United States
Environmental Protection
Agency

Office of Prevention, Pesticides
and Toxic Substances
(7409)

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September 1996

EPA

Consumer Labeling Initiative

Phase I Report

Recycled/Recyclable • Printed with Vegetable Based Inks on Recycled Paper (20% Postconsumer)

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prepared for:

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Executive Summary

Background and Goals

The Environmental Protection Agency undertook the Consumer Labeling Initiative (CLI), published in the Federal Register (61 FR 12011, March 22, 1996), with the goal to foster pollution prevention, empower consumer choice, and improve consumer understanding of safe use, environmental, and health information on household consumer product labels. The CLI is a multi-phased pilot project focusing on indoor insecticides, outdoor pesticides, and household hard surface cleaners (i.e. floor and basin, tub and tile), some of which are registered antimicrobials/disinfectants. CLI efforts are aimed at achieving the goal by conducting research and gathering information so that EPA and our project Partners may learn how to provide consumers with clear information on product labels so they will be better able to make informed choices among products based on their own needs and values, and to use chosen products safely as directed.

The CLI project is noteworthy as a model for cooperative effort between EPA and a wide range of Stakeholders, including a number of local, state, and Federal agencies, consumer product manufacturers, trade associations, public interest groups, health and safety professionals, market research experts, and individual citizens. This report is the product of the collective efforts and expertise of the Stakeholders, volunteer Partners, and the Agency. Initially, it was expected that after six months of work, final recommendations would be forwarded to the EPA Administrator. However, in the process of developing the research plan, it became clear that a phased approach to the research, proceeding from qualitative to quantitative consumer market research, would be needed to provide a sound base for policy making, including more comprehensive labeling improvement recommendations to the Administrator.

Research Process

The first phase of CLI research, ending September 30, 1996, is comprised of three components: qualitative consumer research, a literature review of relevant publications and reports of studies available in the public domain or provided by various Stakeholders, and a review of extensive Stakeholder comments solicited through the FR notice. The qualitative component of the research plan was specifically designed for the CLI project by the CLI Qualitative Research Development Committee, which was comprised of experts in consumer research. The qualitative research was executed by Macro International and included 135 in-depth one-on-one interviews with users of products in each of the focus categories in five major cities across the U.S. Because of the short time frame, the consumer research was designed and conducted concurrently with review of the literature and gathering of Stakeholder comments. However, as information became available from the literature review and Stakeholder comments, it was incorporated into the iterative development of the qualitative research (Phase I) and will be considered in subsequent phases of consumer research.

CLI Report Overview

This Phase I report of the CLI is comprised of an Introduction and Background, a Summary of Stakeholder Comments, a Summary of the Literature Review, a Summary of Qualitative Consumer Research, a Summary of Findings, a section with proposed Next Steps and Recommendations, and a

number of appendices referenced in the report, which provide more detail and background on the research.

Research Findings

Although there was disparity regarding specific points of view, there was also consistency in many of the Stakeholder comments, literature review findings, and learnings from the consumer research. The comments, literature review, and consumer research addressed primarily label readability, the comprehension of product ingredient information, statements mandated by the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), hazard identification, and precautionary labeling information. The research also assessed, to the extent possible, consumer reliance upon labels in purchase decisions before use of the product, for precautionary/first aid information, and at the time of container and/or product disposal. The research addressed these questions in general, and where possible, for each of the focus product categories, i.e., indoor insecticides, outdoor pesticides, and household hard surface cleaners

Key general findings in each of these areas are summarized below. Please note that the qualitative research was used as a means for identifying and probing issues concerning messages on the selected product category labels, and do not reflect statistically representative responses. Most of these general findings and other more specific ones not highlighted here warrant further exploration or validation in the next phase of the CLI, which will include quantitative consumer research. Other findings may be more appropriately addressed through channels of communication other than labeling.

Use of Product Labels by Consumers

The available research suggested that whether a consumer read a label depended on the type of product and their familiarity with the product. Most consumers read the label if the product was new to them and if there was concern or an expectation of potential hazard if it was used incorrectly. The literature and consumer research findings indicated that most consumers felt that household chemical products were safe if used according to directions. In general, the research indicated that First Aid information was read only when there was an accidental exposure. Purchasers of insecticides and outdoor pesticides read the label primarily to understand product efficacy and directions for use. Consumers with children or pets were more likely to read precautionary labeling for pesticide products before purchase, but this largely applied to the indoor insecticide and outdoor pesticide product categories. In general, consumers did not read disposal directions, but did report that they stored pesticides in the house or garage out of the reach of children. Stakeholders commented that FIFRA-mandated disposal directions often conflicted with local government household hazardous waste program requirements.

Some Stakeholders suggested, since many people were not reading the label, that efforts should be undertaken to educate consumers about the importance of reading the label.

Product Label Readability

During the qualitative research, consumers mentioned that they wanted less technical words on product labels, and some Stakeholders suggested that labels be at a fourth or fifth grade reading level. Two major problems identified were too-small type size and inadequate color contrast. There was also consensus

that when there is a significant potential hazard, the label should prominently instruct consumers to read the label. When they were read, consumers judged labels on household cleaning products not regulated by FIFRA to be easier to read and understand than those on FIFRA-regulated products. Some Stakeholders suggested that a standard format for key information would improve readability. A few Stakeholders recommended fold-out labels, but consumers interviewed in the qualitative research expressed concern that opening a fold-out label before purchase would obligate them to buy the product. Moreover, when they opened the booklet, many consumers expressed a sense of information overload that discouraged them from reading the information. Another area of investigation was the location of label information. One finding was that consumers look at the back panel for ingredient labeling, but FIFRA requires labeling to be on the front panel. While consumers thought labels could be easier to read, they did not suggest information that could be deleted.

Comprehension of Ingredient and Mandated Label Statements

Public interest groups recommended that comprehensive ingredient information, including full chemical names and even Chemical Abstracting Service (CAS) numbers, must be required for all ingredients. Some Stakeholders provided evidence that consumers did not read or comprehend chemical names, and it was heard repeatedly from consumers in the qualitative research that they did not understand chemical names. For indoor insecticides and outdoor pesticides, qualitative research revealed that some consumers look for specific ingredients in comparison shopping, but they generally recognize only the active ingredient common name. There was also consistency in comments, the literature review, and the consumer research in finding that consumers did not understand the term "inert ingredients."

Mandated statements that consumers did not read and did not understand included the statement, "It is a violation of Federal law to use this product in a manner inconsistent with its labeling."

Hazard Identification and Precautionary Labeling

Consumers also consistently misinterpreted the EPA mandated labeling, "Hazards to humans and animals" to mean "hazardous to humans and animals." It was also interpreted as a stand-alone statement and not as a heading. Stakeholder comments and the CLI consumer research also showed that consumers prefer the term "first aid information" over "statement of practical treatment." The literature review (with support from the information learned from the qualitative consumer interviews) led to the conclusion that consumers understand that the term Danger is more serious than Caution or Warning, but there was not a clear distinction between the latter terms. Some consumers perceived outdoor pesticides and indoor insecticides to be very hazardous (as opposed to cleaners and disinfectants). The implications of consumer reception to new or additional labeling information merits further investigation. Public interest group Stakeholders urged the Agency to provide extensive and explicit hazard information on the label for all ingredients, including acute, chronic, and reproductive health hazards, noting particularly risks to children and pregnant women.

Next Steps and Recommendations

EPA worked with the Stakeholders, through meetings with our Partners and open discussion forums with others wishing to participate, to categorize all the findings into one of the following three categories: 1) labeling issues requiring further development or statistical validation through quantitative research, for

example, the need to establish the hierarchy of importance of label content to consumers, and how satisfied consumers are with each specific label section (e.g., ingredients); 2) labeling issues not requiring further validation, for example, consumers prefer the term "first aid" over "statement of practical treatment;" and 3) education, policy planning, and coordination issues.

Based on the above categories, the recommendations in the report focus on the following areas: 1) a subsequent phase of quantitative and secondary research review; 2) interim label improvement measures; and 3) label-related education, policy, and procedural improvements.

Recommendations for Quantitative and Secondary Research

EPA recommends that the next phase of the CLI include a quantitative assessment of consumer comprehension, attitude, behavior, and satisfaction of (FIFRA and non-FIFRA) labeling and an evaluation of labeling alternatives. In addition, undertaking a subsequent literature review is recommended to explore more detailed existing information in the specific topic areas to be examined during the quantitative phase of research. This research will result in comprehensive and specific recommendations for: 1) label design and content improvements, 2) regulatory or policy changes needed to allow improvements, and 3) additional research to further clarify issues or to test alternative labeling.

Following completion of the second phase of research, EPA will combine the findings from the primary and secondary CLI research phases over two years with input from CLI Stakeholders to develop recommendations for the Administrator.

Recommendations for Interim Label Improvement Measures

Based directly on the findings and information presented in Phase I of the CLI, the Office of Pesticide Programs should consider three areas as an immediate starting point for label improvement: 1) broader use of common names for active ingredients in addition to chemical names approved by International Union of Pure and Applied Chemistry (IUPAC), 2) use of the heading "first aid" instead of "statements of practical treatment," and 3) inclusion on labels of phone numbers for general or emergency information. The pesticide program can take steps right now to improve information on labels in these three areas.

Recommendations for Education Activities

Recommendations call for the formation of a Product Label Consumer Education Task Force. The task force would be comprised of staff from Federal, state, and local government agencies and interested CLI Stakeholders, and would be mandated to recommend and implement consumer education activities throughout EPA that emphasize the importance of reading the label.

Policy Planning and Coordination Activities

Recommendations in these areas will focus on establishing processes for identifying and presenting the other important factors or considerations that go into the development of labels, so that once it has the consumer perspective in hand, EPA can make sound policy decisions based on all relevant factors. These other factors include the scientific, legal, regulatory, business, and right-to-know issues that may affect how information should be presented on labels or through some other mechanism. Some specific recommendations are as follows:

Labeling Policy Coordination and Development: The Office of Pollution Prevention and Toxics (OPPT) houses responsibility for general coordination of environmental marketing and labeling issues and policy development. Many of the general learnings from the qualitative research, Stakeholder comments, and literature review will be furnished to those who manage labeling programs and related policy issues throughout EPA, in other Federal Agencies, and at the state government level. In addition, these learnings will be considered appropriate in the development of EPA comments on developing international industry standards (e.g., International Organization for Standardization or ISO work on environmental labeling) for the Organization for Economic Cooperation and Development, and in the development of environmental labeling programs.

CLI Research Process: The process used for this pilot was well received by the EPA Partners and Task Force Members. A work group of CLI Stakeholders and others should be formed to develop recommendations for EPA use of the CLI process to inform other Agency policy work.

Pesticide Labeling Needs Vary: The Office of Pesticide Programs should recognize the difference between consumers' label needs and the label needs of agricultural sector users (for whom FIFRA labels were first developed). The Program should take steps now to explore how to eliminate policy or regulatory barriers to address this difference.

Continued Coordination Between EPA and FTC: The EPA and FTC continue to coordinate on environmental marketing and labeling issues across all environmental media programs (e.g., pesticide programs, trade and environmental activities, environmentally preferable products guidance, Energy Star, etc.). Specifically, the Office of Pesticide Programs Labeling Unit is attempting to better coordinate claims approved for pesticide labels with the FTC Guidelines for Environmental Marketing Claims.

Form Inert Ingredients and Health and Safety Information Work Groups: Form one or two small work groups made up of representatives of all interested Stakeholders to work with the Office of Pesticide Programs, and charge them with the development of a white paper that identifies and discusses the scientific, legal, regulatory, business, and right-to-know points of view as they relate to the presentation of ingredient and health and safety information on registered pesticide labels.

Storage and Disposal Labeling: Form a work group made up of representatives of CLI Stakeholders to work with the Office of Pesticide Programs to identify all current applicable storage and disposal regulations and issues affecting storage and disposal for development of a white paper.

CLI Pilot: the CLI was designed as a pilot project. EPA should determine whether to further examine additional product categories.

Standardization of Environmental Messages on Product Labels: EPA should consider if it is possible to somehow standardize messages on product labels beyond pesticides (e.g., format, elements of the message).

I. Introduction and Background

This section of the report provides readers with a road map to the CLI Phase I Report. The introduction presents CLI's goals and research process, and describes the roles of various groups participating in the CLI. The overview is followed by a summary of each major section of the report which highlights:

- how and why the research presented in each section was undertaken,
- how each section fits into the overall design of the CLI,
- limitations of the current research, and
- how the findings of each section have been used to guide subsequent research.

The Agency expects that the issues raised and findings in each section of the report will, in conjunction with future CLI research, contribute to the Agency's future formation of labeling policy.

CLI Overview

The goal of the Consumer Labeling Initiative (CLI) is to foster pollution prevention, empower consumer choice, and improve consumer understanding by presenting clear, consistent, and useful safe use, environmental, and health information on household consumer product labels. This goal can be achieved by providing consumers with clear information on product labels so that they will be better able to make informed choices among products based on their own needs and values, and to use chosen products safely as directed. This report summarizes the research and findings from Phase I of the CLI. Phase II of the CLI will start October 1, 1996.

EPA is interested in improving the labeling of products used in the home. Of particular concern are labels of pesticide products, which are often difficult to understand and inconsistent with labels on non-pesticide products of similar composition, such as hard surface cleaners. CLI research will focus specifically on learning how to better communicate the existing health, environmental, use, and disposal information on pesticide products and similar non-pesticide products. This report summarizes Phase I research, which has been completed; outlines Phase II research which, is expected to begin shortly; and provides recommendations for immediate interim label and education improvements. Ultimately, research conducted under the CLI should lead to learning how to make it possible for consumers to:

- quickly locate essential safe and appropriate use, environmental, and health information on product labels;
- reasonably compare products intended for similar uses from information on the label; and
- understand from the label how to use, store, and dispose of products safely and with minimal effect on the environment.

The three product categories selected for Phase I research are:

- Indoor Insecticides
- Outdoor Pesticides
- Household Hard Surface Cleaners (i.e. floor and basin, tub and tile), some of which are registered Antimicrobials/Disinfectants.

CLI Participants and Their Roles

CLI stands out as a distinctly different and cooperative effort between EPA and a wide range of the following Stakeholders interested in labeling issues concerning consumer products: consumer product manufacturers; marketers; trade associations; foreign governments; local, state, and Federal agencies: public interest groups; health and safety professionals; and individual citizens, who were involved in CLI project planning, implementation, review, and comment

EPA: Direct Project

The EPA staff initiated the pilot project, directed all CLI activities, and was responsible for overseeing research and the preparation of this report, which includes the opinions of all the various Stakeholders. Decisions on individual questions or issues that arose in the project were made by EPA staff, following opportunities for Task Force members and EPA Partners to provide input. Dissenting opinions were always invited and the diverse opinions are reflected in several parts of this report, including the summary of Stakeholder comments. Two contractors assisted EPA with the project: Abt Associates Inc., who performed the literature and Stakeholder comment reviews, and Macro International, who conducted the qualitative research

Task Force Members: Guide Project, Share Experience, Avoid Regulatory Interference/ Duplication

The Task Force helped to determine the overall direction of the project, provided input on the development of the research plan, shared labeling-related experience, coordinated with EPA to avoid regulatory duplication or interference, and were invited to participate in the design and execution of CLI research. The complete list of Task Force members can be found in Appendix G.

EPA Partners: Help Guide Project, Provide Information/Data, Suggest Options for Improving Labels, Possibly Pilot Label Solutions

Companies that manufacture or market products falling within the selected three pilot product categories were recruited to serve as EPA Partners through the *Federal Register*. They provided EPA with input to guide the development of the qualitative research; provided information and data for the literature review; assisted in the design, testing, and execution of the qualitative research; reviewed components of this report; and donated their considerable experience and effort to the research process. The complete list of EPA Partners can be found in Appendix H.

Industry Trade Associations: Help Guide Project, Coordinate Input From Members

Several industry trade associations participated on behalf of their members, assisting in the design and review of the literature review, qualitative research, and final report. In many respects they functioned in the same capacity as EPA Partner representatives. They helped to disseminate information on the CLI to their members, and to assemble and organize comments and ideas from their membership for presentation to EPA. The complete list of trade associations can be found combined with the list of EPA Partners in Appendix H.

Other Stakeholders: Provide Input/Data, Raise Issues With Current Labels, Suggest Options for Improving Labels, Assist in Project Outreach

Participating CLI Stakeholders included foreign governments; Federal, state, and local officials; EPA Partners; academics; individual citizens; consumer groups; environmental labeling program practioners;

environmental groups; public interest groups; health and safety professionals; retailers; standard-setting organizations, media, and individual companies. They were invited to offer their ideas and comments at several points throughout the project, including written comments responding to a March 22, 1996 *Federal Register* Notice, a series of follow-up informational meetings with EPA management and staff, and written comments submitted throughout Phase I of the CLI. Their input was particularly valuable in identifying possible deficiencies in current labels and in suggesting options for changes to EPA programs not directly related to product labels. In addition, individual consumers were randomly recruited to participate in the qualitative research. The draft document was placed into the publicly accessible Administrative Record on the project, and was available for review and comment. For a list of participants, see Appendix J.

CLI Research Process

For practical purposes related to funding and the sequence of primary consumer research, the CLI research was broken down into two distinct phases. Phase I was undertaken during the 1996 Federal fiscal year (ending September 30, 1996). During this period, various investigations and research efforts focused on: 1) providing the CLI Task Force with the full range of hypotheses related to consumers, their information needs, and interactions with labels; and 2) summarizing existing research and the experience of related programs concerning the effectiveness and limitations of labeling as a policy tool to protect public health. The second phase will focus on exploring issues left unaddressed during the initial investigations, and validating hypotheses related to consumer preferences and understanding of specific labeling issues.

The research comprising Phase I of the CLI contains three components: qualitative consumer research, a literature review, and Stakeholder comments, all of which were submitted to EPA's peer review process (peer review comments are summarized in Appendix K). The literature review and Stakeholder comments were intended to assist in the development of a qualitative study to gather further information directly from consumers, but the consumer research was designed and conducted concurrently with review of the literature and gathering of Stakeholder comments because of the short time frame. As information became available from the literature review and Stakeholder comments, it was incorporated into the development of the qualitative research. The Stakeholder comments and literature review can provide background information, and the qualitative research provides deeper insight into many of the issues raised. Findings from the three parts were used together to develop the Findings and Next Step sections.

Qualitative Research

The qualitative research was designed to reveal information about respondents' use of labels and their understanding of the information on the labels for the three types of product categories studied. The Qualitative Research Development Committee (QRDC), composed of EPA staff and Task Force and EPA Partner experts in consumer research, was responsible for assisting EPA in developing a methodological approach and discussion guides for one-on-one interviews with consumers with recent product purchase/use experience. The QRDC also observed the 135 45-minute interviews that were held throughout the U.S. during May and June. **Where there was remarkable consistency in consumer comments and when learnings corresponded to those found in the literature review, conclusions and recommendations can be drawn. Other findings will need further exploration, development,**

and/or testing of hypotheses or options for labeling improvements. The QRDC prepared findings related to each of 14 learning objectives that they identified prior to the interviews, as well as recommendations for subsequent quantitative research. The Key Learning Objectives can be found in Appendix C.

Literature Review

A literature review was undertaken to synthesize existing research in three areas: consumer understanding of environmental, health and safety issues; consumer perception of product attributes; and consumer reaction to precautionary labels. The review was intended to provide the CLI with a synopsis of the wide range of labeling research that the Agency could use in designing the primary research and in interpreting results. It built upon environmental labeling research undertaken previously for EPA and upon precautionary labeling research performed by the Consumer Product Safety Commission. The literature review was not fully completed by the time the qualitative research was designed and conducted, but relevant information from the literature was incorporated as it became available. While the goal of the CLI project was defined around the improvement of environmental, health, and safe use information, and the primary research focused on all parts of the label to assist in reaching this goal, the majority of the literature identified focused on the precautionary part of labels. A future literature review is recommended to address issues related to other parts of the label, such as directions for use, product storage and disposal, environmental information, and education of consumers regarding labeling issues.

Stakeholder Comments

EPA announced the start of the CLI in a March 22, 1996 *Federal Register* Notice. The Notice described the goals and proposed a general plan of research, at the same time soliciting comments and information. Forty-one substantive comments were received from: foreign governments; Federal, state and local officials; EPA Partners; academics; individual citizens; consumer groups; environmental labeling program practioners; environmental groups; public interest groups; health and safety professionals; retailers; standard-setting organizations; media; and individual companies. In addition, EPA staff and management met with small groups of Stakeholders in April and May and again in August to present the CLI and interim findings and to solicit input. Finally, EPA received approximately 3,000 postcards written by private individuals, and other comments over the course of Phase I. The Stakeholder comments are valuable in defining policy issues, such as consumer education, which may not be addressed directly by CLI's focus on product labels. The summary also captures a wide range of opinions and perspectives concerning the content, format, and role of product labels, allowing EPA to take these into consideration in the future development of policy and guidance.

Summary of Findings

Findings based on the qualitative research, literature review, and Stakeholder comments are summarized in Section V. Each of these three sources was incorporated into the CLI to provide EPA with very different types of information as described above. These findings, in addition to a set of overview findings (categorized into three groups: issues requiring additional validation, issues not requiring further validation and education, and policy planning and coordination issues), are an integral part of a comprehensive background document which 1) identifies the full range of issues related to the CLI, and 2) provides a thorough examination of the core issues related to labeling. This investigation and scoping

phase will assist those involved with the CLI to develop specific hypotheses and labeling alternatives (e.g., language, format, and/or content), which will be evaluated as part of the Phase II quantitative research planned for the near future (FY97). The findings are also useful to EPA in framing the important policy considerations being addressed by the CLI.

Next Steps

At the outset of the CLI in March 1996, the Initiative was expected to take six months to complete and would contain comprehensive recommendations for label improvements. In the course of designing primary research, EPA and others participating in the CLI determined that a phased approach to the primary research was more suitable and would provide EPA with a sound basis for policy making concerning labeling activities at the Agency. However, EPA staff did identify some interim steps that the Agency can take right now to improve labels and label-related policies. The purpose of Section VI is to articulate as clearly and in as much detail as possible next steps for the Consumer Labeling Initiative. Phase I of research activities, conducted in FY96, probed a wide range of consumer issues related to product selection, use, storage, and disposal in three product categories. Two major tasks are proposed for the second phase: primary quantitative research and additional literature reviews. Also in this section, EPA makes several recommendations based on the summary findings from Phase I. The quantitative research, i.e., a survey of a large number of consumers nationwide, will be used to derive statistically significant conclusions regarding the consumer comprehension of (FIFRA and non-FIFRA) labeling and an evaluation of labeling alternatives that may improve any or all of the following: consumer interaction with various parts and component of labels, consumer understanding of label content, wording, retention of labeling information, and recognition of the label as a resource for future needs (e.g., first aid instructions). The literature review would likely address consumer reaction to and interactions with other parts of the label beyond precautionary and environmental information, such as directions for use; research on comparable survey/study design; and segmentation and profile of potential and current subpopulations of consumers.

EPA makes three main recommendations for interim pesticide label improvement measures: increase the use of common names for active ingredients, use the term "first aid" instead of "statement of practical treatment," and include on product labels phone numbers for general emergency information. For education activities directed at all EPA labeling programs, EPA recommends forming a product label consumer education task force. Finally, EPA makes several recommendations regarding policy planning and coordination activities.

II. Qualitative Research

1. Introduction

The Environmental Protection Agency's Consumer Labeling Initiative (CLI) recently concluded the qualitative phase of its research. This phase of the project was developed by a Qualitative Research Design Committee (QRDC) made up of representatives of EPA staff, the CLI Task Force, EPA Partners, and the contractor for the qualitative research phase, Macro International. The qualitative research study consisted of a series of one-on-one interviews with consumers throughout the country. The interviews were conducted with users of indoor insecticides, outdoor pesticides, household cleaners and disinfectants, and persons who used a combination of those products. The overall objective of the qualitative research phase was to obtain answers to a series of "key learning objectives" that had been identified previously by the QRDC of the CLI.

2. Key Learning Objectives

Using input from Stakeholder comments and preliminary data from the draft literature review, the QRDC identified fourteen "key learning objectives" for this project, with the recognition that the learning objectives would require both a qualitative phase and a quantitative phase in order to be addressed fully. The 14 key learning objectives identified by the committee are as follows:

1. What do consumers want to know about these products?
2. Do consumers read labels? If so, which ones? To what extent do they read labels? If they don't, why not? What parts of the label do they read?
3. Do consumers understand labels?
4. Do consumers follow instructions on the label? If not, why not? (Does the consumer measure the product? Dilute appropriately? Wear protective clothing?)
5. Do consumers find information on the labels confusing or counterproductive? If so, what information?
6. Do consumers perceive that there is any risk related to these products? If so, which ones? Is the perceived risk related to perceived efficacy? Does perceived risk relate to label reading?
7. How do consumers currently use label information to make a purchase decision?
8. What could motivate consumers to become more likely to use the label information? Why?
9. How does precautionary information impact purchase behavior, if at all? Why?
10. How does information on the label impact how the product is used?
11. How does information on the label impact how the product is stored/disposed of?
12. What label information is broadly applicable across categories; what is specific to categories?
13. Do consumers use outside pesticides in the house?
14. Do consumers over-use or under-use products? (e.g., "If a little is good, more is better...")

These key learning objectives formed the basis for development of the research design, including identification of appropriate respondents and adoption of a qualitative research format that would most successfully elicit honest and useful responses from consumers.

3. Study Design

Qualitative research is a useful tool for determining how consumers look at issues. In this study, the EPA wanted to know how extensively consumers read product labels, and whether or not the information provided on labels is helpful. Qualitative research methodologies include focus groups (structured discussions with 8-10 people from the target population), dyads and triads (similar to focus groups, but using 2-3 people), and one-on-one discussions (structured interviews with one respondent and one interviewer). All of these approaches use a trained moderator, recruitment of participants using carefully developed recruitment criteria, and a discussion guide that has been designed to elicit answers to the key research questions.

Strengths and Limitations of Qualitative Research

The strength of qualitative research is that it can identify issues of concern to specific populations, and it can be used to frame questions that can be developed further to derive quantitative data about that topic. As the results of this study will indicate, qualitative research often identifies issues that may not have been considered previously, or they may suggest framing questions differently.

It is important to note that results from focus groups and other qualitative research methodologies such as one-on-one interviews cannot be generalized to a given population. A qualitative research study does not provide a statistically significant representation of a population. Rather, it is a group of individuals selected from the population being studied, and thus can be used to bring up issues of concern to that population. It also is important that the interpretation of qualitative data not be misrepresented in quantitative terms. For example, a statement that "nine of twelve" participants in interviews responded the same way should not be interpreted as "75 percent of the population of _____," again because qualitative data cannot be aggregated or quantified to describe a population as a whole.

Methodology

Qualitative research is designed to further understand issues and gain insights and ideas. It is a useful tool for exploring and explaining consumer motivations, attitudes, and behaviors. Findings from this exploratory approach can be used to clarify issues and establish priorities for further research.

While many different interviewing techniques can be employed, including focus groups, and triads and dyads, the one-on-one interviewing approach was selected. This technique was most useful for the context of this study in terms of obtaining an in-depth understanding of consumers and their relation to labels. Also, one-on-one interviews provided an environment for exploration of areas where consumers may become hesitant or embarrassed in a large group. For example, comprehension of labels could be explored in a less threatening environment. Finally, the one-on-one approach worked well in obtaining very detailed information such as content and format information related to labels.

Determining the sample selection of people to be interviewed for this study was more difficult in that the scope of this project was very broad, covering a large population. Specifically, each of the three major product categories had a wide range of products. Including non-users and other special consumer groups in this phase of the study would have required separate research designs. Weighing the value of the data in the context of the exploratory phase, along with the economics of this approach, resulted in a more focused strategy. The final strategy emphasized a focus on consumers most relevant to the issues.

including product purchasers/users that represent the majority of the business in these categories. Please note that while smaller consumer groups were not addressed in this study, the anticipated future quantitative research is a vehicle where learning about a wider range of consumers can be explored.

Participants were recruited using a set of questions that clearly identified them as product users for the selected category. Other information was collected and weighed to ensure diversity of participants, including gender, age, ethnicity, presence or absence of children and pets, and types of products used. For the full list of criteria, please refer to the telephone screeners in Appendix E.

This project focused on labels on three types of consumer products: indoor insecticides, outdoor pesticides, and household cleaners and disinfectants. The methodology selected initially called for 15 interviews for each product area in each of three cities. This would provide a total of 45 interviews per topic with geographic diversity represented. The cities selected for the indoor insecticide interviews were Miami, New York and Los Angeles; the cities selected for outdoor pesticides were Dallas, Chicago, and Los Angeles. Dallas, Chicago, and Los Angeles were the sites selected for the household cleaner interviews as well, because of logistical considerations and documented evidence from past industry research that use of household cleaners was not as sensitive to geographic differences as were other types of consumer products.

Pilot interviews were conducted for each of the three product categories. The pilot interviews were conducted in Cincinnati, Ohio, for cleaning products; Calverton, Maryland, for outdoor pesticides; and Racine, Wisconsin, for indoor insecticides.

One of the advantages of a qualitative research study is that modifications to the methodology can be made during the course of the study to reflect new insights gained from the research process to date. At the outset of this study, there was an expectation -- based upon past corporate research that had been done in this area -- that the responses of participants in the cleaners and disinfectants category would not vary much from city to city, and that 45 interviews in this category might not be needed. After completion of six pilot interviews in Cincinnati and 14 interviews in Dallas, this assumption appeared to be confirmed. At that time, a decision was made to hold an additional eight interviews in Chicago to ensure that the initial impressions were correct, and then -- if Chicago responses confirmed those of the other cities -- to schedule a series of interviews with people who used all three product categories (outdoor pesticides, indoor insecticides, and cleaners/disinfectants) for the final series of interviews in Los Angeles to obtain some qualitative information about perceived differences, if any, in labeling needs among the three product categories.

Recruitment criteria

Participants were recruited using a set of questions that clearly identified them as product users for the selected category. Phase I of the project selected only product users in order to ensure that interview participants would have had at least some experience in dealing with product labels which could be used to probe their initial understanding of and reaction to such labels. It was felt that attempting to include non-users at this phase in order to determine whether label information affected their decisions not to use particular products would have introduced too much complexity and variability into the study design. Additional information about each participant also was collected to ensure diversity of the participants,

including a range of ages, occupations, economic and cultural situations, gender, and the presence or absence of small children and pets. The telephone screeners used to select participants are included in Appendix E.

Development of the discussion guide

The discussion guides for each topic were developed jointly by the QRDC members and the contractor, Macro International, to reflect the specific areas of information required for each subject area. The discussion guides were designed to provide a relatively open-ended structure within which consumers would discuss their actual experiences with reading and using labels. This structure would also give consumers an opportunity to examine several product labels in-depth and provide immediate feedback on them.

All of the discussion guides were pilot-tested prior to initiation of the scheduled interviews. The outdoor pesticide discussion guide was modified significantly as a result of the initial pilot testing, and the modified version of that guide is in Appendix F. The guides that were used for the pilot interviews for household cleaners and indoor insecticides were not modified after the pilots, and are included in Appendix F as well.

4. Key Findings

General Findings

Consumers interviewed for this project tended to use product labels on an as-needed basis. Three factors appeared to influence label usage overall. One factor was familiarity with a product. The more familiar the respondents were with a product, the less likely they were to read the label. Consequently, consumers in the household cleaners/disinfectants interviews indicated that they rarely read labels for those kinds of products, while respondents in the indoor insecticide and outdoor pesticide interviews tended to look at labels for those products more often if it was a product that they did not use on a regular basis.

A second factor that affected label usage was the perception of risk of the product to the user, children, pets, or the environment. If a product was considered to be potentially harmful if used improperly, the respondents were more likely to look at the label before using it than if they did not perceive the product to be particularly toxic.

A third factor that appears to affect label usage is the perceived ease or difficulty in using the product, regardless of the type of product. Products available in aerosol cans and trigger sprays, for example, as well as enclosed roach baits that the consumer simply sets out, were perceived by consumers as easy to use. Consumers, therefore, were less likely to read directions when using those products. Labels of products requiring the most preparation -- indoor fogger products requiring extensive site preparation or outdoor pesticides that required dilution or attachment of a nozzle and hose, for example -- tended to be read more often.

Certain parts of the label tend to be read more often than others. Since the front panel of the label, or "principal display panel," is displayed on the market shelf, it is the first thing consumers see and the first information consumers refer to. Unless consumers pick up the container and deliberately read the back panel, the front panel will be the only information a consumer will get about a product. The types of

Household Cleaners and Disinfectants

Of all the categories included in this study, the household cleaners and disinfectant interviews were the most similar from city to city. The only discernible difference among cities included in this study was the recycling habits of consumers. While many of the respondents in Cincinnati and Chicago recycled product packaging routinely, and checked the bottom of the container to see if the product was marked as recyclable, none of the respondents in the Dallas interviews did so.

When comparing registered and non-registered products, most consumers said that they prefer the simpler, non-registered labels. The less-cluttered appearance of the non-registered labels was cited by many consumers as a major factor in this preference, and they could not identify any substantive differences between the registered and non-registered labels on the quantity or quality of the information provided. They indicated that the information they obtained from both labels was about the same, but that the non-registered labels were easier to read.

Many of the consumers we interviewed were interested in the disinfecting benefit, and many believe that the non-registered products also disinfect, especially if they contain bleach.

Several respondents indicated the belief that there is some kind of screening or approval process that all cleaning products go through before they can be sold. The perception was that some agency of "the government" was responsible for this process, with guesses ranging from the Food and Drug Administration to the Bureau of Alcohol, Tobacco and Firearms, the Consumer Product Safety Commission, the Department of Agriculture, and the Environmental Protection Agency.

When asked directly about how satisfied they were with the information they currently receive from product labels, all participants said that they were generally satisfied, but many did suggest that the print size be larger.

Following is a summary of their responses to the key learning objectives identified by the QRDC of the CLI.

1. What do consumers want to know about these products?

Participants in the household cleaners/disinfectants interviews were asked to describe what they looked for on product labels, either in the store when they were making a purchase decision or at home when they were going to use a product. Based upon these "top of mind" responses, there appeared to be a general hierarchy of importance of information:

a. **Functionality** - Do they do the job, do they work?
b. **Use** - How complicated? Can I handle it?
c. **Safety/Cautions** - Both for personal safety and for surfaces the product can be used upon.
d. **Ingredients**
e. **Disposal**
f. **1-800 number** - For more information.

information that they might look for would include the intended use of the product, directions for use, and whether or not the product has any special features (disinfects, or "kills bugs fast," or "pine-scented"). The ingredients statement on the label was often consulted for outdoor pesticides, but rarely for indoor insecticides and almost never for household cleaning products. For these products, consumers expected to find the ingredients statement on the back panel. Except in the case of outdoor pesticides, there was very little knowledge of the chemical names, and the difference between active and inert ingredients was not understood by most respondents. Many participants in all three categories commented upon the helpfulness of pictures and icons for getting information across to the user.

The directions for use section is the most likely section for consumers to consult on the back label, according to our respondents. However, consumers tend to not read that section as carefully as they think they do, since few of them had noticed the statement, "It is a violation of Federal law...." in the FIFRA-regulated directions prior to being asked to read that statement during the interview. Certain sections of the labels were uniformly misunderstood by respondents in all categories. The statement that "It is a violation of Federal law....," the EPA registration information, and the chemical names of products were either not understood at all or misunderstood by participants in these interviews.

The precautionary and hazards section of the label were less likely to be read unless there was a preconceived perception of risk of that particular product. Users with pets and children also tended to consult this section more often than those without, as would persons (such as those with asthma) who might experience problems resulting in exposure to a product. There were mixed responses to the "signal words" -- Caution, Warning, and Danger -- because most participants considered caution and warning to be equivalent terms, with danger indicating a greater level of risk. Others recognized the gradation of warnings being provided by the three terms. There also was little understanding of the phrase, "Statement of Practical Treatment," although participants figured the phrase out once they read the information below it.

