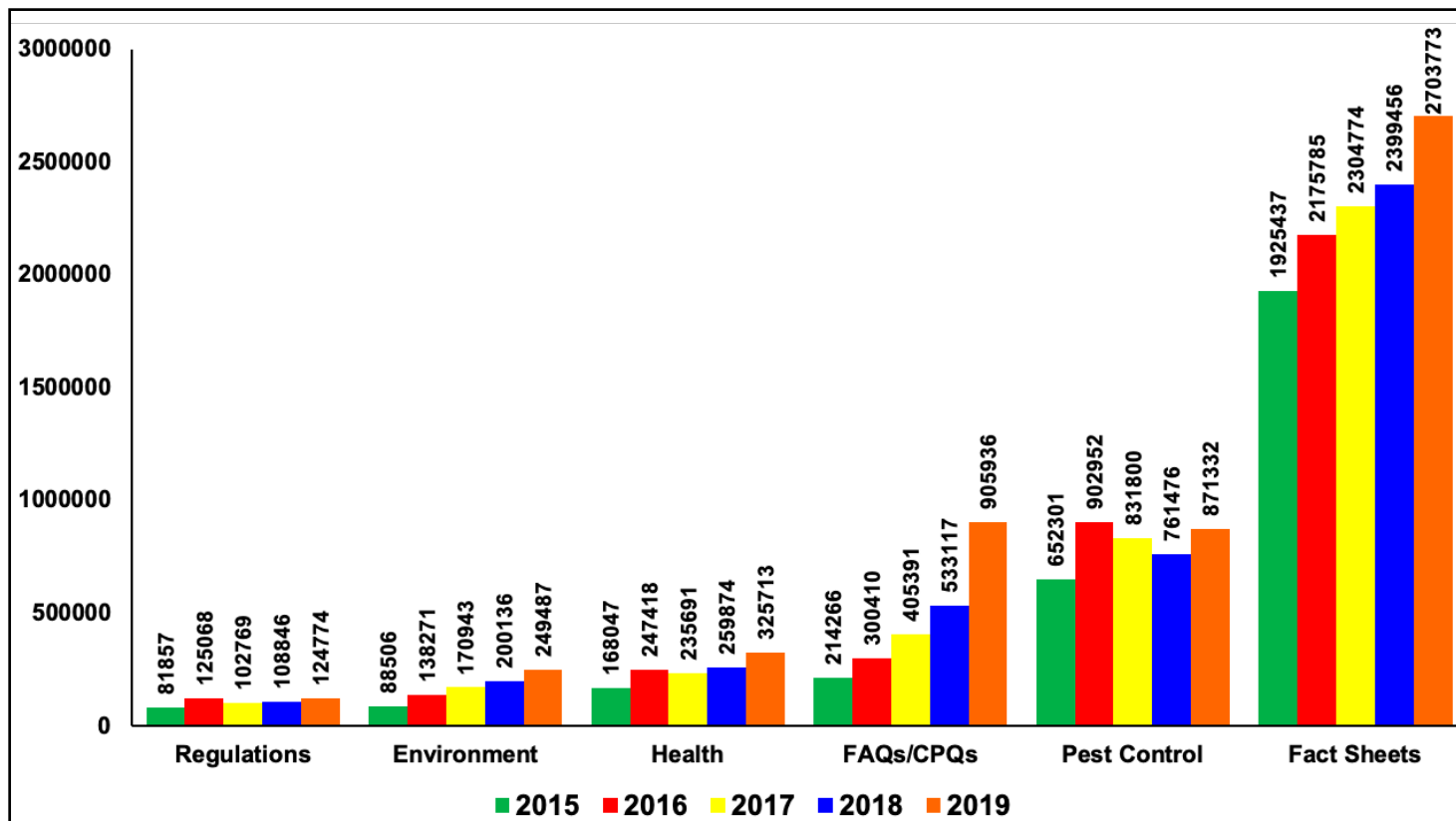
(253,723 views).

Table 4. Selected page views

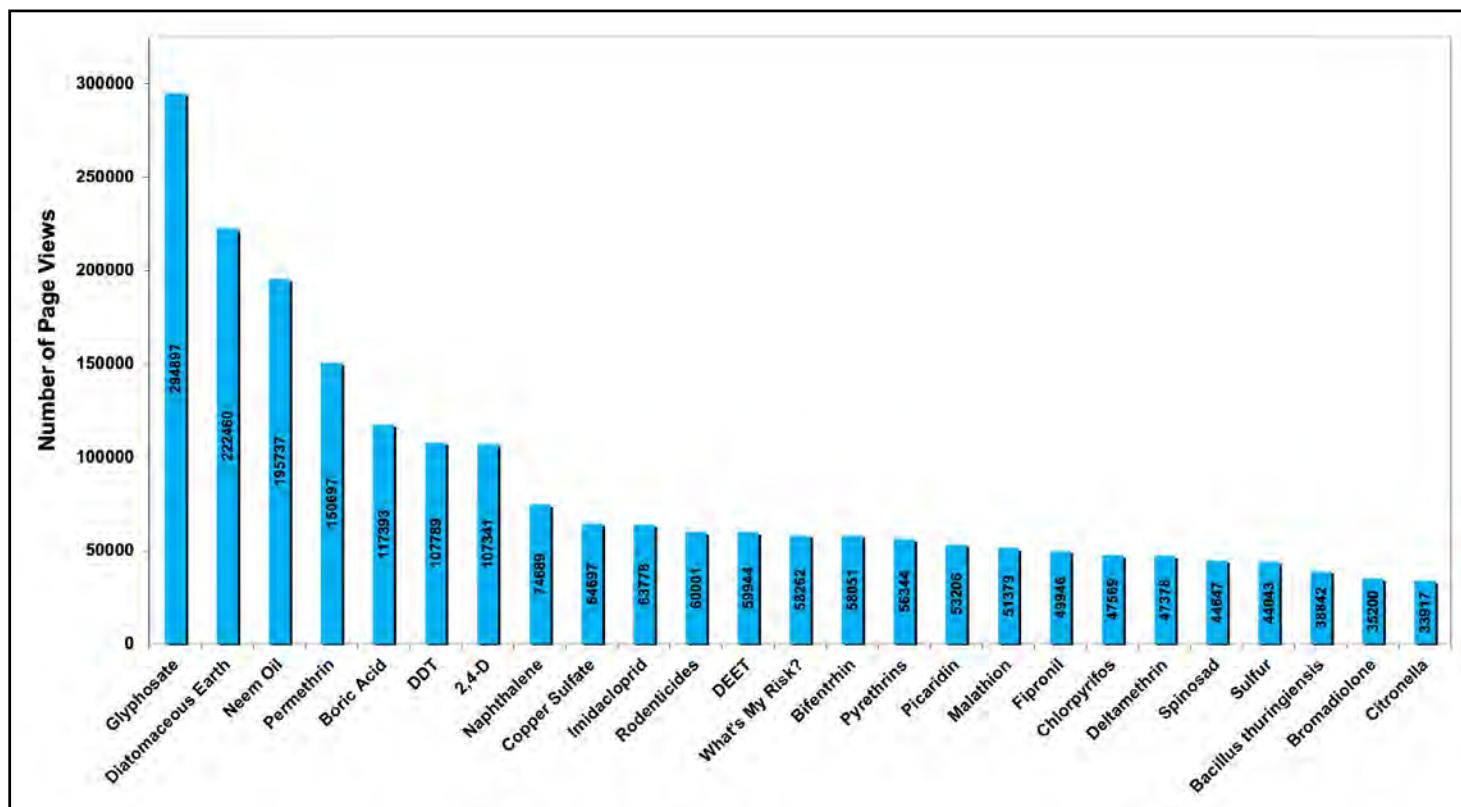
Page Accessed	English page views	Number of pages available	Spanish page views	Number of pages available
Fact Sheets	2,652,526	222	51,247	6
Pest Control	526,384	65	344,948	37
FAQs/CPQs	427,095	88	478,841	85
Health and Safety	222,049	32	103,664	21
Environment	171,533	29	77,954	7
Regulations	113,404	27	11,370	7

NPIC WEBSITE

Graph 4.2. Top 6 web pages viewed by topic



Graph 4.3. Top 25 active ingredient fact sheet pages viewed



TYPE OF INQUIRER

5. Type of Inquirer

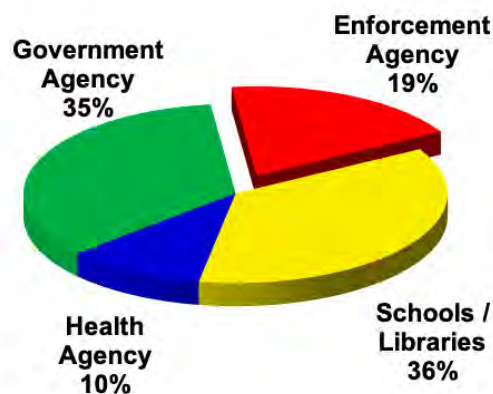
Table 5 summarizes the profession/occupation of individuals contacting NPIC. The majority of inquiries to NPIC are from the general public. Of the 9,970 inquiries received, there were 8,643 (86.7%) from the general public, 241 (2.4%) from federal, state, local government agencies, or schools, 205 (2.1%) from pesticide manufacturers, and 97 (1.0%) from human and animal medical personnel.

Chart 5 summarizes the 241 governmental entities that contacted NPIC during the grant year. Health agencies include health departments and WIC personnel. Government agencies include city, county, and other government entities without enforcement roles. Enforcement agencies include the US EPA, state pesticide regulatory agencies, and police, among others.

Table 5. Type of inquirer

Type of Inquirer	Total
General Public	8643
Federal/State/Local Agencies	
Schools / Libraries	85
Government Agency	82
Enforcement Agency	44
Health Agency	25
Fire Departments	5
Medical Personnel	
Human Medical	64
Animal / Vet / Clinic	33
Other	
Pesticide Mfg / Mktg Co	205
Farm	130
Pest Control	108
Labs / Consulting	62
Retail Store / Nursery	39
Media	36
Info Service / Unions	36
Beekeepers	29
Master Gardener	24
Environmental Orgs	22
Lawyer / Insurance	19
Nonmigrant Ag Worker	8
Migrant Ag Worker	2
Other	269
Grant Year Total =	9970

Chart 5. Inquiries from federal / state / local agencies (Total: 241)



TYPE OF QUESTION

6. Type of Question

The questions received at NPIC are most often related to health (e.g., effects, risk, etc.), pest control (e.g., how to control a pest, pest habits, etc.), and application (e.g., methods, label clarity, etc.). "Other" questions (1,494) include all wrong numbers and people seeking their pest control companies, among others.

Questions about regulations (1,020) range from "How do I get a new product registered?" to "Can the authorities make my neighbor stop spraying?" Questions about how to follow pesticide label directions were coded as "Application" questions (1,027).

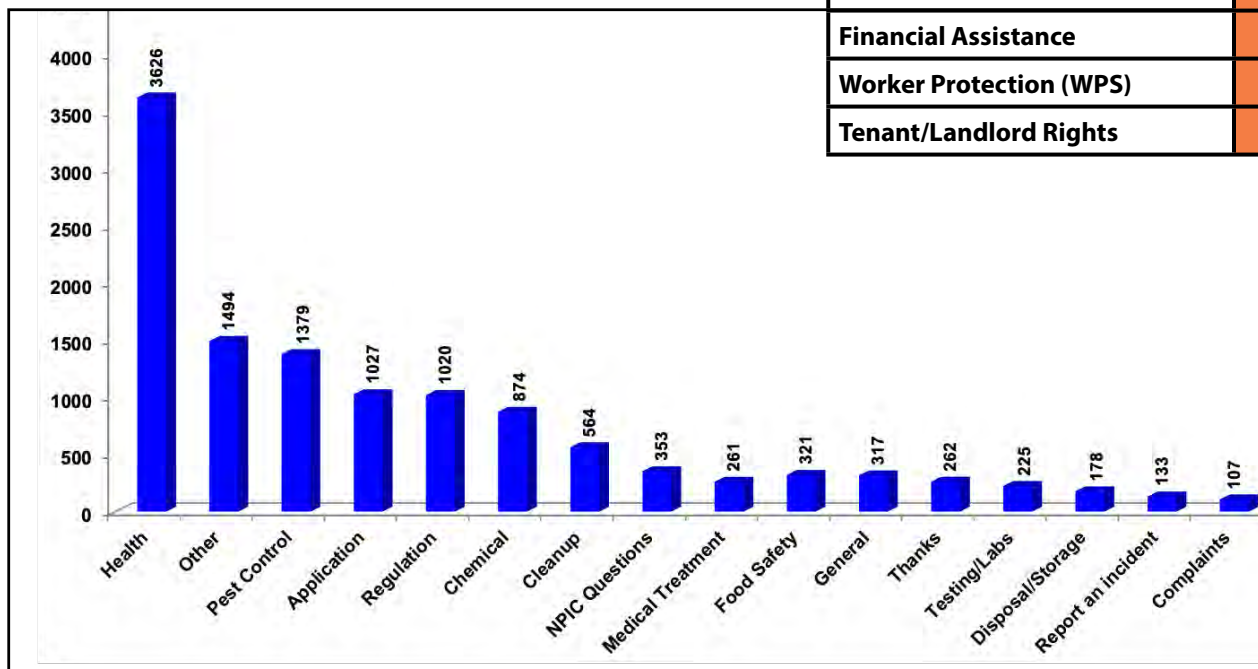
People contacted NPIC in order to report a pesticide incident 133 times. In these cases, NPIC provides people with appropriate local referrals for enforcement, as needed.

Inquiries may involve more than one type of question. Inquirers asked 12,556 questions during this grant year in the course of 9,970 inquiries.

Table 6. Type of question

Type of Question	Total
Health	3626
Other	1494
Pest Control	1379
Application	1027
Regulation	1020
Chemical	874
Cleanup	564
NPIC Questions	353
Food Safety	321
General	317
Thanks	262
Medical Treatment	261
Testing/Labs	225
Disposal/Storage	178
Report an incident	133
Complaints	107
Where to Buy a Product	103
Just Wants Another Contact	68
Inert Ingredients	55
Harvest Interval/Re-entry	52
Pros vs. Cons	51
Financial Assistance	40
Worker Protection (WPS)	26
Tenant/Landlord Rights	20

Graph 6. Type of question



ACTIONS TAKEN

7. Actions Taken

Primary actions:

NPIC Specialists respond to inquiries in a variety of ways. The primary actions are summarized in Table 7.1. Most inquiries (8,338) were answered by providing information over the phone. Information was also sent via email in 1,590 cases and by mail in 56 cases. Upon request, NPIC brochures and other promotional materials were mailed to people 23 times in this period.

Table 7.1. Primary action taken

Primary Action Taken	Number of Inquiries
	2019
Verbal Info	8338
Emailed Info	1590
Handled Inquiry in Spanish	120
Interpreted via Language Line Svcs	79
Transferred to Specialist / Voicemail	67
Mailed Info	56
Transferred to EC / PC	30
Sent NPIC Outreach Material(s)	23

Risk reduction actions:

NPIC keeps track of certain conversation topics aimed at reducing pesticide risk. Specialists documented 5,669 risk reduction actions, detailed in Table 7.2.

Table 7.2. Risk reduction actions

Risk Reduction Action Taken	Number of Inquiries
	2019
Discussed Ways to Minimize Exp.	2536
Discussed Following the Label	2306
Discussed IPM Concepts	713
Discussed Environmental Protection	114

Referrals to other organizations:

The number of referrals to various organizations is presented in Table 7.3. Specialists use their training and SOPs to evaluate the need for referrals, providing them only when the requested information is outside NPIC boundaries and there is an appropriate resource available to provide the information. Examples include “manufacturer/distributor” for detailed application instructions and product complaints, “county extension” for pest control advice, and “state pesticide regulatory agencies” for enforcement.