The storage and disposal section was the least read of all the label sections. Correct storage was considered common sense and in most cases the product was disposed of in the trash without wrapping, or recycled in cities where recycling was encouraged.

While a number of the respondents in all categories expressed the desire that labels be easier to read, few were willing to suggest information that could be taken off the label to make it less cluttered or to allow for larger lettering. Even though many respondents did not read the labels, they indicated that they wanted and expected detailed information about the product to be there in case they wanted to use that information at some time.

All respondents were asked how satisfied they were in general with the information provided to them on the labels. While many of them expressed some confusion with specific wording, or complained that there was too much information to make the label readable, all answered that in general they were satisfied with the level of information provided on labels.

In general, participants said that they appreciate the fact that in-depth information on products is provided, but they would like less clutter. Suggestions for improvement included large print, the use of pictures where possible, color changes to signal or set aside information, and bullet points to highlight specific pieces of information.

2. *Do consumers read labels? If so, which ones? To what extent do they read labels? If they don't, why not? What parts of labels do they read?*

There is not a high level of label usage either for product selection or product use. Label usage is highest when dealing with a new product. Participants said that they generally don't read a label unless the product is new to them, or if it is a new category of product. They might look at the directions for use if it is a new product. They also might look at whether or not the product can be used on specific surfaces. They also often will look for whether or not the product is a disinfectant, if that action is specifically wanted. Participants said that they look to the front label for quick knowledge of what the product is and whether it disinfects, and refer to the back only for directions if the product is new to them, and for whether an 800 number is present.

In response to the question, "How often do you look at the labels of products you're using?" one respondent's answer typifies what was heard throughout this interview process: "Not real often. This is stuff I've been using so long, I don't remember the first time I looked at it. Honest, the way labels are written, I wouldn't know whether an ingredient was good or bad. I don't know what a lot of those things are. With food products, I do that more: with cleaning, I rely more on what people tell me."

One woman responded, "When I was newly married, I probably would have read everything and measured. Now I just toss it in. I probably wouldn't read the directions. I wouldn't read anything in the store or at home, unless I was buying a new product, like the first time I had to buy marble cleaner for the marble tables."

3. *Do consumers understand labels?*

By and large, our respondents said that they found labels basically easy to read and understand, except for some specific language: the Federal regulation information, names of ingredients, and active/inert ingredients. However, when the label was read section by section, a number of areas of ambiguity were identified, primarily with respect to the FIFRA-required information. For example, there was a uniform lack of understanding of the phrase "It is a violation of Federal law to use this product in a manner inconsistent with its labeling." Even if they understood it, no one understood why it was in the directions section. The most common responses to the question of why it was there were that it was to prevent people from sniffing the product to get "high," and that manufacturers put the statement there to avoid potential lawsuits.

<Laugh> "It sounds like they're going to come out and arrest you if you use it the wrong way. If you can buy something off the shelf, if it's safe for household use, you're obviously not going to use it for anything else but cleaning. They're probably trying to protect themselves if anyone uses it some way, maybe they're really trying to make people pay attention. Make it seem more serious a product than they've used before. Mostly, I think it's kind of ridiculous."

Another person said, "I thought that (the Federal law statement) was an odd thing to put first - how does that tell me how to use it? First thing I would think is maybe some kids would use it for a high." When the interviewer asked for a reason why one product had the statement and the other did not, the participant questioned, "I wonder if there was a lawsuit? Maybe they're extremely conscious of that?"

"This Federal law stuff," said another, "That doesn't make any sense. Like that tag on pillows that says 'don't remove.' Why should it be all that difficult? There's gotta be a Federal law to tell me how to use it? That sounds scary. There's Federal legislation telling me how to use Lysol? They're trying to say there's a way to use this product to make it safer environmentally, but if that's so, why not say 'We'd like to tell you how best to use this product to use it safely and not harm the environment.' What are they going to do, come in and clean for you?"

Participants also did not understand chemical terms. Almost every respondent said, "I'm not a chemist," when asked about their understanding of the chemical terms for products. The only chemical term that was understood was bleach, and most respondents had definite ideas about the properties of bleach.

Few valued or understood the ingredient percentage information, and few found value in the active/inert ingredients information. None of the respondents understood the EPA registration number information.

"I assume it's some regulation number that the product complies with." When shown a non-FIFRA label for comparison, the respondent suggested, "Either Mr. Clean doesn't comply with the thing -- I can't imagine that -- or they figure people don't look for that." This person suggested that "EPA wants to make sure the product is safe if it's going down the drain."

Another respondent said, "I interpret it to mean that the EPA has approved this product, that it means that it's somewhat environmentally safe."

4. Do consumers follow instructions on the label? If not, why not?

Virtually all of the respondents in this set of interviews indicated that they hardly ever refer to the labels on household cleaning products. "Who needs instructions about a household cleaner?" said one participant. "It's intuition." In fact, many respondents reported with some sense of pride that they never measured dilutables, but instead relied upon their personal knowledge of cleaning to know how much dilutable to use with a bucket of water.

Other product usage also appeared intuitive to the respondents. Aerosol and trigger sprays are used almost universally by this population, and thus few respondents said that they referred to directions. Several said that they might refer to the directions if they were using a product type that was new to them, or a product that they perceived to be potentially dangerous to them or members of their family, such as a tile cleaner that produces fumes.

Typically, the respondents indicated that they only do what the directions say if that is what they would do anyway.

One interesting exception occurred, however, among cleaning and disinfectant products. If a product made the claim that it disinfected, people usually assumed that it would disinfect no matter how it was used. When asked to read the directions, many participants were surprised to see two sets of directions, one for cleaning and one for disinfecting. They claimed that they would not "clean something twice" in order to disinfect it, although the claim that a product was a disinfectant was the reason they had purchased it in the first place.

5. *Do consumers find information on labels confusing or counterproductive? If so, what information?*

Because few of the respondents had looked carefully at product label information prior to these interviews, they said they found the information to be clear and understandable. However, when questioned about specific language used -- particularly language used on the FIFRA-regulated labels -- it was clear that some of the specific wording was confusing to many of the respondents.

"Hazards to humans and animals" was often interpreted to mean "hazardous to humans and animals." In fact, many of the respondents read the phrase as "hazardous..." when asked to read that section out loud. The phrase also was generally interpreted as a stand-alone phrase rather than as a section heading, particularly when no specific hazards were identified underneath the heading.

People tended to skip over confusing language without noticing it, until those sections were specifically pointed out to them. Once the specific language was read, they acknowledged having difficulty understanding it.

The phrase, "It is a violation of Federal law..." was perhaps the most misunderstood phrase on the label. Respondents said it seems like common sense to use the product for the purpose for which it was intended, so guesses as to the purpose of this statement were many and varied. Quite a few respondents surmised that it was to discourage people from sniffing the products to "get high." Most respondents assumed that the statement was used by manufacturers to avoid liability for injuries where someone did not follow instructions.

Another confusing part of the FIFRA-regulated labels was the location of the ingredients on the front of the label rather than on the back. Every person expected ingredients to be listed on the back on every product, and often they simply could not find the ingredients until the interviewer suggested that they check the front label.

Despite the fact that the specific wording was not well understood, consumers said that they want to have this kind of information available.

6. *Do consumers perceive that there is any risk related to these products? If so, which ones? Is the perceived risk related to perceived efficacy? Does perceived risk relate to label reading?*

All of the respondents in the cleaners/disinfectants interviews recognized that there was a certain level of risk involved with household cleaning products, but that proper usage would minimize the risks of potential hazardous properties. As one participant said, "What do you mean by 'safe'? I doubt that any of these products are really safe. They could hurt you, but should be okay if you use them right."

Most participants indicated that there was a direct association between risk and efficacy of the product. although some said that the word "disinfectant" indicated to them that a product made the house "healthier" than one that did not say that it "disinfects."

The potential risks associated with these products were related to ingestion of the product, getting it in one's eyes, or fumes in the case of tile cleaners. However, most respondents also indicated that common sense usage of the product would minimize risk. There appeared to be a general perception that if a product was on the shelf, it was safe enough if used correctly; and the underlying assumption was that government somehow ensured that products on the shelf were basically safe. In general, consumers have a high level of comfort with cleaning products. They do not perceive high levels of risk.

Several issues were raised concerning the caution information, including the following: 1) On the non-registered products, precautionary statements were easier to find than on the regulated products. Although not present in a standardized format, the information was easier to understand than when it was arranged in the specific sections of the registered labels (Precautionary Statements, Hazards to Humans and Domestic Animals, Statement of Practical Treatment, and Storage and Disposal). 2) "Statement of Practical Treatment" was not consumer-friendly language. Perhaps "First Aid" or "In Case of Emergency" would be more familiar to consumers. 3) "Hazards to Humans and Domestic Animals" is uniformly misinterpreted to say "Hazardous to Humans and Domestic Animals," which meant "Dangerous." 4) If anything, a few consumers would like to know more about long-term health impacts.

DANGER is viewed as more harmful than WARNING or CAUTION, which were occasionally considered equal. Consumers said that if a product was marked "Danger," they might not buy it for that reason.

7. How do consumers currently use label information to make a purchase decision?

The respondents indicated that they look primarily at the front label for purchasing information, and the kind of information that they look for includes brand name, product usage, and in some cases whether or not the product is a disinfectant. Purchase decisions, according to these respondents, were usually made on the basis of brand familiarity, whether or not they had a coupon for the product, or simple price comparisons. Not one of our respondents indicated that they used any of the information on the back label for purchasing decisions.

8. What could motivate consumers to become more likely to use the label information? Why?

Based upon these interviews, it appears that very little can be done to get consumers to use label information more readily. Several participants said that they personally would look at labels more intently after having gone through the interview process, but the interview process itself clearly served as the impetus for that statement. Some suggested that graphics would help, or bullet points, making the labels easier to read, but they generally indicated that they know what they're buying and how to use it, and therefore have no need to seek and use more information than they have already internalized.

9. How does precautionary information impact purchase behavior, if at all?

Precautionary information appears to have very little impact upon purchase behavior. While some respondents indicated that they would be less likely to purchase a product that said "Danger" as opposed

to "Caution" or "Warning," they indicated that they would not change their buying habits if the product was one that they were used to using anyway. Some participants actually looked at the "Warning" indication as a sign of strength of the product. They said that a product marked "Danger" would probably do the job better than a similar product marked "Caution" or "Warning."

10. How does information on the label impact how the product is used?

Label information appears to have little if any impact upon how a product is used. Participants said that they looked for the product function on the front of the label, and then used the product to perform that function. They would not refer to the directions, disposal information, or any other information on the back label unless it was a new product type to them.

11. How does information on the label impact on how the product is stored/disposed of?

Consumers uniformly store the products safely so do not refer to the label for this information. They recognize that children should not get into these products, and so routinely store them in places young children are unable to reach.

Not one respondent indicated having ever read the disposal information prior to attending the interview. Those who routinely recycled containers knew to look at the bottom of the container for the "recycle" indicator; those who did not recycle simply threw the container in the trash. Some participants indicated that the disposal information provided on regulated product labels seems to be in conflict with recycling, like the instructions tell them to wrap the container and place it in the trash.

12. What label information is broadly applicable across categories; what is specific to categories?

13. Do consumers use 'outside pesticides' inside the house?

These questions are not applicable to this set of interviews

14. Do consumers over-use products? Too often? 'If a little is good, more is better?' Do consumers under-use? Any places or circumstances where consumers wouldn't use?

All of the consumers who use dilutables say that they "eyeball" the amount of product that they add to the water. Some routinely under-use the product ("I just like to get that pine smell in the water," said one), and others tend to over-use dilutables if they feel that their cleaning job is an especially difficult one. The only times that they measure products are those where the cap itself indicates the amount of product to use, as on some of the "ultra" products. However, they do not tend to measure the water in the bucket even if they measure the product.

Additional Comments on Specific Terminology

Disinfectant/antibacterial/sanitize

Responses ran the gamut from people who felt that all three terms meant the same thing, to those who preferred one term to another. Most said that all three terms meant "kills germs."

Cleaning v. Disinfecting

Many people indicated that cleaning something in effect "disinfected" it. Others drew a clear distinction, saying that cleaning could get dirt but still leave germs behind; disinfecting kills germs.

EPA Reg. No., Est. No.

No one had ever seen this number before, nor did they have any clear idea of what this might mean. When probed specifically on this part of the label, participants often had the perception that if a number was present, the product was somehow a safer product.

Danger, caution, warning

Danger was generally seen as being a stronger statement than caution and warning; little difference was perceived between caution and warning, but the few who saw a difference placed them in the correct level of order.

Ingredient Information

- Consumers expect to find ingredient information on the back label.
- Consumers think that "active" ingredients might mean the ingredients that clean, and that "inert" ingredients are probably water and perfume.

General Readability

- Font size and color were the primary attributes mentioned for improving readability of a label.
- Some mandated language can actually result in the consumer reading less of the label. (Example: "It is a violation..." statement resulted in the consumer not reading the balance of the section.)
- Most consumers value pictures more than words.
- Background colors can either enhance or detract from readability.

Outdoor Pesticides

The consumers interviewed for the outdoor pesticide category were the most likely to read labels of all of the respondents interviewed for this project. The major factors affecting label reading among these consumers were the perception of the "danger" or toxicity of these products being higher than those in the household cleaners/disinfectants and indoor insecticide categories, the relatively more complicated usage instructions for some outdoor pesticide products, and the relative lack of familiarity with these products compared to products in the other two categories.

Although the people interviewed for outdoor pesticide use were more likely to read labels than consumers in the other two user categories, their use of the label was limited primarily to knowing what the product did, and how to use it. As with users in other categories, few respondents had read the labels word-for-word prior to being asked to do so in this interview. When they did read the labels in detail, their responses to the FIFRA-required wording were similar to those of other respondents.

Summarized below are the key learning questions, followed by findings for the outdoor pesticide user interviews.

1. What do consumers want to know about these products?

In all three locations, the primary information that consumers wanted about outdoor pesticide products was what the product did, and how the product was used. How the product is used included issues such as how much to use, where (and where not) the product could be used, timing, re-entry restrictions, how long the product's effects lasted, and any special conditions for use (such as after a rainfall). In Chicago, several participants also mentioned safety as information they would like to have. They also emphasized the importance of brand name and price. In Los Angeles, participants wanted to easily determine what pests the product kills, indicating that illustrations are critical. They also wanted to have an 800 number to call for questions.

"I just wanted to get rid of 'em," said one respondent. "Now when I buy stuff that I have to mix, you know, an overall thing, then I do read what's in it, and if it's going to be safe for my dogs, if I need to keep him inside while I'm using, how long I should wait before I let [my grandson] go back out, or what, you know."

Another person said, "I think what I looked at was what did it cover, if this covers the ants, I mean fire ants and roaches and grasshoppers or whatever else was the problem, then I took it."

2. Do consumers read labels? If so, which ones? To what extent do they read labels? If they don't, why not? What parts of labels do they read?

For the most part, our respondents said that they read outdoor product labels thoroughly the first time they purchase the product, especially for the dilution rate, although one woman said, "Heaven forbid I should read the directions -- that would be too much." Most participants said they are less likely to read the label thoroughly if they are using a familiar product or a familiar product form, such as an aerosol. Generally, however, people in the outdoor pesticide interviews tended to fall into two categories -— those who just read labels for the minimum amount of information to see if a product will do the job, and those who tend to read labels thoroughly, no matter what they are buying or using. This category is further divided into two segments - lawn and garden enthusiasts, and cautious consumers.

Respondents indicated that they use the front label primarily to identify the product that they need. They generally scan it first to see if it is the right product for their problem, and then go to the back label to see directions for use. Instructions can be used as an indicator of how safe a product is. For example, if the instructions suggest using gloves or a mask, the product may be deemed harmful by the consumer. Several respondents indicated that this often led to the impression that such a product was a more hazardous product than he or she wanted to use. Also, if the instructions are very detailed, they may decide that it is too difficult to use, or that it requires too much attention, and thus decide to purchase another product.

The amount of attention paid to directions depends in part on how complex the product looks to the user. If it appears simple to use (point and shoot, for example), it is more likely that the users will assume that they already know how to use the product. Some respondents said that they also look at precautionary

and first aid information. Most who did look at this information indicated that they generally read everything on a label. "I look at the danger thing, and that would affect how I use it," said a Chicago respondent. "How far it goes is important, too. Most of the information is pretty important. It's like baking -- you have to follow instructions exactly to make it work."

Many outdoor pesticide products have fold-out or peel-off labels, due to the amount of information required to be on them. Most respondents indicated that they would not open fold-out or peel-off labels in the store, because they perceive that as damaging the packaging, possibly obligating them to buy the product. Many respondents said that they would not buy a product with a peel-off label, choosing instead to use a product with a label that they did not have to open, because they want the information they cannot see without opening a label. There were also concerns that after several uses of the product, the foldout label could fall off of the container and be lost, thereby leaving the user with no use instructions.

According to some of our respondents, the amount of information on the label may be inversely proportional to the amount of the label actually read. For example, if a consumer purchased a product with a ten-page brochure, he may scan the brochure and pick out specific information, while that same person might read the instructions more thoroughly if the total amount of instructions were less.

Very few respondents read the storage and disposal section, even among those who appeared to be inveterate "label readers." For example, many said they would recycle the package despite what the instructions say. All informants said they store the product away from children and in a specific place (such as a shelf or cupboard) where they kept similar products. Oftentimes this was described as a cool, dark place. This behavior was less a result of consumers reading the label than of "common sense" or continuing behaviors taught to them by parents.

3. Do consumers understand labels?

All of the respondents said that they understood the labels in general. However, most had difficulty with some of the regulated phrases on the labels when they were probed directly on those phrases. When asked to read the label aloud, many respondents struggled with isolated words and the pronunciations of those words (such as "estuarine").

One woman stated that most outdoor pesticide product labels were "Pretty clear. They have to be, by law." When questioned about that, she said that it was a "truth in advertising" issue.

4. Do consumers follow instructions on the label? If not, why not?

Most participants reported that they follow the instructions on the label. Almost unanimously, they declared that they treat these products with caution since they are "dangerous." Many respondents talked of the need to use common sense, and to use such products with care. Even when the participants reported that they were not detailed label readers, they did claim to follow the instructions, usually meaning the directions for use, which include proper dilution.

For dilution and application purposes, instructions are most often used for reference. For example, consumers will check to see the suggested amount of product to be used, considering the recommended amount as reference point. They will then adjust amounts and application methods and frequency for

their own conditions. Herbicides in combination with fertilizer are more likely to be followed faithfully, because consumers don't want to burn out their lawns.

For suggestions regarding square footage and application, consumers reported making rough estimates and guessing on the amount of product to use. For outdoor insecticides, one participant (who reported following the use instructions) described overusing the products. Many had the "more is better" attitude, practicing heavy applications and frequent reuse of the products.

5. Do consumers find information on labels confusing or counterproductive? If so, what information?

Several label items were confusing to participants. Only a handful of participants had any use for the long chemical names. The names were used to make product comparisons only, with consumers checking to see if the ingredients in two products were the same, and if so, choosing the less-expensive alternative. A few consumers looked for specific chemical names, although most looked for the common name only, and reported that the long chemical name meant nothing to them. Most made no reference to the names, and when asked stated something like, "I'm not a chemist."

The terms "active" and "inert ingredients" generally meant little to people. Many reasoned that active ingredients are what makes the product work, but to most, inert ingredients had no meaning, or were interpreted as being unimportant, water, or "everything else." "I don't recall what inert means," said one man. "I would have to look in the dictionary and see what this means."

When asked to read the ingredient statement, many consumers flipped the package over from the front to the back, as if they expected the information it to be there. Consumers tend to skip over any confusing language or vocabulary (such as "washwater" and "aquatic invertebrates," and concepts such as environmental hazards and computing square footage to determine usage amounts) without noticing it, until such language was specifically pointed out to them.

Many consumers did not feel empowered to open the fold-out label unless they planned to buy the product. They often felt that to do so would violate the packing and obligate them to purchase the product. Many expressed confusion over their ability to determine intended use and ease of use products labeled in this manner. Once these consumers referred to the label booklet, many expressed a sense of information overload, finding the amount of information distracting and discouraging to read.

Several participants expressed confusion over what they considered to be an inconsistency in the instructions to not recycle the containers even though the chasing arrows symbol with number was present on the container bottom. Many participants, especially in Los Angeles, reported that the presence of the symbol creates the idea that the container should be recycled. They diverged on opinions about whether the instruction or the symbol was the correct information to follow.

The heading "hazards to humans and domestic animals" was misread numerous times as "hazardous to humans and domestic animals." The environmental hazards section was not in laymen's terms, and was thus somewhat hard to understand for many consumers. In Los Angeles, most felt that these warnings

were not applicable, since much of the content focuses on hazards to wetlands. Still, nearly all of the participants considered this information important and necessary.

One additional confusing aspect of some labels was the placement of target pests directly following the directions for use. Many participants complained that they could not determine how to use the product because it was hidden after the list of pests on which to use the product. "I'm not interested in reading a book," sums up the feelings of many participants.

6. *Do consumers perceive that there is any risk related to these products? If so, which ones? Is the perceived risk related to perceived efficacy? Does perceived risk relate to label reading?*

In all three cities, outdoor pesticides were consistently referred to as "toxic," "poisonous," "deadly," and "dangerous" in conversation. Consumers generally perceived at least some risk with all the products. "It's common sense, since these products are designed to kill things, that they are dangerous. That's why I buy them," was a common theme of respondents.

"I believe that if it kills bugs then it might be with the right dose it could kill something and it's dangerous if you use a bigger dose or a straight dose and not follow instructions," said one person.

Another participant related the following story: "In the case of the spray there was a story on TV that somebody, some lady, used three or four bombs at once and it created an explosion because there was too much in the pilot light somewhere..."

There was some confusion over the meaning of the signal words "danger," "warning," and "caution," although respondents recognized that the words indicated differing degrees of hazard. "This [caution] is a little bit of danger," explained one participant. "This [warning] is 'you're getting there, and then over here [danger] you'd better watch it, you know, this is the highest," he continued.

Many self-reported that if they saw the word "danger," they would read labels more carefully, and would expect to see more information on specifically what the danger is and how to avoid it. Nearly all of the informants expressed that they would be extra cautious when using a product labeled "danger," and that such a signal word would prompt them to read the use instructions and other parts of the label more carefully and thoroughly. "I'd probably use gloves for this one here [that said danger]," said one man. None of the informants believed that product efficacy is related to the signal word, although in every city, some related the word "danger" to the potency of the product.

7. *How do consumers currently use label information to make a purchase decision?*

Consumers look for the following things when making purchasing decisions: brand name, product name, pictures or icons of target pests, directions for use, and price. Some participants mentioned using the ingredient names for comparison shopping purposes. Nearly all who mentioned this based their comparison on the active ingredient's common name when possible, rather than the full chemical name. Very few participants mentioned referring to precautionary information when purchasing such products. Their main concerns were the safety of their children and pets, followed by some environmental concerns such as harming water or wildlife.

"The pictures help a lot because from one name to the other I have no idea, because I'm not a gardener, so I look at the pictures -- 'Yeah, that's what I got,' and 'No, that's not what I got.'"

"I think everything that's on there is important," said one person, "especially the precautions or the, you know, if you get it on your hands or if you do something, how to clean or do you use an 800 number to call. 'Do not take orally' or whatever, that's very important."

8. What could motivate consumers to become more likely to use the label information? Why?
Formatting would make the biggest difference according to participants. Nearly everyone mentioned that print or font should be bigger, and that section headings should be boldly presented, either with larger print, bullet points, or with a different, eye-catching color. A more standardized format was desired, similar to the information box used for food labeling. When asked what information should be included in such a box, participants indicated that all the information presented on the labels is important, so it should all be included. Participants believed that all the information should remain on labels, with most indicating that they did not need the information, but that others might. "A smart guy like me, this stuff is common sense, but there are some people out there who might not know this stuff, so it should be there for them." Pictures and icons were helpful and popular with nearly all the participants.

One woman stated, "Emphasize how easy it is to use! If people knew how easy [this product was to use], [they] might not hire yard companies. Now I just need a man to go with it!" she said with a laugh.

9. How does precautionary information impact purchase behavior, if at all?
For some consumers, if precautionary information was sufficiently scary, they would not buy the product (scariness relates to severity of effects, language on how many things could be affected, how many precautions the consumer would have to take in order to use, maybe extent of recommended first aid steps). Most participants, however, made no comment on any precautionary text until asked to do so by the moderator. Many felt that such information is everywhere, on every product one can buy, and so the effectiveness of the message is lost. In general, consumers did not seem to notice the information, let alone use it for a purchase decision.

When prompted, informants discussed their perceived differences in the signal words. Participants unanimously considered "danger" to indicate the most hazardous materials. "Warning" and "caution" were thought to be interchangeable, with "warning" usually considered more hazardous than "caution." When asked, most participants arranged the words, in order of most hazardous to least hazardous, as danger-warning-caution. In all locations, "danger" was considered the strongest signal word, and some participants indicated that use of the word might be a deterrent to purchase. In Chicago especially, several participants indicated that they would not purchase a product labeled "danger," although this was less of a concern to participants in the other two cities.

As with the other product categories, participants in the outdoor pesticide interviews tended to read the phrase "Hazards to humans and domestic animals" as "hazardous." The interviewer asked one person, "What comes to mind when you see that word, 'hazard?'" The respondent replied, "Hazardous, oh yes, you can get sick with it or contaminated and have some sort of problem. Have to be careful with it."

10. How does information on the label impact how the product is used?

For most products, both herbicides and insecticides, people will read directions for use at least once, that usually being the first time they have used the product. Also, during the first use, people will generally try to follow the instructions closely. For products considered by consumers to be intrinsically easy and obvious to use, it is less likely that instructions will be re-read after the first use (this particularly applies to spray and aerosol products). With both herbicides and insecticides, dilution instructions are read and followed, although several participants described how they estimated and guessed at product amounts when diluting the chemicals.

When asked how she figured out how to use a product, one woman said, "First, I'd go by what he [the clerk at the store] told me. Once I've read the label, I'd go with the label information if it was different from what he said. Then, before I used the product, I'd look for the directions for use and skim them again."

Application amounts also varied among users, from those who followed the instructions to the tee, and those who made modifications for various reasons. Some applied less product than instructed if they were running short. Others applied more than instructed in an effort to accelerate the process to reach the desired results more quickly. Many participants indicated that they carefully check child and pet re-entry statements regularly. Other sections of the label may be taken for granted by consumers who will typically employ "common sense" caution when using pesticides. Virtually all participants talked about the importance of using the products carefully.

One participant said that she would read the safety information on a label "If I touch it or get it in my eye. If it's in my eye I would seriously read the label and hope it's [safety information] in there. If not in there I'd call the 800 number."

11. How does information on the label impact on how the product is stored/disposed of?

This section is the least likely to be read or followed, although one man in Dallas said, "I look for storage. It'll tell me how to store it because most of all my chemicals are in the garage and if it tells me to store in a cool, dry place or whatever, I have to look at that because during the summer the garage gets very hot." Most people appear to be taking appropriate storage precautions even without reading instructions, because of "common sense," their desire to keep such products out of reach of children and pets, and "conventional wisdom."

Even people who claimed to read every word on a label had plainly never seen the storage and disposal information before, and when pointed out, still said that they would not follow disposal instructions. Because consumers believe they know how to dispose of the product, these instructions are the most apt to be disregarded. Consumers have been conditioned to look for the recycle symbols, so the inclusion of the chasing arrows on pesticide bottles leads to confusion. Some participants said that they routinely disposed of unused pesticides by waiting for their community's hazardous waste pick-up program. Many consumers would prefer to recycle plastic bottles rather than follow the disposal instructions. Also, consumers said they do not see the benefit of wrapping the container in several layers of newspaper before discarding.

"I seal it up and put it on a high shelf in the garage," said one participant. To dispose of it, he said he'd "Toss it in the garbage. I wouldn't recycle it. It had chemicals in it. Do manufacturers make recommendations?" he asked.

12. What label information is broadly applicable across categories; what is specific to categories?

Not applicable to these interviews

13. Do consumers use "outside pesticides" inside the house?

All of the participants in these interviews said that they did not use outdoor pesticides in the house. There was a general perception that outdoor pesticides presented risks by their very nature, and that they should not be used inside the home.

14. Do consumers over-use products? Too often? "If a little is good, more is better?" Do consumers under-use? Any places or circumstances where consumers wouldn't use?

The typical reaction across all interviews was to use the amount of product listed on the label. Some respondents indicated that they may use a slightly greater strength for a pest they have an emotional response to and that they want to die quickly (e.g., chasing large insects and drowning them with aerosol spray). They do not appear to use the products too often, although a few indicated that if the desired results had not been achieved within a few days, they might reapply a pesticide to accelerate the process. One consumer stated that he might increase the strength to deal with a problem he had allowed to get out of control before overcoming his reluctance to spray. Consumers in LA typically said they would prefer not to use pesticides, and thus used them less often than called for.

A Chicago respondent said that she might over-use a pesticide on her plants to kill weeds or bugs, but "Then if it [the plant] dies -- rats!" The same participant said that she might use less than the recommended amount "If I was beginning to run out and I didn't have much of the yard left to treat."

Additional Findings

Ingredient Information

- Consumers expect to find ingredient information on the back label.
- Consumers think that "active" ingredients might mean the ingredients that kill, and that "inert" ingredients are probably water.
- Most consumers said that they preferred the shorter name rather than the technical name for a product. "A shorter name, that's what I go for," said one "The technical name goes right over my head."

General Readability

- Font size and color were the primary attributes mentioned for improving readability of a label.
- Some mandated language can actually result in the consumer reading less of the label. (Example: "It is a violation..." statement resulted in not reading the balance of the section.)
- Most consumers value pictures more than words.

- Background colors can either enhance or detract from readability.
- Put first aid information in bolder print

Indoor Insecticides

Many users of indoor insecticides had familiarity with the products they were using because they had sustained bug problems in their homes or apartments over a significant period of time. While they considered these products to have risks associated with them, the risks were considered acceptable in light of the problem that they were solving -- getting rid of cockroaches or other insects that the consumer found unacceptable in their homes. Usage of label information appeared to depend upon the level of risk that the user associated with the product or the product type, and the familiarity of the product or product format to the user. The more comfortable a person was with the product, the less likely that person was to use label information.

More than any other product category, some significant differences were found among cities. In Miami, for example, few of the respondents read the labels, while the New York respondents tended to be more attentive to information on the labels, both for purchasing and use information. Respondents in LA tended to be a mix of "label readers" and those who did not tend to read labels. A large number of the Miami respondents were of Hispanic origin, and many of them used English as a second language. Although the issue of English as a second language was not explored as part of the qualitative research due to research limitations, it may be a proper subject to explore in future phases of the Initiative.

The other major difference between the indoor insecticide users and the other user categories was that several respondents in this category had substantive suggestions for getting people to read labels more carefully. One person suggested that the front label contain a statement in bold letters saying "Read back panel." Another suggestion was to condense the precautionary information into one section rather than separating out hazards to humans and animals, and the environmental impact statements.

1. What do consumers want to know about these products?

The main thing consumers in all three cities wanted to know were the types of bugs killed by the product, how easy it was to use, and how safe it would be for use around children and pets.

"That's hard," said one woman. "I have to go by the packaging, the information on the packaging, and names I know and have confidence in... also how convenient, how easy, how attractive it is to me. I look [at] how harmful it's going to be for stuff indoors."

One person who did not have children or pets said, "When I read the label, it has to say things that it's not going to affect me personally with allergies. That I'm not going to get sores or pimples or be affected by the spray itself."

Another person said it very succinctly: "I want to know that the product is going to control the problem that I have."

2. *Do consumers read labels? If so, which ones? To what extent do they read labels? If they don't, why not? What parts of labels do they read?*

In Miami, few of the respondents read the labels, except if the product was of an unfamiliar type or perceived to have a greater level of risk than similar products. In New York and Los Angeles, there were variable levels of label reading. Most said that they looked at the label to some extent, primarily to find out what bugs they killed, and -- in New York -- to attempt to find the most economical buy by comparing ingredients and purchase price for the strongest "brew" at the lowest price. "I look for the higher percentage of the ingredient for killing roaches, and the one that has the highest percentage I buy."

3. *Do consumers understand labels?*

As with the other product categories, respondents said that they basically understand the information on the label, but when probed to read specific regulated wording, they had difficulty understanding what was being said. No one understood why the "Federal law" statement was there, nor did they understand the chemical names for the ingredients. They did understand the directions, and responded favorably to pictures. And, once they were prompted to read information they otherwise would never read, such as storage and disposal information, they were able to understand it.

4. *Do consumers follow instructions on the label? If not, why not?*

Consumers in the indoor insecticide interviews said that they tended to use the instructions less on the labels of products that were familiar to them, and to a greater extent with products or product types that were unfamiliar to them. "Yeah, a spray is pretty self-explanatory, I'd probably read [the directions] on a bait or fogger because I haven't really used them before. I did use, years ago, glue traps for mice but not for bugs."

In general, they said that they followed instructions for use, although some tended to change the amount of a product used depending upon previous experience with it. Some respondents also used sprays as "attack instruments" to go after just one bug until it was dead, rather than applying the product as a preventive measure in a manner specified.

"Give me directions that are simple, so I know where to place them [baits]," said one person.

5. *Do consumers find information on labels confusing or counterproductive? If so, what information?*

They simply do not read the parts that are confusing to them. Consequently, people would skip over the "Federal law" statement or the heading, "Statement of Practical Treatment," and skip down to the sections that they understood.

Most consumers in this study said that they understood the information on the labels. However, when asked to read particular statements, such as the phrases above, they did indicate some confusion. When asked to look at the ingredients of one product, a participant said, "I probably wouldn't look at that. I wouldn't really know what to make of it. Twelve syllable compounds...I have no idea what they are." The same person said about active/inert ingredients, "I really don't know what the difference is." And the Federal law statement? "Never noticed. I'm not sure why it's there or what it means."

6. *Do consumers perceive that there is any risk related to these products? If so, which ones? Is the perceived risk related to perceived efficacy? Does perceived risk relate to label reading?*

All of the respondents in this category perceived potential risk with these products, but indicated that it was common sense that there would be risks associated with products intended to kill things like cockroaches, spiders, ants, and other undesirable creatures. They generally would keep the products away from children, and they assumed that breathing in too much of these products was probably not a good idea. Some participants in the New York interviews said that they thought that professionally applied treatments and outdoor pesticide treatments probably had greater risks associated with them than insecticides intended for home use. "presumably an exterminator would use harsher chemicals than you can get in a store," said one of them.

Some respondents perceived differences in risk based upon the product type. For example, foggers were considered by some to be particularly strong treatments for severe problems, and therefore would have greater risks associated with them, particularly because they can be messy and the product gets on everything in the room. Others said that they would not use sprays in certain rooms, such as the kitchen. because they might contaminate food. Several participants expressed a preference for baits or traps because they were perceived as easier to control access to, and less chance of contamination or accident as long as they were placed out of the reach of children.

Some subjects indicated that really large, prominent "Danger" flags or the presence of a blatant poison symbol would encourage them to deal with insecticides more carefully and be more inclined to read labels.

One of the respondents in New York summarized the kinds of responses we heard all over the country: "It would be nice to have it safer, something totally safe, but if you're using something to kill an insect it's not going to be safe for human consumption. Even this one that says 'Safer,' it still says caution and keep away from children."

7. *How do consumers currently use label information to make a purchase decision?*

Most participants were not using much of the label in their decision-making "I, look, I read labels, hearsay..." said one woman. They often look for national-type brand names, good value in quantity for the price, the pictures of the bug(s) the product is intended to kill, the duration of the product's killing action, and any other eye-catching front-panel information, such as pleasant scents. A few respondents in New York also compared the ingredients and attempted to purchase the strongest product for the lowest possible price. Although they did not understand the chemical names, some would look to see if the same name appeared on multiple products, and whether the percentage beside the name was the same; they would elect to purchase the cheapest product with the highest percentage of that chemical. "Price is the biggest thing, there's stuff I just can't afford. The other thing is quality...if I've heard recommendations from friends or a guy in the store," said one woman.