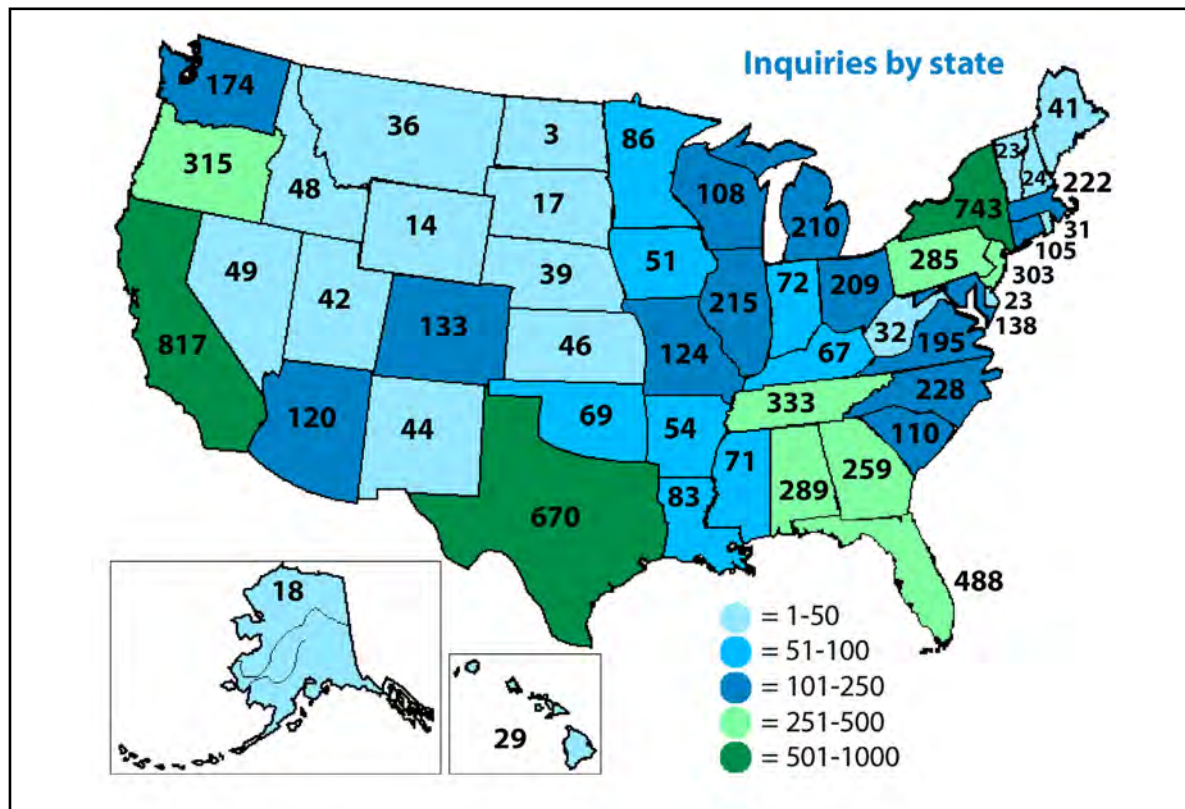
Table 7.3. Referrals to other organizations

Organization Name	Number of Inquiries
	2019
Manufacturer / Distributor Contact	1784
NPIC Website	1272
County Extension Contact	953
State Lead Contact	891
Other Org. Contact	789
Poison Control Contact	320
EPA HQ / OPP Contact	270
EPA Website	247
EPA Region Contact	189
Hazardous Waste Contact	147
Other State Agency Contact	141
Department of Health Contact	123
Other Federal Agency Contact	89
Animal Poison Contact	68
OSHA Contact	26

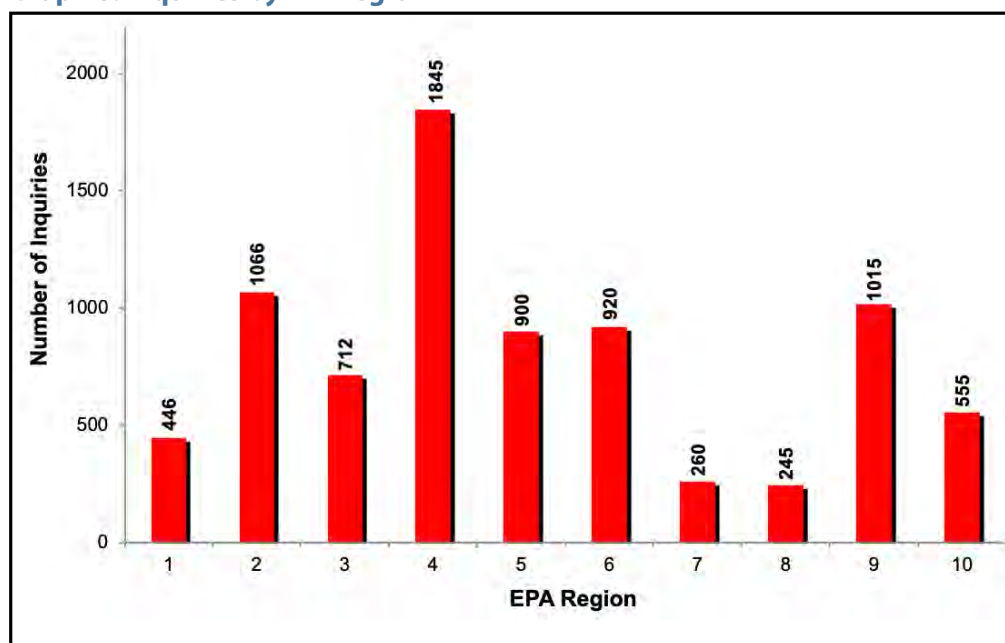
INQUIRIES BY STATE

8. Inquiries by State

The map below shows the number of inquiries received by NPIC from each state. The largest number of inquiries came from California, Texas, New York, and Florida. In addition to the states, NPIC received inquiries from US Virgin Islands (2), Puerto Rico (18), District of Columbia (39), Canada (94), and other countries (220). Sometimes a state cannot be identified during the inquiry.



Graph 8. Inquiries by EPA region



Graph 8 summarizes inquiries by EPA region.

The top 5 regions with a known state were:

- Region 4 (18.5%)
- Region 2 (10.7%)
- Region 9 (10.2%)
- Region 6 (9.2%)
- Region 5 (9.0%)

TOP 25 AIs FOR ALL INQUIRIES

9. Top 25 Active Ingredients for All Inquiries

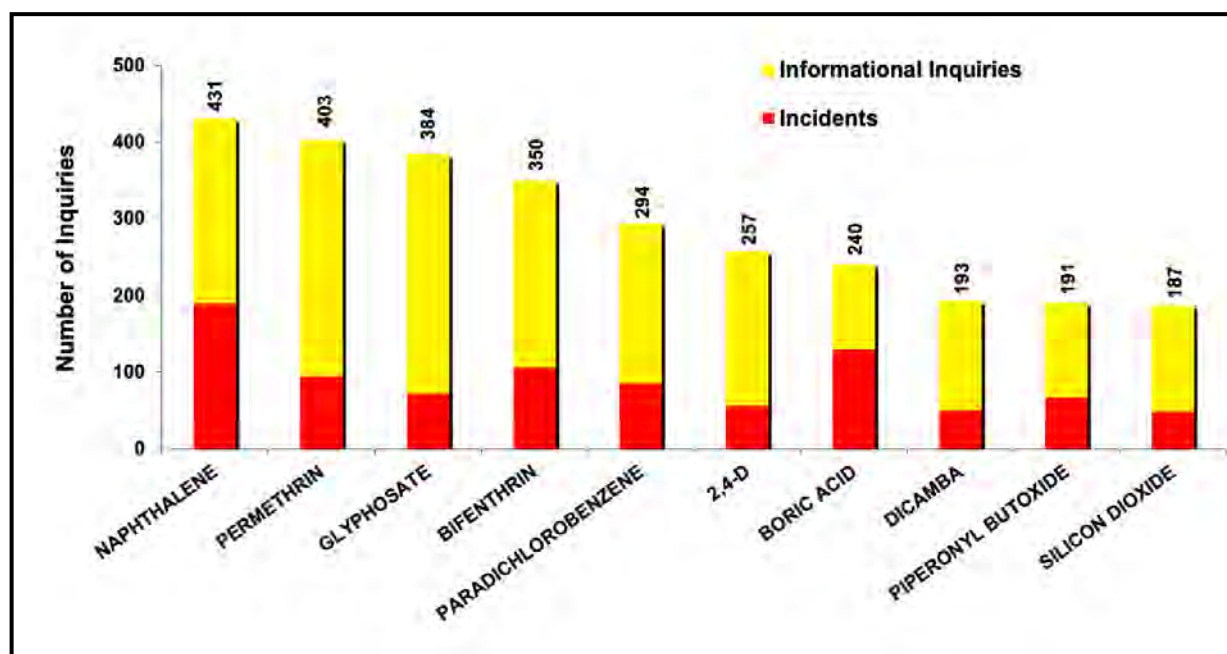
When inquiries to NPIC involve discussion of a specific product or active ingredient, Specialists record the product and the active ingredient in the PID. Naphthalene was discussed in more inquiries than any other single active ingredient this year (Table 9, Graph 9). Of the 431 inquiries involving naphthalene, 190 (44.1%) were incidents. Note that an inquiry may involve discussion of several active ingredients.

Graph 9 illustrates the number of informational and incident inquiries for the top active ingredients discussed during the grant year.

Table 9. Top 25 active ingredients for all inquiries

Active Ingredient	Total Inquiries	Incident Inquiries	Information Inquiries
NAPHTHALENE	431	190	241
PERMETHRIN	403	94	309
GLYPHOSATE	384	72	312
BIFENTHRIN	350	106	244
PARADICHLOROBENZENE	294	85	209
2,4-D	257	55	202
BORIC ACID	240	129	111
DICAMBA	193	49	144
PIPERONYL BUTOXIDE	191	67	124
SILICON DIOXIDE	187	48	139
PYRETHRINS	183	53	130
FIPRONIL	178	37	141
IMIDACLOPRID	172	48	124
DELTAMETHRIN	153	57	96
NEEM OIL	151	40	111
MALATHION	127	59	68
CYPERMETHRIN	115	55	60
TRICLOPYR	102	25	77
LAMBDA-CYHALOTHRIN	94	27	67
MECOPROP	92	17	75
CYFLUTHRIN	85	23	62
PYRIPROXYFEN	83	25	58
PRODIAMINE	81	11	70
SULFURYL FLUORIDE	80	6	74
IMAZAPYR	68	8	60

Graph 9. Top 10 pesticide active ingredients for all inquiries



INCIDENT TYPE

10. Incident Type

An incident may involve a spill, misapplication, exposure, adverse effects, or any combination of these events.

There were 2,080 pesticide exposures and 820 accidents. Charts 10.1 and 10.2 provide further details. Among reported exposures, inhalation was the most common route of exposure (43.0%), followed by dermal contact (18.2%) and ingestion (14.5%). When a specific exposure route could not be identified, specialists documented an "Unknown" exposure route (9.8%).

Indoor spills (81) were reported more often than outdoor spills (27). Among reported misapplications (522), 78.9% were misapplications by the homeowner or resident. Misapplications by homeowners decreased between 2019 (412) and 2018 (550). The number of incidents involving drift increased from 2018 (70) to 2019 (98).

Chart 10.1. Pesticide exposures (Total: 2,080)



Chart 10.2. Pesticide accidents (Total: 820)

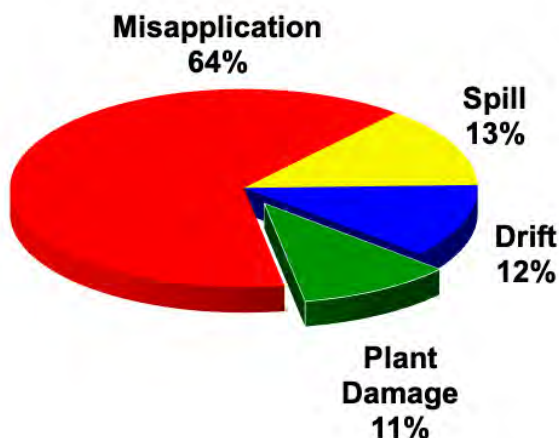


Table 10. Incident Type

Type of Incident	Total
Exposures	
Inhalation	895
Dermal	379
Ingestion	302
Unknown	203
Exposure Possible	216
Ocular	49
Occupational	30
Workplace	6
Accidents	
Misapp. - Homeowner	412
Drift	98
Plant Damage	87
Spill - Indoor	81
Misapp. - Other	56
Misapp. - PCO	43
Spill - Outdoor	27
Misapp. - Unknown	11
Other	4
Fire	1
Total =	2900

TOP 25 AIs FOR INCIDENTS

11. Top 25 Active Ingredients for Incidents

The most common active ingredients reported during incident inquiries are listed in Table 11. The table identifies the number of exposures or accidents involving humans, animals, and other entities, such as environmental entities and property. Naphthalene and paradichlorobenzene were involved in more reported exposures/accidents than any other active ingredients. Both are commonly found in mothballs and similar products.

In Table 11, the top three active ingredients for human and animal exposures are highlighted below. Naphthalene, paradichlorobenzene, and boric acid were involved in the highest number of exposures for human incidents. The top three active ingredients with the highest number of exposures involving animals were boric acid, naphthalene, and bifenthrin.

Table 11. Top 25 active ingredients for incidents reported to NPIC¹

Active Ingredient	Human Exposures	Animal Exposures	Other Accidents
NAPHTHALENE	358	39	283
PARADICHLOROBENZENE	300	34	239
BORIC ACID	58	67	12
BIFENTHRIN	54	36	34
PERMETHRIN	65	15	25
GLYPHOSATE	50	14	38
PIPERONYL BUTOXIDE	41	15	18
2,4-D	23	18	27
DELTAMETHRIN	33	11	19
MALATHION	32	8	27
IMIDACLOPRID	22	15	18
DICAMBA	23	10	25
PYRETHRINS	37	7	17
CYPERMETHRIN	33	4	19
SILICON DIOXIDE	33	7	10
FIPRONIL	17	16	14
IRON PHOSPHATE	1	28	1
NEEM OIL	30	4	7
PYRIPROXYFEN	16	6	9
CAPSAICIN	19	5	7
LAMBDA-CYHALOTHRIN	20	1	13
BROMETHALIN	3	17	3
D-PHENOTHRIN	19	5	6
TRICLOPYR	12	6	8
CHLORPYRIFOS	18	8	3

¹ Note that incidents may include multiple humans, animals, and other entities. See Table 9 for a count of incident inquiries by active ingredient.

LOCATION & ENVIRONMENTAL IMPACT

12. Locations of Exposure or Accident

For incidents, specialists record the location of an exposure or accident. Of the 2,693 locations where exposures or accidents were documented, 85.0% occurred in the home or yard, 4.5% occurred at the intersection of home and agricultural property, and 2.2% occurred in an agricultural setting. Table 12 identifies the number of exposures or accidents reported to NPIC in a variety of other locations.

Based on inquiries, NPIC saw a decrease in incidents occurring at natural (e.g., ponds, lakes, streams) and treated water locations in 2019 (23) compared to 2018 (28).

Table 12. Location of exposure/accident

Location	Total
Home - Inside	1447
Home - Outside	842
Ag/urban interface	120
Vehicle	66
Agricultural	58
Office Building	35
School/Day Care	23
Pond/Lake/ Stream	22
Industrially Related	21
Roadside/Right-of-Way	17
Health Care Facility	13
Retail Store	12
Park/Golf Course	11
Nursery/Greenhouse	4
Food Service/Restaurant	1
Treated Water	1
Total =	2693

13. Environmental Impact

Table 13 presents the type of incidents reported for each kind of environmental or built entity. The most common environmental incidents reported to NPIC involve pesticide misapplications to buildings by residents (220).