One participant in Los Angeles said that colors and the word "plus" on the label were the most effective ways to get him to buy a product. "Kills ants and this word is important -- says 'plus' -- means to me... Really eye-catching with bright yellow and the word 'plus' in bright yellow. Suckered me in! "

Another participant said, "I read it to make sure it's OK for my cat, or friends who have pets. The cat plays with the Combat trays sometimes -- it looks like a hockey puck. I read it to make sure it will handle my problem."

"I'd just sort of glance at each one," said still another respondent. They all seem to say roach and ant, so they're all pretty much the same as far as that goes. I like to look at a brand name that I'm familiar with -- Raid -- I guess I'd check the back....general information, directions for use, oh, here's disposal. I suppose I would probably just buy this."

8. What could motivate consumers to become more likely to use the label information? Why?

There wasn't much identified that could be done to get the average person to read a label more thoroughly. If something about one product looked considerably different on an otherwise common product, the consumer might be induced to look at the label. If he/she was sensitized to a particular problem -- such as the "exploding foggers" story in the Miami area -- then a look at the label might result. Generally, however, respondents in these interviews did not sense a need for information, because these people felt that they knew how to use such products with reasonable safety. Since the products are common and appropriate use is obvious, and because logical actions in case of problems are to wash affected areas or call poison control if ingested, respondents did not feel the need to look for this information on the label.

9. How does precautionary information impact purchase behavior, if at all?

Most appeared not to consider precautionary information in making purchase decisions, although some consumers said that they would not purchase products that were labeled "Danger" or that were of a product type that they considered to be too risky around children. Again, the "exploding foggers" issue in Miami caused several parents of young children to say that they would not purchase foggers. It is important to point out, however, that this is a reaction to news reports rather than to information on a label.

One person mentioned that "Something about death -- 'resulting in death' -- or something like that would really throw me off. This says it's only going to really irritate skin. If they used a stronger word maybe..."

10. How does information on the label impact how the product is used?

Most participants look for the directions at least the first time they are using a product or are using a new product type. However, the directions are about the only type of information people look for; they generally skip over the precautionary statements unless they have specific concerns about a particular product, and they almost never read storage and disposal information. "You're supposed to keep even Tylenol out of the reach of children," said one participant from the New York interviews. "I would particularly look for cautions about getting it on the skin, because if you're spraying it, it's real possible you'll get it on your skin."

Another woman said, "I read the directions. I use it where it's got to be used."

11. How does information on the label impact on how the product is stored/disposed of?
Storage information is generally not read, although participants intuitively keep them in the kinds of places suggested on the label. Disposal information was almost never read prior to being asked specifically to do so in these interviews.

"Usually I might not read this," said one person. "Knowing these products use poison, I guess I always assume it's best to keep it in a cool, dry place with the rest of the cleaning products. I probably wouldn't wrap the container in newspaper, just pitch it. Maybe I'd check the recycle list."

12. What label information is broadly applicable across categories; what is specific to categories?
Participants said that these products were similar to any other products you should keep away from children, such as paint thinner, cleaning products, outdoor pesticides, and so forth. However, one of the New York respondents said, "These are different from detergents. They're designed specifically to kill insects. Household cleaners -- even though they may have some toxic stuff in them -- aren't designed to kill. I'd tend to be a little more cautious with this, more fast and loose with some other stuff."

13. Do consumers use "outside pesticides" inside the house?
Our respondents indicated that they do not use outdoor pesticides inside the house, because several assumed that outdoor products would be more potent and therefore not safe for indoor use.

14. Do consumers overuse products? Too often? "If a little is good, more is better?" Do consumers under use? Any places or circumstances where wouldn't use?
Most subjects in Miami used sprays for assault purposes if they actually saw a bug and wanted it dead. In New York, they tended to use sprays more in a preventative fashion. No particular patterns were discerned in Los Angeles.

Additional Findings

"Federal law ..." Statement

As with the other product categories, this statement did not really mean anything useful to anybody; they generally did not even read it, unless they were specifically asked to do so.

"Danger," "Caution," and "Warning"

Most saw these terms as meaning the same thing with just a choice of wording. For those who did perceive a hierarchy, they correctly saw "Danger" as stronger, then "Warning," then "Caution."

General

As with the other product categories, people said that they wanted to keep all the information on the label, but suggested that they remove redundant information. Some respondents also suggested using larger type, bullet points, making sure there was good color contrast, and pictures as ways to improve the label.

People often scan the label for keywords rather than using headings. Common examples included going to bold letters "If swallowed" and glossing right over the "Statement for practical use" heading. In the directions, they often scanned for anything mentioning particular target bugs.

Ingredients

People appeared to be using ingredient statements in totally different ways for different purposes, and drawing different conclusions. Some used percentages to compare products, to see if products had the same names in them so they could buy the highest percentage of product at the best price, assuming that a high percentage was probably stronger and more effective on the target bug. No one understood the chemical names, but they generally felt that someone might understand the terms, and therefore they should stay on the label.

Active/Inert

Many people interpreted inert to mean harmless, or water; one said inert ingredients would have no impact on humans or environment. Most people knew or guessed that the active ingredient is what kills the insects. "Active is something that's really going to work on something? I don't know. I never really thought about it. And inert isn't even in my vocabulary," stated one participant.

Differences among the three cities:

In general, more of the New York respondents read the labels than in the other two cities, Miami and Los Angeles.

In Miami, quite a few respondents made reference to products (foggers) potentially "exploding," while that was not mentioned in the other two cities as a potential risk. It appears that a recent television report in the Miami area may have made reference to that risk in cases of misuse where multiple foggers were discharged in a confined area.

The New York respondents indicated that they were more likely to use ingredient statements for price comparison purposes than were respondents in the other two cities. The New York subjects also indicated more safety/environmental concerns and directed more attention to that information on the labels than did the respondents in Los Angeles or Miami.

Combined Category User Interviews

Pilot interviews for individuals who used all three product types -- indoor insecticides, outdoor pesticides, and household cleaners and disinfectants -- were held in Cincinnati on June 20. A total of five interviews were conducted in Cincinnati, and an additional eight interviews were conducted with "combined" product users in Los Angeles, for a total of 13 interviews in this combined category. The purpose of these combined category interviews was to see whether or not consumers differentiated among product types, and whether or not their perceived information needs varied from one type of a product to another when they had different products placed in front of them and were asked the kinds of questions that had been asked in the individual product categories. It is important to note that this phase of the research was

added during the course of the interview schedule, and thus the number of interviews conducted was considerably less than those conducted for the other categories. In addition, we did not have a geographic mix of respondents comparable to the other categories. Nevertheless, the opportunity to conduct these initial combined category interviews was seen as an important one in terms of developing the next portion of the study, the quantitative study.

The participants in the combined category interviews clearly considered cleaners and disinfectants to be the category of products with the least risk to them, their children and pets, and the environment. In general, they tended to consider indoor insecticides to be more toxic than household cleaners and disinfectants, but less so than outdoor pesticides. The category of outdoor pesticides had a somewhat mixed reaction, with weed killers considered by some to be less toxic than either indoor or outdoor bug killers, whereas others considered anything intended for the outdoors to have a relatively increased level of risk for humans and pets.

The use of labels by the combined users reflected the responses that had been seen in each of the individual categories. The more familiar the consumer was with the product or the product format, the less likely he or she was to read the label. Few of the respondents had ever read the labels on household cleaner products, while most of them would be inclined to look at the intended use and the directions for both indoor insecticides and outdoor pesticides. The directions for use often were consulted to determine ease of use of the product as a condition for purchase.

1. What do consumers want to know about these products?

As with all of the individual categories, consumers in the combined interviews wanted to know first and foremost what the product was designed to do, and how easy it was to use. Participants also expressed concern about risks associated with use of the product, such as whether or not it could be harmful to children, pets, and occasionally the environment. If the respondent had allergies or asthma, then personal comfort and safety in using the product also was a consideration. Another important consideration was the effectiveness of the product, e.g., does it do what it is supposed to do? Finally, these respondents wanted to know what to do if there was an accident, especially with ingestion of pesticides by pets.

One participant in the Los Angeles interviews said, "I've been buying this stuff so long that I know the products I like and don't like. I don't want to go with something new, I go with what I know works."

Another respondent said. "I want to see what a product will do, if it's harmful in any way, harmful to your body, what to do if something goes wrong, like kids get into it. I think that information, in a poisonous situation like this one, is important. It should be in big type."

One participant said, "I often try to do things with as much naturalness as possible, so if it says natural, I go for it. So they won't upset my pets, or the food, that it wouldn't be poisonous. I don't want things that would kill the birds if they eat the dead bugs. For cleaning products, I usually look for something that will kill germs as well as clean, do two things at once."

In general, respondents indicated that, although products in all categories contained a lot of information (including information that they might not understand, such as chemical names for product ingredients),

it was better to have too much information than not enough. "The more information a manufacturer gives," said one man, "it makes me feel they have less to hide. I wouldn't like it if there were less information."

2. *Do consumers read labels? If so, which ones? To what extent do they read labels? If they don't, why not? What parts of labels do they read?*

Consumers in these groups said that they were most likely to read labels of products unfamiliar to them. The less often they used a product, the more likely they were to read the label. In addition, if there was a high degree of perceived risk with the product, such as danger to animals or children if ingested, they would be more likely to read the label than with something they perceived as less intrinsically risky.

Only one person in these combined category interviews indicated any previous experience with peel-open labels, and that person was the only one who would have known to open the label or would have even considered opening it.

As with the household cleaners/disinfectants respondents, people in these interviews said that they would be unlikely to read labels of products they had grown up with. This included products in all three categories. It also appeared from these interviews that different personality types affected label reading, with label reading being most common among people who generally desire information, those who approach any product with caution, and those who are more likely to read than ask someone for information. Even among the "label readers," however, reading was selective. Most people only scanned the label for information that they specifically wanted, such as an indication of directions, and for some an indication of potential hazards associated with the product. Even if respondents were "label readers," they generally said that they would read the label once, and not again.

One woman in Los Angeles said that directions on all types of products were important, except probably less so for household cleaners and disinfectants. "Oh, I suppose [directions should be on them] but for someone young. After a while, you just know how to use them. I don't read them any more, because I don't have to," she said. On an outdoor pesticide product, however, she said, "I want to see what it does." She had a similar reaction to indoor insecticides. "I expect and read caution information on bug sprays, both for outside and indoors. I did once read the directions on bleach, but not any more. When you have new product, you read. A bug spray, you know, you can't take chances with that. The powerful, strong ingredients that are in there, the odor....bleach, too."

3. *Do consumers understand labels?*

People who read the labels say that they understand them, except for the specific FIFRA phrases that created confusion among the single category respondents. Typical of the responses in these interviews were the following comments:

"Hazards to humans -- it means just what it says, that it could be fatal to humans and animals."

It is a violation of Federal law... -- "It's made for one thing and that's what you're supposed to use it for, not on lilies or other things."

Active/inert -- "I don't know anything about the ingredients, but to me, it says 99% inert. I don't even know what that word means, unless it means immediate or something. I know what it does and that's enough, if it does what it says it's going to do."

4. Do consumers read/follow instructions on the label? If not, why not?

None of the respondents said that they read or followed directions on the household cleaners/disinfectants, which is consistent with the responses obtained from the household cleaner interviews. They were so familiar with these products and their intended uses that they felt no need to consult the label for anything. "I wouldn't read the directions, I don't know why. It's kind of weird. Just the way I always use a similar product..."

The more a product was perceived as a "killer" -- particularly of living, moving creatures -- the more likely the consumer was to read the label. However, if the product was a self-contained product like roach bait, consumers considered these products to be self-explanatory and thus were less likely to consult the label. Respondents also were less likely to read labels on aerosols or trigger sprays, regardless of the contents of the container, because they felt comfortable with these product formats. The products that were most likely to encourage solid reading of the directions were those that required significant preparation, or that created fumes or "fogs" that respondents could smell.

"On these products, the writing is too small," complained one man. "It's probably good information but probably too much information."

"I'll read it [the instructions]," said another woman. "I don't know if I'd read it on something like this (a cleaning product that she had used regularly), but I probably read it a long time ago."

One person said that she would not read a peel-apart label before buying it. "I've never seen that before. You have to read that little thing that tells you to pull that back, people aren't going to be looking for that. Wouldn't pull that back and read every little thing, not in the store. I don't see. this wouldn't give me a clue to pull this back. If I could see that there was additional information back there, then yes, I would peel it back in the store."

5. Do consumers find information on labels confusing or counterproductive? If so, what information?

As with all of the individual categories, terms such as active/inert ingredients, "Statement of Practical Treatment," and the "It is a violation of Federal law..." statement were not understood by most participants.

One man in Los Angeles explained the Federal law statement this way: "It's against the law to use it for anything other than what the label tells you to use it for. If you use it to make a bomb, you're breaking the law. Because nowadays you can use these to make bombs or take certain element out of products and make drugs. I think the Federal government decided it should be there." When asked who in the Federal government, he replied, "Alcohol, Tobacco and Firearms. Usually they're the ones going after the terrorists, the bombs."

The active/inert information caused confusion among these individuals, as well. "Active is what's the germ-killing stuff," said one woman. "Inert is just all the rest of it. This is both a cleaner and a disinfectant. The active says what the disinfectant is, but the inert is probably involved with the cleaning, and it doesn't tell you anything about those."

6. *Do consumers perceive that there is any risk related to these products? If so, which ones? Is the perceived risk related to perceived efficacy? Does perceived risk relate to label reading?*

The respondents in these interviews perceived some level of risk with all of these products, but indicated a greater level of comfort with cleaning products because they used them often and the effect of cleaners was to make things cleaner. They generally perceived a greater level of risk with both indoor insecticides and outdoor pesticides, because the purpose of these products was to "kill things." For many respondents, the level of risk associated with the products appeared to be related to smell. If a product smelled strong and the smell was perceived as a "bad" smell, the product was considered dangerous. One respondent even said, when looking at a pine-scented insecticide, that the product probably was "weaker" than most sprays because of the pine scent.

Participants also indicated a perception of risk on things they felt might be inhaled: things that couldn't be controlled and constrained to one place, such as foggers being perceived as more dangerous than sprays, and sprays being perceived as more dangerous than pellets. They also clearly indicated that things that kill bugs presented a greater risk to themselves, children, pets, and the environment than things that kill plants, or than disinfectants to kill germs. However, they were willing to accept these perceived greater risks in order to kill bugs. Several respondents used the term "necessary evil" when referring to these products.

A general perception among the respondents was that cleaners and disinfectants are meant to wash away and won't pose a lasting problem, while pesticides are intended to stay, and therefore increase the risk of use.

"It would seem to me that the bug killers would be a bit more poisonous. They'd kill live animals. But I'm sure that these cleaners contain poisons, too. I'd say that the Combat and Black Flag would be more poisonous -- bug killer more poisonous than weed killer. Judging from past experience, the aroma -- I even got nauseous using the Black Flag -- maybe less so when using this stuff outside." When asked about cleaners and disinfectants, he said, "They have less of a strong odor than bug killers, so I would assume they are less dangerous. Bleach, for some reason, seems like a pure form of a household cleanser. I'm sure if you drink that you're going to be sick." And, what if it says 'disinfectant'? "That means it's safer...it implies that it gets rid of the bugs in your behalf."

7. *How do consumers currently use label information to make a purchase decision?*

They use the front label to see if the product does what they want it to do, and they often check the brand name to see if it is a brand that they trust. Some also look to the back label to see if the product is easy enough to use. There was a clear preference for ready-to-use products as opposed to those that required significant preparation. Finally, some said that they looked at the label to determine potential risks to

humans and pets, although they had difficulty explaining how they determined the relative level of risk associated with any given product.

Most of the participants in the "combined" interviews were not familiar with the peel-off label format. and said that they would not be inclined to look at information inside the peel-off label before purchasing it. "No, I'd only peel a label if it had a coupon. Why would they want to put more information than they would need in here?" asked one woman. Another person said, "This is the first product where I've had to open [the label] up. It's too much to read. I read it once, when I buy the bottle. I don't know if many people would read all that."

8. What could motivate consumers to become more likely to use the label information? Why?
As with all of the other categories, participants did not have many suggestions for improving consumer use of information on a label. "All of this, the whole back, I've found that the warnings are basically the same; the directions are basically the same," said one woman.

Several suggested better color schemes or larger print.

9. How does precautionary information impact purchase behavior, if at all?
One person indicated that the longer the paragraph, the more likely the product was to be dangerous. so they might avoid that product in favor of one that advised fewer precautions. Some indicated that they might not buy a product labeled "danger," but when they compared the label warning with the problem they were attempting to solve, they indicated that they would probably buy the product anyway. Most of the respondents indicated that despite the precautionary information provided, they simply did not read that kind of information on cleaning products.

One participant suggested that "Skull and crossbones would be the ultimate," and would affect how a purchase decision was made. Another person said, "I try to look at the package. at the content. If you need a special mask or something, that's....not something I would buy. For example, termites. they use special treatment. I wouldn't dare try to use something like that myself."

10. How does information on the label impact how the product is used?
Information on cleaning products rarely had an impact upon how the product was used, because people generally did not read the labels on those products. The information on foggers made an impression on most respondents. who knew to close the windows and leave the room after using the product. Participants also tended to correlate label information with target insects and the types of weeds they wanted to kill.

"I always read the label on a product I've never used before," was a typical comment.

11. How does information on the label impact on how the product is stored/disposed of?
In Los Angeles, we heard some people say (for the first time in this series of interviews) that they would read the label to find out where to keep an unused product. Most people simply kept like products in the same place. such as in the laundry room, under the sink. or in the garage, depending upon common

practice for the type of product being discussed. No one consulted the information on disposal. There was an overall (but not comprehensive) assumption that these product containers could not be recycled.

"Wrap in layers of newspaper, " read one woman. "It didn't say this when I bought it."

"I'd just throw it in the regular garbage," said another respondent. "I don't think you can recycle this. I look for the sign [on the bottom of the container]. I would tend to recycle bottles from cleaning products." When asked about a plastic bottle of weed killer, she said, "Well, the symbol is there, but I'd hesitate just a bit because of what's in there, the chemicals, but I guess I'd recycle this: not aerosols, you don't recycle those."

12. What label information is broadly applicable across categories; what is specific to categories?

The factors mentioned for all three product types were consistent with what we had heard in the individual category interviews:

- Function;
- Efficacy;
- Where the product could be used, and how;
- Even when it was not read, a perception exists that precautionary information is good to have:
- Desire to know extreme things, like flammability and explosivity.

Interestingly, although they perceived these products to be quite different in terms of function and degree of risk associated with the products, they said that they wanted the same information for all product categories, even though they perceived cleaners and disinfectants to be "safer."

13. Do consumers use "outside pesticides" inside the house?

There were no indications that people did use outside pesticides in the house, and there were several who claimed definitively that they did not.

14. Do consumers over-use products? Too often? "If a little is good, more is better?" Do consumers under-use? Any places or circumstances where consumers wouldn't use?

Consumers appear to use what they think they need. They tend to determine this by "guesstimate" for cleaners/disinfectants that need to be diluted, and they tend to use indoor insecticides and outdoor pesticides according to package directions. The only recurrent exception to this rule is that a lot of people would spray a single bug until they saw it roll over and die in front of them.

Additional Findings

Federal law ...

This was generally seen as a statement that companies used to protect themselves against lawsuits. Some mentioned that it might be required by a government agency, but guesses included OSHA and the Bureau of Alcohol, Tobacco and Firearms No one suggested EPA as the proper agency.

Danger, caution, warning

"Caution" and "Warning" generally were perceived as equivalent, and "Danger" was perceived as more serious, but not a bar to purchase or use of a desired product. People often depended on an internal gauge, based upon personal perception of the product and whether they believed it to be risky. They did not look for words to identify warning. Several also suggested the skull and crossbones were even more extreme, and was a symbol that would really catch the attention of consumers.

Ingredients

No one looked at the chemical names, no one would understood the words. The phrase, "I'm not a chemist" was repeated by almost every respondent when asked to look at the chemical name of a product. Some said they would prefer to have all ingredients generically described in layman's terms.

Active/Inert

A few said they had never heard the word "inert" before, and none professed to know the difference. Some guessed that active is what made the product work, and inert is the rest of it, the "filler." One person, when she noticed that the highest percentage was inert, thought that was the most important ingredient.

Differences among cities.

In the Cincinnati pilot interviews, there was a general perception that products for outdoor use were more hazardous than indoor products, and that cleaners and disinfectants were the "safest"; in LA, the perception of risk appeared to be based more upon the form of the product than upon where the product was to be used.

Other Observations:

- People generally liked having poison control numbers on the product label;
- Several people wanted shelf life information, expiration dates;
- People appeared to be associating sub-level information (e.g., green bottles imply environmentally friendly products; the "Safer" brand name also was seen as an indication that the product was environmentally safer);
- There was an observation by one woman that more and more information was being added to labels over the years. This was not a complaint, but rather an indication that people were understanding more, and being given more, information.

III. Literature Review

This literature review provides EPA with a synopsis of the wide range of consumer labeling research applicable to the Consumer Labeling Initiative (CLI). Topically, the review is limited to issues related to consumer perceptions and understanding with respect to labeling and does not directly address consumer behaviors, for which there is significantly more research in the public domain. Such a summary provides all those involved in the CLI with background information with which to interpret results of the primary research and assist in formulating next steps for further research and policy development.

This review relies on research previously carried out by EPA and other Stakeholders and is not exhaustive in certain areas. Another significant limitation is that referenced studies may differ substantially in the questions they are trying to answer, in the study design employed, and in the conclusions they draw. Certain details are presented within the text of the review. Greater detail, such as date, target audience, sample size, methodology and research objective(s) are presented for each referenced study in an annotated bibliography, which can be found in Appendices A and B.

Readers should note that the majority of literature found on product labels appeared to focus mainly on the precautionary component of the label, although many studies did not specify which part of the label was analyzed. Because all parts of the label are essential to mitigate potential risk, this literature review is limited by the lack of information on other label components. It should also be recognized that there are many semantic differences among the studies referenced and that the terms "hazardous waste" and "risk" are not defined or used consistently. While we have attempted to use the authors' own wording, the term "risk," in general, is not a statutory definition but refers to the potential toxicity of a product, not addressing the likelihood of exposure. We did not assign a definition to the term "risk" (e.g., human/ecosystem, acute/chronic effects) when there were no additional descriptive phrases; the original studies themselves may provide readers with greater context for how this term is used.

The review is organized into three major sections as proposed in the CLI Research Plan:

1. Consumer Understanding of Environmental, Health and Safety Issues
2. Consumer Perception of Product Attributes
3. Consumer Reaction to Labels

In this section, we have attempted to capture and present the range of research that is applicable to the CLI in these three topics. In many instances, the findings of studies are not consistent nor conclusive but are presented for the reader to interpret.

1. Consumer Understanding of Environmental, Health, and Safety Issues

Consumer Knowledge about Environmental Issues

Consumer understanding of environmental issues is a complex set of topics that has not been well researched. To investigate this issue thoroughly, relationships between consumer knowledge, concern, understanding, and misunderstanding of environmental issues must be carefully considered. There are also important distinctions between consumer concerns about health and family and concerns about the environment at large. These caveats notwithstanding, existing research suggests that consumers are not very knowledgeable about basic environmental facts, despite a growing interest in and concern for environmental issues such as wildlife diversity, pollution, and solid waste. In addition, consumers who are aware of, or concerned about, environmental issues tend to be more critical about manufacturers' product claims than consumers who are uninformed or uninterested. Within this topic, the following studies were identified.

Recent research suggests that there is a correlation between wealth and education, and level of environmental awareness and activity. According to some surveys, however, the correlation between demographics and environmental awareness does not extend to consumer purchasing behavior. Also, some studies have indicated that a) many consumers do not understand the specific environmental terms they encounter, and b) consumers often do not follow through on their own assertions that they would preferentially purchase environmentally preferable products. (U.S. EPA, 1994. *Determinants of Effectiveness for Environmental Certification and Labeling Programs.*)

According to a 1991 survey of 2,000 adults performed by the Roper Organization for S.C. Johnson Wax, Inc., Americans are not very knowledgeable about the environment, despite a growing interest and concern for environmental issues such as wildlife diversity, pollution, and solid waste. In a test consisting of five true/false questions and five multiple choice questions on basic environmental facts and issues, the "typical" American scored only 33% correct. (Roper Organization, 1991 *America's Environmental GPA*, p. 2.)

According to a study of undergraduates by Davis (1995), different consumers will interpret environmental information about products in various ways, and those consumers who are more involved with environmental issues may be more critical of implied product information regarding environmental attributes. (Davis, 1995. *The Effects of Issue Involvement and Implications in Product Information on Product Attitude and Purchase Intention: A Look at the FTC Guidelines for Environmental Marketing.*)

In a set of focus groups designed to explore use and disposal of household chemicals among minority groups, most participants thought they were not getting enough information about household chemicals and their effects. Participants were particularly interested in more information about "non-chemical" alternatives to "hazardous" household products. Many thought that local governments should continue to spend money on public education on these topics, but several participants thought it was up to manufacturers -- not government -- to disseminate hazards information. (Elway Research, Inc., 1995. *Household Hazardous Waste Focus Groups*, p. 7.)

In this same set of focus groups, some participants were specifically recruited from urban areas and others for whom English is a second language (ESL) and were asked how they disposed of leftover household chemicals. Few urban participants seemed to know about safe disposal programs, although some mentioned knowledge of safe disposal facilities. Participants in the ESL group were also generally unfamiliar with ways to dispose safely of household chemicals, and almost all of them put leftover chemicals in their regular garbage. (Elway Research, Inc., 1995. *Household Hazardous Waste Focus Groups*, p. 7.)

In contrast, a related survey of 239 adult Seattle residents and 161 King County residents living outside Seattle who purchase household cleaners, paints, or garden supplies found that "more than six out of ten Seattle and other King County residents said they had adequate information about the health effects of household hazardous products." (Elway Research, Inc., 1994. *Household Hazardous Waste Survey.*)

Respondents to a 325-person survey on household hazardous waste reported themselves to be extremely knowledgeable about what products are hazardous and unsuitable for the regular garbage. Over 95% of the respondents knew that hazardous products such as pesticides should not go into the regular garbage. (Patmont and MAR-KEY Research, 1992. *King County Residential Opinion Survey of Household Hazardous Waste Issues: Round II, 1991*, p.25.)

Consumer Perception of Household Product Safety

Several studies showed that, in general, consumers perceive little or no threat from household products, and that they believe injury occurs because products are used incorrectly. Several other studies showed that people want more information about products perceived to be less hazardous than others, and that consumers are becoming more interested in using such products. Within this topic, the following studies were identified.

A 1988 Decision Research survey of 720 respondents revealed that most participants perceive "little or no threat to themselves from household chemicals in general." Ninety-five percent of survey respondents agreed that "most household products and chemicals could be used safely by following package instructions." Respondents also identified "consumer inattention to package warnings and instructions" as the two most likely causes of safety problems involving household chemicals. (Kraus and Slovic, 1988. *Consumer Risk Perceptions of Household Chemicals Study Report*, p.5.)

In a study of 750 subjects, injury accidents involving all types of household chemicals were perceived to be largely preventable. There was a wide range of perceptions about the severity of injury that may result from an accident; however, respondents indicated that proper action could, in most cases, reduce the severity of the consequences of that accident regardless of the type of product involved. Respondents did not express a great deal of concern that these types of products or their ingredients would pose very great risks to the environment. (Neil, Slovic, and Hakkinen, 1993. *Mapping Consumer Perceptions of Risk*, p. 12.)

In the study of Seattle and King County residents, 127 reported that they were pesticide users. Of these, 17% reported that they would use "less hazardous bug and weed killers" if information on such products

was more readily available, and 11% said they would use less hazardous products if they were more effective. (Elway Research, Inc., 1994. *Household Hazardous Waste Survey*, p. 16.)

A King County report summarized the results of a survey done in 1994 of 1,661 King County residents, and compared them to the results of a baseline survey done in 1992 of 1,600 King County residents. Between these two years, the number of people who reported no longer using any pesticides increased slightly from 2.5% in 1992 to 4.5% in 1994, but the number of people who reported using a greater amount of pesticides increased from 1.4% to 3.8%, respectively. (King County, 1994. *King County Household Hazardous Waste Survey*, p.16.) Six percent of respondents who used toilet bowl and bathroom cleaners indicated that they use a "less-toxic" variety, about 30% made an effort to use a less-toxic product, and 58% made no effort. (King County, 1994, p. 17.) In another King County study conducted in 1991, over 95% of the 325 survey respondents indicated that they knew that pesticides were hazardous and should not be discarded in the regular garbage. (Patmont and MAR-KEY Research, 1992. *King County Residential Opinion Survey of Household Hazardous Waste Issues: Round II, 1991*, p.25.)

2. Consumer Perception of Product Attributes

When consumers purchase any product, they make a very personal and complex assessment of the product's attributes, including: perceived quality/expected performance, price, availability, and convenience, as well as attributes specific to the product category. Consumers, to varying degrees, also factor possible health and environmental risks into their product purchasing decisions. Research shows that the process of forming risk perceptions is highly influenced by individual experience and is often not correlated with actual risk. Consumers also have a difficult time integrating multiple risk attributes (e.g., controllability, familiarity, severity of adverse outcome) into an accurate estimate of overall risk. Because of the difficulty in accurately evaluating product risks, if any, consumers often simplify their decision-making.

Risk Perception

People generally have difficulty assessing risk accurately. Studies reported that people's risk perception is greatly affected by past experience and familiarity in addition to characteristics such as voluntariness of exposure and controllability. Additionally, there is evidence that people do not easily process multiple risks and assess overall risks. Within this topic, the following studies were identified.

One study noted that people's perceptions of risks are often inaccurate. People tended to overestimate some risks (e.g., death by airplane crash and homicide), while underestimating others (e.g., death by car crash and diabetes). Researchers also noted that people have a difficult time dealing with multiple risks. For example, if a product such as a drain opener includes risks of contact burns and poisoning, what overall risk do consumers project? The authors suggested that people find it difficult to combine multiple items of information and therefore may be biased in forming overall risk perceptions of products that have multiple risks. (Bettman, 1986. "Cognitive Considerations in Designing Effective Labels for Presenting Risk Information," pp. 2-8.)

A 1986 study of undergraduates by Leonard, Matthews, and Karnes found that personal experience greatly affects risk perception. People tended to overestimate risk if they could recall or imagine instances of risk. Similarly, if an event had not occurred recently, people tended to underestimate risk. Researchers suggested that consumers also ignore information that they feel has little benefit. As a consequence, if consumers perceive low risk from a household cleaner, then they will probably ignore information regarding the product's potential risk. (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 6-2.)

Another report stated that risk perception is sensitive to value-laden, qualitative characteristics, such as catastrophic potential, controllability, familiarity, voluntariness of exposure, and severity of consequences. Personal experience and media exposure were two factors that increased familiarity and greatly biased risk perception. (Neil, Slovic, and Hakkinen, 1993. *Mapping Consumer Perceptions of Risk*, pp. 2-5.)

From the same study, researchers reported that participants perceived little or no personal threat from household chemicals. In addition, 95% of respondents felt that most household products and chemicals could be used safely by following package instructions. Respondents also perceived that consumer inattention to package warnings and instructions were likely causes of safety problems involving household chemicals. Injury accidents were perceived to be largely preventable. Although respondents varied widely on the expected severity of sustained injuries, they felt that proper action would often mitigate injury severity regardless of product type. In this study, researchers found little concern over the environmental risks of household products. (Neil, Slovic, and Hakkinen, 1993. *Mapping Consumer Perceptions of Risk*, pp. 5-12.)

Incorporating Risk Perception into Decision-making

What factors do consumers consider when making purchase decisions? Product effectiveness, cost, potential health risk, and environmental risks are some factors involved in consumer decision making. Much of the available research identified in this project focused on risk issues in such decision-making. Several studies indicated that consumers face challenges when making decisions on household products. Additional research suggested that consumers may avoid considering possible risks or adopt heuristics (or rules of thumb) to simplify the decision making process. Within this topic, the following studies were identified.

One report noted that consumers have trouble making tradeoffs when a standard product is compared against one with enhanced performance and greater risk. Empirical evidence indicated that people find it difficult to trade off the greater perceived benefits of one brand of household cleaner against those of a second brand of cleaner when the former had a higher level of risk associated with it. The report suggested that inadequate information about comparative risks and benefits further challenges the consumer in making tradeoffs. (Bettman, 1986. "Cognitive Considerations in Designing Effective Labels for Presenting Risk Information," pp. 2-5.)

In the same study, researchers found that consumers had great difficulty making decisions among risky options when tradeoffs were involved. The authors suggested that consumers react in two ways when faced with multiple decisions: consumers may deny the risk and treat the risk as negligible; or they may

adopt heuristics that allow the consumer to ignore some of the available information. Both of these tactics are strategies to simplify the decision making process. Coping with information about risks is complex and difficult, and these mechanisms allow consumers to use their limited cognitive capacity to process available information. (Bettman, 1986. "Cognitive Considerations in Designing Effective Labels for Presenting Risk Information," pp. 6-8.)

Recently conducted focus groups made up of Seattle residents found that respondents were ambivalent about product tradeoffs involving risk and effectiveness. Respondents expressed concern about using bombing techniques to rid one's home of cockroaches because of the pervasive nature of bombing and the accumulation of harmful effects. On the other hand, respondents were skeptical that traps would be as effective as bombing, especially since traps would have no effect on pests' nests. (Elway Research, Inc., 1995. *Household Hazardous Waste Focus Groups.*)

The results of two focus groups indicated that households with children are more sensitive to buying products with lower perceived risk levels. Focus group participants reportedly switched from using pesticide pellets to a certain liquid pesticide because they were perceived to be safer for children and pets. (Brattesani, 1993. *Metro Hazardous Household Products Focus Groups Report.*)

A survey of Seattle and King County residents found that a larger percentage of families with children purchased "environmentally friendly cleaning products" (which may include "non-chemical" attributes, such as recycled content containers) and "environmentally safer" pesticides. They reported that 66% of families with children at home purchased environmentally friendly cleaning products compared with 60% of households with three or more people and 41% of single-person households. Households with children were more likely than the population as a whole to say they used fewer pesticides recently (63% and 52% respectively) although households with children were less likely to report having recently purchased "environmentally safer weed or bug killers." (Elway Research, Inc., 1994. *Household Hazardous Waste Survey.*)

The same survey found that "half of Seattle residents and almost half of other King County residents said they would pay extra for increased efforts in household hazardous waste education, safe disposal, and waste reduction information." (Elway Research, Inc., 1994. *Household Hazardous Waste Survey*, pp ii-iii.)

A similar study compared the results of two surveys done in 1990 and 1991 (the baseline and round two, respectively). Both groups surveyed showed considerable willingness to pay more for environmentally safer products, 74% in the baseline survey, 75% percent in round two. Nearly half of both groups were willing to pay 10% for alternative products. Likewise, the groups also expressed that they would be willing to "use more elbow grease in place of toxic cleaners." (King County, 1991. *King County Residential Opinion Survey of Household Hazardous Waste Issues: Round II*, 1991, pp 19, 25.)

3. Consumer Reaction to Labels

Product Selection

Product selection is a personal and complex activity; the factors that influence product selection are difficult to observe and study. Research on information sources used in product selection was found to be quite limited. One factor that may contribute to the lack of data found in this area is that other factors affecting consumer choice may be far more powerful than precautionary or hazard statements on product labels. Such forces may include advertisements of products seen by consumers well before they ever enter the store, loyalty to specific brands, and familiarity with certain types of products. The majority of the studies identified focused on precautionary labeling, even though several components of the label are essential for proper product use. The main issues that surfaced in the literature about product selection were whether or not consumers read precautionary statements on labels, how explicit consumers want such statements to be, and how the level of explicit information affects product desirability.

Consumer acceptance of labels during product selection

We have defined consumer *acceptance of labels* in terms of the level of credibility labels have as sources of information as well as the preferability of label components such as format, language, etc We have also defined it to include the likelihood that consumers are aware of the various label components.

Do consumers read labels?

While asking the question as to whether or not consumers read product labels, studies with conflicting conclusions were found. Studies indicated both that consumers do and do not read labels when selecting products, depending on circumstances. Most of the literature focused on the precautionary label information in particular. Within this topic, the following studies were identified.

An evaluation of consumer labels on non-FIFRA products found that consumers do not search out or read precautionary statements before purchasing a product. (Mrvos, Dean, and Krenzelok, 1986.) (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 2-13.)

It is unlikely that consumers rely on caution labels alone to assist them in making decisions about the safety of a product, concluded a study of 720 panelists. The study found that 66% of the panelists do not read precautionary information on product labels, but 81% felt safer when using a product with such information. (Kraus and Slovic, 1988. *Consumer Risk Perceptions of Household Chemicals*, p. 48.)

King County ran two sets of consumer focus groups in 1993 on consumer "hazardous" household products to determine general public awareness about such products. When they asked participants to select one of six bathroom cleaning products, almost none of the participants looked beyond the product name to make a selection. Participants said they would "look for a product they knew, or they would look at the label to see if it was meant to do the job." Participants were not accustomed to reading the labels very thoroughly. (Brattesani, 1993. *Metro Hazardous Household Products Focus Groups Report*, p. 8.)

A survey of twenty-five pesticide industry experts who speak frequently with consumers analyzed their perception of consumer concerns about labeling information and product usage. The survey found that ["most"] of the experts believed pesticide labels have "at least some impact" on consumer purchasing

decisions, and that consumers most frequently read label information before purchase to determine whether the product will solve their problem, the number of applications they will receive, and what environmental or safety considerations are important. A "minority" of respondents disagreed, stating that consumers primarily buy on the basis of advertising and brand recognition, not detailed information on the product label. (Fleishman-Hillard Research, 1996, pp. 5.)

In a survey of 1661 King County residents, 14% stated that they did not read the label when trying a new product, and that 13% check for safety for children and pets, 30% check for other health/safety/toxicity information, and 24% check for environmental information. (Decision Data Inc.,1994. *King County Household Hazardous Waste Survey*, p.18.)

Misperception of risk is compounded by the possibility that consumers will "ignore information which they feel has little benefit." If there is little perceived risk, then there is little perceived additional benefit to be gained from reading a label. (Bettman, 1986. "Cognitive Considerations in Designing Effective Labels for Presenting Risk Information." p. 2-5.)

Explicit information

Inconsistent research exists surrounding the level of label explicitness desired by consumers. The explicitness of a warning usually refers to the level of detail used to describe information presented in the warning. It is also unclear what effect an increase in perceived hazard has on the desirability of a product. Some studies show that consumers want explicit hazard information while they are selecting products and that they view precautionary statements positively, while others find that consumers may be negatively affected by detailed hazard information on product labels. Within this topic, the following studies were identified.

A study of 300 consumers compared their reaction to the descriptions of three cleaner/ antimicrobial products: one with cleaning benefits but with neither antimicrobial benefits nor a caution, another with cleaning and antimicrobial benefits (based on product safety profile, no cautions were required), and the last with cleaning and antimicrobial benefits, as well as a FIFRA caution label. Consumer interest in the product dropped significantly with the presence of the FIFRA label (33% to 23%), and negative comments increased about both the ingredients used and the perceived safety (7% to 12%). The non-caution-labeled product was also considered safer for children when compared to the FIFRA-labeled product (56% to 44%). (Procter & Gamble. *Household Cleaning Product Concept Test Comparing EPA Labeling vs. No Labeling.*)

The study of 720 consumers found that products lacking a precautionary or warning statement are not considered safer to use than a similar product *with* a precautionary or warning statement. Similarly, the study did not find that a product is considered more risky if it *has* caution or warning information. It found strong evidence that consumers view precautionary and warning statements positively. Consumers felt that such statements provide valuable information about how to use household products in a safe and effective manner. (Kraus and Slovic, 1988. *Consumer Risk Perceptions of Household Chemicals Study Report*, p. 49.)

A study conducted by Laughery and Stanush (1989, 108 undergraduate students) found that subjects feel that manufacturers who report more detailed safety information are more concerned about consumer safety. The results of the study did not show any significant effects of perceived manufacturer's concern on potential buying decisions, and while there was no clear indication that more explicit warnings specifically influence purchase decisions, there was some indication that greater understanding of the hazard may lead to a greater likelihood of purchasing the product. Vaubel and Brelsford (1991, 73 undergraduate students) found that subjects had an overwhelming preference for explicit warnings and that the vast majority (89%) preferred explicit warnings when faced with a decision to buy an unfamiliar product. (CPSC, p. 3-9.) Ursic (1984, 91 subjects) found that consumers viewed warnings very positively and that warnings on one product caused suspicion about competitor products that do not have warnings. (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 5-20.) [The studies done with college students may not be representative of the general population.]

Product Use

This section looks at literature on consumers' reliance upon various label components while the product is being used. This topic can be broken down into two main sections: consumer acceptance of labels and consumer understanding of labels. While several parts of the label may be essential for proper product use, the majority of studies focus on the precautionary component. We define consumer acceptance of labels in terms of the level of credibility of labels as sources of information as well as the preferability of label components such as format, language, etc. We have also defined it to include the likelihood that consumers are aware of the precautionary component of a label. Few sources were found about proper use of products as it relates to consumers' ability to follow label directions. Research done on consumer understanding of labels is mostly composed of analyses of the label components that encourage compliance with warnings and consumer ability to get the information needed in first aid situations.

Consumer acceptance of labels during product use

Do consumers read labels?

Results from studies varied greatly as to whether or not consumers read labels. Some studies determined that consumers rarely read precautionary labels while using a product, and others found that consumers usually read labels, and that most consumers look for precautionary information all or some of the time. Other studies analyzed <u>when</u> consumers read labels. Studies primarily analyzed the precautionary components of labels. Within this topic, the following studies were identified.

In a survey done by the Office of Pesticide Programs (OPP) of people in the pesticide industry, state agencies, environmental organizations, the farm industry, and people who used pesticides in the home, respondents generally agreed that very few people read "an entire label." People appeared to blame several factors for discouraging the reading of information on pesticide labeling. For example, the "legalese," redundancy, and crowded format of the label text appeared to discourage some users from reading the label. (U.S. EPA, 1986, Draft. *Pesticide Label Utility Project Report.*)

One observation that surfaced from a set of two focus groups analyzing consumers' knowledge of hazardous products was that, "Although participants knew that information about product hazards was available from the label, they did not make use of it and did not feel the ingredient lists were useful." (Brattesani, 1993. *Metro Hazardous Household Products Focus Groups Report*, p. 11.)

One report cited that one respondent, a poison control center director, claimed that in 1985, over 63% of the 560 poisonings handled at the center "resulted from actions directly contrary to the directions provided on the product label." The report does not state how many of these poisonings were pesticide poisonings. (U.S. EPA. 1986, Draft. *Pesticide Label Utility Project Report*, p. 5.)

Twenty of the 25 pesticide industry experts believed that the directions for use were read by consumers. Sixteen believed that the precautionary section was read, 14 believed the ingredients statement was read, and 10 believed the directions for storage and disposal section were read. The ingredients section and the directions for use section were considered by 12 and 9 respectively to be the most difficult for consumers to understand. (Fleishman-Hillard Research, 1996, pp. 15.)

A survey performed on 239 and 161 Seattle and King County residents who buy household cleaners, paints, or garden supplies, asked how often they "read product labels for any warnings or disposal directions" on household hazardous products. The researchers found that 46% of Seattle residents and 34% of other King County residents said they look for such information "all the time." Among Seattleites, an additional 46% said they look for such information "most of the time," or "some of the time." Six percent of Seattleites, and 12% of other King County residents said that they "never look" for warning labels. (Elway Research, Inc., 1994. *Household Hazardous Waste Survey*, p. 12.)

Safety instructions were read more frequently when they were moved from "Precautions" to "Directions for Use." (37% and 89% of respondents, respectively). Subjects read more than 90% of the safety instructions when they were completely integrated into "Directions for Use," 64% when instructions were partially integrated, and 60% when instructions were completely separated. (Frantz, 1993, 80 undergraduates.) (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 6-16.)

Studies showed that consumer perception of product hazardousness is the most significant indicator of whether or not they will read the precautionary label, followed in significance by the level of familiarity with a product. Leonard et al. (1989, 70 undergraduates) found that the more hazardous a product was perceived to be, the more willing the subjects were to read the warning. Similarly, Godfrey et al. (1983, 32 undergraduates) and Wogalter et al. (1986, 70 undergraduates) found that perceived hazardousness was the most important determinant of willingness to read a warning label. Godfrey et al. found that subjects had a lower perception of hazardousness with more familiar products, and Lerner (1985, 80 undergraduates) found that individuals with "benign" experiences are often less likely to read and comply with warnings. (CPSC, 1995. *Product Labeling Guide, Literature Review*, pp. 6-3 - 6-5.)

"Reading, understanding, and following information presented on pesticide labels are dependent on one another. In order to understand the information, one must first read the label. In order to follow the instructions, one must understand what was read...." The OPP study noted contradictory opinions regarding whether pesticide labels are utilized, and specifically, by whom. Some of the people interviewed believed household users of pesticides often read and attempt to follow the directions because they believe that the product will harm them, while others believed homeowners disregard the information due to the belief that if it were not safe, it would not be on the market. (U.S. EPA, 1986, Draft. *Pesticide Label Utility Project Report*, pp. 2.)

Credibility of precautionary information

Most research found that consumers believe product labels. Findings from studies brought up ideas about consumers' view about the reliability of labels, and what consumers view as causes of safety problems. The credibility of pesticide labels in particular was questioned by one study. By and large, studies that were analyzed dealt with the precautionary components of labels. Within this topic, the following studies were identified.

The credibility of pesticide labels was called into question by a number of the commenters in the OPP study. According to the authors, "Most people believed that statements which are meaningless, unenforceable, ambiguous, or unreasonable serve to decrease the credibility of the entire label which results in a smaller percentage of people following the instructions presented." Some respondents appeared to suspect the validity of the labels because of their "boilerplate" nature. Others questioned whether following the directions would provide sufficient protection from the potential hazards. Examples of confusing terms included "avoid drift or runoff," "do not contaminate water," and "keep away from wildlife (found on a rat poison label)." (U.S. EPA, 1986, Draft. *Pesticide Label Utility Project Report*, p. 4-5.)

A survey of 720 adults analyzed consumer's views about sources of information. It found that consumers consider caution and warning statements on product labels to be among the most reliable sources of safety information about household products, surpassed only by the perceived reliability of poison control centers and physicians. Seventy-five percent of respondents believed that precautionary labels were reliable, 98% percent felt that a poison control center was reliable, and 90% felt that "your doctor" was reliable. Product manufactures and the government were considered reliable by 60% and 59% respectively. (Kraus and Slovic, 1988. *Consumer Risk Perceptions of Household Chemicals*, p. 49.)

The same survey found that 95% of respondents believe that most household products and chemicals can be used safely by following package instructions, and that the two most likely causes of safety problems result from consumer inattention to package warnings and instructions. Twenty-seven percent of the respondents indicated that a manufacturer's failure to list all caution or warning information on a product would be among the three most likely causes of safety problems. (Kraus and Slovic, 1988. *Consumer Risk Perceptions of Household Chemicals*, p. 7.)

In a set of two focus groups, respondents agreed that the product label was the best source of information about the hazard level of products, and that store personnel are not good sources. If a new rating system were developed, respondents would most likely trust a system developed by a third-party consumer group, and least likely to trust one developed by product manufacturers. Other credible sources would be government agencies. (Brattesani, 1993. *Metro Hazardous Household Products Focus Groups Report*, pp. 9-11.)

Consumer understanding of labels during product use

First aid

Evidence shows that even though the availability of readily accessible first aid information can be very valuable, consumers generally read first aid information only after an accidental exposure to a product. Within this topic, the following studies were identified.

P&G began producing Spic and Span Pine with voluntary first aid instructions, Accident Management Labeling, in 1987. This was possible when P&G discontinued pesticide registration so that the labeling was no longer regulated under FIFRA. The voluntary labeling provided what was considered to be more consumer-friendly first aid instructions for accidental ingestion. As a result of this additional labeling, P&G measured a 50% decrease in comments made to the 800-line, which was almost exclusively due to a decrease in ingestion comments. Data for other products showed a similar pattern of decreased 800-line calls for first aid information after adding to the product label first aid information. (Procter & Gamble memo, *The Effect of Voluntary Accident Management Labeling on the Consumer Comment Rate for Spic and Span Pine.*)

Results from an evaluation of consumer labels on non-FIFRA products found that consumers read first aid and warning information only after exposure to a poisonous product. (Mrvos, Dean, and Krenzelok, 1986.) (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 2-13.)

Likelihood to follow precautionary instructions

Studies found that consumers seem more likely to comply with warning instructions when they are easier to follow. Other studies found that consumers may or may not be more likely to follow precautionary labeling if they must interact with the label. Within this topic, the following studies were identified.

When asked if consumers typically follow instructions on pesticide product labels, 16 of the 25 pesticide industry experts agreed that they do, although other comments made during the survey indicated the belief that consumers do a "good but not thorough job of reading and understanding" the information on labels. Similarly, most of the respondents in the survey were of the opinion that pesticide product labels can have a big impact on how the consumer uses a product, and many noted that the labels could have a positive impact <u>if</u> the consumer reads it. (Fleishman-Hillard Research, 1996, pp. 15, 16.)

Several studies have found that the cost of compliance is the greatest indicator of label effectiveness. Two studies of warning compliance had subjects try a cleaning product that required the use of gloves. In each case, the subjects supplied with gloves demonstrated a significantly higher compliance rate than those without (88% and 25%, respectively). (Hunn and Dingus, 1992, 356 undergraduates, 14 people from a university community; Dingus, Hathaway, and Hunn, 1991, 318 undergraduates.) A study of chemistry students had similar results. Students used masks and gloves 73% of the time when the cost of compliance was low, and 25% of the time when it was high. Costs were manipulated by varying the location of the masks and gloves. (Wogalter, McKenna, and Allison, 1988, 23 undergraduates.) In addition, the inclusion of the gloves in the package appeared to increase the perception of danger associated with the product use. (Hunn and Dingus, 1992.) (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 6-8.)

Several studies have examined whether the likelihood of compliance increases when the subject must interact with the warning label to use the product. Two studies found a positive correlation, one with a spray bottle containing a cleaning solution. (Dingus, Wreggit, and Hathaway, 1993, 224 adults.) Each of the three groups tested used a bottle with a different type of label. One bottle had a conventional consumer label, another had a one time interactive warning, and the last had a continuously interactive trigger-block warning. The study found that subjects are more likely to comply with warnings when they are required to interact with the warning label. The other study had similar results, finding that interactive labels were noticed, read, and complied with more often than the conventional on product label. (Duffy, Kalsher, and Wogalter, 1993, 120 undergraduates.) (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 6-15.)

Two other studies had contrary results. One, testing subjects' use of a spray bottle labeled similarly to those above, found that interaction with an interactive trigger block warning had no significant or meaningful effect on compliance. (Hunn and Dingus, 1992, 356 undergraduates, 14 people from a university community.) In another, three groups of subjects used an electric space heater, each with a different label (traditional tag on the back of the heater, ski-pass designed label on cord, and a plastic label on the cord that has to be bent back to plug it in). It was found that none of the warning label designs were effective in encouraging safe behavior. The interactivity was, however, more attention-getting, and a significantly greater number of subjects recalled observing the interactive label. (Gill, Barbera, and Precht, 1987, 83 adults.) (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 6-15.)

Older users are more likely to take precautions in response to warnings (Desaulniers, 1991), and warnings are more likely to be effective with women than with men. Researchers found that women report a greater likelihood to look for and read warnings (Godfrey, et al., 1983, 32 undergraduates), and women are more likely than men to take appropriate precautions. (Goldhaber and deTurck, 1988; Vicusi, et al., 1986; Desaulniers, 1991.) (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 6-1.)

Product Storage and Container Disposal

Methods by which consumers store products and dispose of product containers have not been studied extensively. The studies encountered analyzed the way in which consumers are likely to follow disposal instructions, the level of detail consumers desire in disposal instructions, the effect label information has on the way consumers dispose of products and of empty product containers, and whether or not consumers look for disposal information before purchasing a product. Within this topic, the following studies were identified.

One study compared two sets of consumers and the way each disposed of disinfectant containers. One group prepared a container for disposal following a CSMA recommended label, and the other an EPA recommended label. The CSMA label used simple language in the preparation instructions, and the EPA recommended label detailed a specific method for disposal preparation, including triple rinsing the container. The study concluded that the two sets of consumers prepared product containers in a very similar manner. In both sets, seven in ten rinsed the containers. Although the CSMA label does not specify the number of times a product container should be rinsed, consumers from this set rinsed the

container as many times as the consumers using the EPA label. (Walker Research, 1994. *Disinfectant Product Disposal Label Study.*)

A similar study on home lawn and garden product disposal also had two sets of consumers prepare product containers for disposal, following both Chemical Specialties Manufacturers Association (CSMA) and EPA recommended labeling. The study found that consumers following the EPA label were more likely to rinse and shake the bottle. The study concluded that 79% of the consumers believed that the CSMA recommended label was easier to understand than the EPA recommended label. In addition, 87% of consumers stated that they would be likely to follow CSMA instructions "both completely and accurately when disposing of such products at home." Sixty-one percent of the consumers using the EPA label said they would be likely to follow the instructions to such an extent. (Walker Research, 1994. *Home Lawn & Garden Product Disposal Label Study.*)

When asked about the degree to which a product label influences consumer disposal behavior, 12 out of 25 industry experts believed that it has "very little" or "not that much" influence. (Fleishman-Hillard Research, 1996, p. 21.)

A survey of 1661 King County residents found that only 4% check label for disposal information when selecting a new product. (Decision Data Inc., 1994. *King County Household Hazardous Waste Survey*, p.18.)

General Aspects of Precautionary Label Design

Ideally, precautionary labels are easily understood, inviting, and both utilized and helpful to consumers. It is also critical that consumers are able to quickly locate pertinent information, because precautionary labels are often used on an as-needed basis (e.g., the first aid instructions). Numerous studies have been done to determine the most effective ways to display information so that labels can have the aforementioned qualities. This section lays out studies in three main categories: precautionary label readability, format, and symbols. Readability touches on general comprehension, reading level, target populations, signal word understanding, and the order of information presented on a precautionary label. Studies found on label format illustrate ideal designs for positioning a label on a product container, as well as effective letter heights, fonts, uppercase versus lowercase letters, bolded text, and color. The last part analyzes the usefulness of precautionary symbols, and what qualities of symbols are the most easily understood. The majority of the research that relates to label formats and symbols comes directly from the Consumer Product Safety Commission's *Product Labeling Guide, Literature Review*.

Readability

First and foremost, it is essential that precautionary labels be readable and easy to locate quickly. If, when consulting a label, a consumer must stumble over words and remember long strings of information, the consumer is not likely to internalize the information presented, and will probably miss information that may directly benefit him or her. Within this topic, the following studies were identified.

General comprehension

A study of warning recallability found that "recall of warning label risk depends on the frequency of information communicated, whether the information is dramatic, sensational, or heavily reported in the

media, and the vividness and personal relevance of the information." (Bettman et al., 1986.) A warning may be ignored if it is "perceived as providing few rewards or involving little risk or danger," and consumers may simplify the message if a warning is too complex. (U.S. EPA, 1994. *Determinants of Effectiveness for Environmental Certification and Labeling Programs*, p. 67.)

"Most participants expressed a clear preference for a simple code, sticker, color coding, or bar graph on the product to indicate the extent of hazard along a single criterion. In other words, they want a simple way to judge hazard level, one that does not rely on familiarity with chemical names." (Brattesani, 1993. *Metro Hazardous Household Products Focus Groups Report*, p. 10.)

Researchers found that properly designed warning labels "boost consumers' intentions to take safety precautions." In processing the information, however, consumers were found to trade off increased recall of risk information for a decrease in the recall of product usage information. The study found a point of diminishing returns with the amount of risk information that could be presented on a label. (Viscusi and Magat, 1978.) (U.S. EPA, 1994. *Determinants of Effectiveness for Environmental Certification and Labeling Programs*, p. 67.)

U.S. EPA's Office of Prevention, Pesticides and Toxic Substances received information about a "talking label" and in a preliminary report mentioned that the use of it is being considered. This label could be a way to encourage greater compliance by pesticide applicators. The "talking label" would be imbedded in a product's packaging, and while it is an expensive method to dispense information, studies showed that a large portion of the pesticide user community does not 1) read the label prior to use; 2) follow the directions for use, resulting in both over- and under-application of pesticides; and 3) communicate to field workers information about the pesticides being applied. According to the Ecological Effects Branch, talking labels have the potential to improve consumer understanding. (The *Talking* Label, March 25, 1995.)

Reading level

While it is generally believed that people are more willing to read shorter, lower reading-level warnings, the results of one study showed the opposite: that subjects were more willing to read the warnings with more sentences and which contained more detailed information. The author of this study noted that because subjects were college students and read at a higher levels than the general population, they may have been more willing to read longer warnings. (Leonard, Ponsi, Silver, and Wegalter, 1989) (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 3-9.)

Researchers have also noted that, although a 4th- to 6th- grade reading level is the generally accepted guideline for warning labels, readability formulas should not be relied on solely to design the message. In fact, Morris, Myers, and Thilman (1980) found that subjects rated a label that was easiest to read as lowest on interest value and positive evaluation of the material. The authors conclude that product labeling should be written for audience acceptance rather than for favorable scores on reading test readability formulas. (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 3-2.)

The pesticide industry experts recommended that to make labels easier to understand, they should have "Fewer words written at a lower education level," and "use very direct, concrete information, word

statements that anyone can understand." The also mentioned that "Most labels are written in legal jargon.... Directions could be written in clear, simple terms so regular people could understand them." (Fleishman-Hillard Research, 1996, pp. 5-7.)

Study respondents felt that pesticide labels should be written to a specific audience and in such a manner that the information can be understood by persons with 6th grade reading levels. Phrases singled out as being difficult to understand included "irrigate eyes" as opposed to "wash eyes with water," and "may cause reversible corneal damage," as opposed to "may cause temporary blindness." (U.S. EPA, 1986, Draft. *Pesticide Label Utility Project Report*, p. 3)

Target populations

"Characteristics of the target population must be considered when determining the wording of the warning message. Laughery and Brelsford (1991) have identified four categories of receiver characteristics that are important for warnings: demographics (gender and age), familiarity and experience with the product or situation, competence (technical knowledge, language, and reading ability), and the perception of hazard. The authors noted that these receiver characteristics seem to have important implications for the design and effectiveness of warnings." (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 3-2.)

In a study that evaluated subject comprehension of words and phrases commonly used in warnings, researchers found that readers did not understand the concepts intended by the warning. The researchers noted sharp decreases in the risk ratings associated with combustible and flammable items. Research to date shows that, even for common words and phrases, warnings must be tested on the target population before use. (Leonard, Creel, and Karnes, 1991.) (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 3-2.)

Signal word understanding

The survey of Seattle and King County residents reported that two-thirds of respondents said that they knew there was a difference between the words "danger," "caution," and "warning" on a product label." (Elway Research, Inc., 1994. *Household Hazardous Waste Survey*, p. ii.)

Perceptions resulting from a set of two focus groups analyzing consumer knowledge of "hazardous" products indicated that consumers were generally aware that "danger" connoted greater hazard than "warning" or "caution," but participants did not realize that these terms have "standard definitions indicating a continuum of greater or lesser hazard." (Brattesani, 1993. *Metro Hazardous Household Products Focus Groups Report*, p. 9)

"Half" of the industry experts believed that such signal words like "caution" or "warning" have an impact on consumer purchases, "particularly among those with children and pets." The remainder of the respondents believed that the words have "some, mild, or no impact." Sixteen of the respondents thought that precautionary words impact consumer use of the product. (Fleishman-Hillard Research, 1996, pp. 22-23.)

"Researchers have found that the presence of a signal word raises hazard perceptions compared to its absence. (Wogalter, Jarrard, and Simpson, 1992; Wogalter, et al., 1987.) In previous work, Wogalter, et al., (1987) found that the removal of the signal word from warning signs reduced hazard perceptions. However, removing the signal word had the least effect on hazard ratings as compared to the removal of the hazard, consequence, or instruction statements. (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 2-3.)

"Researchers suggested that signal words may not effectively communicate the level of hazard. (Lehto and Papastavrou, 1990; Miller and Lehto, 1984.) Studies examining the level of hazard associated with various signal words have been inconclusive. Several studies have found reliable differences in perceived levels of hazard associated with an extreme term such as DANGER when compared with a more intermediate term such as CAUTION or when compared to [a term at the opposite] extreme such as NOTE. However, no significant differences in hazard ratings have been found between intermediate terms such as CAUTION and WARNING. (Silver and Wogalter, 1991; Lirtzman, 1984; Dunlap, Granda, and Kustas, 1986; Bresnahan and Bryk, 1975.) Although not significantly different, ordering of the mean hazard ratings for terms generally conforms to the ordering of terms as defined in most standards. (Leonard, Hill, and Karnes, 1989; Silver and Wogalter, 1991; Wogalter, Jarrard, and Simpson, 1992.) The majority of these studies, however, have not presented labels in context. Rather, they have required subjects to assign signal words to specific hazardous situations or to assign hazard ratings to the signal words. The subjects, in these cases, knew the purpose of the studies, which may have biased their responses. Most studies that present warning labels in a more contextual setting, however, have found no significant effects on hazard perception as a result of the signal word being used. (Wogalter, et al, 1987; Leonard, Matthews, and Karnes, 1986; Ursic, 1984.) (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 2-3.)

"One exception to these observations of contextual differences is the recent study by Wogalter, Jarrard, and Simpson (1992). In this study, product labels were presented to subjects under the guise of a marketing study.... The signal word conditions were NOTE, CAUTION, WARNING, DANGER, and LETHAL. Significant differences were found between the extreme terms (NOTE and DANGER or LETHAL), but not between intermediate terms (CAUTION, WARNING, and DANGER). However, ordering of the hazard means concurred with the ordering of the terms as defined by current standards and earlier research." (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 2-3.)

Order of information

Labels were most easily understood and most likely to be complied with when they contained both a warning label and instructions (e.g., Gasoline - No Smoking), although they were the least likely to be recalled. Labels most likely to be recalled contained a warning label only (e.g., Poison). These also depicted a high degree of danger, but were considered the least informative and most difficult to understand. Signs containing only instructions without labeling the warning (e.g., Do Not Enter) were generally the least effective. (Polzella, et al., 1992.) Similarly, another study found that the proportion of the label devoted to conveying risk information correlated significantly with the tendency to take precautions, and that more direct warnings tended to be more effective. (Wogalter, et al., 1985.) (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 2-10.)

When conveying procedural information, research suggested that it is often preferable to state actions before conditions. In other words, the reader should be given information about what to do before being told when to do it. (Wright, Creighton, and Threlfall, 1982; Dixon, 1982; Wright, 1981.) Besides the structure of the phrasing, positive and negative wording formats should be considered. However, there was no consensus on the relative effectiveness of phrasing statements in a positive form (e.g., wear gloves) or negative form (e.g., do not use without wearing gloves). Easterby and Hakiel (1981) and Sell (1977) recommended against the use of negative forms. (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 3-3.)

Format

Formatting a label takes into account stylistic considerations as opposed to content. This part presents studies on positioning of labels on a product container so as to enhance prominence and compliance to the warning, as well as creating a shape around the label, making it more desirable to read. Other studies presented go into detail about effective type size and font, the benefits of and problems associated with using uppercase versus lowercase letters, and whether text should be bolded or in color. Within this topic, the following studies were identified.

Positioning of label

One study compared strategies for dealing with restricted label space. Barlow and Wogalter (1991) had college students view a small glue container and rate the six different labels used. For the control condition, the warning information was located on the product label. The other labeling methods both increased label area and made the warning more noticeable. These methods included label "wings" surrounding the bottle, a tag attached to the bottle, wrapping the warning on the bottle cap, placing the warning on a box that the bottle sat in, placing the warning on a horizontal disc surrounding the foot of the bottle, and placing the warning on a wrap-around label attached to the body of the bottle. The subjects rated all of the novel label methods as more likely to be noticed and read than the control, with the tag being highest rated. A sample of elderly subjects judged the tag and the wing methods as most likely to be noticed and read. A subsequent experiment by Wogalter, Forbes, and Barlow (1993) yielded similar results. (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 7-3.)

A study disguised as a chemistry experiment evaluated the shape of warning labels and found that when a written label is surrounded by a shape, it is more likely to be complied with than a label with no surrounding shape. (Rodriguez, 1991.) (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 4-6.)

The effect of warning background clutter was investigated by Wogalter, Rashid, Clarke, and Kalsher (1991). A warning sign instructing subjects in a chemistry task to wear protective gear was presented against either a visually cluttered or uncluttered environment. Compliance increased from 14% to 36% when the clutter was reduced (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 7-4.)

Letter height

A study on the optimal character size found that there was a "greater likelihood of reading a warning when the main body was in 10 point size as compared to 8 point size." (Braun, Silver, and Stock, 1992.) Their sample included 40 subjects with a mean age of 18 years, and 22 subjects with a mean age of 65

years. Similar studies have indicated that elderly users are more likely to prefer larger print than the younger users. (Vanderplas and Vanderplas, 1980; Wogalter, Forbes, and Barlow, 1993.) Larger print size may improve noticeability and subsequent readability of the warning for younger users as well, and character heights above what is necessary for optimal legibility may have benefits. (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 4-25.)

The effects of differentiating the signal word letter height from the message text letter height has also been investigated. (Braun, Silver, and Stock, *1992*.) A 2-point size difference between the signal word and the main body of the warning produced a greater likelihood of reading the warning than a 4-point size difference, possibly because the greater difference minimized the importance of the main body of the warning. (CPSC, 1995. *Product Labeling Guide Literature Review*, p. 4-25.)

Research has shown that the size of the signal word has no impact on the perception of risk. (Leonard, Matthews, and Karnes, 1986.) Rather, perception of risk seems to be more a function of the informational content of the sign. (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 4-25.)

Font/Type and letter case

"For legibility and readability factors, research has indicated that serif fonts are advantageous, especially when small type is used." (Braun, Silver, and Stock, 1992.) Additionally, Vanderplas and Vanderplas (1980) have noted that font style did not have a significant effect on young subjects, although older subjects preferred Roman styles. (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 4-25.)

Young, Laughery, and Bell (1992) found that type width affects legibility more so than does inter-character spacing. They concluded that the smaller the type width, the less readable the text. MIL-STD-1472D (1989) recommends stroke widths of 1:6 to 1:7 for black characters on a white or light background, and narrower stroke widths, from 1:7 to 1:8, for white print on a black background. (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 4-25 - 4-26.)

A study about the effects of the case of text found that upper case letters were correctly read at significantly greater distances than lower case letters. (Hodge, 1962.) "In this respect, it is appropriate for the signal word text to be presented in all upper case lettering. However, Tinker (1955) found that using all upper case lettering retards reading by a significant amount. Therefore, the message text may be more easily read when both upper and lower case formats are incorporated, although upper case letters may be used for emphasis. MIL-STD-1472D (1989) recommends that labels be printed in all capitals, but that lower case type may be used when there are several lines of text." (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 4-26.)

One study found that Bold type is more likely to be read than Roman type (Braun, Silver and Stock, 1992), and another found that boldface type increases the readability of lower case type. (Ralph, 1982.) Hartley, Bartlett, and Branthwaite (1980) showed that underlined words were more likely to be recalled. Highlighting (inverting the background and foreground colors) was shown to increase the number of subjects who read the warning, but appeared to have no effect on compliance with the warning. (Strawbridge, 1986) Similarily, Zlotnik (1982) found that highlighting of warning messages had no effect on task performance." (CPSC, 1995. *Product Labeling Guide, Literature Review*, p. 4-26.)

Color

In a review concerning the attention-getting capabilities of color, "Young (1991) noted that several studies have shown that color enhances noticeability (Asper, 1972; Adams & Lien-tsang, 1981).... In one of the most recent studies to date concerning color on warning labels, Young (1991) presented simulated labels for an alcoholic beverage to subjects on a computer screen. Four salience variables (pictorial, color, signal icon, and border) were manipulated. Subjects were asked whether each label contained a warning or not. Results showed that color, along with pictorial and signal icons yielded faster response times. In the same type of study, Laughery and Young (1991) found that location time was 32% shorter when the warning included color (red). The results were consistent with the notion that enhancement features, such as pictorials, color, and to a lesser extent, icons and borders, can result in warnings being more noticeable or attention orienting. This was found especially true when the features are used in combination (total response time was reduced by 47% when pictorials, icons, and color features were used).

"As a method of reinforcing the perception of hazard seriousness and, therefore, improving warning effectiveness, color alone does not seem to be a reliable predictor (Dorris, 1991). Limited studies, however, have found some association between colors and hazard perception. Bresnahan and Bryk (1975) found that industrial workers associated the colors red and yellow with a greater degree of danger than the colors green and blue. Supporting these findings, Collins (1983) found that red, yellow, and orange were selected as the most appropriate colors for indicating hazards. More recent studies, however, have found no significant differences between safety colors in terms of their ability to convey a certain level of hazard. (Bresnahan, 1985; Rodriguez, 1991.) Likewise, in a study of signal word effectiveness, the color of the signal word had no significant effect on the subjects' perception of risk. (Leonard, Matthews, and Karnes, 1986.)

"However, color does show significant effects on perception of risk when used in combination with certain shapes. In a mock chemistry experiment, Rodriguez (1991) studied the effectiveness of various label colors (red, green, and black and white) and shapes (octagon, triangle, no border). The red octagon conveyed a significantly higher level of danger than all other combinations. Similarly, Bresnahan (19[8]5) concluded that the combination of color and shape significantly affected hazard perceptions. A red circle with slash and a red circle alone scored highest in terms of perceived hazard, followed by yellow triangles with black borders, and green rectangles.

"Standardization of colors and color-coding will likely enhance the effectiveness of warnings. As Cunitz (1992) writes, 'we can learn to be more sensitive to certain stimuli which we have come to associate with danger. As a result of this perceptual learning phenomenon, standardized warning colors (e.g. red, yellow and black stripes), shapes (e.g. oval, triangle), signal words (e.g. DANGER, WARNING, CAUTION), flashing lights and sounds (e.g. siren, bell) can take on greater attention-getting ability than other colors, shapes, words and sounds.'" (CPSC, 1995. *Product Labeling Guide, Literature Review*, pp. 4-12 - 4-13.)

Symbols/Shapes

A project on pesticide labels initiated by EPA's Office of Pesticide Programs found overwhelming agreement that the use of symbols on consumer product must be accompanied by an educational

"Level of Abstraction of Symbols/Pictograms

"Studies show that the use of abstract symbols should be avoided. Several researchers have found that subjects have difficulty identifying and interpreting highly abstract topics. (Collins, 1983; Easterby and Hakiel, 1977b; Brainard, Campbell, and Elkin, 1961.) For a particular image content, the level of detail and realism in pictograms can also vary. For example, the familiar U.S. Department of Transportation standard roadway signs use a highly stylized silhouette form for the human figure, while other suggested symbols (see Collins, Lerner, and Pierman, 1982 for examples) use highly detailed representations of the human figure. Generally, if a lay group of viewers is asked to judge which of several versions of a pictorial message they prefer, more highly detailed and realistic pictorial representations are selected. For example, Easterby and Hakiel (1977b) presented subjects with several versions of similar warning symbols. The researchers found that the subjects preferred descriptive and more visually complex symbols and that graphic simplification or abstraction seemed to reduce the perceived appropriateness of the symbols. However, this preference is at odds with the recommendations of graphics specialists, and with the recommendations of common guidelines, which favor bold, simple images. For example, ANSI (1991) recommends solid forms and the avoidance of superfluous detail. Finer detailed images have poorer legibility and are more subject to loss of understandability under degraded viewing conditions (e.g., Collins and Lerner, 1983). Overall, the literature suggests that for symbols that are both understandable and immediately legible, the image content should be concrete, but not more complex than needed, and not dependent upon minor pictorial details for meaning. (Collins and Lerner, 1983.)