Table 13. Reported environmental impacts

	Drift	Misapplication: Resident	Misapplication: Other	Misapplication: PCO	Misapplication: Unknown	Other	Plant Damage	Spill: Indoor	Spill: Outdoor
Agricultural Crop	11	0	1	1	0	0	7	0	0
Building - Home/Office	4	220	32	11	8	3	0	56	4
Home Garden	34	66	4	14	0	0	42	0	0
Home Lawn	8	32	2	2	0	0	4	0	0
Natural Water	1	0	0	0	0	0	0	0	2
Property	4	24	6	10	0	0	0	16	5
Soil/Plants/Trees	25	43	4	2	2	1	34	0	5
Treated Water	1	0	0	0	0	0	0	0	4
Vehicle	8	11	2	1	0	0	0	8	0
Other ¹	0	7	3	1	0	0	0	0	3

¹“Other” refers to miscellaneous items not included in previous categories (i.e., sidewalk, food).

CERTAINTY INDEX

14. Certainty Index

Table 14 and Graphs 14.1 and 14.2 summarize the certainty index (CI) assignments for all incidents that were eligible to be classified. An incident is eligible to be classified if there was an exposed person or animal with reported signs/symptoms and at least one active ingredient was known.

Of the total number of entities assigned a CI (2,396), 14.2% of the cases were assigned a certainty index of “consistent,” 13.7% were assigned an index of “inconsistent,” and 72.1% were considered “unclassifiable.” Because none of the information reported to NPIC has been verified or substantiated by independent investigation, uncertainty is common. This is the case with many forms of self-reported data, which are often used for monitoring public health. As a result, the certainty index assignment for “definite” is rarely assigned.

All certainty index assignments are reviewed by a quality assurance specialist. Dr. Berman, DVM, provides additional consultation for human and animal incidents.

What is the Certainty Index?

The certainty index is an estimate by NPIC as to the likelihood that the reported signs and symptoms were “**consistent**” or “**inconsistent**” with published reports/materials for the identified active ingredients, in the context of the reported pesticide exposure.

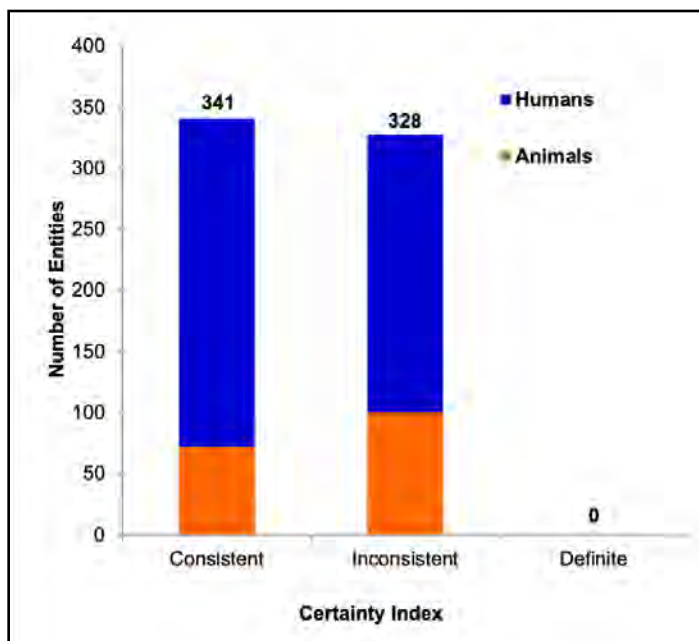
The certainty index is “**unclassifiable**” when one or more of the following criteria apply:

- An exposure occurred, but no symptoms were reported.
- No active ingredient could be identified.
- The presence or absence of symptoms was unknown.

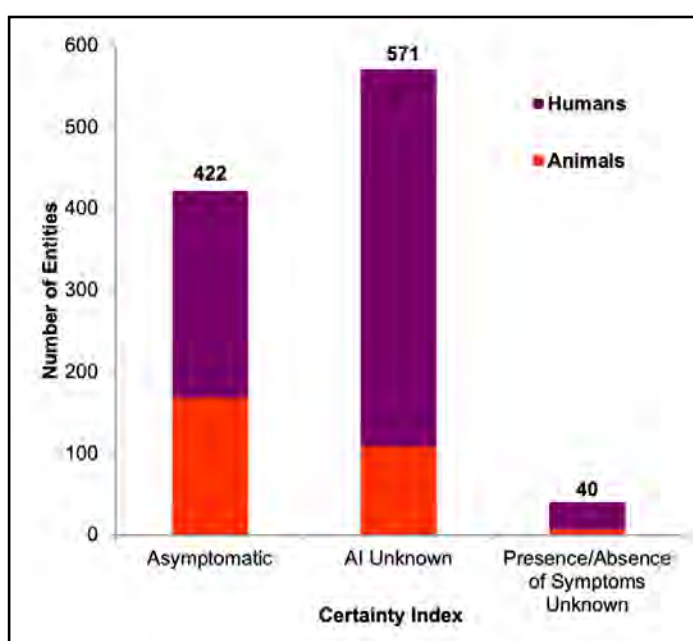
Table 14. Incident inquiries by certainty index (CI)

CI for All Categories of Entities					Breakdown of Human-Entity Incident Inquiries			
Certainty Index (CI)	Humans	Animals	Other	Total	Male	Female	Groups	Gender Not Stated
Unclassifiable	750	283	694	1727	240	402	98	10
Definite	0	0	0	0	0	0	0	0
Consistent	269	72	0	341	95	156	18	0
Inconsistent	228	100	0	328	85	140	3	0

Graph 14.1. Certainty index for incidents



Graph 14.2. Unclassifiable CI categories



SEVERITY INDEX

15. Severity Index

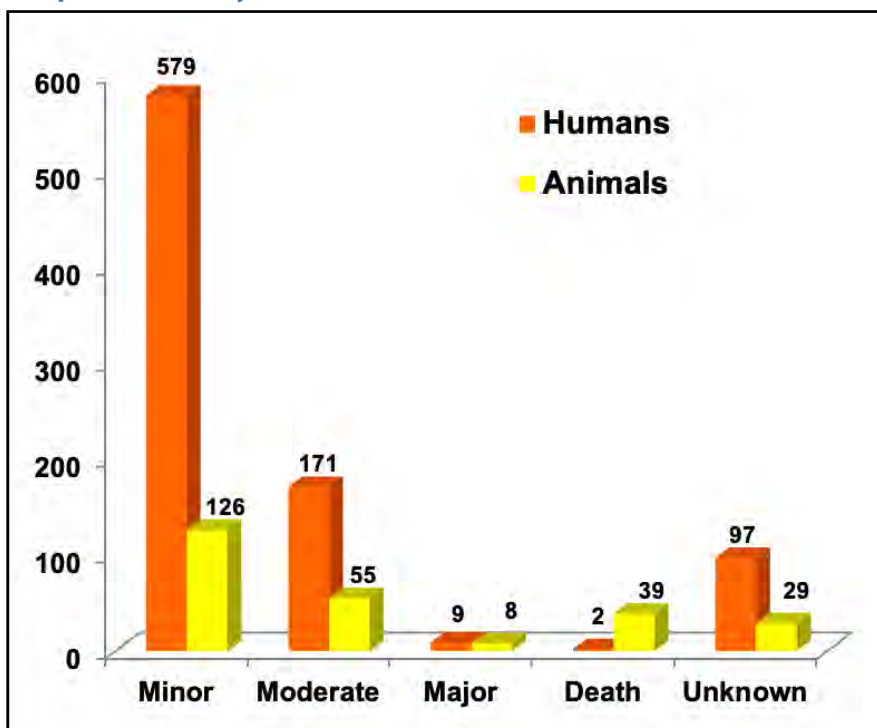
Table and Graph 15 summarize the severity of symptoms for all human and animal incidents reported to NPIC.