"Symbols/Pictograms Context

"The comprehension of a symbol or pictogram is related to the context in which it is presented. There are two senses to this 'context:'message context and situational context. Message context refers to the use of the symbol with other elements of the warning display. In particular, there is a question of whether symbols and pictograms can replace, or merely supplement, written text. Studies of the comprehension of specific symbols and pictograms have certainly identified images that have very high rates of understandability, even in the absence of accompanying text (e.g., Collins, Lerner, and Pierman, 1982). However, in some cases, pictograms may be effective in conveying the general message, but not important subtleties. For example, for roadway signs, people do not discriminate well between the 'advance pedestrian crossing' warning sign and the 'pedestrian crossing' sign. These differ only in the presence of crossing lines at the feet of the walking figure. Supplemental wording can reduce this ambiguity. Also, a single pictogram may not convey all of the recommended aspects of the warning message: the hazard, the result of ignoring the warning, and the appropriate action to take. Frantz, Miller, and Lehto (1991) studied the comprehensibility of a generic flame symbol which was mandated by the Canadian government and displayed on the container of an extremely flammable adhesive product. The researchers found that virtually everyone recognized the symbol and understood that it meant something about flammability. However, only four percent of the subjects recognized the precautions that were necessary to avoid serious injury (e.g., to extinguish pilot lights). The addition of statements regarding the consequences of ignoring the warning and instructions on how to avoid the hazard would have been beneficial.

"Situational context refers to the location of the warning display with respect to the product and the environment. Because the context can provide cues to the message, symbols may be expected to show greater understandability when presented in a meaningful context. This was experimentally verified by

campaign. Many consumers like the idea of shapes and symbolic representations even though they are not usually universally understood. The Consumer Product Safety Commission has compiled extensive research; much of their work is presented here. Specifically, research has been done on symbol components such as the shapes around them, the best degree of abstraction, how viewers of different ages understand various symbols, how symbols affect compliance, and how easily symbols are understood. Within this topic, the following studies were identified.

While the study found varying opinions on the extent to which symbols should be used, there was "universal agreement... that educational efforts are essential if symbols/colors are to communicate effectively." The report demonstrates this point by pointing out that after an extensive educational campaign waged by Canada, 95% of Canadians understood the meaning of the symbols. A similar survey conducted in the United States, where no efforts were taken to educate consumers, showed that the comprehension rate of the population was less than 25%. (U.S. EPA, 1986, Draft. *Pesticide Label Utility Project Report*, p. 8.)

A number of members of the ESL focus group mentioned the need for translation of hazardous waste information, and use of symbols, pictures, or icons to indicate hazard. (Elway Research, Inc., 1995. *Household Hazardous Waste Focus Groups*, p. 9.)

The following research is from CPSC's Product Labeling Guide, Literature Review, (pp. 5-5 - 5-15):

"Effects of Shape Alone on Hazard Perception

"The perceived severity of hazards associated with shape have been studied by a limited number of researchers. Cochran, Riley, and Douglass (1981), in a paired comparisons study, investigated 19 different shapes. The researchers concluded that a triangle pointing downward was most associated with hazard, followed by a square on a point (i.e., diamond), an octagon, and a triangle resting on its base. These results are consistent with other studies evaluating shapes (e.g., Collins, 1983). In general, simple rounded shapes and polygons resting on a base were least associated with danger, while shapes with corners and sharper points were more frequently recognized as warning shapes. Likewise, Bresnahan (1985), found a potential trend for higher hazard association values accompanying more graphic and definitive shapes, although no significant differences were shown based simply on shape alone. In these studies, unfortunately, the shapes being evaluated were not presented to subjects in context. Therefore, the results cannot be directly applied to warning label design without further investigation.

"Effects of Shape and Color Interaction on Hazard Perception

"Although studies of shape alone have produced few statistically significant findings, studies of color and shape interaction have been more definitive. Bresnahan (1985), who found no significant difference in hazard perceptions based simply on shape, found significant differences when shape was varied along with color. Hazard ratings were highest for a red circle, followed by a red circle with a slash. These shape/color combinations were followed by yellow and black triangles, with green rectangles scoring the lowest hazard ratings. In a similar study by Rodriguez (1991), a red octagon was shown to draw significantly higher ratings of perceived danger than other combinations."

Cahill (1975). She compared two groups of subjects. One group viewed a set of symbols for automotive machinery (e.g., bulldozers) with no additional information. The other group was also provided with a diagram of a typical cab. with the location of the symbol indicated on the diagram. Across all subjects and symbols, the effect of context was to substantially improve correct interpretation, with about a 40% improvement in the rate of correct responses. The benefits of context were not the same for all symbols. Cahill noted that symbols that were less directly pictorial and object oriented -- such as the label for the 'choke' control -- were highly dependent on context. Because symbol comprehension is usually tested without a situational context, the level of comprehension observed in such studies may underestimate real-world understandability when the label occurs in an informative context.

"Viewer Characteristics

"Older viewers, as a group, generally show lower levels of symbol comprehension (e.g., Collins, 1983; Easterby and Hakiel, 1977b; Lerner and Collins, 1980). No research was found which addressed the basis of this effect, which may be related to different experience with the hazard situation, different associations with the graphic image elements, or more basic cognitive and perceptual changes that occur with age. Viewer experience with the product or hazard, or general experience with related applications, can also have an effect on symbol comprehension. Cahill (1975) found that unfamiliar symbols related to farm and industrial machinery were better understood by subjects who had working experience with such machinery. Men and women who worked outside the home had better comprehension of safety symbols than housewives, and experienced railway users had better comprehension of novel railway information symbols than non-users. (Easterby and Hakiel, 1981.) Rates of correct identification of industrial safety symbols were greater in a study of miners than in a similar study of the general population. (Collins, 1983.) These findings indicate that there is some user-specific aspect to the consideration of symbol or pictogram effectiveness.

"Effect of Symbols/Pictograms on Compliance, Recall

"Studies examining the effects of adding symbols or pictograms to warnings on such factors as compliance, recall, and hazard perception have failed to yield consistent results. Although some researchers have shown that icons increase warning recall (Young and Wogalter, 1988), others have found no such effects (Otsubo, 1988; Ursic, 1984). Similarly, studies have shown no effect of symbols and pictograms on compliance, detection, reading time, or perceived safety. (Friedmann, 1988; Otsubo, 1988; Ursic, 1984.) In one study, however, Wogalter, et al. (1987) found that the combination of size, pictorials, and color enhancements of warnings increased compliance. The researchers caution that it is not known to what degree any one of the factors contributed to the results.

"Legibility of Symbols

"Although symbol or pictogram legibility for warning labels is mentioned as a concern in various guidelines, the available research comes from signing applications. Legibility for symbols generally refers to the distance at which the viewer recognizes the symbol, or all its elements. Although legibility differences among symbol signs can vary substantially (Kline, 1991), research on highway signs has found that symbol signs, as a group, have dramatically greater legibility distances (e.g., about double, Johnston, Cole, Jacobs, and Gibson, 1976) than comparably sized word signs.

"Influence of the Hazard Alert Symbol on Warning Effectiveness

"Several guidelines currently recommend the use of a hazard alert symbol (e.g., exclamation point surrounded by a triangle) along with the signal word on warnings. Hazard alert symbols are intended to help attract attention to the warning and to communicate the existence of a hazard. Wogalter, Jarrard, and Simpson (1992) found no effect of the symbol on warning effectiveness. However, in a recent study evaluating simulated alcohol beverage warnings, Young (1991) found shorter search times for warning labels that contained the symbol. The author attributes this to the icon's utility in attracting people's attention to the warning, although it may have no additional influence beyond this.

"Comprehending symbols

"A wide variety of methods have been used to evaluate the understandability of symbols and pictograms in various applications. However, relatively few studies have directly evaluated or compared alternative methods for evaluating comprehension. A study by Lerner and Collins (1980) provided a systematic evaluation of several methodological factors. This study compared three modes of presenting symbols (slides, placards, booklets), and three measures of comprehension testing (short answers, multiple choice, and confidence ratings). No meaningful differences were found among the three presentation modes. Short answer and multiple choice methods generally, but not always, led to similar findings. The report argued that when multiple choice methods are used, it is important to at least collect some initial short answer data, so that the appropriate set of choice alternatives can be composed. The use of confidence ratings (the degree to which the subject felt confident that the answer he chose was correct) was found to be useful in identifying multiple choice answers that benefited from high rates of guessing (i.e., meaning was not clear). The authors also indicated that scoring 'definition' answers could be a problem. They relied on two levels of scoring (partially correct/lenient scoring, and fully correct/strict scoring), and found that for some symbols, the range of ambiguous responses (partially correct) could be quite large.

"Cahill (1975) demonstrated the importance of context for the interpretation of symbolic labels. Symbols for controls in heavy automotive machinery (e.g., bulldozer) were shown to subjects, who were to indicate the meaning of the symbol. Subjects in a 'context' group were also shown a picture of the cab interior, with an indication of where the symbol would be located. The context group provided about 40% more correct answers.

"Collins and Lerner (1983) investigated symbol comprehension under degraded viewing conditions. Symbols for exit-related signs were evaluated under various degrees of reduced contrast (simulating smoke effects). The study found that some symbols were much more affected by visual degradation than others, and that certain symbol elements could lead to confusion when the image was degraded. While this study was directed at exit symbols, the more general point is that if a symbol may be seen under degraded environmental conditions (e.g., grime, dust, glare, dripped substances, etc.), some images may be particularly susceptible to misinterpretation, although this is seldom explicitly evaluated in testing.

"Wolff and Wogalter (1993) emphasized the iterative nature of the symbol evaluation process and the use of an appropriate target population. In a recent evaluation of the redesign of pharmaceutical pictorials, they state that one of the major costs of testing pictorials is the collection of data from relevant target populations. The authors recommend that preliminary iterative testing cycles be conducted on readily available participants prior to collecting subjects from the target population. In this way,

designers can reduce expenditures by determining which pictorials are deficient prior to formal testing with representative groups of target populations. They note that if educated, literate individuals could not understand the pictorials in question and that the designs would probably not survive comprehension testing with more disadvantaged populations. The authors offer a set of preliminary guidelines for redesigning pictorials. The testing method consisted of the following stages: 1) Subject pictorials were tested for comprehension; 2) Incorrect responses were evaluated and alternative designs were developed; 3) Redesigned pictorials were tested for comprehension; 4) Responses were reexamined; 5) Focus groups were used to gather information on alternative designs; 6) Information gathered from focus groups was used to design second set of alternative pictorial designs."

IV. Stakeholder Comments

Introduction

A *Federal Register* Notice was published on March 22, 1996 entitled "Consumer Labeling Initiative: Notice of Project Initiation" to launch the Consumer Labeling Initiative (CLI). The Notice described the goals and proposed structure of the CLI, and invited interested parties to submit data and ideas related to improving product labels. This section summarizes for EPA the information received from: foreign governments; Federal, state and local officials; EPA Partners; academics; public interest groups; health and safety professional organizations; individual citizens; and retailers. This section also summarizes information gathered from meetings with EPA staff and small groups of Stakeholders held in April and May, and again in August to present the CLI and interim findings and to solicit input. The summaries of Stakeholder comments will assist in defining policy issues, such as consumer education, which may not be addressed directly by CLI's focus on product labels.

A wide range of opinions and perspectives came out of the forty-one substantive comments received and Stakeholder meetings. Comments focused on label readability, comprehensibility, product ingredient information, container and product disposal instructions, and consumer education. In addition, several Stakeholders had comments on specific parts of product labels, formatting issues, and the role of product labels; some brought up concern about certain label wording.

In addition, EPA management and staff held a series of four meetings with stakeholder groups during the month of August. Meeting participants were diverse, ranging from representatives of public interest groups, retailers and environmental product certification programs, the media, individual companies, and U.S. EPA. Summary comments and EPA responses are presented for each meeting following the summary of responses to the *Federal Register* Notice. The final part of this section summarizes post cards addressed to Administrator Browner concerning the CLI and written comments submitted over the course of Phase I of the CLI.

1. Comments Submitted in Response to the *Federal Register* Notice

Commenters

Four distinct groups of commenters responded to the *Federal Register* Notice for participation in the Environmental Protection Agency's (EPA) evaluation of indoor insecticides, outdoor pesticides, and hard surface cleaners product labels. A list of the commenters can be found in Appendix J. The *FR* commenters fall into these groups:

Group 1: Individual advocacy groups, environmental groups, consumers, health and safety professionals/organizations, and international groups;

Group 2: International, Federal, State and local agencies;

Group 3: Manufacturers of consumer household products and associated trade organizations, and EPA Partners for CLI: and

Group 4: Retailers[1]

These Stakeholder groups will be referred to throughout this memo as Stakeholder Group # 1, Stakeholder Group # 2, Stakeholder Group # 3, and Stakeholder Group # 4.

One or more members of each of these groups have submitted comments to EPA concerning the labeling initiative. These comments are summarized below. A listing of individuals and organizations submitting comments are presented in Appendix J. This list reflects comments received through August 10, 1996; additional comments received after that date could not be included in this summary for reasons of time, but will be considered and reflected in the later stages of this project.

Issues Raised by All Stakeholder Groups

Members of all Stakeholder groups commented on issues of readability (i.e., legibility and visual accessibility of information) and comprehensibility (i.e., the ability of consumers to understand label information and instructions). In addition, certain categories of information were seen as needing clarification. Research results are presented where they illustrate and support comments submitted.

Readability

Two objections were raised most often. The first objection is that the type used is too small. Variations on this complaint also include poor color contrast that renders type less visible against a similarly-colored background. Stakeholders also pointed out that many consumers are older and cannot see small type easily. A suggestion was made that a standard be set for a minimum type size, and also that the greater the hazard, the larger the type used to indicate danger (e.g., "Consumer Alert: Hazardous Product"). Another suggestion was to use fold-out labels, which would allow both the presentation of information not currently given and presentation in a more readable format. Several respondents pointed out that important hazard information appearing on the back of the label rather than the front, as well as in small type, essentially makes that information inaccessible to the average consumer. An industry respondent included voluntary guidelines for over-the-counter (OTC) pharmaceutical labeling, that addresses numerous printing and typesetting issues.

The second objection was that information is not visually obvious enough. Several Stakeholders suggested that if information was more obvious, it would prompt label reading, especially by including instructions in a prominent place to "read the label" before purchase, before mixing and use, before storage, and before disposal. A private individual cited a "Pesticide Users Guide" (Bert Bohmont, 1983) that specifies what information on a label is to be read and when. Respondents agreed on the need to motivate consumers to read a label in the first place. An industry Stakeholder found, in a study of consumers' perception of risk of personal harm from cleaning products, that consumers do not pay attention to precautionary or first aid labels until they have a question or need. Another industry Stakeholder found that the primary cause of safety problems stems from the consumer not reading or

[1] Although only one retailer submitted comments, retailers' interests and perspectives are distinctly different from those of the other groups and are therefore presented separately.

paying attention to warning labels, while the secondary cause stems from the consumer not following package instructions. Similarly, a local agency found that household cleaning product users in a focus group were not accustomed to reading labels very thoroughly (even for their favorite products) and could not identify hazards; and a state agency merely stated that consumers feel they don't have to read labels. A retailer commented that labels must highlight simple information required for quick buying decisions in the store and then encourage consumers to read further once they are home. When asked what they look for on a product label when trying a new product, 12 percent of respondents in a survey conducted by a local agency listed product use instructions; 13 percent cited safety information for children and pets; 24 percent cited environmental information and hazards; and 30 percent listed other safety, health, toxicity, and precautions information.

The use of icons to indicate hazard and other information was also proposed by members of all Stakeholder groups. Icons are further discussed in "Comprehensibility," below.

Comprehensibility

Almost all Stakeholders cited vague and complex language as a problem. While many members of Stakeholder Group #1 requested more detailed information on product ingredients and health hazards (see "Issues Raised by Stakeholder Group #1," below), respondents agreed that language must be streamlined and simplified, and presented in a format easily accessible to low-literacy groups. A fourth or fifth grade reading level was suggested. For example, many Stakeholders suggested that where possible, the statement, "It is a violation of Federal law to use this product in a manner inconsistent with its labeling" should be simplified to read, for example, "Use product according to package directions." Furthermore, some Stakeholders recommended that common names of active ingredients be used.

Consumers, many Stakeholders pointed out, are unfamiliar with the meanings and hierarchy of "signal words" such as "Caution" versus "Danger," as well as the meaning of terms like "Precautionary statement." More than one respondent cited an EPA Home and Garden Survey when stating that of the 85 percent of households with at least 1 pesticide in storage, 47 percent of households with children under 5 years of age store the pesticide within reach of the children.

Stakeholders agreed that where possible, visual icons should be used. (An industry trade group cited the ANSI Z535 Committee on Safety Signs and Colors, which standardizes signs and symbols.) Some suggested using easy to understand symbols like Mr. Yuk, and providing a matrix showing both hazard level (e.g., cancer, birth defects) and information for product comparisons. Icons could also be used to show when ventilation, gloves, or goggles are needed. The ability to make some product distinctions was expressed: an industry Stakeholder found that first aid information needs vary for different consumer products (e.g., some products were more likely to be ingested orally, others via dermal contact, etc.); while an environmental group indicated consumer inability to distinguish between similarly-packaged herbicides, fungicides, and insecticides. Other suggestions for presenting hazard information included the use of a simple code, sticker, color coding, traffic signal, or bar graph. One Stakeholder suggested using an icon to distinguish among products governed by the EPA, the FDA, and by the CPSC. In addition, Stakeholders suggested that translations be available for the most important signal words like "Danger" and "Poison." A study conducted by one industry group Stakeholder showed that for several household cleaning products, simple instructions on how to avoid accidents resulted in fewer accident

reports by consumers to their 800 consumer comment line. This same study showed that caution and warning statements are seen positively and are not necessarily associated with higher risk: 75 percent of the panelists responded that information about safety of household products is reliable to very reliable. Part of the problem, one respondent noted, was that hazardous products are often not perceived as such. Pesticides and cleaners comprised 12.1 percent of total accidental exposure cases reported to a particular agency; most of these reports were regarding children under age 5. Another problem may stem from consumer confusion if signal words are used in text (for example, the use of "danger" in text under the signal word "caution"). Signal words on a product with multiple hazards can also be confusing.

Several Stakeholders cited the FDA's "Nutrition Facts" label as a successful way to present information and one they would like to see emulated. In addition, several expressed preference for language used by the Consumer Product Safety Commission over FIFRA language for its relative simplicity and conciseness. Conciseness was given great importance; for example, a local agency pointed out that one box of rat poison included 47 tiny lines of type on the back of the package. A retailer defined the Consumer Information Sheet (CIS) for pressure treated wood as "overly wordy and unfriendly." An industry Stakeholder stated that consumers who are "over-warned" by extensive language tend to not buy the product. This commenter added that sometimes FIFRA has led to "inappropriate" labeling, and gave the example of first aid instructions *for toxic exposure* that appeared on the label of a non-toxic product. Stakeholders also suggested standardizing the placement of information on labels, with signal words that are both uniform and common sense. Headers should serve as landmarks for text, and signal words should be offset with special colors or borders and be capitalized. Some Stakeholders suggested eliminating the inconsistencies between instructions for products containing registered pesticides and those containing similar but nonregistered ingredients. A retailer pointed out that labels are currently based on arbitrary criteria, with no consistency in terms of whether labels are based on product or process regulation. (See "Other Stakeholders" below, for more comments on word definitions.)

Several Stakeholders also expressed the need to use positive language. For example, the phrase "do not breathe fumes" may be replaced with, "use only with open windows or fans which provide fresh air."

Disposal instructions

Members of all Stakeholder groups agreed that disposal instructions pose a major problem. Disposal directions on pesticide and household cleaner labels contradict many local regulations and household hazardous waste collection programs. With the exception of hard surface cleaners, labels should specify that non-empty containers not be disposed of in the trash or have their contents poured down the drain. (In some cases, empty containers may be disposed of in the trash or, in the case of aerosols, brought to a recycling facility.) Labels should direct consumers to follow local laws for disposal. In a survey performed by a local agency in which 84 percent of respondents reported that they had "heard, read or seen" information about how to handle hazardous products within the previous year, 20 percent were unable to recall any specific information. Of those who did, only 5 percent said they had gotten information from the product label. When asked what they look for on a product label, only 4 percent reported actively checking for disposal information.

In addition, one EPA respondent suggested that products not completely destroyed or rendered harmless without questionable byproducts in a 1200-degree flame have labels that read, "Do not dispose of in a waste stream which is directed toward a municipal waste incinerator."

Education

Members of all Stakeholder groups suggested a public education effort beyond the use of labels alone Basics about pesticide safety and the four routes of pesticide poisoning were given as one example; educating product users through the use of flyers and booklets, similar to educational practices by the FDA, was another. One Stakeholder suggested advertising and school education programs. An industry Stakeholder found that 87 percent of consumers perceived little or no threat from household chemicals in general, and reported that in a study of risk perception, the more serious the perceived accident danger for a product category, the more important it was perceived for the news media to inform people about potential hazards and for Federal regulations to control product labeling. (Interestingly, a labeling study conducted by the same Stakeholder showed that if EPA labeling, instead of non-registered labeling, is used for an antimicrobial cleaning product, consumer interest in the product drops significantly due to concerns for product safety.)

Stakeholders also agreed that product labels should include the telephone numbers of various contacts. These contacts included manufacturers' 800-numbers, agencies that can answer questions about the product, OPP's Occupational and Residential Exposure Branch, EPA's National Pesticides Telecommunication Network, and a toll-free number to a poison control agency independent of any producer, manufacturer, or vendor. One consumer group suggested that where a manufacturer's 800-number is provided, the operators who staff it need to be better informed about the properties of product ingredients, a state agency respondent specified that the toll-free hotline should have the same information as Material Safety Data Sheets. (This agency also pointed out that a voice-mail hotline is not user-friendly, and advised on using a live operator.)

Issues Raised by Stakeholder Groups #1 and #2

Individual advocacy groups, environmental groups, consumers, health and safety professionals/ organizations, and international groups, and International, Federal, State and local agencies

Several issues were raised by Stakeholders excluding manufacturers, EPA Partners, and trade organizations:

- List not only acute but also chronic (long-term) health hazards, such as cancer and birth defects, on the label.

- Specify harmful effects if product is over-used, and how much product should be used and under what conditions. "Maximum use applications" should be expressed both for single and multiple product applications. Also specify expected outcome from use.

- Discontinue the term "inert ingredients" because it is misleading. Some consumers perceive "inert" ingredients to mean non-hazardous or non-toxic, while these particular Stakeholders perceive them to be "secret ingredients of the manufacturer." These ingredients are only

"pesticidally inert" and are often toxic in nature. (One individual respondent pointed out that there are instances of products that contain "inert" ingredients that are many times more acutely toxic than the active ingredient.) Because these ingredients have associated hazards, labels should state what these other ingredients do.

Issues Raised by Stakeholder Group #1

Individual advocacy groups, environmental groups, consumers, health and safety professionals/ organizations, and international groups

Many suggestions made by members of Stakeholder Group 1 are similar to those already addressed above, but include an additional level of detail:

- Standardize chemical nomenclature on labels (e.g., brand name versus generic name chemicals). List chemicals by common name and CAS number on both regular and inert ingredients and specify which propellants are used in aerosols. Include toxicity in terms of LD_{50}. One consumer stated that it was more important to know that an ingredient contains mercury than that it contains thimerosol. An advocacy group pointed out that many products don't have the common name of the active ingredient on the label.

- Include clearly marked warnings on respiratory effects, skin absorption, and other harmful health effects (e.g., liver and kidney damage). State how the product will affect children and pregnant women specifically. Where applicable, include a special classification "for school use" or "special precaution if used around children" section.

- Disclose all chemical ingredients, even if in non-regulated amounts, to accommodate chemical sensitivities. Identify the health and environmental hazards of each ingredient, especially since some manufacturers have opted not to prepare Material Safety Data Sheets (MSDSs) for home and garden use products. In addition, describe the extent of potential environmental impacts as they apply to all (not just a few) communities (e.g., prohibit use during certain times of year due to migratory bird flight paths).

- Indicate on the label what health testing has been performed. If no testing on a specific toxicity endpoint (i.e., cancer) has been done, indicate that lack of test information on the label.

- One consumer group stated that identifying hazards are more important than evaluating product safety.

- Indicate in the ingredients list if the ingredient is a sensitizer (e.g., formaldehyde).

- Pesticide labels should include instructions to identify pests before use, since both pests and plants differ across regions of the country.

- Eliminate exceptions for ingredients that protect the product, e.g., pesticide ingredients in sponges, paints, carpets, etc. This exception violates a consumer's Right to Know.

- Eliminate overstated efficacy claims. These claims may cause consumers to use more of a hazardous product needlessly (e.g., DEET) and may cause consumers to believe that other precautions (e.g., wearing long pants and socks to protect against ticks) are unnecessary. In general, check the accuracy of all information.

- Indicate clearly the amount of each component to be used in premix combinations.

- Design label surfaces to protect legibility, since print often wears off and becomes illegible when wet.

- For cleaning products, identify chemical characteristics (e.g., abrasive, solvent, acid, alkaline, etc.) of product constituents and provide definitions.

- Include the statement, "Do not store in living space" on toxic chemicals sold for commercial or residential use. Include information on how to store products.

- Give the shelf life for unopened and opened packaging, including those for which shelf life is indefinite. Include production as well as expiration dates.

- Establish maximum temperatures of usage, keeping in mind that there are geographical differences in which volatization temperature is dependent upon altitude.

- Provide instructions on recurring problems stemming from chemical misuse.

- Provide information on known incompatible formulations, e.g., bleach and ammonia.

- Consult state and local agencies that have explored the topic of consumer product labeling.

Issues Raised by Stakeholder Group #2

International, Federal, State, and local agencies

- One local agency stated that focus group participants did not feel that an ingredients list was useful. (Note that this contradicts statements made by members of Stakeholder Group #1.)

- Make lot numbers clearly visible.

- List any known carcinogens or mutagens in ingredients.

Issues not applicable specifically to indoor insectides, outdoor pesticides, or hard surface cleaners:

- For lighter fluid, warn of VOC emissions and explain how best to start fires. Indicate the contents for charcoal briquet labels, which are not all charcoal and contain other chemicals.

- For exterior paint products containing pesticides, the warning "For Exterior Paint Use Only" is difficult to see and must be made more prominent. Interior use of these products has caused poisoning.

Issues Raised by Stakeholder Group #3

Manufacturers of consumer household products and associated trade organizations, and EPA Partners for CLI

- Make first aid information technically accurate, relevant to how the product is used or misused and how disposed, and based on sound toxicological and environmental risk assessment.

- Give instructions on how to avoid accidents, and what to do in case of an accident. Specifically, convey "avoid mixing" statements in clear language.

- List key attributes (e.g., biodegradability) of major ingredients, based on environmental profile.

- Information on septic tank compatibility, ingredient biodegradability, package recyclability, and recycled content is useful to consumers (commenter provides this information upon request).

- Offer separate educational materials instead of adding more wording to the label.

- Include information on personal protective equipment, exposure factors, and contacts for disposal issues.

- Specify if the consumer must remove a seal before using the product.

- Provide MSDS-type information.

- One industry Stakeholder inquired whether the CLI will expand to include glues and adhesives.

Issues Raised by Stakeholder Group #4

Retailers

A product retailer provided the following comments:

- There is no standard use of the word "natural." For example, EPA prevents the word "natural" from being used on fungus/spore type roach killer traps (which can only use the word "biological"), yet allows the term "natural" on sewage sludge fertilizers.

- By promoting "Exceptional Quality" labeling on sewage sludge fertilizer, EPA ignores inconsistencies in labeling laws; e.g., some states allow the descriptors "organic" and "natural," while others prohibit them. Furthermore, this labeling conflicts with Federal organic labeling laws and private organic certifiers.

- Definitions must be provided for "biodegradable" and its derivatives, "inherently biodegradable," "readily biodegradable," etc. The term "inert" must also be defined.

- There is no current legal definition of "non-toxic." EPA needs to define this term with respect to environmental fate, aquatic toxicity, etc.

2. Comments Submitted During the Development of Phase I of the CLI

Four Stakeholder meeting were held in the month of August. Following is a summary of comments made at these meetings.

August 8, 1996 Meeting:

Participants:
Mary Dominiak, EPA
Jim Downing, EPA
Amy Breedlove, EPA
Steve Morrill, EPA
Sandy Schubert, National Coalition Against the Misuse of Pesticides
Paul Orum, Work Group for the Community Right to Know
Ron Grandon, Pesticides and Toxic Chemical News
Ryan Johnson, Student
Conference Caller:
John Miller, Vermont Agency of Natural Resources

Comments:
Paul Orum: Most environmental groups do not have the resources to participate in or follow a protracted project, particularly if there are not clear gains to be made by the project. EPA needs to clearly communicate whether it expects to address the concerns and adopt the solutions brought up by Stakeholders (in this case, the April 22 letter to Administrator Browner which was co-signed by 72 Stakeholders). **EPA Response:** The report to the Administrator will address issues brought up in the April 22 letter

Paul Orum and Sandy Schubert: A concern was expressed that our research so far had excluded non-users of pesticides and would not capture the concerns of people who don't use pesticides precisely because they either feel that pesticides are unsafe or they felt that they could not determine their safety from information on the label. **EPA Response:** We reassured them that those interests are not lost and that we are aware of them and intend to present them in the report.

The Northwest Coalition for Alternatives to Pesticides, the Working Group on Community Right-to-Know, and the National Coalition Against the Misuse of Pesticides submitted a follow-up letter to EPA administrator Carol Browner stating that they were encouraged that many of the concerns raised in our original comment letter of April 22, 1996 (submitted with cosignatories from 69 other organizations) generally appear in the text of the EPA's Draft Consumer Labeling Initiative Interim Report. They made several additional comments, including:

- Within the summary of Stakeholder comments, they would like a separate discussion of label "contents" concerning ingredients, health concerns associated with ingredients, and how testing results (or lack of results) are displayed, equal in depth to the discussions of "readability" and "comprehensibility."

- In the final report, EPA must indicate what steps it will take to adopt the suggestions proposed by the 72 Stakeholders in their April 22 letter. In particular, EPA must not delay in its commitment to the public's right-to know. EPA's intent of conducting more research to validate the need for "label content" disclosure falls short of the commitment to the public right-to-know that is evident on labels for consumer products under the jurisdiction of other Federal agencies. Consumers already have access to full disclosure of product ingredients (sometimes with CAS numbers) for various products. The interim report must clearly state that EPA rejects an approach to merely gather more research and instead commits to basic public right-to-know principles.

August 14, 1996 Meeting

Participants:
Steve Morrill, EPA
Amy Breedlove, EPA
Ramé Cromwell, EPA
Luis Hernandez, Barrera Associates
Arthur Weissman, Green Seal
Madelyne Cromwell, CSPI

Comments:

Arthur Weissman: Suggested that we use the quantitative research phase to learn more about what the public thinks about the information presented in certification programs and how that information might be presented on the label. **EPA Response:** We will consider the suggestion.

Arthur Weissman: Suggested that we look at how Canada is handling the bi-lingual issue on pesticide labels to possibly instruct us as to how we should address language barriers in this country. **EPA Response:** We are looking at how Canada is dealing with labeling and expect to capture our findings in the final report.

Luis Hernandez: Had several questions regarding Task Force and industry participation in the project and voiced concerns that Stakeholders have the same opportunity to give input. **EPA Response:** We agree and that was the purpose of these Stakeholder meetings. Also, drafts of the report to the Administrator will be made available to those who request them and there will be an opportunity to comment.

August 16, 1996 Meeting

Participants:
Charlotte Cottrill, EPA
Steve Morrill, EPA

Amy Breedlove, EPA
Ramé Cromwell, EPA
Jim Jones, EPA
Luis Hernandez, Barrera Associates
Ron Grandon, Pesticides and Toxic Chemical News
James L. Connaughton, US SubTAG3 to ISO TC207
Maureen Breitenberg, NIST/DoC

Comments:
Maureen Breitenberg: Did you do any research into symbols, colors, etc.? **EPA Response:** Some secondary research was done. In the qualitative research, EPA probed for what people thought about those issues; some people even volunteered information about the subject. This subject will also be included in the quantitative phase.

Jim Connaughton: Informed us that there is a guidance/lexicon of symbols in the private sector already approved by ANSI and ISO, and further signed off on by industry, that may be useful to EPA. [In addition,] there's a lot of information on labels. Have you considered trying to rank the information? **EPA Response:** There is a lot of information on the labels. We have been hearing that some additional information may be needed, but we've also been told by others that they didn't want to give up any of the information that's currently on the labels. We will try and quantify what people consider to be missing or not needed, in the next phase of the CLI.

Maureen Breitenberg: Mentioned that there's a growing section of the population that doesn't speak English. Did we address their needs? **EPA Response:** In this phase we screened only for people who could read English. However, the secondary research did provide information on this issue, and the issue did come up to some extent during the qualitative phase. It will likely be addressed in the "non-label specific" recommendations category of the report to Carol Browner

Jim Connaughton: Did you look at the CFC warning program for overlaps (products containing or manufactured using ozone-depleting chlorofluorocarbons (CFCs) prior to the phase-out called for in the Montreal Protocol are required to label their products as such)? **EPA Response:** I believe it's been addressed in the secondary research. Also, there may be some issues that could be included in the quantitative phase.

Ron Grandon: Has package size been an issue? **EPA Response:** Only to the extent that some people felt the type font was too small, or had comments concerning the color or contrast of the package and label.

August 26 Meeting

Participants:
Steve Morrill, EPA
Mary Dominiak, EPA
William Currie, International Pest Management Institute
Sally Patrick, Minnesota Pollution Control Agency

Elizabeth Knee, Jellinek, Schwartz and Connolly, Inc.
Luis Hernandez, Barrera Associates
Jim Versweyveld, Lab Safety Supply
Traci Williams, Self American U
Steve Risotto, Center for Emissions Control
Conference Callers:
Jim Moore, New York Coalition for Alternatives to Pesticides
Ven McDonald
Joanne Holcher, Citizens for a Better Environment
Brian Johnson, Environmental Programs Division, Santa Monica CA
Mark Eisen, Home Depot

Comments:
Sally Patrick: The storage and disposal instructions currently on labels often run counter to state programs. For that reason, it is probably good that consumers don't read them. **EPA Response:** This concern will be noted in the report. Recommendations for improving storage and disposal labeling are included in the report to the Administrator.

Jim Moore: Improving the label is all well and good but there needs to be a major emphasis on educating the public on the need to read labels. **EPA Response:** It is not yet clear how the report will approach the education component of its recommendations, but the report could possibly recommend forming a "Labeling Education Task Force or Working Group" to explore how to improve labeling education efforts.

Mark Eisen: Education on the importance of reading label is important; however, the label itself should dictate the education approach. If the label has all the correct components, manufacturers will design their own education programs to convey the label information. **EPA Response:** (see response to Jim Moore's comment above) **Mark Eisen:** If the next phase of the CLI includes market testing of alternative labeling, Home Depot will volunteer its stores as a test site and will encourage its suppliers to participate in the testing. **EPA Response:** EPA welcomes Home Depot's offer to assist in market testing of labeling alternatives.

Brian Johnson: Has the CLI tried to determine how and why people form their perceptions about the safety of pesticides? **EPA Response:** There is some secondary research in this area that is included in the report; however, there will most likely be a need for the quantitative research being conducted in the next phase of the project to focus on this issue. **Brian Johnson:** The qualitative research did not address or include persons that looked at a product label and then decided not to purchase the product. **EPA Response:** The goal of the CLI is to ensure proper selection, use, storage, and disposal of product through sound and understandable information of the label. For that reason we did not include people that choose not to buy a product. In the next phase of the project, we may need to revisit that position.

Van McDonald: Many pesticides are not safe when use either by themselves or in combination with other pesticides. In many cases the research needs to prove that safety is not complete. In

most cases, it is not communicated on the label that there are incomplete risk assessments and risk managements options. **EPA Response:** This concern will be included in the report to the Administrator.

Bill Curie: The paradigm "Safe When Used as Directed" is no longer used at EPA. It is now "When Used as Directed, Will not Result in Unreasonable Adverse Effects to Human Health or the Environment." We need to better communicate this concept to consumers. **EPA Response:** This concern will be noted in the report to the Administrator.

Post Cards Addressed to Carol Browner, US EPA Administrator

The Agency has received approximately 3,000 pre-printed post cards that were addressed to EPA Administrator Carol Browner.

The pre-printed cards urged the Administrator to "tell the truth about pesticides" and also stated that the "consumers have the right to know."

The pre-printed cards also stated that the signee believes they have the right to pesticide labeling that includes:

- Identification of all ingredients
- Short and long term health effects of all ingredients
- Whether or not health testing has been completed
- The truth. Terms like "inert" are misleading.

Some of the cards included handwritten statements from the signee that further supported the pre-printed statements. In addition, many of the handwritten statements also indicated support for the **Citizens for a Better Environment** and its initiatives.

Written Comments

Scientific Certification Systems of Oakland, California submitted written comments in September concerning four topics, summarized below.

- Any changes to current labeling requirements and guidelines should be consistent with International Organization for Standardization (ISO) standard 14000 related to general principles of environmental labeling and ISO's specific guidelines for Type I (voluntary third party programs), Type II (self declaration environmental claims), or Type III (independent quantified label information using life cycle assessment indicators) labels;
- The Consumer Labeling Initiative should adopt a life-cycle perspective in developing labeling options, including presenting such information to consumers;
- The CLI should consider the need for continuity in the environmental information provided to consumers (for all products) as was done for nutritional labeling, which was cited as an effective educational tool; and
- SCS concurred with other Stakeholders that additional consumer education is needed beyond the information appearing directly on the label, including: label references to

other sources of information (e.g., World Wide Web sites, an EPA consumer information telephone number)

Citizens for a Better Environment submitted a letter commenting on the August 21, 1996 draft Consumer Labeling Initiative Report. Their comments are summarized below:

- Within the summary of Stakeholder comments, they would like a separate discussion of label "contents" concerning ingredients, health concerns associated with ingredients, and how testing results (or lack of results) are displayed, equal in depth to the discussions of "readability" and "comprehensibility."

- In the final report, EPA must indicate what steps it will take to adopt the suggestions proposed by the 72 Stakeholders in their April 22 letter. In particular, EPA must not delay in its commitment to the public's right-to know. EPA's intent of conducting more research to validate the need for "label content" disclosure falls short of the commitment to the public right-to-know that is evident on labels for consumer products under the jurisdiction of other federal agencies. Consumers already have access to full disclosure of product ingredients (sometimes with CAS numbers) for various products. The interim report must clearly state that EPA rejects an approach to merely gather more research and instead commits to basic public right-to-know principles.

V. Summary of Findings

Findings based on the qualitative research, literature review, and Stakeholder comments are summarized separately in this section. Each of these sources was incorporated into the CLI to provide EPA with very different types of information as described above. Collectively, the findings are an integral part of a comprehensive background document that 1) identifies the full range of issues related to the CLI, and 2) provides a thorough examination of the core issues related to labeling. The analysis of findings presented at the end of this section will assist those involved with the CLI in developing specific hypotheses and labeling alternatives (e.g., language, format and/or content), which will be evaluated as part of the Phase II quantitative research planned for the near future (FY97). The findings are also useful to EPA in framing the important policy considerations being addressed by CLI.

1. Findings from the Primary Qualitative Research

The qualitative research was designed to reveal information about respondents' use of labels and their understanding of the information on the labels for the three types of product categories studied. Where there was remarkable consistency in consumer comments and when learnings corresponded to those found in the literature review, conclusions and recommendations can be drawn. Other findings will need further exploration, development, and/or testing of hypotheses or options for labeling improvements. The QRDC prepared findings related to each of 14 learning objectives identified by the QRDC prior to the interviews, as well as recommendations for subsequent quantitative research. The general findings from the qualitative research are presented below. Findings related to each product category are presented in detail in the preceding section of this report.

- Consumers interviewed for this project tended to use product labels on an as-needed basis. Three factors appeared to influence label usage overall. One factor was familiarity with a product. The more familiar the respondents were with a product, the less likely they were to read the label. Consequently, consumers in the household cleaners/disinfectants interviews indicated that they rarely read labels for those kinds of products, while respondents in the indoor insecticide and outdoor pesticide interviews tended to look at labels for those products more often if the products were not used by them on a regular basis.

- A second factor that affected label usage was the perception of risk of the product to the user, children, pets, or the environment, which depended on the product risk. If a product was considered to be potentially harmful if used improperly, the respondents were more likely to look at the label before using it than if they did not perceive the product to be particularly toxic.

- A third factor that appears to affect label usage is the perceived ease or difficulty in using the product, regardless of the type of product. Products available in aerosol cans and trigger sprays, for example, as well as enclosed roach baits that the consumer simply sets out, were perceived by consumers as easy to use, and therefore they were less likely to read directions when using those products. Labels of products requiring the most preparation -- indoor fogger products requiring extensive site preparation or outdoor pesticides that required dilution or attachment of a nozzle and hose, for example -- tended to be read more often.

- Certain parts of the label tend to be read more often than others. Since the front panel of the label, or "principal display panel," is displayed on the market shelf, it is the first thing consumers see, and the first information consumers refer to. Unless consumers pick up the container and deliberately read the back panel, the front panel will be the only information a consumer will get about a product. The types of information that they might look for included the intended use of the product, directions for use, and whether or not the product had any special features (disinfects, or "kills bugs fast," or "pine-scented"). The ingredients statement on the label often was consulted for outdoor pesticides, but rarely for indoor insecticides and almost never for household cleaning products. For these products, consumers expected to find the ingredients statement on the back panel. Except in the case of outdoor pesticides, there was very little knowledge of the chemical names, and the difference between active and inert ingredients was not understood by most respondents. Many participants in all three categories commented upon the helpfulness of pictures and icons for getting information across to the user.

- The directions for use section is the most likely section for consumers to consult on the back label, according to our respondents. However, consumers tended to not read that section as carefully as they thought, since few of them had noticed the statement, "It is a violation of Federal law...." in the FIFRA-regulated directions. Certain sections of the labels were uniformly misunderstood by respondents in all categories. The statement that "It is a violation of Federal law....," the EPA registration information, and the chemical names of products were either not understood or misunderstood by participants in these interviews.

- The precautionary and hazards sections of the label were less likely to be read unless there was a preconceived perception of risk of that particular product. Users with pets and children tended to consult this section more often than those without, as well as persons (such as persons with asthma) who might experience problems resulting in exposure to a product. There were mixed responses to the "signal words" -- Caution, Warning, and Danger -- because some participants considered "caution" and "warning" to be equivalent terms, with "danger" indicating a greater level of risk. Others recognized the gradation of hazard being provided by the three terms. There also was little understanding of the phrase, "Statement of Practical Treatment," although participants figured out the phrases once they read the information below the it.

- The storage and disposal section was the least read of all the label sections. Correct storage was considered common sense and in most cases the product was disposed of in the trash without wrapping, or recycled in cities where recycling was encouraged.

- While a number of the respondents in all categories expressed the desire that labels be easier to read, few were willing to suggest information that could be taken off the label to make it less cluttered or to allow for larger lettering. Even though many respondents did not read the labels, they indicated that they wanted and expected detailed information about the product to be there in case they wanted to use that information at some time.

- All respondents were asked how satisfied they were in general with the information provided to them on the labels. While many of them expressed some confusion with specific wording or

complained that there was too much information to make the label readable, all answered that in general they were satisfied with the level of information provided on labels.

2. Findings from the Literature Review

The literature review was undertaken to synthesize existing research in three areas: consumer understanding of environmental, health and safety issues, consumer perception of product attributes, and consumer reaction to precautionary labels. Most of the studies in the literature focused on precautionary parts of labels. Additional topics and information sources on product labeling will be further researched in Phase II of the CLI.

Consumer Understanding of Environmental, Health, and Safety Issues

- Existing research suggests that consumers are not very knowledgeable about basic environmental facts, despite a growing interest and concern for environmental issues such as wildlife diversity, pollution, and solid waste. In addition, consumers who are aware of, or concerned about, environmental issues tend to be more critical about manufacturers' product claims than consumers who are uninformed or uninterested.

- Studies that were found indicated that consumers perceive little or no threat from household products, and that the cause of injury is usually the misuse of a product. Other studies show that people want more information about products perceived to be less hazardous, and that consumers are becoming more interested in using such products.

Consumer Perception of Product Attributes

- Studies indicate that people do not always accurately assess risk. Studies reported that people's risk perception is greatly affected by past experience and familiarity in addition to characteristics, such as voluntariness of exposure and controllability, and is often not correlated with actual risk. Additionally, there is evidence that people do not easily process risk when more than one risk is presented at a given time (e.g., controllability, familiarity, severity of adverse outcome). Because of the difficulty in accurately evaluating product risks, if any, consumers often simplify their decision-making.

Consumer Reaction to Labels

- Whether or not consumers read precautionary label statements during product selection depends on the type of product. For example, a consumer is more likely to read the precautionary label statements if the product is labeled "danger" or it is being used for the first time.

- Inconsistent research exists surrounding the level of label explicitness, and the level of detailed information desired by consumers. It is also unclear what effect a higher perceived hazard has on the desirability of a product. Some studies show that consumers want explicit hazard information during product selection and that they view precautionary statements positively,

while other studies found that consumers may be alarmed by detailed hazard information on product labels.

- Results from studies varied greatly as to whether or not consumers read precautionary labels during product use. In general, this depended on the type of product and the consumers' familiarity with it, where the labels of familiar products were not frequently read. Some studies determined that consumers rarely read precautionary labels while using a product, and others found that consumers usually read them and look for precautionary information all or some of the time. Other studies analyzed when consumers read labels. By and large, studies primarily analyzed the precautionary components of labels.

- Most research found that consumers believe information in the precautionary component of product labels. Study findings brought up issues about consumers' reliance upon label information, and what consumers view as the causes of any safety problems.

- Evidence was found that during product household cleaner use, first aid information is usually read by consumers after an accidental exposure to a product. The availability of readily accessible first aid information was shown to be very valuable.

- Studies generally found that consumers using household cleaners do not consult label information until there is an immediate need, although consumers do seem to be more likely to comply with warning instructions when they are easy to follow. A variety of studies analyzed ways to encourage a consumer to follow instructions, including the use of an interactive label (e.g., move the label to use the product).

- Studies on ways consumers dispose of product containers focused on the likelihood that consumers would follow disposal instructions, the effect label information has on the way consumers dispose of a product, and whether or not consumers look for disposal information before purchasing a product. One of the issues that came up related to the level of detail consumers desire in disposal instructions.

3. Findings from Stakeholder Comments

The summary of Stakeholder comments captures a wide range of opinions and perspectives concerning the content, format, and role of product labels. Understanding the range of Stakeholders' perspectives and experience enables EPA to take these into consideration in the future development of policy and guidance. The principal limitation of the summary of Stakeholder comments is the diversity among Stakeholders and the variability of evidence provided by commenters used to support their opinions. Evidence ranges from summaries of large and small surveys concerning consumer use of label information on household products, to reports by groups or professionals based on years of experience dealing with one or more aspects of CLI, to individuals' personal opinions or experience with a particular household product. The evidence submitted by Stakeholders represents a wide range of groups, including public interest groups, right-to-know groups, industry, trade associations, and individual consumers. Nonetheless, Stakeholder comments are valuable in defining policy issues, such as consumer education,

which may not be addressed directly by CLI's focus on product labels. Various individual Stakeholders commented that:

- Chemicals should be listed by their common name.

- All chemical ingredients should be disclosed, even if they are in non-regulated amounts, to accommodate chemical sensitivities. CAS numbers should be listed for both regular and inert ingredients, and propellants used in aerosols should be specified. Include toxicity in terms of LD_{50}.

- The term "inert ingredients" should be discontinued.

- Consumers who are "over-warned" by explicit language tend to not buy the product.

- Packages should include clearly marked warnings on respiratory effects, skin absorption, and other health effects, with a statement about how the product will affect children and pregnant women specifically. Where applicable, products should include a special classification "for school use" or a "special precaution if used around children" section.

- Health and environmental hazards of each ingredient should be identified, and the extent of potential environmental impacts as they apply to all (not just a few) communities should be described.

- Commenters referred to a study that shows that while many respondents to a survey performed by a local agency reported that they had "heard, read or seen" information about how to handle hazardous products within the previous year, 20 percent were unable to recall any specific information. Only 4 percent of respondents reported actively checking for disposal information on a product label.

- Simple instructions on how to avoid accidents on several household cleaning products resulted in fewer accident reports by consumers to their 800 consumer comment line. Caution and warning statements are seen positively and are not necessarily associated with higher risk.

- First aid information needs to be technically accurate, relevant to how the product is used and disposed of, and based on sound toxicological and environmental risk assessment.

- There is no standard use of words such as "natural," "biodegradable," "inherently biodegradable," and "readily biodegradable." There is also no current legal definition of "non-toxic" with respect to environmental fate, aquatic toxicity, etc.

- Labels should be written at a fourth or fifth grade reading level, and written as concisely as possible. Consumers are mostly unfamiliar with the meanings and hierarchy of "signal words" such as "Caution" versus "Danger," as well as the meaning of terms like "Precautionary statement."

- Language used by the Consumer Product Safety Commission was preferred over FIFRA language for its relative simplicity and conciseness.

- The statement, "It is a violation of Federal law to use this product in a manner inconsistent with its labeling" should be simplified to read, for example, "Use product according to package directions."

- A focus group study of household cleaning product users were not accustomed to reading labels very thoroughly (even for their favorite products) and could not identify hazards.

- Consumers need to be motivated to read a product label because many feel they don't have to read them. Making information visually obvious prompts label reading, as does including instructions in a prominent place to "read the label."

- Important hazard information appearing in small type on the back of the label rather than the front makes the information inaccessible to the average consumer.

- Labels should be written in positive language. For example, the phrase "do not breathe fumes" may be replaced with, "use only with open windows or fans which provide fresh air."

4. Analysis of Findings

The purpose of this section is to articulate as clearly and in as much detail as possible how the findings from this phase of the project were analyzed for use in developing the next steps for the Consumer Labeling Initiative. What follows is the result of an open and inclusive planning process which has been in place since the launch of the CLI in March 1996. This process was designed to gather as much relevant information as possible and to allow all points of view to be heard. The results of this process, however, do not represent a consensus.

Findings based on the Stakeholder comments, literature review, and qualitative research provided EPA with very different types of information that are integral to identify the full range of issues related to CLI, as well as provided a thorough examination of the core issues related to labeling. With input from Agency staff, Agency management, Stakeholder groups, CLI Partners, and CLI Task Force members, CLI staff worked to consolidate the findings and then analyze them to determine how best to proceed. Input was received through a series of meetings, conference calls, and review cycles with the above groups. During this process, a decision model was developed to help guide this process (see Appendix D) and was applied to each of the findings. As a result, all findings were categorized into one of the following three categories: 1) Labeling Issues requiring statistical validation through quantitative research; 2) Labeling Issues not requiring further validation; and 3) Education, policy planning, and coordination issues.

Labeling Issues, Problems Requiring Statistical Validation Through Quantitative Research

- Need to explore consumer satisfaction with scope of current label information content.
- Need to explore consumer desire for additional, new, or revised information on label, such as
  - -safety/environmental;

-chronic/long-term; and
-all ingredients.

- Need to establish hierarchy of importance of label content to consumers and parts of the label, and how satisfied consumers are with each specific label section (e.g., ingredients).
- Need to establish where on the label consumers expect to find specific information.
- Need to establish when (including frequency), how, and why different parts of the label are referred to for disposal information, use instructions, and precautionary statements.
- Need to establish consumer comprehension of specific label language, such as "Federal law...." headings, signal words, active/inert ingredients, use directions, etc. For wording that is already known to be misunderstood (e.g., Signal Words and "Hazards to Humans and Domestic Animals"), can test possible solutions.
- Need to establish current storage and disposal practices of consumers.
- Need to test preference for non-FIFRA over FIFRA types of labels and language.
- Need to develop and test new label format based on current information and information gained from the quantitative research.

Labeling Issues Not Requiring Further Validation

- Common names for chemicals are preferable to long chemical names.
- Consumers desire phone numbers on labels for accessing product and safety information.
- Consumers felt that the phrase "first aid" was more simple and straightforward than "statement of practical treatment."
- While consumers felt labels were crowded, they did not recommend that anything be removed.
- Front panel of label is most often noticed by consumers.
- Consumers familiar with product are less likely to read parts of label.
- Labels should be consistent in how chemical ingredients are named.
- People read labels at a 4th or 5th grade level.
- There is some evidence that the required statement, "It is a violation of Federal law to use this product in a manner inconsistent with its labeling," is not understood.

Education, Policy Planning, and Coordination Issues

- Because consumers familiar with a product are less likely to read certain parts of the label, education on the label's importance could be beneficial. As examples, consumers do not think of looking at a label for information on how to dispose of a product or container, and consumers do not distinguish among labeled safety or ingredient differences on products within the same product category.
- The process used for this pilot was well received by the EPA Partners and Task Force Members. EPA may want to consider using the process used for the pilot to inform other Agency Policy Work and whether to consider other product categories
- EPA must recognize the difference between consumers' label needs and the label needs of agricultural sector users (for whom FIFRA labels were first developed).
- EPA and the Federal Trade Commission continue to coordinate on environmental marketing issues and specific claims as appropriate.
- The costs and benefits of requiring disclosure of inert ingredients were of interest to some participants but were not addressed.

- Secondary research suggests that EPA-required label information contradicts local regulations on household hazardous waste.
- EPA should consider learnings from the first phase of the CLI in the development of labeling policies and comments provided on developing industry standards
- Forward the CLI Phase I report to the appropriate International Organization for Standardization (ISO), European Union (EU), and Organization of Economic Cooperation and Development (OECD) Committees or working groups; other Federal, state, and local government offices; and EPA offices that deal with environmental labeling issues.

VI. Next Steps and Recommendations

The purpose of this section is to present EPA's recommendations for how to proceed with the next phase of the CLI based on the initial findings of the pilot project. In developing recommendations, EPA considered the secondary research and the primary research conducted to date, as well as input from its staff and management, CLI Task Force, EPA Partners, and interested Stakeholders

At the outset of the CLI in March 1996, the Initiative was expected to take six months to complete. At the end of that period, it was expected that a report to the Administrator would include detailed recommendations for actions needed to improve labeling. However, in the course of designing consumer market research, EPA and others participating in the CLI determined that a phased approach to the primary consumer market research was more suitable and would provide EPA with a sound basis for label improvement and policy development at the Agency. Thus, the first phase of research activities, conducted in FY96 (ending on September 30th, 1996), was designed to probe a wide range of consumer needs and understanding of label information related to product selection, use, storage, and disposal of three product categories. This investigation and scoping phase will assist those involved with the CLI to develop specific hypotheses and labeling alternatives to be evaluated as part of quantitative research planned for the near future (FY97). It also became clear that there were a number of label issues or problems that can be addressed now, without further research, based upon acceptable evidence presented in the first phase. In addition, EPA recognizes, as did many others involved in the CLI, that labels are just one of many tools with which to disseminate information and educate consumers. Therefore, the recommendations in this report will focus on the following areas: 1) a subsequent phase of quantitative and secondary research; 2) interim label improvement measures: and 3) label-related education, policy and procedural improvements.

1. Recommendations for Quantitative Research and Supplementary Literature Review

Quantitative Research

EPA recommends that the next phase of the CLI include a quantitative assessment of consumer comprehension, attitude, behavior, and satisfaction of (FIFRA and non-FIFRA) labeling and an evaluation of labeling alternatives. In addition, undertaking a subsequent literature review is recommended to explore more detailed existing information in the specific topic areas to be examined during the quantitative phase of research. This research will result in comprehensive and specific recommendations for: 1) label design and content improvements, 2) regulatory or policy changes needed to allow improvements, and 3) additional research to further clarify issues or to test alternative labeling. The length of time and resources needed to conduct this research will depend on the research method selected and the complexity of the issue. EPA is currently working closely with the CLI participants to develop a quantitative research plan that will get the answers we need while using a reasonable amount of time and resources.

Focus of research

Research will focus on quantifying some of the following topics noted as needing further development for the product categories of indoor insecticides, outdoor pesticides, and hard surface cleaners (some of which are registered antimicrobials/disinfectants) following the first phase of research:

- frequency, context, and rationale for using various parts of product labels;
- consumer satisfaction with scope of current label information in various parts of labels;
- consumer attitude toward and satisfaction with format and location of information within labels,
- comprehension and preference of specific label language; and
- hierarchy of the importance to consumers of various parts of the label.

In addition, the Agency expects to test consumer preference and understanding of alternative labels and/or label components during quantitative research. Much of this work will focus on layout, readability, and comprehension alternatives, such as use of pictures and icons to convey or clarify key use or precautionary information.

How quantitative research will be utilized

Quantitative research will provide EPA with a statistically sound basis for policy formulation concerning labeling requirements falling within the Office of Pesticide Program's purview. Following completion of the second phase of research, EPA will combine the findings from the primary and secondary CLI research with input from CLI Task Force Members, Partners, and Stakeholders to develop recommendations for the Administrator. The findings of this research are expected to inform changes that EPA can make on pesticide labels including:

- some substantial improvements that EPA can make on pesticide labels within the context of existing regulations; and
- improvements that will require fundamental changes in the pesticide program, which may require legislative, regulatory or policy reform.

The findings of this research are also expected to identify changes that manufacturers and marketers can undertake voluntarily to improve non-pesticide labels, beginning with hard surface cleaners. The findings will also help EPA determine whether it is worthwhile to examine other non-pesticide product categories for inclusion in future CLI work. This research will help EPA determine if there is a need or benefit to standardize environmental information on product labels across product categories. It should be highlighted that further research in this area is still needed. Finally, it is expected that the results of this research will help EPA determine the utility of the approach used in the CLI and whether this should become part of the way EPA conducts its research and program evaluation where consumers are concerned.

Design and implementation of quantitative research

Future planning forums and other opportunities for input from the CLI Task Force, Partners, and Stakeholders will be used to assist EPA in developing more detailed and comprehensive research studies, protocols, and instruments. As with the first phase, EPA anticipates preparing a detailed quantitative research plan including a limited set of learning objectives designed to help EPA meet CLI's project goals. The overall research plan will be circulated to all interested CLI Stakeholders. Specific components of the plan, such as research instruments and sampling design, will be circulated to interested individuals and organizations as they are prepared. Later in the project, the statistical weighting and analysis of results will be circulated widely for review, comment, and interpretation. EPA will seek input from all Stakeholders as Agency staff drafts a Phase II report summarizing quantitative research findings.

Supplementary Literature Reviews

Additional literature reviews are proposed for two reasons. They will provide those involved in the CLI with background information, which will help to inform the design of quantitative research and will provide EPA with a synopsis of existing research in specific topic areas. Possible topics include but are not limited to:

- published studies and other available research on consumer reactions to and interactions with other aspects of labeling, such as directions for use;
- published studies and other available research on surveys and study design;
- published studies of segmentation of potential consumers and profiles of various subpopulations of potential consumers (who may interact with product labels); and
- published studies on how labeling challenges have been addressed to meet the multiple regulations of various agencies, including multilingual labeling requirements, packaging constraints, label design considerations, the use of icons, etc.

2. Recommendations for Interim Label Improvement Measures

EPA recommends that the Pesticide Program institute several interim labeling improvements based on acceptable evidence supporting certain findings presented in this report. These recommendations are supported or allowed under current regulations. As interim measures, they can be evaluated for their effectiveness within a certain period of time and/or could be replaced with more permanent measures that may be recommended following the next phase. The following are proposed changes to be implemented.

Use of Common Names for Active Ingredients

CLI finding: Consumers indicated that the common name for a chemical should be used on the label in addition to or instead of the scientific name. Many products do not yet have a common name for the active ingredient.

Recommendation: The Pesticide Program should work with product registrants, the American National Standards Institute (ANSI, the organization that approves common names) and others to identify the barriers to approving common names, make recommendations for increasing the number of chemicals having common names, and ultimately get these common names listed on the label.

Use of the Term "First Aid" instead of "Statement of Practical Treatment"

CLI finding: Consumers indicated that the phrase "first aid" was more simple and straightforward than "statement of practical treatment."

Recommendation: The Pesticide Program should issue an *EPA Label Policy Alert* that encourages registrants to voluntarily use the term "First Aid" in place of the term "Statement of Practical Treatment."

Phone Numbers for General or Emergency Information

CLI finding: Consumers indicated a desire for phone numbers on labels that they can use to get general or emergency information regarding a product.

Recommendation: The Pesticide Program should encourage registrants of pesticide products to place phone numbers on labels where consumers can call to get general or emergency

information. EPA should also explore other options for making this type of information available to consumers.

3. Recommendations for Agency Education and Planning Activities

Education Activities

There was general agreement among CLI Stakeholders regarding the need for educational programs that stress the importance of reading product label thoroughly. The need to improve consumers' use of labeling information was highlighted by several of the Phase I research findings. Research found that consumers were less likely to read all parts of the label if they were already familiar with a product or if they perceived that a product poses very low risks. Specifically, Storage and Disposal information is often disregarded completely, and Health and Safety information is often disregarded unless an accidental exposure to the product has occurred. The terms and wording used on the labels also appear to cause confusion and may be misunderstood. Furthermore, many consumers may not be able to read labels because of physical (related to sight), literacy, or language barriers. Therefore, educational efforts may be warranted to help consumers distinguish differences in label information, such as safety or ingredient information, for products within the same product category.

Form a Product Label Consumer Education Task Force: The Consumer Education Task Force would gather information regarding both current and completed education activities geared toward getting consumers to read product labels. The Task Force would then develop recommendations for improving the effectiveness of those activities. The Task Force should be made up of representatives of Federal, state, and local agencies and interested CLI Stakeholders, and should be mandated to recommend and implement effective consumer education activities that emphasize the importance of reading the label. The purview of the Task Force would include all products and be well-coordinated with the appropriate Federal, state, and local governments, and other organizations. EPA must provide adequate funding for both the formation of the task force and for carrying out its recommendations.

Policy Planning and Coordination Activities

The CLI has begun a research process to better understand consumers' comprehension and use of label information. Ultimately, this will help the Agency to better present information on product labels. However, EPA needs to also begin a formal process of identifying and presenting the other important factors or considerations that go into the development of labels, so that once it has the consumer perspective in hand, EPA can make sound policy decisions based on other relevant factors as well. These other factors include the scientific, legal, regulatory, business, and right-to-know issues that may affect whether and how information should be presented on labels. It may be that the label is not the most suitable means of transmitting all types of information to all consumers. Following are some specific planning and coordination activities that EPA can undertake now so that EPA is in position to take advantage of the information likely to come out of the upcoming CLI quantitative market research.

Distribute Phase I findings to enhance labeling policy coordination and development: Within EPA, the Office of Pollution Prevention and Toxics (OPPT) has the responsibility for general coordination of environmental marketing and labeling issues and policy development. **Recommendation:** Many of the general learnings from the qualitative research, Stakeholder comments, and literature review will be furnished to those who manage labeling programs and to those dealing with related policy issues

throughout EPA, in other Federal Agencies, and at the state government level. In addition, these learnings will be considered in the development of EPA comments on developing international industry standards (e.g., International Standards Organization, or ISO) work on environmental labeling, to the Organization for Economic Cooperation and Development (OECD), and to environmental labeling programs in the U.S. and abroad.

Examine the CLI research process as a prototype: The process used for this pilot was well received by the EPA, Partners, and Task Force Members. **Recommendation:** A work group of CLI Stakeholders and others should be formed to develop recommendations for EPA use of the CLI process for other Agency policy work.

Recognize that pesticide labeling needs vary: The Office of Pesticide Programs should recognize the difference between consumers' label needs and the label needs of agricultural sector users (for whom FIFRA labels were first developed). It is expected that the quantitative research will identify ways in which EPA can present information on labels that are easier for consumers to understand. However, current regulations make no distinction between consumer and agricultural/professional products. **Recommendation:** The Program should take steps now to explore how to eliminate policy or regulatory barriers to address these differences.

Continue coordination between EPA and FTC: The EPA and FTC continue to coordinate on environmental marketing and labeling issues across all environmental media programs (e.g., pesticide programs, trade and environmental activities, environmentally preferable products guidance, Energy Star, etc.). **Recommendation:** The Office of Pesticide Programs Labeling Unit should continue attempting to better coordinate claims approved for pesticide labels with the FTC Guidelines for Environmental Marketing Claims

Investigate issues related to inert terminology, ingredients listing, and health and safety information: The issue of the availability and presentation of ingredient and health and safety information, and the use of the word "inert" on product labels, is complicated and controversial. The qualitative research examined these issues in the context of labels (for the three product categories studied) on products that are registered pesticides, and those that are not registered but serve the same function (e.g., hard surface cleaners). Through the quantitative research proposed in this report, the EPA expects to learn a great deal about consumers' understanding and demand for this type of information. However, EPA also needs to identify all of the scientific, legal, regulatory, business, and right-to-know points of view that also must be considered. **Recommendation:** Form a small work group made up of representatives of all interested Stakeholders to work with the Pesticide Program and charge them with the development of a white paper that identifies and discusses the above points of view as they relate to the use of the word inert, policy options concerning the listing of ingredients, and health and safety information. This paper can then be considered along with the results of the quantitative research when EPA determines possible recommendations regarding this information on registered pesticide labels.

Investigate storage and disposal labeling issues: Phase I CLI findings indicate a need for EPA to better understand consumer perceptions and needs for disposal information on pesticide labels. This need can be met by the quantitative research proposed in this report. However, CLI findings also indicate

that EPA-required storage, and disposal label information may contradict local regulations on household hazardous waste. **Recommendation:** Form a work group made up of representatives of CLI Stakeholders to identify all current applicable storage and disposal regulations and issues affecting storage and disposal and to articulate the relevant issues within a white paper on storage and disposal labeling. The white paper can then be considered by the pesticide program along with the results of the quantitative research when EPA considers how to improve the availability of this information.

Determine if CLI pilot should be expanded: The CLI was designed as a pilot project. **Recommendation:** EPA should determine whether to further examine additional product categories.

Determine effects of standardizing environmental messages on product labels: EPA could consider if it is possible to standardize messages on product labels (e.g., format, elements of the message).

Appendix

Appendix A

Annotated Bibliography

Bender, Michael, and Michael Frishman, 1996. *An Assessment of Consumer Information and Household Hazardous Materials Shelf Labeling Programs In Iowa & Vermont.* A Joint Publication of Community Environmental Council, Inc. and North American Hazardous Materials Management Association (NAHMMA), March.

Sample Size: Two states

Method: Review of two states' consumer labeling initiatives.

Objective: To describe the development and implementation of Iowa and Vermont consumer information and household hazardous materials shelf labeling programs and assess the utility of existing information to evaluate its impact on program effectiveness.

Bettman, James R., John W. Payne, and Richard Staelin, 1986. "Cognitive Considerations in Designing Effective Labels for Presenting Risk Information," *Journal of Public Policy*, Vol. 5, pp. 1-28.

Sample Size: Not applicable

Method: Not applicable

Objective: Literature review of how people process information when thinking about risk and general guidelines for designing labels for presenting risk information.

Bottum, T. and I. Ross, 1995. "A Marketplace Perspective on Consumer Product Safety," *1995 Marketing and Public Policy Conference Proceedings*, Volume 5.

Sample Size: Not applicable

Method: Not applicable

Objective: Literature review of that proposes a framework for improving managerial and regulatory understanding of safety by explicitly considering the related constructs of risk, injury, and hazard.

Brattesani, K., Research Innovations, 1993. *Metro Hazardous Household Products Focus Groups Report*, prepared for Metro Household Hazardous Waste Education, March.

Sample Size: One group of 8 adults and one group of 10.

Method: Two focus groups were used. Participants had taken part in a telephone survey of 1600 King County residents conducted by Decision Data, Inc. Participants for the focus groups were chosen from the group of respondents who were moderate in terms of attitudes and behaviors concerning hazardous household products and the environment.

Objective: The Household Hazardous Waste Education Subcommittee was developing a plan for household hazardous waste education. The subcommittee wanted to look at the general level of public awareness about hazardous household products, what hazard-related criteria people use when purchasing these products, and the relative importance of health and environmental hazards in group participants' product choices. Specifically, the aim of the study was to explore attitudes and behaviors concerning household cleaners and pesticides.

Chemical Specialities Manufacturers Association (CSMA), 1996. Comments to the CLI FR Notice.

Sample Size: Not applicable

Method: Not applicable
Objective: To provide comments on the initiation of consumer labeling project.

Davis, Ann, 1995. "The Effects of Issue Involvement and Implications in Product Information on Product Attitude and Purchase Intention: A Look at the FTC Guidelines for Environmental Marketing," in *Marketing and Public Policy Conference Proceedings* Volume 5, Pam Scholder Ellen and Patrick J. Kaufman, eds., Georgia State University.
Sample Size: 185 college students
Method: Subjects were given product information and then asked to fill out questionnaires.
Objective: To determine if claims based on FTC guidelines cause consumers to make different inferences and have different attitudes toward products. To investigate the effects of involvement and inferences formed from product information (implication or direct) on attitudes and purchase intention.

Decision Data Inc., 1994. *King County Household Hazardous Waste Survey*, written for Local Hazardous Waste Management Program in King County, November 15-December 20, 1994.
Sample Size: 1,661 randomly selected King County residents
Method: Random telephone survey of county residents
Objective: To evaluate changes in King County residents' attitudes and behavior with regard to household hazardous waste and to help define target audiences and develop education strategies.

Decision Data Inc., 1992. *King County Household Hazardous Waste Survey*, written for Local Hazardous Waste Management Program, November.
Sample Size: 1,600 randomly selected King County residents
Method: Random telephone survey of county residents
Objective: To provide baseline information on behaviors and attitudes related to four waste streams generated from latex and oil-based paint, motor oil, pesticides and weed killers, and households cleaners.

Ellen, Pam Scholder, and Patrick J. Kaufman, 1995. *Marketing and Public Policy Conference Proceedings*, Vol. 5.
Sample Size: Not applicable
Method: Not applicable
Objective: Compilation of articles presented at the 1995 Marketing and Public Policy Conference

Elway Research, Inc., 1995. *Household Hazardous Waste Focus Groups*, written for Seattle Solid Waste Utility, Local Hazardous Waste Program in King County, January.
Sample Size: Focus groups consisting of either minority residents or self-reported voters
Method: Subjects were recruited at random from a local community college and from a list of survey participants who agreed to be contacted for further research.
Objective: To follow-up on a telephone survey completed during August 1994. To explore use and disposal of household hazardous chemicals among groups under represented in the

survey, and to test reactions to measures local governments could propose to reduce the impact of household hazardous chemicals.

Elway Research, Inc., 1994. *Household Hazardous Waste Survey*, written for Seattle Solid Waste Utility, Local Hazardous Waste Program in King County, November.

Sample Size: 239 Seattle adults and 161 King County residents living outside Seattle who buy household cleaners, paints, or garden supplies.

Method: Telephone survey

Objective: To explore behaviors and attitudes about use of household hazardous chemicals.

Fleishman-Hillard Research, 1996. *Consumer Understanding of Home and Garden Pesticide Use: A Qualitative Survey of Pesticide Industry Experts*. Commissioned by Responsible Industry for a Sound Environment.

Sample Size: 25 county extension agents, garden center managers, Poison Control managers, manufacturing consumer help line staff, master gardeners, and EPA employees

Method: Telephone survey

Objective: To learn what perceptions pesticide industry experts have of consumer concerns with labeling information and product usage.

Kotwal, Bari M., and Neil D. Lerner, 1995. *Product Labeling Guide Literature Review*. COMSIS Corporation for Consumer Product Safety Commission Contract # CPSC-C-93-1132.

Kraus, Nancy, and Paul Slovic, 1988. *Consumer Risk Perceptions of Household Chemicals*. Conducted for Proctor & Gamble, May.