For all human pesticide incidents with reported exposures, 46.5% had minor symptoms, 13.7% had moderate symptoms, 0.7% had major symptoms, and 0.2% reported a death. Symptoms were unknown in 7.8% of human incidents. In 31.1% of human exposure incidents, the person reported that they did not experience any symptoms.

Table 15. Human and animal incidents by severity index (SI)

SI for All Categories of Entities				Breakdown of Human-Entity Incident Inquiries			
Severity Index (SI)	Humans	Animals	Total	Male	Female	Groups	Gender Not Stated
Minor	579	126	705	188	357	33	1
Moderate	171	55	226	61	103	7	0
Major	9	8	17	5	4	0	0
Death	2	39	41	1	1	0	0
Unknown	97	29	126	34	50	7	6
Asymptomatic	387	198	585	131	181	72	3

Graph 15. Severity index for human and animal incidents



What is the Severity Index?

The severity index is an estimate by NPIC as to the severity of signs/symptoms reported for incidents. The severity of signs/symptoms can be categorized as minor, moderate, major, death, unknown, or asymptomatic. The NPIC severity index is based on criteria used by poison control centers in their National Poison Data System (NPDS).

DESCRIPTION OF ENTITIES

16. Description of Entities

The chart and graphs below provide a summary of entities involved in pesticide incidents. Of the 2,396 entities involved in incidents reported to NPIC during this period, 52.0% were human, 19.0% were animals, and 28.4% were environmental nontarget entities. Other entities (13) are miscellaneous items (i.e., sidewalk, food). Pesticide incidents may involve multiple entities.

Graph 16.1. Humans

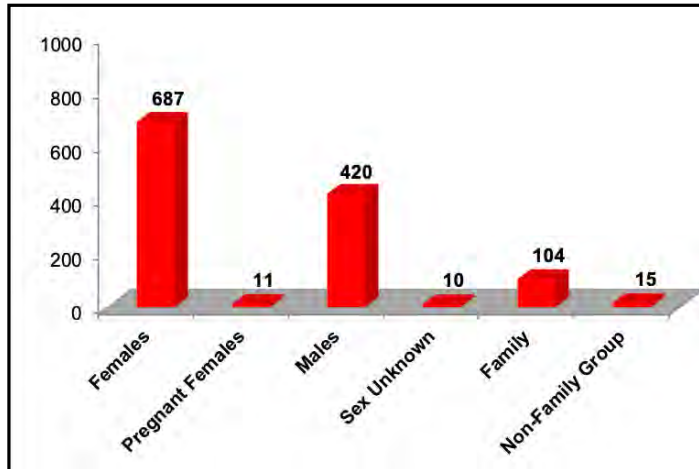
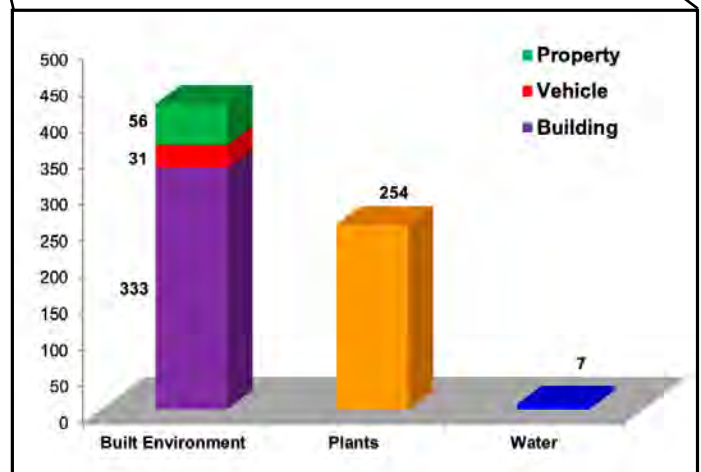
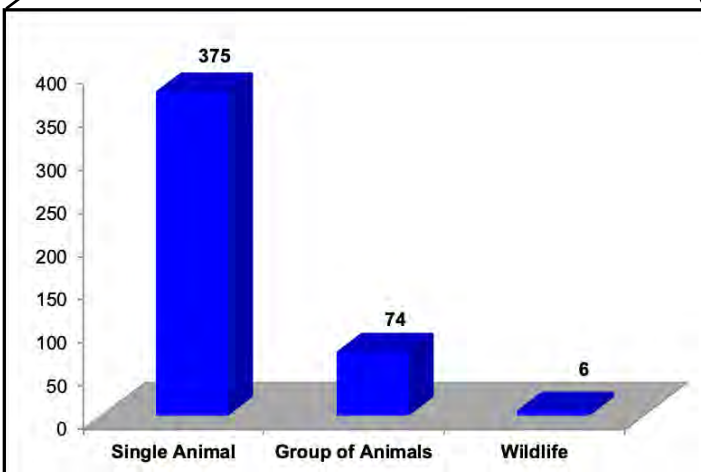
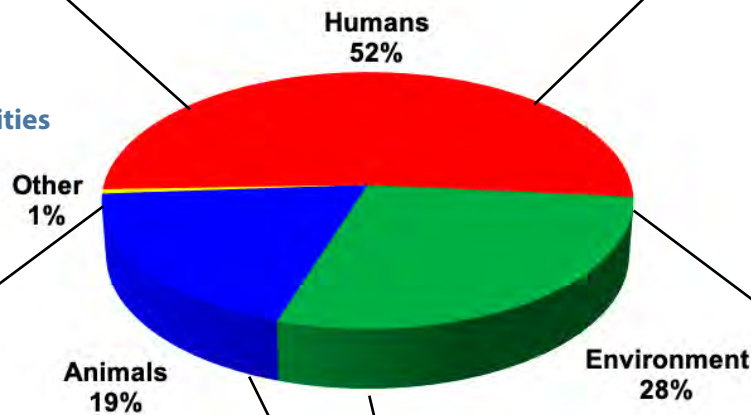


Chart 16. Description of entities



Graph 16.2. Animals

Graph 16.3. Environmental entities

DEATHS WITH KNOWN ACTIVE INGREDIENT

17. Reported Deaths

Of the 455 animal entities involved in pesticide incidents, 39 deaths were reported. Of those, there were 27 animal deaths where the active ingredients were known (Table 17.1).

Table 17.2 describes reported deaths with known active ingredient(s) where signs and/or symptoms were consistent with literature, in the context of the reported exposure scenario.

Two human deaths were reported to NPIC in 2019. One individual reportedly mixed an unknown "Hot Shot" product with intravenously injected methamphetamines. Specific product or exposure information could not be provided to NPIC for the second individual.

Table 17.1. Reported deaths with known active ingredient

Reported Deaths	Total
Animal Deaths	
Single Animal	14
Group of Animals	12
Wildlife	1
Total =	27

Table 17.2. Reported animal deaths with compatible signs/symptoms in severity

PESTICIDE PRODUCT	ACTIVE INGREDIENT	INCIDENT TYPE	ENTITY	CERTAINTY INDEX	STATE
TRIMEC 992 BROADLEAF HERBICIDE LESCO CROSSCHECK PLUS MULTI-INSECTICIDE DIMENSION 2EW	MECOPROP DITHIOPYR DICAMBA BIFENTHRIN 2,4-D	Exposure: Possible	Group of Animals	Consistent	MA
TRIMEC 992 BROADLEAF HERBICIDE LESCO CROSSCHECK PLUS MULTI-INSECTICIDE DIMENSION 2EW	MECOPROP DITHIOPYR DICAMBA BIFENTHRIN 2,4-D	Exposure: Possible	Single Animal	Consistent	MA
TRES PASITOS	ALDICARB	Exposure: Ingestion	Single Animal	Consistent	PR
SUPER-FINE SPRAY OIL BIFEN IT	MINERAL OIL BIFENTHRIN	Drift	Group of Animals	Consistent	VA
N/A	COPPER SULFATE	Exposure: Inhalation Exposure: Ingestion Exposure: Dermal	Wildlife	Consistent	CN
BIFENTHRIN TC INSECTICIDE/ TERMITICIDE	BIFENTHRIN	Misapplication: PCO	Group of Animals	Consistent	DE
N/A	BROMADIOLONE	Exposure: Ingestion	Single Animal	Consistent	CA
PETACTION PLUS FOR DOGS	METHOPRENE FIPRONIL	Exposure: Dermal	Single Animal	Consistent	CO
RADAR GRAMOXONE CORVUS	PARAQUAT ATRAZINE 2,4-D	Exposure: Possible	Group of Animals	Consistent	IL
N/A	COPPER SULFATE	Misapplication: Homeowner	Group of Animals	Consistent	TX
UNKNOWN	DICAMBA	Exposure: Possible	Group of Animals	Consistent	MO
JAGUAR RAT BAIT	BRODIFACOUM	Exposure: Possible	Single Animal	Consistent	FL
UNKNOWN	BIFENTHRIN	Exposure: Possible	Single Animal	Consistent	AZ

ENTITY AGE

18. Entity Age

Table 18 and Graph 18 summarize the ages of people involved in incidents reported to NPIC. Among 1,128 single human entities, NPIC was able to collect the person's age 84.4% of the time. NPIC aims to capture the age for all human entities; occasionally callers decline to provide that information.

Among the 952 humans with known age, 7.8% were children (ages 4 and under), and 32.4% were seniors (ages 65 and over).

Graph 18. Age of people involved in reported incidents

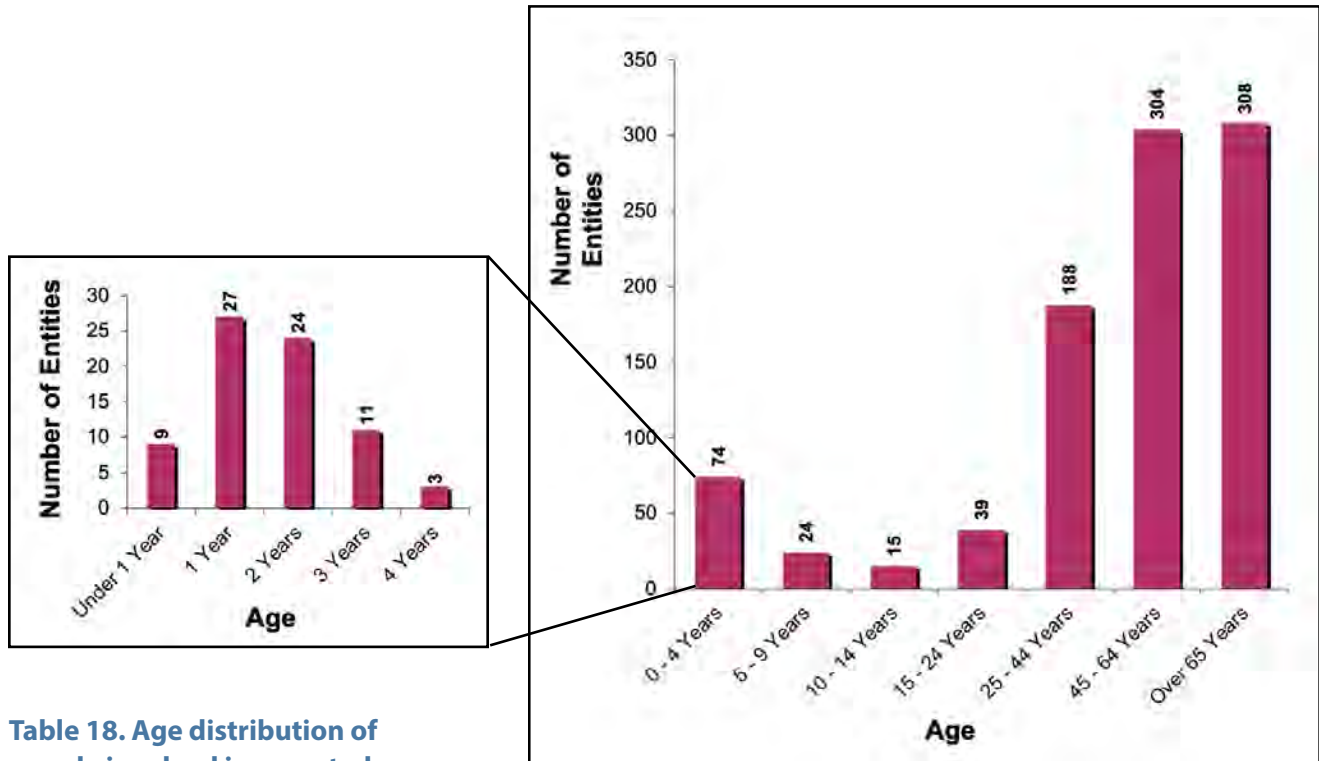


Table 18. Age distribution of people involved in reported incidents

Age Category	Total
Under 1 Year	9
1 Year	27
2 Years	24
3 Years	11
4 Years	3
Total (0 - 4 Years) =	74
5 - 9 Years	24
10 - 14 Years	15
15 - 24 Years	39
25 - 44 Years	188
45 - 64 Years	304
Over 65 years	308

NOTABLE EXPOSURES

19. Notable Exposures

There were 2,396 entities potentially exposed to pesticides in 1,613 reported incidents.

Figure 19.1

There were 1,613 pesticide incidents reported, involving 2,396 exposed entities (people, animals, buildings, plants, soil, and water).

Total = 2,396 entities

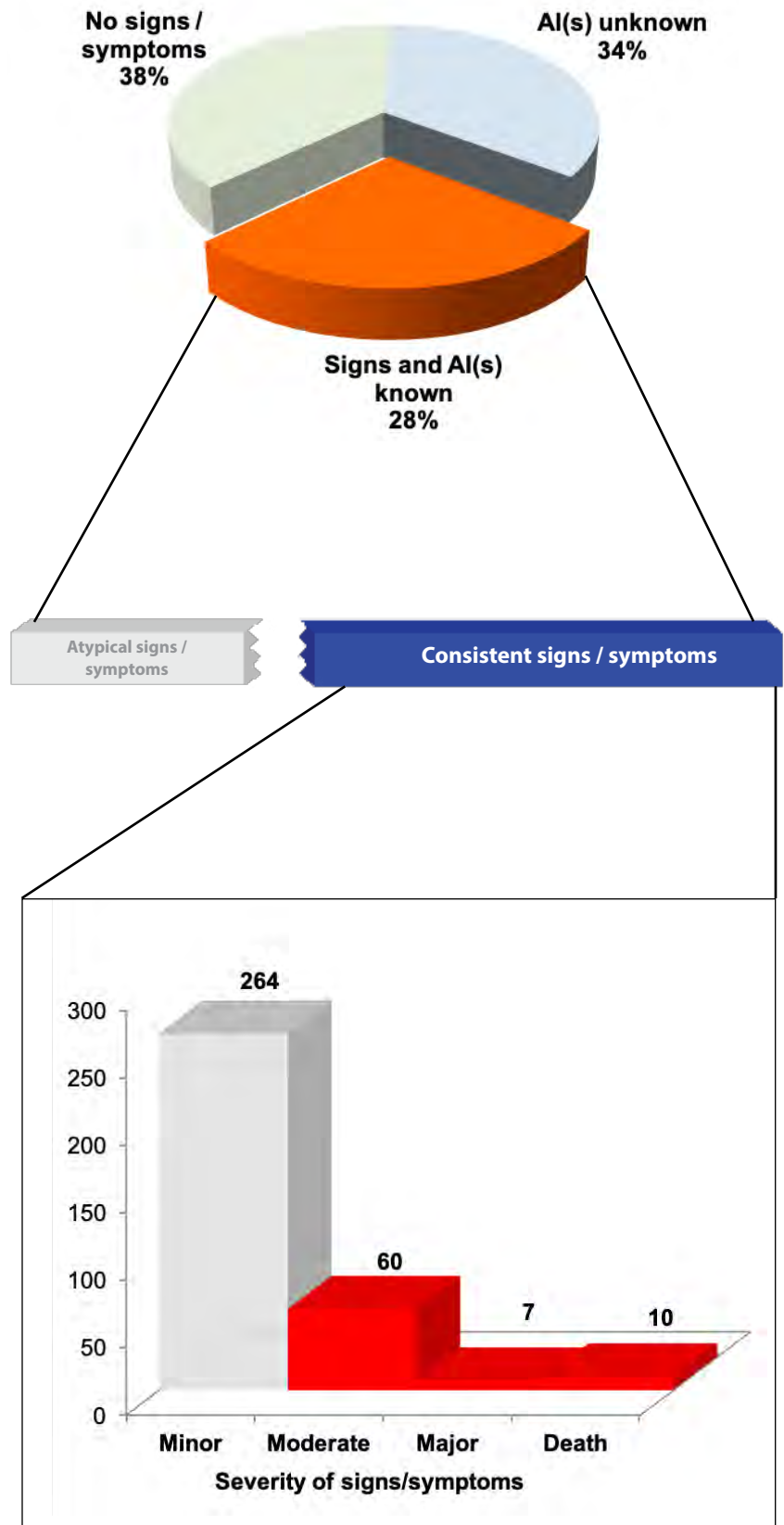


Figure 19.2

Human and animal entities potentially exposed to a known pesticide, with reported signs/symptoms.