Sample Size: 750 consumers

Method: Recruited from four cities (Erie, PA; Omaha, NE; New Orleans, LA; San Diego, CA). Completed a one hour session and answered survey questionnaires. Returned for another hour two days later to complete the perceptual mapping portion of the study.

Objective: To develop an understanding of consumers' perceptions of risk associated with household cleaning products relative to other types of consumer products; to gain an understanding of the perceptions of the risk associated with various types of packaging and labeling, and different product forms; and to gain insight into the best way to communicate safety information to individual consumers.

Neil, Nancy, Paul Slovic, and PJ. (Bert) Hakkinen, 1993. *Mapping Consumer Perceptions of Risk*. Chemical Manufacturers Association.

Sample Size: 750 subjects

Method: 47 items judged by respondents on each of 15 evaluative scales, from large-scale multi-topic study; two one-hour sessions over two days

Objective: To demonstrate the psychometric paradigm for mapping risk perceptions in the domain of consumer goods by using their study of household chemical products as an example. To help marketing decision makers understand consumer risk perceptions better and to forecast the impact of those perceptions on consumer expectations and behavior.

Ott, S., 1990. "Supermarket Shoppers' Pesticide Concerns and Willingness to Purchase Certified Pesticide Residue-Fresh Produce." *Agribusiness*, vol. 6 p. 593.

Sample Size: Not available
Method: Not available
Objective: Not available

Patmont, Christine, MAR-KEY Research, 1992. *King County Residential Opinion Survey of Household Hazardous Waste Issues: Round II, 1991*, written for Local Hazardous Waste Management Program, February.

Sample Size: 325 randomly selected King County households
Method: Random telephone survey of county residents
Objective: To evaluate changes in King County residents' attitudes, knowledge, and behavior with regard to household hazardous waste, and assess the effectiveness of a five-year local hazardous waste plan.

Patmont, Christine, MAR-KEY Research, 1990. *King County Residential Opinion Survey of Household Hazardous Waste Issues*, written for Local Hazardous Waste Management Plan, June.

Sample Size: 324 randomly selected King County households
Method: Random telephone survey of county residents
Objective: To get baseline data for use in evaluating the "Hazard Free Community" program in Seattle.

Patmont, Christine, MAR-KEY Research, 1990. *City of Kirkland Residential Opinion Survey of Household Hazardous Waste Issues: Baseline, 1990*, written for Local Hazardous Waste Management Program, December.

Sample Size: 326 randomly selected King County households
Method: Random telephone survey of county residents
Objective: To generate baseline data for comparison with future surveys.

Procter & Gamble, 1988. *The Effect of Voluntary Accident Management Labeling on the Consumer Comment Rate for Spic and Span Pine. Memo.*

Sample Size: Not available
Method: Not available
Objective To show the rate of ingestion and eye accident comments for two household products over a six-quarter period.

Procter & Gamble. *The Effect of Voluntary Accident Management Labeling on the Rate of Ingestion and Eye Accident - Comments for Mr. Clean, Top Job and Comet.*

Sample Size: Not available
Method: Not available
Objective To show ingestion accident comments for three household products.

Procter & Gamble. 1996. *Summary of Environmental Consumer Comments in March 1996 for Hard Surface Cleaners.*

Sample Size: 58 environmental consumer comments

Method: Comments received on toll-free 800 line

Objective: To report environmental consumer comments in March 1996 for Hard Surface Cleaners.

Procter & Gamble. *Household Cleaning Product Concept Test Comparing EPA Labeling vs. No Labeling*

Sample Size: 300 consumers

Method: Consumers were exposed to single product descriptions that included information on product benefit, usage, etc.

Objective: To measure consumer interest in a product that offered antimicrobial benefits in addition to cleaning benefits and to understand the impact of EPA-required labeling on this interest.

Procter & Gamble. 1991. *Environmental Labels - Focus Group Summary.*

Sample Size: Not available

Method: Consumers were asked to screen a comprehensive list of environmental statements for overall understanding, meaningfulness, and importance. Active and passive environmental consumers were asked to review recycle content and recyclability statements for overall reaction, likes/dislikes, and alternatives. Statements regarding product ingredients were probed for consumer understanding. Panelists were paired up and asked to design environmental labels of their own.

Objective: To see how consumers view and are influenced by environmental labels. To see what kinds of labels consumers would prefer.

Roper Organization, The. 1993. *Teen America's Environmental GPA.* Commissioned by S.C. Johnson Wax.

Sample Size: 506 high school students

Method: Written survey administered among students

Objective: To explore and evaluate teenagers' knowledge of a variety of environmental issues.

Roper Organization, The, 1991. *America s Environmental GPA.* Commissioned by S.C. Johnson Wax, November.

Sample Size: 2,000 adults nationwide

Method: Face-to-face interviews in respondents' homes

Objective: To explore and evaluate public understanding of environmental issues and provide a platform for broader public discussion and education.

Roper Organization, The, 1993. *The Environment: Public Attitudes and Individual Behavior, North America: Canada, Mexico, United States.* Commissioned by S.C. Johnson Wax. February.

Sample Size: 1,994 Americans; 2,000 Mexicans; 1,920 Canadians

Method: Face-to-face interviews in respondents' homes.

Objective: To determine the real scope and potential of the North American "green market," to determine the true environmental behaviors in each country, and to find patterns of individual behavior concerning the environment.

Roper Organization, The, 1990. *The Environment: Public attitudes and Individual Behavior.* Commissioned by S.C. Johnson Wax, July.
Sample Size: 1,413 adults selected nationwide
Method: Face-to-face interviews in respondents' homes
Objective: To examine general public attitudes toward the environment and to focus on individual actions and behavior with regard to the environment.

Roper Starch, 1996. *Sustainable Development: The New American Dream: A national Survey of American Attitudes & Actions for Economic, Environmental & Social Progress.* Commissioned by S.C. Johnson Wax, March.
Sample Size: 1,002 adults
Method: Face-to-face interviews in respondents' homes
Objective: To gauge the extent to which Americans may be prepared for a "sustainable movement."

Shimp, Robert J., 1996. The Reality of Ecoseals: Barriers to Environmental Progress in the Global Marketplace. Proctor & Gamble. *Proceeds of the Recycling Laws International "Take it Back" International Seminar for Product and Package Makers*, June 2-3, 1996, Baltimore, Maryland.
Sample Size: Not applicable
Method: Review of eco-seal programs and studies
Objective: To assess the effectiveness of eco-seal programs as a means of 1) informing consumers; 2) encouraging environmental innovation; and 3) improving the environment.

Solaris, 1996. *1996 Label Guide: Roundup, Ortho, Yard Basics, Greensweep.*
Sample Size: Not applicable
Method: Not applicable
Objective: Not applicable

U.S. Consumer Product Safety Commission, 1995. *Product Labeling Guide, Literature Review.* CPSC-C-93-1132.
Sample Size: Not applicable
Method: Not applicable
Objective: Not applicable

U.S. EPA, 1994. *Determinants of Effectiveness for Environmental Certification and Labeling Programs.* OPPT EPA 742-R-94-001.
Sample Size: Not applicable
Method: Not applicable
Objective: To analyze factors related to the effectiveness of environmental labeling in the U.S.; and to ascertain whether additional information about the environmental burdens of a

product's manufacture, use, and disposal can shift consumer choices effectively and cause manufacturers to change manufacturing processes and product formulations. Uses existing research to estimate effectiveness of voluntary third-party labeling.

U.S. EPA, 1986, Draft. *Pesticide Label Utility Project Report.* Office of Pesticide Programs.

Sample Size: 25 responses plus input from others

Method: Responses to Federal Register notice, pesticide industry, regulators, environmental organizations, farmers, pesticide dealers, household pesticide users, and cooperative extension.

Objective: To determine and gain consensus on whether pesticide labels can be relied upon on as a risk reduction tool, to determine ways to improve their reliability, and to determine alternative communication avenues that could help users use information on labels.

U.S. EPA, Draft. "The Talking Label," Provided by U.S. EPA Office of Pollution and Toxics

Sample Size: Not applicable

Method: Not applicable

Objective To discuss the advantages and disadvantages of an audio label. Refers to a study that examined pesticide application efficiency for 133 farmers and commercial operators.

U.S. Food and Drug Administration, 1991. *Estimated Health Benefits of Nutrition Label Changes, Final Report, Volume 1.* Prepared by Research Triangle Institute.

Sample Size: Not applicable

Method: Estimated changes in consumers' dietary intakes of total fat, saturated fat, and cholesterol, and estimated health benefits from reduced risk of coronary heart disease and cancer.

Objective: To provide estimates of the potential health benefits from the dietary changes expected to occur as a result of the 1990 Amendments expanding mandatory nutrition labeling.

Walker Research, 1994. *Disinfectant Product Disposal Label Study.* Conducted for the Chemical Specialties Manufacturers Association (CSMA), May.

Sample Size: 200 product users

Method: Residents from four cities who met security requirements and passed three month product usage requirements.

Objective: To compare two different sets of rinsing instructions for household disinfectant cleaning product containers, those proposed by EPA and alternate language developed by CSMA. Screened at shopping malls and escorted to separate interviewing area where they were asked to read labels and answer questions.

Walker Research, 1994. Home Lawn & Garden Product Disposal Label Study. Conducted for the Chemical Specialties Manufacturers Association (CSMA), May.

Sample Size: 200 product users

Method: Residents from four cities who met security requirements and passed three month product usage requirements

Objective: To compare two different sets of rinsing instructions for home lawn and garden product containers: those proposed by EPA, and alternate language developed by CSMA. Participants were screened at shopping malls and escorted to a separate interviewing area, where they were asked to read labels and answer questions.

21 CFR Parts 5, 20, 100, 101, 105, and 130. *Regulatory Impact Analysis of the Final Rules to Amend the Food Labeling Regulations*.

Appendix B

CPSC Annotated Bibliography

Braun, C.C., C. Silver, and B.R. Stock, 1992. Likelihood of reading warnings: The effect of fonts and font sizes. *Proceedings of the Human Factors Society 36th Annual Meeting*, 926-930. Santa Monica, CA: Human Factors Society.

Sample Size: 40 undergraduate students (mean age = 18.17), 22 elderly subjects (mean age = 65.45)

Method: Subjects rated 24 detergent labels based on their likelihood to read the warning, the saliency of the warning, and readability of the warning. Participants then completed a 24-page questionnaire containing sample labels.

Objective: To examine the effects of color, symbol, and shape of the signs on hazard perception.

Bresnahan, T., 1985. The hazard association value of safety signs. *Professional Safety, 30*(7), 26-31.

Sample Size: Not available

Method: Subjects were from industrial population.

Objective: To determine most appropriate colors and shapes for hazard warnings.

Bresnahan, T.F. and J. Bryk, 1975. The hazard association values of accident-prevention signs. *Professional Safety*, January, 17-25.

Sample Size: Not available

Method: Not available

Objective: Not available

Collins, B.L., 1983. Evaluation of mine-safety symbols. *Proceedings of the Human Factors Society 27th Annual Meeting*, 947-949. Santa Monica, CA: Human Factors Society.

Sample Size: 267 miners (20-61 years) from 10 different mine sites in the U.S.

Method: Subjects used a ranking procedure to evaluate perceived hazardousness of 6 different surround shapes for several different interior images.

Objective: To determine most appropriate colors and shapes for hazard warnings.

Cunitz, R.J., 1992. Warnings: A human factors perspective. In L. Ring (Ed.), *Handling Product Warning Litigation*. Esquire, Wiley Law Publications: Consumer Usage Laboratories, Inc.

Sample Size: Not available

Method: Not available

Objective: Not available

Desaulniers, D.R., 1987. Layout, organization, and the effectiveness of consumer product warnings. *Proceedings of the Human Factors Society 31st Annual Meeting*, 56-60. Santa Monica, CA: Human Factors Society.

Sample Size: Not available

Method: Not available

Objective: Not available

Dingus, T., J. Hathaway, and B. Hunn, 1991. A Most Critical Warning Variable: Two Demonstrations of the Powerful Effects of Cost on Warning Compliance. *Proceedings of the Human Factors Society 35th Annual Meeting*, 1034-1038. Santa Monica, CA: Human Factors Society.

Date: 1991 - Experiment 1
Sample Size: 920 racquetball players at large centers in 2 universities
Method: Varied cost of compliance with wearing protective eye wear for players.
Objective: To determine rates of compliance with wearing safety gear based on different costs of compliance.

Date: 1991 - Experiment 2
Sample Size: 318 university students
Method: Experiment was presented under the guise of a marketing study; subjects thought they were evaluating the marketing potential of a "new" cleaning product.
Objective: To determine rates of compliance with wearing safety gear based on different costs of compliance

Dingus, T.A., S.S. Wreggit, and J.A. Hathaway, 1993. Warning variables affecting personal protective equipment use. *Safety Science, 16*, 655-673.

Date: 1993 - Experiment 2
Sample Size: 224 adult volunteers
Method: Subjects were given a questionnaire after using the product for one week. Subjects were also asked what they thought the purpose of the study was; if the subject answered this question correctly, that subject's data was included in the analysis.
Objective: To determine relationships between interactivity, label content, and cost of compliance.

Dixon, P., 1982. Plans and written directions for complex tasks. *Journal of Verbal Learning and Verbal Behavior, 21*, 70-84. (Cited in Wright, P. (1981).)

Sample Size: Not available
Method: Not available
Objective: Not available

Dorris, A.L., 1991. Product warnings in theory and practice: Some questions answered and some answers questioned. *Proceedings of the Human Factors Society 35th Annual Meeting*, 1073-1077. Santa Monica, CA: Human Factors Society.

Sample Size: Not available
Method: Not available
Objective: Not available

Dorris, A.L. and J.L. Purswell, 1977. Warnings and human behavior: Implications for the design of product warnings. *Journal of Product Liability, 1*, 255-263.

Sample Size Not applicable
Method: Not applicable

Objective: To provide summary of McCormick (1976), VanCott and Kinkade (1972), Peters and Adams (1959), for purposes of determining proper visual display attributes (i.e., stroke width-to-height, font height, etc.).

Duffy, R.R., M.J. Kalsher, and M.S. Wogalter 1993. The effectiveness of an interactive warning in a realistic product-use situation. *Proceedings of the Human Factors Society 37th Annual Meeting*, 935-939. Santa Monica, CA: Human Factors Society.

Sample Size: 120 undergraduate college students

Method: Study was disguised as an evaluation of instructional media

Objective: To compare the effectiveness of interactive warning labels to standard labels.

Easterby, R.S. and S.R. Hakiel, 1981. Field testing of consumer safety signs: The comprehension of pictorially presented messages. *Applied Ergonomics*, 12(3), 143-152.

Sample Size: 4000 British residents

Method: Not available

Objective: To test comprehension rates of known hazard symbols.

Essex Corporation, 1986. *Quick response human factors analyses for product safety assessment.* (CPSC-C-84-1091). Bethesda, MD: Consumer Product Safety Commission.

Sample Size: 120 subjects

Method: Presented different labels and tested on ability to recall and recognize them.

Objective: To test recall and recognition of labels while varying label format, position, and volume.

Frantz, J.P., 1993. Effect of location and presentation format on attention to and compliance with product warnings and instructions. *Journal of Safety Research, 24*, 131-154.

Sample Size: 80 college students

Method: Subjects were asked to unclog a kitchen sink drain, apply a water sealant to a plant stand, and then to clean the sink, using materials provided. Subjects were videotaped; videotapes were used to determine the amount of time subjects spent viewing various panels of the drain opener container.

Objective: To determine the effect of safety information location relative to usage instructions and the effect of presentation format of usage instructions on the attention to and compliance with on-product warnings and instructions.

Frantz, J. and T. Rhoades, 1993. A task analytic approach to the temporal and spacial placement of product warnings. *Human Factors, 35*(4), 719-730.

Sample Size: Not available

Method: Subjects were asked to set up a mock office, which included a filing cabinet. The warning concerned the tipping hazard, and indicated that the lower drawer should be filled before the upper drawer. Four label conditions were compared, which included different locations and degrees of task disruption.

Objective: To compare several warning label locations and strategies in an experimental setting.

Gill, R.T., C. Barbera, and T. Precht, 1987. A comparative evaluation of warning label designs. *Proceedings of the Human Factors Society 31st Annual Meeting*, 476-478. Santa Monica, CA: Human Factors Society.

Sample Size: 83 adult volunteers

Method: Subjects were told that the purpose of the experiment was to study the ability of subjects to perform problem-solving tasks; THEY were asked to melt votive candle inside A metal cup using tools at hand (e.g., space heater, flood lamp, etc.). Subjects were given a questionnaire in which they were asked to identify locations and content of all warning labels on the heater, flood lamp, extension cord, etc.

Objective: To test recall and recognition of labels while varying label design.

Godfrey, S.S., L. Allender, K.R. Laughery, and V.L. Smith, 1983. Warning messages: Will the consumer bother to look? *Proceedings of the Human Factors Society 27th Annual Meeting*, 950-954. Santa Monica, CA: Human Factors Society.

Sample Size: Not available

Method: Not available

Objective: Not available

Goldhaber, G.M., and M.A. deTurck, 1988. Effects of consumers' familiarity with a product on attention and compliance with warnings. *Journal of Products Liability*, 11,29-37.

Sample Size: Not available

Method: Not available

Objective: Not available

Hartley, J., S. Bartlett, and A. Branthwaite, 1980. Underlining can make a difference -- sometimes. *The Journal of Educational Research*, 73(4), 218-224.

Sample Size: Not available

Method: Presented 6th graders with passages with underlined or not underlined words.

Objective: To test recall of words based on underlining or not underlining.

Hodge, D.C., 1962. Legibility of a uniform-stroke-width alphabet: Relative legibility of upper and lower case letters. *Journal of Engineering Psychology*, 1(1), 289-299.

Sample Size: 4 male and 11 female subjects between 16 and 44 years old with 20/20 vision

Method: Studied legibility performance of upper- and lower-case letters of uniform stroke-width.

Objective: To determine legibility of upper- versus lower-case letters.

Hunn, B., and T. Dingus, 1992. Interactivity, information, and compliance cost in a consumer product warning scenario. *Accident Analysis & Prevention*, 24(5), 497-505.

Sample Size: 356 total (96% were undergraduate college students; 4% were members of the university community)

Method: Subjects were given three levels of warning.

Objective: To assess the potential effectiveness of packaging variables on modifying behavior during the use of a consumer product.

Laughery, K.R., and J.W. Brelsford, 1991. Receiver characteristics in safety communications. *Proceedings of the Human Factors Society 35th Annual Meeting*, 1068-1072. Santa Monica, CA: Human Factors Society.

Sample Size: Not available
Method: Not available
Objective: Not available

Laughery, K.R., and S.L. Young, 1991. An eye scan analysis of accessing product warning information. *Proceedings of the Human Factors Society 31st Annual Meeting*, 585-589. Santa Monica, CA: Human Factors Society.

Sample Size: 5 students
Method: Questionnaires were produced by simulating 12 signs that described 12 different hazards, each using one of three signal words (CAUTION, WARNING, DANGER). Subjects were asked to rate whether they would obey or disregard the sign on a 7-point scale based on perceived danger level.
Objective: To test whether enhancement features increase attention.

Leonard, S.D., E. Creel, and E.W. Karnes, 1991. Adequacy of responses to warning terms. *Proceedings of the Human Factors Society 35th Annual Meeting*, 1024-1028. Santa Monica, CA: Human Factors Society.

Sample Size: Not available
Method: Not available
Objective: Not available

Leonard, S.D., D. Matthews, and E.W. Karnes, 1986. How does the population interpret warning signals? *Proceedings of the Human Factors Society 30th Annual Meeting*, 116-120. Santa Monica, CA: Human Factors Society.

Sample Size: 368 undergraduate college students
Method: Subjects were asked to rate on a 7-pt scale the amount of risk that was associated with different warning signs.
Objective: To examine the effect of warning sign appearance and signal words on perceived risk.

Leonard, D.C., K.A. Ponsi, N.C. Silver, and M.S. Wogalter, 1989. Pest-control products: Reading warnings and purchasing intentions. *Proceedings of the Human Factors Society 33rd Annual Meeting*, 436-440. Santa Monica, CA: Human Factors Society.

Sample Size: 70 undergraduate college students (17-19 yrs) and 20 older adult undergraduate students (mean age 37 yrs, standard deviation 7.7 yrs)
Method: Subjects were given a questionnaire to assess perceptions of the 22 pest-control products' packaging, labeling, and warnings; responses were recorded using a 9-point Likert scale (0 to 8).
Objective: To examine whether several objective measures of the warning readability (statements, words, grade level) would be related to the willingness-to-read variable.

Lerner, N.D., 1985. Slope safety warnings for riding-type lawnmowers. *Proceedings of the Human Factors Society 29th Annual Meeting*, 674-678. Santa Monica, CA: Human Factors Society.

Sample Size: Not available
Method: Not available
Objective: Not available

MIL-STD-1472D, 1989. *Human Engineering Design Criteria for Military Systems, Equipment and Facilities*. Washington, DC: U.S. Department of Defense.

Sample Size: Not available
Method: Not available
Objective: Not available

Miller, J.M., and M.R. Lehto, 1984. *Comments on 29 CFR 1910.14*, report submitted to Documents Department, Occupational Safety and Health Administration.

Sample Size: Not applicable
Method: Not applicable
Objective: Not applicable

Morris, L.A., A. Myers, and D.G. Thilman, 1980 Application of the readability concept to patient-oriented drug information. *American Journal of Hospital Pharmacy, 37*, 1504-1509.

Sample Size: 199 college students
Method: Each subject was asked to read one of the four versions, rate the information using a semantic-differential scale, and estimate the reading level of the information.
Objective: To study readability of four versions of diazepam labeling documents intended for patients.

Mrvos, R., B.S. Dean, and E.P. Krenzelok, 1986 An extensive review of commercial labels...the good, bad, and ugly. *Veterinary and Human Toxicology, 28*(1), 67-69.

Sample Size: Not available
Method: Not available
Objective: Not available

Patterson, D.G., and M.A. Tinker, 1940. *How to make type readable*. New York: Harper.

Sample Size: Not available
Method: Not available
Objective: Not available

Polzella, D.J., M.D. Gravelle, and K.M. Klauer, 1992. Perceived effectiveness of danger signs: A multivariate analysis. *Proceedings of the Human Factors Society 36th Annual Meeting*, 931-934. Santa Monica, CA: Human Factors Society.

Sample Size: 58 undergraduate college students
Method: Subjects rated 80 OSHA accident prevention signs on 13 dimensions related to perceived effectiveness using a 7-point Likert scale.

Objective: To analyze effectiveness of hazard labels and instructions in terms of ease of understanding, informativeness, and likelihood of compliance.

Ralph, J.B., 1982. A geriatric visual concern: The need for publishing guidelines. *Journal of the American Optometric Association, 53*, 43-49.

Sample Size: Not available

Method: Not available

Objective: Not available

Reynolds, L., 1979. Legibility problems in printed scientific and technical information. *Journal of Audiovisual Media in Medicine, 2*, 67-70. (Study not reviewed. Cited in Miller, Lehto and Frantz, 1990.)

Sample Size: Not available

Method: Image quality was manipulated by performing various degrees of photocopy darkening and lightening of text.

Objective: To determine the effects of image quality, typefaces, and background noise, among others, on legibility.

Rodriguez, M.A., 1991. What makes a warning label salient? *Proceedings of the Human Factors Society 35th Annual Meeting*, 1029-1033. Santa Monica, CA: Human Factors Society.

Sample Size: 94 subjects

Method: Subjects conducted a mock chemical experiment with three unknown reagents, one of which had a warning label attached to the bottle. Experiment was viewed through a one-way mirror; subjects were observed for compliance and if the label was read. Questionnaires were used to determine retention of label details and perceived danger.

Objective: To test the effectiveness of warning label color and shape in terms of subject compliance, retention of label details, and perception of danger level.

Sell, R.G., 1977. What does safety propaganda do for safety? A review. *Applied Ergonomics*, 203-214.

Sample Size: Not available

Method: Not available

Objective: Not available

Strawbridge, J.A., 1986. The influence of position, highlighting, and imbedding on warning effectiveness. *Proceedings of the Human Factors Society 30th Annual Meeting*, 716-720. Santa Monica, CA: Human Factors Society.

Sample Size: 195 subjects

Method: Subjects were given an unfamiliar consumer product to actually use; direct observation and follow-up questions were utilized to measure the percentage of subjects who noticed, read, and complied with the warning, plus the amount of information subjects could recall about the specific cause, nature, and prevention of the danger.

Objective: To investigate the behavioral influence of varying warning position, highlighting, and imbedding on warning detection, recall, and compliance.

Tinker, M.A., 1963. *Legibility of print.* Ames, Iowa: Iowa State University Press.
Sample Size: Not available
Method: Not available
Objective: Not available

Ursic, M., 1984. The impact of safety warnings on perception and memory. *Human Factors, 26* (6), 677-682.
Sample Size: 91 undergraduate college students
Method: Subjects were asked to rate 3 hypothetical brands of bug killers and hair dryers on effectiveness and safety. Attributes of each (e.g., price, smell, safety, etc. for bug killers; price, power output, safety, etc. for hair dryers) were presented.
Objective: To investigate the impact of product attributes on consumer perception of effectiveness and safety.

Vanderplas, J.M., and J.H. Vanderplas, 1980. Some factors affecting legibility of printed materials for older adults *Perceptual and Motor Skills, 50*(3), 923-932. (Study not reviewed. Cited in Miller, Lehto, and Frantz, 1990.)
Sample Size: 28 adult subjects (mean age = 72)
Method: Measured reading speed and acceptance ratings as a function of type size, type style, line width, and line spacing.
Objective: To determine styles and sizes of type at which adults perform better.

Vaubel, K.P. and J.W. Brelsford, Jr., 1991. Product evaluations and injury assessments as related to preferences for explicitness in warnings. *Proceedings of the Human Factors Society 35th Annual Meeting*, 1048-1052. Santa Monica, CA: Human Factors Society.
Sample Size: 73 undergraduate college students
Method: Presented written descriptions of 7 fictitious products and 7 potential hazards. Subjects filled out written questionnaires to rate the detail of each warning, choose whether they preferred to buy the product with either an explicit or nonexplicit warning; rate the severity of the consequences and the extent to which the hazard could be controlled by taking necessary precautions; rate perceived product worth according to societal value, and decide whether the product should be sold in the U.S.
Objective: To examine purchase intentions as a function of the detail or explicitness with which on-product warnings describe potential consequences of using (or misusing) a product.

Vaubel, K.P., 1990. Effects of warning explicitness on consumer product purchase intentions. *Proceedings of the Human Factors Society 34th Annual Meeting*, 513-517. Santa Monica, CA: Human Factors Society.
Sample Size: Not available
Method: Not available
Objective: Not available

Viscusi, W.K., W.A. Magat, and J. Huber, 1986. Informational regulation of consumer health risks: An empirical evaluation of hazard warnings. *Rand Journal of Economics, 17*(3), 351-365.

Sample Size: approx. 400 consumers
Method: Each subject examined only one of several product labels. Label variations included no hazard warning information and varying amounts of risk information conveyed. A questionnaire was given exploring the degree to which consumers would take precautions when using the products (a liquid bleach and a liquid drain opener).
Objective: To determine to what degree consumers would take precautions, given different amounts of hazard warning information.

Wogalter, M. S., J.W. Brelsford, D.R. Desaulniers, and K.R. Laughery, 1991.Consumer product warnings: The role of hazard perception. *Journal of Safety Research, 22,* 71-82.
Date: 1991 - Experiment 1
Sample Size: 125 college students
Method: Subjects rated 72 products and evaluated them on familiarity and perceived hazardousness.
Objective: To examine whether hazard perception and familiarity relate to willingness to read warnings.
Date: 1991 - Experiment 2
Sample Size: 28 college students
Method: Subjects rated 72 products and evaluated them on familiarity and perceived hazardousness.
Objective: To determine what information is involved in the formation of people's perception of hazard.
Date: 1991 - Experiment 3
Sample Size: 70 college students
Method: Subjects were asked to read over a list of 18 products and then perform 5 tasks.
Objective: To determine whether the hazard-severity relationship would be found using a different methodology and to investigate characteristics of scenarios with regard to production order.

Wogalter, M.S., D.R. Desaulniers, and J.W. Brelsford, Jr., 1986. Consumer products: How are the hazards perceived? *Proceedings of the Human Factors Society 31st Annual Meeting*, 615-619. Santa Monica, CA: Human Factors Society.
Date: 1986 - Experiment 1
Sample Size: 28 undergraduate college students
Method: Subjects were presented with 72 generic products in a list format and were asked to rate each product on such attributes as perceived hazardousness, likelihood of injury, frequency of use, and familiarity.
Objective: To test relationship between perceived hazardousness and attributes like familiarity and likelihood of injury.
Date: 1986 - Experiment 2
Sample Size: 70 undergraduate college students
Method: Subjects were presented with a list of 18 products and were asked to rate perceived hazardousness, to indicate possible accident scenarios associated with each product including type of injury, severity of injury, and likelihood of injury

Objective: To determine what was the most important determinant of willingness to read warnings.

Wogalter, M.S., D.R. Desaulniers, and S.S Godfrey, 1985. Perceived effectiveness of environmental warnings. *Proceedings of the Human Factors Society 29th Annual Meeting*, 664-668. Santa Monica, CA: Human Factors Society.

Sample Size: 107 undergraduate college students

Method: 17 warnings were used in a study manipulating signal word (DANGER, WARNING, CAUTION), hazard statement (SHALLOW WATER, HIGH VOLTAGE), consequence statement (POSSIBLE HEAD INJURY, ELECTRICAL SHOCK), and instruction statement (NO DIVING, DO NOT TOUCH).

Objective: To test the effectiveness of signal word, hazard statement, consequence statement, and instruction statement on warning effectiveness.

Wogalter, M.S., R.M. Forbes, and T. Barlow, 1993. Alternative product label designs: Increasing the surface area and print size. *Proceedings of Interface '93*, 181-186.

Sample Size: 60 total (30students from introductory psychology courses (mean=19.1 years) and 30 elderly volunteers (mean=72.3 years))

Method: Two alternative label designs (tag and wings) and varying label sizes and prints were developed. Students rated the products on eight factors, including attractiveness, ease of use, and likelihood of noticing the warning. Elderly participants were asked to select the single bottle that best represented each dimension.

Objective: To test effectiveness and purchasing bias of alternative label designs and font sizes

Wogalter, M.S., S.S. Godfrey, G.A. Fontenelle, D.R. Desaulniers, P.R. Rothstein, and K.R. Laughery, 1987. Effectiveness of warnings. *Human Factors, 29* (5), 599-612.

Date: 1987 - Lab Experiment 1

Sample Size: 51 undergraduate college students

Method: Subjects conducted a mock chemical experiment with unknown reagents, where location of warning messages on instructions sheet was varied.

Objective: To test the effectiveness of warning label placement on compliance.

Date: 1987 - Rating Experiment 1

Sample Size: 107 undergraduate students

Method: Subjects rated the effectiveness of 17 different warning signs.

Objective: To test the perceived warning effectiveness of signal words, hazard statements, and instruction statements.

Date: 1987 - Rating Experiment 2

Sample Size: 81 people from two universities (not specified whether all were students, employees, etc.)

Method: Similar to Rating Exp 1, except with a larger sample of stimulus signs, different experimental instructions, and an 11-pt rating scale; subjects were asked to make ratings based on the percentage of people who would obey the warning sign if they saw it.

Objective: To test the perceived warning effectiveness of signal words, hazard statements, and instruction statements.

Date: 1987 - Rating Experiment 3
Sample Size: 66 undergraduate college students
Method: Subjects rated on an 8-pt Likert scale the degree to which the information in the missing statement was already included in the 3-statement sign.
Objective: To test the perceived redundancy of information on warning signs.
Date: 1987 - Experiment 3
Sample Size: Not available
Method: A baseline and two experimental observations were conducted on the use of a water fountain; each section lasted 30 minutes.
Objective: To determine what warning sign characteristics are most effective.

Wogalter, M., S. Godfrey, G. Fontenelle, D. Desaulniers, P. Rothstein, and K. Laughery, 1987. Warnings: Do they make a difference? *Proceedings of the Human Factors Society 29th Annual Meeting*, 669-673. Santa Monica, CA: Human Factors Society.
Date: 1987 - Experiment 3
Sample Size: Not available
Method: Field observation of door users in a college classroom building. Compliance with a warning sign on a broken door was measured. Cost of compliance was manipulated by varying distance to alternate doors.
Objective: To determine what cost people were willing to pay to comply with warning signs.

Wogalter, M.C., S. W. Jarrard, and S.N. Simpson, 1992. Effects of warning signal words on consumer-product hazard perceptions. *Proceedings of the Human Factors Society 36th Annual Meeting*, 935-939. Santa Monica, CA: Human Factors Society.
Date: 1992
Sample Size: 45 undergraduate college students, 45 high school students
Method: Participants were given a questionnaire, presented under the guise of a marketing study; responses were based on a 9-pt Likert-type scale; questions about product included frequency of use, attention-getting capabilities, familiarity, hazardousness, likelihood of purchase, expected cost.
Objective: To test effect of signal words on subjects' perceptions of attributes like perceived hazardousness, familiarity, likelihood of purchase.

Wogalter, M., N. McKenna, and S. Allison, 1988. Warning compliance: Behavioral effects of cost and consensus. *Proceedings of the Human Factors Society 32nd Annual Meeting*, 901-904. Santa Monica, CA: Human Factors Society.
Date: 1988 - Experiment 1
Sample Size: 23 college students
Method: Subjects performed a chemistry demonstration task using a set of instructions that contained a warning directing them to wear a safety mask and gloves. Cost was manipulated by varying the location of the masks and gloves.
Objective: To determine relationship between cost of compliance with warnings and compliance.

Wogalter, M., R. Rashid, S. Clarke, and M. Kalsher, 1991. Evaluating the behavioral effectiveness of a multi-modal voice warning sign in a visually cluttered environment. *Proceedings of the Human Factors Society 35th Annual Meeting*, 718-722. Santa Monica, CA: Human Factors Society.

Sample Size: 94 subjects

Method: Subjects conducted a mock chemical experiment where a warning sign to wear goggles and mask was presented in either a visually cluttered or uncluttered environment.

Objective: To test the effect of cluttered environment on warning compliance.

Wright, 1981."The instructions clearly state..." Can't people read? *Applied Ergonomics, 12*(3), 131-141.

Sample Size: Not available

Method: Not available

Objective: Not available

Wright, P., P. Creighton, and S.M. Threlfall, 1982. Some factors determining when instructions will be read. *Applied Ergonomics, 25*, 225-237.

Sample Size: 52 volunteers from the subject panel of the Applied Psychology Unit, Cambridge, were paid for taking part in an experiment.

Method: Subjects were asked to fill out a questionnaire.

Objective: To examine the extent to which a person's attitude toward a consumer product influences the likelihood of their reading the instructions.

Young, S.L., 1991. Increasing the noticeability of warnings. Effects of pictorial, color, signal icon and border. *Proceedings of the Human Factors Society 35th Annual Meeting*, 580-584. Santa Monica, CA: Human Factors Society.

Sample Size: Not available

Method: Not available

Objective: Not available

Young, S.L., K.R. Laughery, and M. Bell, 1992. Effects of two type density characters on the legibility of print. *Proceedings of the Human Factors Society 36th Annual Meeting*, 504-508. Santa Monica, CA: Human Factors Society.

Sample Size: Not available

Method: Subjects were asked to select the more "readable" of two choices of sentences.

Objective: To examine the effect of two print density manipulations, type width, and inter-character spacing, on the ease with which warnings could be read.

Zlotnik, M.A., 1982. The effects of warning message highlighting on novel assembly task performance. *Proceedings of the Human Factors Society 26th Annual Meeting*, 93-97. Santa Monica, CA: Human Factors Society.

Sample Size: Not available

Method: Subjects were asked to complete tasks.

Objective: To examine the effectiveness of various methods of highlighting warning messages contained in the instructions for a novel assembly task.