Total = 669 entities

Figure 19.3

Human and animal entities potentially exposed to a known pesticide with reported signs/symptoms that were **consistent** with reports in the literature for that pesticide.

Total = 341 entities

Signs and symptoms are compared to the open literature, including fact sheets, case reports, textbooks, and articles. Furthermore, the timing of onset and duration are considered.

VETERINARY REPORTING

NPIC developed a web-based portal for veterinarians to report adverse reactions to pesticides among animals. NPIC does not verify or conduct quality assurance of the information submitted into the Veterinary Incident Reporting Portal (VIRP).

Veterinarians submitted 20 incident reports to the VIRP involving 20 animals (14 canine and 6 feline). All VIRP reports are forwarded to EPA quarterly, in their entirety.

Table 20.1 and Chart 20.1 summarize the formulation of products that were involved in the incidents reported by veterinarians. About half of incidents were liquid products (40%).

Table 20.2 and Chart 20.2 summarize the pesticide types that were involved in the incidents reported by veterinarians. Most of the products reported in incidents were insecticides (80%).

Table 20.1. Product formulations as reported in VIRP

Known Formulations	Number of Products
	2019
Liquid	8
Pellet	3
Unknown	3
Aerosol	2
Other	2
Spot-on	2
Total =	20

Chart 20.1. Product formulations reported in VIRP

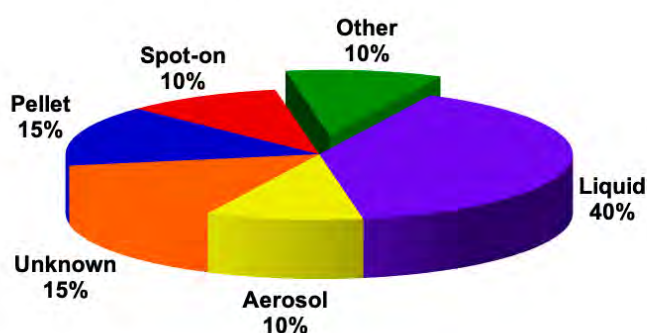
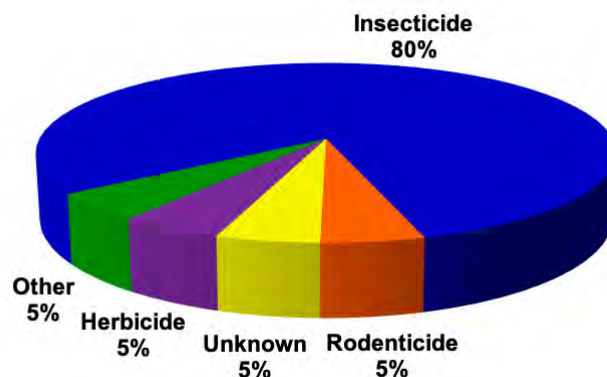


Table 20.2. Product types as reported in VIRP

Product Type	Number of Products
	2019
Insecticide	16
Herbicide	1
Rodenticide	1
Other	1
Unknown	1
Total =	20

Chart 20.2. Product types reported in VIRP



VETERINARY REPORTING

Table 20.3 and Chart 20.3 show the types of animal symptoms reported to the VIRP. Symptoms are classified as dermatological (e.g., irritant, sloughing, ulcer), gastrointestinal (e.g., diarrhea, vomiting), neurological (e.g., depression, excited state, seizures, tremors), none, or other. Multiple symptoms may be reported for each animal. Of the reported symptoms, 53% were classified as neurological. Twenty percent (20%) were classified as gastrointestinal, 17% were classified as other, and 10% were classified as none.

Table 20.4 and Chart 20.4 summarize the outcomes associated with each animal incident reported in the VIRP. Multiple animals may be involved in each VIRP report. Thus, totals reflect the number of animals, as opposed to the number of reports.

Of the total number of animals involved in VIRP incident reports, 60% of the cases were ongoing. The affected animals had recovered at the time of the report in 20% of cases. Ten percent (10%) of the outcomes reported an animal death.

Table 20.3. Animal symptoms as reported in VIRP

Symptom	Number of Animals
	2019
Gastrointestinal: Vomiting	4
Gastrointestinal: Diarrhea	2
Gastrointestinal total	6
Neurological: Tremor	6
Neurological: Seizure	4
Neurological: Depression	4
Neurological: Excited	2
Neurological Total	16
Other	5
None	3
Total =	30

Chart 20.3. Animal symptoms as reported in VIRP

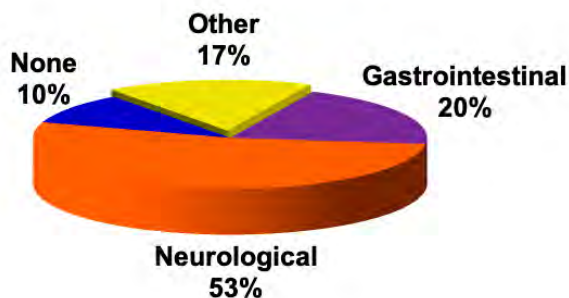
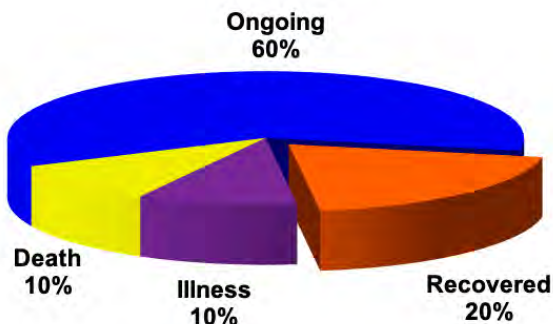


Table 20.4. Incident outcomes as reported in VIRP

Outcome	Number of Animals
	2019
Ongoing	12
Recovered	4
Death	2
Illness	2
Total:	20

Chart 20.4. Incident outcomes as reported in VIRP



ECOLOGICAL REPORTING

In 2009, NPIC developed a web-based portal to facilitate reporting of ecological incidents. It was designed by the US EPA Office of Pesticide Programs (OPP), built and hosted by Oregon State University.

NPIC does not verify reports through independent investigation, nor does NPIC conduct quality assurance of the information submitted into the Eco-portal. NPIC provides each report, without modification, to OPP quarterly, in their entirety. More recently, NPIC developed programming to make that delivery automatic and immediate.

Reports submitted to the Eco-portal in 2019 involved possible exposures to bees, plants, and fish. Table 21.1 summarizes the active ingredients involved in the 25 reports submitted to the Eco-portal.

Table 21.1. Active ingredients involved in the Eco-reports

Active Ingredient	Quantity
UNKNOWN	17
GLYPHOSATE	2
OTHER ¹	2
CYPERMETHRIN	1
FIPRONIL	1
LAMBDA-CYHALOTHRIN	1
PYRETHRIN	1

¹Other = nonpesticide active ingredients

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