Appendix C

Key Learning Objectives

The Qualitative Research Development Committee (QRDC) used input from Stakeholder comments and the draft literature review, and identified 14 "key learning objectives" for the CLI, with the recognition that the learning objectives would require both a qualitative phase and a quantitative phase in order to be addressed fully. The 14 key learning objectives identified by the committee are as follows:

1. What do consumers want to know about these products?
2. Do consumers read labels? If so, which ones? To what extent do they read labels? If they don't, why not? What parts of the label do they read?
3. Do consumers understand labels?
4. Do consumers follow instructions on the label? If not, why not? (Does the consumer measure the product? Dilute appropriately? Wear protective clothing?)
5. Do consumers find information on the labels confusing or counterproductive? If so, what information?
6. Do consumers perceive that there is any risk related to these products? If so, which ones? Is the perceived risk related to perceived efficacy? Does perceived risk relate to label reading?
7. How do consumers currently use label information to make a purchase decision?
8. What could motivate consumers to become more likely to use the label information? Why?
9. How does precautionary information impact purchase behavior, if at all? Why?
10. How does information on the label impact how the product is used?
11. How does information on the label impact how the product is disposed of?
12. What label information is broadly applicable across categories; what is specific to categories?
13. Do consumers use outside pesticides in the house?
14. Do consumers over-use or under-use products? (i.e., "If a little is good, more is better...")

These key learning objectives formed the basis for development of the research design, including identification of appropriate respondents and adoption of a qualitative research format that would most successfully elicit honest and useful responses from consumers.

Appendix D

Decision Model

1. Conduct qualitative research, literature review, and summarize public comments

2. Identify issues/problems

3. Can issue/problem be addressed through label improvement?
   No: go to 4 Yes: go to 6

4. Can issue be solved by other means?
   No: stop Yes: go to 5

5. Make recommendations for non-labeling (i.e., education effort) solution in September report.

6. Will addressing issue through labeling meet the CLI goal?
   No: stop or go back to 1 Yes: go to 7

7. Does label issue/problem need to be quantified/validated?
   No: Go to 9 Yes: Go to 8

8. Conduct quantitative research to statistically validate assumption of problem. Is problem valid?
   No: Stop or go back to 1 Yes: Go to 9

9. Have solutions to problem been identified?
   No: Go to 10 Yes: Go to 11

10. Develop solution/label change.

11. Does solution/label change meet the CLI goal?
    No: Stop or go back to 10 Yes: Go to 12

12. Does solution/label change need to be statistically validated?
    No: Go to 14 Yes: Go to 13

13. Conduct quantitative research to validate solution/label change. Is solution/label change supported by quantitative study?
    No: Go back to 10 Yes: Go to 14

14. Does improvement/solution require change in statutes (i.e., FIFRA)?
    No: Go to 16 Yes: Go to 15

15. Make recommendation for change in statute in September report or when possible Is Statute changed as recommended?

    No: Go to 14 Yes: Go to 17

16. Do recommendations require change in regulation?

    No: Go to 17 Yes: Go to 17

17. Recommend change in regulation to allow improvement (September Report or when possible). Does allowing improvement require change/clarification of policy?

    No: Go to 19 Yes: Go to 18

18. Recommend policy change/clarification (September Report or when possible) to allow improvement (e.g., FR Notice)

19. Recommend implementation (September Report or as soon as possible).

Appendix E

Participant Screener for One-on-One Interviews - Indoor Insecticides

Recruiting Goals

- The participants shall be adults between the ages of 18 and 65.
- Each group shall include people from several cultural or ethnic backgrounds (e.g., Caucasian, African American, Hispanic, Asian, etc.). **["Group" refers to the group of 15 respondents in each interview site.]**
- Each group will be composed of a mix of participants who reside in urban and suburban areas.
- Each group will be composed of a mix of participants who have children and those who have no children.
- Each group will be composed of a mix of participants who own pet(s) and those who do not own pet(s).
- Professional lawn service providers and exterminators will be excluded.
- All participants must have seen ants, roaches, or fleas in their residence within the past 3 months.

  - Each group's participants will be composed of a mix of participants with ants, roaches, or fleas.
  - Each participant must have used an indoor insecticide, bought in a store, to dispose of the insects.
  - Each group's participants will include participants who are light, moderate, and heavy users of indoor insecticides.

Scheduling

The schedule for the groups follows:

June 4-5, 1996

Site: Miami 15 participants

June 18-19, 1996

New York 15 participants

June 26-27, 1996

Los Angeles 15 participants

- Participants are to bring the indoor pesticides that they use to the interview.
- Participants will be paid **$35** for their participation **($50 in New York)**.
- Refreshments will be offered to participants.
- Results of the screening questions and the interviews will remain confidential at all times.

Hello Mr./Ms. _____, my name is _____ and I'm calling from _____. We are presently working with Macro International, a research and consulting firm, on a research project about consumer use of common household and garden products. Could I ask you a few short questions for this survey?

Screening Questions

1. Are you a man or a woman? **[This question may be skipped if the interviewer has already determined the recruit's gender.]**
- Woman
- Man

2. Have you had any problems with insects in your home during the past three months, such as ants, roaches, or fleas?
- Yes
- No ---- ***terminate***

3. Did you use a commercially available indoor insecticide to kill these insects?
- Yes
- No ---- ***terminate***

4. I'm going to read a list of age groups to you. Could you please tell me which group you are in?
- under 18 ---- ***terminate***
- 18-25
- 26-35
- 36-50
- 51-65
- over 65 ---- ***terminate***

5. What is your ethnic background?
- African American
- Asian
- Caucasian
- Hispanic
- Native American
- Other (please specify)

6. Do you work as an exterminator?
- No
- Yes ---- ***terminate***

7. What type of area do you consider the neighborhood where you live?

- Urban
- Suburban
- Rural ---- ***terminate***

8. Do you have children who live with you?

- No
- Yes (include some participants in each group who have children in the home)

9. Do you own a pet?

- No
- Yes (include some participants in each group who have pets in the home)

10. Where did you purchase the insecticide?

- Store or other retail outlet
- Got the insecticide in some other manner ---- ***terminate***

11. Would you classify yourself as a heavy, moderate, or light user of indoor insecticides?

- Heavy
- Moderate
- Light

12. We would like to invite you to participate in a one-on-one interview with a researcher from Macro about indoor pesticides. The interview will take place on [day], [date] at [time] at [facility name and location]. It will last about 45 minutes, and you will be paid $35 [$50 in New York] in cash for your time. Would you like to participate?

- No ---- ***terminate***
- Yes

13. We would like you to bring the indoor insecticides that you have at your house with you to the interview to assist us in our interview process. Could you do that?

- No ---- **(ask if they would be willing to write down the name of the product or products that they use and bring that information to the interview with them. If they refuse, *terminate)***
- Yes

I would like to schedule your interview and send you a confirmation letter and directions to the facility. In order to do so, could you please tell me your mailing address and give me a phone number where you can be reached:

NAME: _____
ADDRESS: _____
CITY: _____ STATE: _____ ZIP: _____
PHONE: (H) _____
(W) _____

Which day and what times are convenient for you?

DATE OF INTERVIEW: _____ TIME: _____

We are inviting only a few people, so it is very important that you notify us as soon as possible if for some reason you are unable to attend. Please call _____ at [phone] if this should happen. We look forward to seeing you on [date] at [time].

Participant Screener for
One-on-One Interviews - Outdoor Pesticides

Recruiting Goals

- The participants shall be adults between the ages of 18 and 65.
- Each group shall include people from several cultural or ethnic backgrounds (e.g., Caucasian, African American, Hispanic, Asian, etc.). **["Group" refers to the group of 15 respondents in each interview site.]**
- All participants must have a private yard at their residence in which they perform their own yard work.
- Each group will be composed of a mix of participants who have children and those who have no children.
- Each group will be composed of a mix of participants who own pet(s) and those who do not own pet(s).
- Professional lawn service providers, exterminators, and farmers will be excluded.
- All participants must have bought or used commercially available outdoor pesticides within the past 12 months.
    - Each group's participants will be divided between persons treating a range of different insect types **[In Los Angeles and Miami, ensure that at least 3 participants use fire ant treatments.]**
    - Each participant must be the actual user of the outdoor pesticide.
    - Each group's participants will be divided between persons who use concentrated and ready- to-use products.
    - Each group's participants will be evenly divided between participants who are light and heavy users of outdoor insecticides.
- Persons who use only fertilizers in their yard will be excluded; at least 2 persons who use a mix of fertilizer and insecticide ("weed and feed") will be included in each group.

Scheduling

The schedule for the groups follows:

June 4-5, 1996

Site:	Dallas	15 participants

June 12-13, 1996

	Chicago	15 participants

June 26-27, 1996

	Los Angeles	15 participants

- Participants are to bring the outdoor pesticides that they use to the interview.
- Participants will be paid **$35** for their participation.
- Refreshments will be offered to participants.
- Results of the screening questions and the interviews will remain confidential at all times.

Hello Mr./Ms. _____, my name is _____ and I'm calling from _____. We are presently working with Macro International, a research and consulting firm, on a research project about consumer use of common household and garden products. Could I ask you a few short questions for this survey?

Screening Questions

1. Are you a man or a woman? **[This question may be skipped if the interviewer has already determined the recruit's gender.]**
- Man
- Woman

2. Does your residence have a private yard?
- Yes
- No ---- ***terminate***

3. Do you, personally, care for that yard? [mow, weed, etc.]
- Yes
- No ----**(ask to speak with the person who does the yard work. If the work is contracted out, *terminate)***

4 I'm going to read a list of age groups to you. Could you please tell me which group you are in?
- under 18 ---- ***terminate***
- 18-25
- 26-35
- 36-50
- 51-65
- over 65 ---- ***terminate***

5. What is your ethnic background?
- African American
- Asian
- Caucasian
- Hispanic
- Native American
- Other (please specify)

6. Do you work as a professional lawn care provider, exterminator or farmer?
- No
- Yes ----***terminate***

7. Do you have children who live with you?
- No
- Yes (include some participants with children in the home)

8. Do you own a pet?
- No
- Yes (include some participants with pets in the home)

9. Have you bought or used a commercially available outdoor insecticide or a fertilizer containing insecticide during the past 12 months to exterminate unwanted insects in your yard?
- Yes
- No ---- ***terminate***

10. What type of insects did you buy the insecticides to treat?

11. Did you purchase a concentrated or ready-to-use insecticide?
- Concentrated
- Ready-to-Use
- Both

12. Are you the person living at your residence who actually applies the insecticide?
- Yes
- No ---- ***terminate***

13. Would you classify yourself as a heavy or light user of indoor insecticides?
- Heavy
- Light

14. We would like to invite you to participate in a one-on-one interview with a researcher from Macro about outdoor pesticides. The interview will take place on [day], [date] at [facility name and location]. It will last about 45 minutes, and you will be paid $35 in cash for your time. Would you like to participate?
- No ---- ***terminate***
- Yes

15. We would like to have you bring the outdoor pesticides that you have at your house with you to the interview, to assist us in our interview process. Could you do that?
- No ---- **(ask them if they would be willing to write down the name or names of the products that they use and bring that information to the interview. If they refuse, *terminate)***
- Yes

I would like to schedule your interview and send you a confirmation letter and directions to the facility. In order to do so, could you please tell me your mailing address and give me a phone number where you can be reached:

NAME: _____
ADDRESS: _____
CITY: _____ STATE: _____ ZIP: _____
PHONE: (H) _____
(W) _____

Which day and what times are convenient for you?

DATE OF INTERVIEW: _____ TIME: _____

We are inviting only a few people, so it is very important that you notify us as soon as possible if for some reason you are unable to attend. Please call _____ at [phone] if this should happen. We look forward to seeing you on [date] at [time].

Participant Screener for
One-on-One Interviews - Household Cleaners

Recruiting Goals

- The participants shall be adults between the ages of 18 and 65.
- Each group shall include people from several cultural or ethnic backgrounds (e.g., Caucasian, African American, Hispanic, Asian, etc.). **["Group" refers to the group of 15 respondents in each interview site.]**
- All participants must be the major cleaner in their household.
- Each group will be composed of a mix of participants who have children under age 8 and those who have no children under age 8.
- Each group will be composed of a mix of participants who own furry pet(s) (e.g., dogs, cats) and those who do not own pet(s).
- People living in retirement homes or assisted living facilities will be excluded.
- At least 50% of the participants in each group must currently use cleaning products with the claim "kills germs" on the label.
- Persons who currently work in professional cleaning services will be excluded.

Scheduling

The schedule for the groups follows:

June 4-5, 1996

Site:	Dallas	15 participants

June 12-13, 1996

	Chicago	15 participants

June 26-27, 1996

	Los Angeles	15 participants

- Participants will be paid **$35** for their participation.
- Refreshments will be offered to participants.
- Results of the screening questions and the interviews will remain confidential at all times.

Hello Mr./Ms. _____, my name is _____ and I'm calling from _____. We are presently working with Macro International, a research and consulting firm, on a research project about consumer use of common household and garden products. Could I ask you a few short questions for this survey?

Screening Questions

1. Are you a man or a woman? **[This question may be skipped if the interviewer has already determined the recruit's gender.]**

- Man
- Woman

2. Are you the major cleaner in your household?

Yes

No ---- **(ask to speak with the person who does most of the cleaning)**

3. I'm going to read a list of age groups to you. Could you please tell me which group you are in?

- under 18 ---- ***terminate***
- 18-25
- 26-35
- 36-50
- 51-65
- over 65 ---- ***terminate***

4. What is your ethnic background?

- African American
- Asian
- Caucasian
- Hispanic
- Native American
- Other (please specify)

5. Do you currently work with or for a professional cleaning service ?

- Yes ---- ***terminate***
- No

6. Do you have any children?

- No **[proceed to question 8]**
- Yes

7. What are their ages?
- Newborn to 8 years **(recruit for groups to include children)**
- 9 years and above

8. Do you own any furry pets? (e.g., dogs, cats)
- No
- Yes

9. Do live in a retirement home or assisted living facility?
- No
- Yes ---- ***terminate***

10. Do you currently use any cleaning products that claim to "kill germs"?
- Yes **(recruit at least 50%)**
- No

11. We would like you to participate in a short interview with one of our researchers to talk about cleaners. The interview will take place on [day], [date] at [time] at [location]. It will last about 45 minutes, and you will be paid $35 in cash for your time. Would you like to participate?
- No ---- ***terminate***
- Yes

12. We would like you to bring the cleaners that you have at your house to the interview to assist us in our interview. Could you do that?
- Yes
- No ---- ***(ask them to make a list of all cleaners that they currently have in their home. If they refuse, terminate)***

I would like to send you a confirmation letter and directions to the facility. In order to do so, could you please tell me your mailing address and give me a phone number where you can be reached:

NAME: _____
ADDRESS: _____
CITY: _____ STATE: _____ ZIP: _____
PHONE: (H) _____
(W) _____

DATE OF FOCUS GROUP: _____ TIME: _____

We are inviting only a few people, so it is very important that you notify us as soon as possible if for some reason you are unable to attend. Please call [recruiter] at [telephone] if this should happen. We look forward to seeing you on [date] at [time].

Participant Screener for Combined One-on-One Interviews - Indoor Insecticides, Outdoor Pesticides, and Household Cleaners

Recruiting Goals

- The participants shall be adults between the ages of 18 and 65 inclusive.
- The groups shall include people from several cultural or ethnic backgrounds (e.g., Caucasian, African American, Hispanic, Asian, etc.). **["Group" refers to the group of 8 respondents]**
- Each group will be composed of a mix of participants who reside in urban and suburban areas.
- All participants must be able to read and understand English.
- Participants should reside in a mixture of dwelling types
- People living in retirement homes or assisted living facilities will be excluded.
- Each group will be composed of a mix of participants who have children and those who have no children; of those with children, the participants will be a mix of those who have children under age 8 and those who have children age 8 and over.
- Each group will be composed of a mix of participants who own cats and/or dogs and those who do not own cats and/or dogs.
- Persons who work in the following occupations shall be excluded: professional lawn service providers, cleaning service providers, landscapers, farmers, and exterminators. Additionally, persons working for advertising companies, market research companies, pharmaceutical companies, or manufacturers of insecticides, household cleaners, or lawn and garden products will be excluded.
- Participants shall not have participated in a focus group or other qualitative research study during the past year (with the exception of telephone surveys).

Household Cleaner Criteria

- All participants must be the primary person responsible for cleaning in their household.
- All participants must currently use commercially available household cleaning products.

Indoor Insecticide Criteria

- All participants must have seen and treated one or more of the following in their residence within the last three months: ants, roaches, or fleas. **(NOTE: products used for fleas should be for fleas in the home, <u>not</u> fleas on pets)**
  - Each group's participants will be composed of a mix of participants with ants, roaches, or fleas.
  - Each participant must have used an indoor insecticide, bought in a store, to dispose of the insects.
  - Participants will include light, moderate, and heavy users of indoor insecticides.
  - Participants will include people who use sprays, baits, foggers, fumigators, bug bombs, powders (boric acid), gels, or chalk.

Outdoor Pesticide Criteria

- All participants must have a private yard at their residence in which they perform their own yard work.

- All participants must have used commercially available outdoor pesticides within the past 3 months.
  - Outdoor pesticides include any chemical or biological agent that kills, mitigates, prevents or repels any pest (unwanted insects, worms, rodents, weeds, fungi, or micro-organism). Included in this classification are insecticides, herbicides, and fungicides intended for outdoor use (in lawns and gardens).
  - Participants will include persons treating a range of different insect, weed, or other pest types.
  - Each participant must be the actual user of the outdoor pesticide.
  - Participants will include persons who use concentrated and ready- to-use products.
  - Each group's participants will be divided between participants who are light and heavy users of outdoor pesticides. Use of pesticides 1 to 4 times in past year is light.
- Persons who use only fertilizers in their yard will be excluded.

Scheduling

The schedule for the groups follows:

June 26, 1996

Los Angeles 8 participants

- Participants will be paid **$35** for their participation.
- Refreshments will be offered to participants.
- The identity of the participants will remain confidential.

Hello Mr./Ms. _____, my name is _____ and I'm calling from _____. We are presently working with Macro International, a research and consulting firm, on a research project about consumer use of common household and garden products. Could I ask you a few short questions for this survey?

Screening Questions

1. Are you the male or female head of the household?
- Male head of household
- Female head of household
- Not head of household ---- **(request to speak with head of household; if not available, *terminate)***

2. Do you, personally, perform the following duties in your household:
- Cleaning?
- Lawn care?
- Indoor insect control?

(If 'yes' to all of the above, continue. If 'no' to any of the above, ask to speak with the person who is primarily responsible for most of the cleaning, lawn care, and indoor insect control . If not available, *terminate*)

3. In the past year, have you or anyone in your household participated in any market research study? **[Participation in telephone surveys is allowable.]**
- Yes ---- ***terminate***
- No

4. I'm going to read a list of age groups to you. Could you please tell me which group you are in?
- under 18 ---- ***terminate***
- 18-25
- 26-35
- 36-50
- 51-65
- over 65 ---- ***terminate***

5. What is your ethnic background? **[Include a mix of ethnic groups representative of the local population.]**
- African American
- Asian
- Caucasian
- Hispanic
- Native American
- Other (please specify)

6. Are you currently employed?
- Yes
- No----*proceed to question 9*

7. Could your employer be described as any of the following?
- An insecticide company ----*terminate*
- A market research company ----*terminate*
- An advertising company ----*terminate*
- A pharmaceutical company ----*terminate*
- A chemical company ----*terminate*
- A manufacturer of consumer household cleaners or lawn and garden products ----*terminate*
- A professional cleaning service ----*terminate*
- A pest exterminator ----*terminate*
- A landscape or lawn care company ----*terminate*

8. Do you work as a farmer?
- No
- Yes ----*terminate*

9. Would you describe the area where you live as urban, suburban or rural?
[Include a mix of participants that is representative of the local population.]
- Urban
- Suburban
- Rural

10. Would you describe your home as a house, apartment, duplex, townhouse, mobile home, or other?
[Include participants who live in a variety of residence types such as houses, duplexes, and mobile homes.]
- House
- Apartment ----*terminate*
- Duplex
- Townhouse
- Mobile home
- Other (define)

11. Do you have children that live with you?
- Yes
- No -----*proceed to question 13*

12. Are your children 8 years old or younger?
- Yes
- No

13. Do you have a cat or dog?
- Yes
- No

14. Does your residence have a private yard?
- Yes
- No ---- ***terminate***

15. Do you, personally, care for that yard? [mow, weed, etc.]
- Yes
- No ----(ask to speak with the person who does the yard work. If the work is contracted out, ***terminate***)

16. Are you the person living at your residence who actually applies bug killer or weed killer in your yard?
- Yes
- No ---- ***Can I speak with that person? (terminate if unavailable)***

17. During the past 3 months, have you, personally, used a store bought outdoor bug killer in your yard?
- Yes ----***proceed to question 20***
- No

18. During the past 3 months, have you, personally, used a store bought outdoor weed killer in your yard?
- Yes----***proceed to question 20***
- No

19. During the past 3 months, have you, personally, used a store bought outdoor pesticide in your yard to kill something besides bugs or weeds?
- Yes
- No ---- ***terminate***

20. How frequently during the past 3 months have you applied a weed killer or bug killer in your yard?
[Include a mix of people from each category.]
- 1 to 4 times
- 5 or more times

21. How would you describe your outdoor insect problem?
[Include a mix of participants.]

- Heavy
- Moderate
- Light

22. What kinds of outdoor pests have you had problems with?
[Looking for weeds, grubs, flies, mosquitoes, fire ants, wasps, hornets, other]
[Include respondents with a range of insects, plants, fungi, etc.]

23. What forms of outdoors pesticides do you typically use?
Do you use **liquid concentrates**? (These are products that you mix with water and apply in a tank sprayer of a hose-end sprayer.)
Do you use **ready-to-use** products that you don't have to mix and measure before using? (These include liquids in a trigger sprayer bottle. aerosols, granules. dusts and liquids.)

- Uses concentrates
- Uses ready-to-use
- Uses both
- Other

24. This year, have you used a "weed and feed" — that is a fertilizer product that also contains something to kill weeds?

- Yes ***(include at least 2 individuals answering "yes")***
- No

25. Have you had any problems with insects inside of your home during the past 3 months. such as ants. roaches, or fleas? **(fleas in the home, <u>not</u> fleas on pets)**

- Yes
- No ---- ***terminate***

26. Do you use a store bought indoor insecticide to kill these insects?

- Yes
- No ---- ***terminate***

27. Which of the following store bought insecticide products have you, personally, purchased and used inside your home in the past 3 months? You may choose more than one.

- Sprays
- Baits [black or white stations where bugs eat poison and then carry it back to their nest or colony]
- Indoor foggers, fumigators or bug bomb products
- Powders such as boric acid or gels
- Chalks

- Flea treatment product to be used on pets (***terminate*** **if only treatment used)**
- Other
- None of the above ----***terminate***

28. We would like to invite you to participate in a one-on-one interview with a researcher from Macro about products used around the home and yard. The interview will take place on [day], [date] at [facility name and location]. It will last about 45 minutes, and during the interview, you will be asked to read and comment on some information. You will be paid $35 in cash for your time. Would you like to participate?

- No ---- ***terminate***
- Yes

I would like to schedule your interview and send you a confirmation letter and directions to the facility. In order to do so, could you please tell me your mailing address and give me a phone number where you can be reached:

NAME: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

PHONE: (H) _____

(W) _____

Which day and what times are convenient for you?

DATE OF INTERVIEW: _____ TIME: _____

We are inviting only a few people, so it is very important that you notify us as soon as possible if for some reason you are unable to attend. Please call _____ at [phone] if this should happen. We look forward to seeing you on [date] at [time]. If you use reading glasses, please bring them with you to the interview

Appendix F

Discussion Guide for
One-on-One Interviews - Indoor Insecticides

I. Introduction (5 minutes)

Greet the respondent. "We're talking to people today about products used to kill bugs or insects in your home, also called insecticides. These products would be used in your home. Let me emphasize that their are no wrong answers to any of the questions that will be asked. All we want is to get your honest feedback. Let's start with you telling me something about yourself, your occupation, your family, your home, and your yard.

II. Pest Experience and Product Selection (5 minutes)

"Let's talk about the kinds of problems you face with insects (bugs) in your home. Can you tell me what types of problems you've had lately?"

A. "Have you recently purchased or used a product to solve your problem with ...."

B. "How do you go about deciding which product is the right one to solve your problem with .... (*restate pest*)"

"How do you use that? Describe to me how you actually used that."

C. "Recognizing that there are many products to choose from for controlling .... (*restate pest*), do you think there are any differences in these various products?" *If "yes," ask* "**How do the products differ?**" "Do any other factors play into your decision to buy one or the other?"

> probe for perceived differences in product performance. What role does the label play in the decision process?

D. "Do you think there are differences in the ***effectiveness*** of these products, or do they all work pretty much the same?"

> probe for perceived differences in safety. What role does the label play in the development of these perceptions?

III. Recall of Label Information (5 minutes)

"Let's focus on the problem and products you mentioned earlier."

A. "How did you decide you had a problem with *(restate pest)*?"

B. "How did you decide what product to buy?"

C. "What role did the label play in that decision?"

D. "Off the top of your head, will you list for me the different parts of a label for products like this? Just mention those parts that you remember seeing on such a label."

E. "Is there any part of the label that you really never use or refer to?"

> probe further if respondent comments on product safety, risk, or the environment; otherwise move on.

IV. Exercise to Extract In-Depth Impressions of Label Content (20 minutes)

Based on screening questions, preselect a pest and product solution that respondent is not likely to be familiar with. The pest and solution scenario should be rotated to achieve a balance in the presentation of products across interviews (e.g. liquid concentrates, liquid ready-to-use, granular weed & feed, etc.). It will be critical for the interviewer to keep a record of which label/prop is used for this discussion.

"Let's pretend for a minute that there are a lot of *(problem)* in your yard and you want to get rid of them. Your neighbor told you that this product is what you need to get rid of your problem." *Show the product.*

A. "Now you're at the store, and thinking about buying this product. There is a lot to choose from. **How would you know if this is the right product for your yard?**"

> probe for specific features that would be consulted f they mention the label.

> if they cannot determine that this is the right product, probe for types of information that would facilitate this determination.

B. "Let's say you decided to buy the product and now you're back at home. How would you figure out how to use it?"

1. "Show me the section of the label you would consult."
probe for clarity, usefulness, ease of finding information desired.

2. "Are there parts of these instructions that are confusing?"
*probe for specifics on confusing **vocabulary**.*

3. "Are there ever situations when you need to use more of this product than the directions tell you to?" "Are there ever situations when you need to use less than they suggest?"
probe for why they would, and get a description of how they actually did use too much.

C. "Now you're ready to start using the product. Other than the information on how much to use and how to apply it, is there any other information on this label that you'd consult before using?"

> if respondent mentions any of the precautionary text, probe for clarity, usefulness, ease of finding information, and motivation for consulting this text.

> ** if respondent mentioned earlier that the product says it is **SAFE** for the environment, animals, children, remind them of that, and ask them "**safe in what way? What gives you that impression?**"*

> if respondent doesn't mention the caution text, probe for reasons why not.

1. "Why do you think this information is on the label?"

> probe for whether this information would impact decision on product purchase.

D. "Now let's say you're finished using the product. How would you store it or dispose of it?"

> if respondent mentions the storage and disposal text, probe for clarity, usefulness, ease of finding information, and motivation for consulting this text.

E. "What are your overall impressions about this label? Dose it contain all of the information you need?"

> probe for positive and negative features to label.

V. Specific Label Inquiries (5 minutes)

"Let's take a look at the labels on one of the types of products you mentioned you use in your home. We're just going to use these a sample to talk about in greater detail. It doesn't matter whether you've used these specific brands or not. Why don't you go ahead and spend a minute or two glancing through the product label."

"**Show me what information you would use on these labels**"
This leads to a loosely structured discussion of each of the key sections of the label, following up on each section as it comes up naturally in the conversation. For areas which don't come up naturally, the interviewer will direct the participant's attention to them after other areas have been discussed.

A. Within each area, probe for clarity, usefulness, ease of finding information. Some suggestions are:

- What would you be looking for in this area? Why?
- What would this information mean to you?
- When would you be most likely to look at this information? How often would you consult it?
- What about this information is helpful to you?
- Is one of these bottles better than the other in providing this type of information?
- Do you think this part of the label, on either bottle, could be confusing to some people?
- How would this information impact which product you buy?

- Is this information more or less important on this type of product than on other types we've discussed today?

  > *if opportunity arises, "How could this section be improved?"*

B. Specific probes for specific sections:

Statement of Practical Treatment

"If I say to you 'statement of practical treatment,' what comes to mind? Reading that on the label, is it clear what is meant by this heading?"

"If someone accidentally got this in their eyes/swallowed some, would one of these bottles make it easier to find out what to do?"

"What do these words 'Hazards to Humans and Domestic Animals' mean to you about this product?"

Storage and disposal

What does this information about storage and disposal mean to you?

probe for why/why not the use instructions are followed.

Ingredients

"Do you see this section (*refer to ingredients statement*)? What does this term **Active Ingredients** and the chemical name that follows it mean to you? What about the term **Inert Ingredients?**"

probe for the value that this information provides them.

Signal Words

"I'm going to give you these three index cards to look at. Each one of them has a word on it that might be found on a pesticide label." *[Give respondent cards that have CAUTION, WARNING, or DANGER printed on them; cards should be randomly arranged.]*

1. "What do these words mean to you?"

> *probe for whether they perceive a difference in these 3 signal words.*

2. "In what way would one of these words impact how you PURCHASE a product?" If "yes," ask "**In what way?**" "In what way would one of these words impact how you USE a product? If "yes," ask "**In what way?**"

3. "Does one word make you think the product will work better than either of the other words?"

Hazards to Humans and Domestic Animals

"What does this heading 'Hazards to Humans & Domestic Animals' mean to you? What does the information under it mean?"

VI. Label Usage

"*In general, what types of products do you typically read labels for?*"

> *probe for food, clothes, etc.*

VII. Label Improvement (5 minutes)

"Some people believe that there is too much information given on labels such as these. Others think that there is not enough information present, and some think that there is just the right amount. What is your opinion on this issue?"

"Do you have any suggestions on how these labels could be improved?"

VIII. Closure

"The manufacturers of these products want to make sure that they are giving persons like yourself the *information they need to facilitate choosing the right product for your needs and how to safely use and* dispose of products once you have brought them home. What should my recommendation be to them to make sure they are fulfilling this goal?"

Thank respondent.

Discussion Guide for
One-on-One Interviews - Outdoor Pesticides

I. Introduction (5 minutes)

Greet the respondent. "We're talking to people today about products used to kill bugs and weeds, also called pesticides. These products would be used on your lawn and garden. Let me emphasize that their are no wrong answers to any of the questions that will be asked. All we want is to get your honest feedback. Let's start with you telling me something about yourself, your occupation, your family, your home, and your yard."

II. Pest Experience and Product Selection (5 minutes)

"Let's talk about the kinds of problems you face with insects (bugs), weeds and other pests in your yard. Sometimes it's easiest if we just mentally walk around the outside of your house. How about starting in the front of the house?" (*Stop after a couple of pests are mentioned*).

A. "Have you recently purchased or used a product to solve your problem with .... (*restate pest*)?" *For each product mentioned, ask,* "**Does that come ready-to-use or do you need to dilute it with water?**"

B. "How do you go about deciding which product is the right one to solve your problem with .... (*restate pest*)"

"How do you use that? Describe to me how you actually used that."

C. "Recognizing that there are many products to choose from for controlling .... (*restate pest*), do you think there are any differences in these various products?" *If "yes," ask* "**How do the products differ?**" "Do any other factors play into your decision to buy one or the other?"

> probe for perceived differences in product performance. What role does the label play in the decision process?

D. "Do you think there are differences in the ***effectiveness*** of these products, or do they all work pretty much the same?"

> probe for perceived differences in safety. What role does the label play in the development of these perceptions?

III. Recall of Label Information (5 minutes)

"Let's focus on the problem and products you mentioned earlier."

A. "How did you decide you had a problem with *(restate pest)*?"

B. "How did you decide what product to buy?"

C. "What role did the label play in that decision?"

D. "Off the top of your head, will you list for me the different parts of a label for products like this? Just mention those parts that you remember seeing on such a label."

E. "Is there any part of the label that you really never use or refer to?"

> probe further if respondent comments on product safety, risk, or the environment; otherwise move on.

IV. Exercise to Extract In-Depth Impressions of Label Content (20 minutes)

Based on screening questions, preselect a pest and product solution that respondent is not likely to be familiar with. The pest and solution scenario should be rotated to achieve a balance in the presentation of products across interviews (e.g. liquid concentrates, liquid ready-to-use, granular weed & feed, etc.). It will be critical for the interviewer to keep a record of which label/prop is used for this discussion.

"Let's pretend for a minute that there are a lot of *(problem)* in your yard and you want to get rid of them. Your neighbor told you that this product is what you need to get rid of your problem." *Show the product.*

A. "Now you're at the store, and thinking about buying this product. There is a lot to choose from. **How would you know if this is the right product for your yard?**"

> probe for specific features that would be consulted if they mention the label

> if they cannot determine that this is the right product, probe for types of information that would facilitate this determination.

B. "Let's say you decided to buy the product and now you're back at home. How would you figure out how to use it?"

1. "Show me the section of the label you would consult."

   probe for clarity, usefulness, ease of finding information desired.

2. "Are there parts of these instructions that are confusing?"

   *probe for specifics on confusing **vocabulary**.*

3. "Are there ever situations when you need to use more of this product than the directions tell you to?" "Are there ever situations when you need to use less than they suggest?"

> probe for why they would, and get a description of how they actually did use too much.

C. "Now you're ready to start using the product. Other than the information on how much to use and how to apply it, is there any other information on this label that you'd consult before using?"

> if respondent mentions any of the precautionary text, probe for clarity, usefulness, ease of finding information, and motivation for consulting this text.

** if respondent mentioned earlier that the product says it is **SAFE** for the environment, animals, children, remind them of that, and ask them **safe in what way? What gives you that impression?***

> if respondent doesn't mention the caution text, probe for reasons why not.

1. "Why do you think this information is on the label?"

> probe for whether this information would impact decision on product purchase.

D. "Now let's say you're finished using the product. How would you store it or dispose of it?"

> if respondent mentions the storage and disposal text, probe for clarity, usefulness, ease of finding information, and motivation for consulting this text.

E. "What are your overall impressions about this label? Dose it contain all of the information you need?"

> probe for positive and negative features to label.

V. Specific Label Inquiries (5 minutes)

"Let's take a look at the labels on one of the types of products you mentioned you use in your home. We're just going to use these a sample to talk about in greater detail. It doesn't matter whether you've used these specific brands or not. Why don't you go ahead and spend a minute or two glancing through the product label."

"Show me what information you would use on these labels"
This leads to a loosely structured discussion of each of the key sections of the label, following up on each section as it comes up naturally in the conversation. For areas that don't come up naturally, the interviewer will direct the participant's attention to them after other areas have been discussed.

A. Within each area, probe for clarity, usefulness, ease of finding information. Some suggestions are:

- What would you be looking for in this area? Why?

- What would this information mean to you?
- When would you be most likely to look at this information? How often would you consult it?
- What about this information is helpful to you?
- Is one of these bottles better than the other in providing this type of information?
- Do you think this part of the label, on either bottle, could be confusing to some people?
- How would this information impact which product you buy?
- Is this information more or less important on this type of product than on other types we've discussed today?

(If opportunity arises, ask, "How could this section be improved?")

B. Specific probes for specific sections:

Statement of Practical Treatment

"If I say to you 'statement of practical treatment,' what comes to mind? Reading that on the label, is it clear what is meant by this heading?"

"If someone accidentally got this in their eyes/swallowed some, would one of these bottles make it easier to find out what to do?"

"What do these words 'Hazards to Humans and Domestic Animals' mean to you about this product?"

Storage and disposal

"What does this information about storage and disposal mean to you?"
> probe for why/why not the use instructions are followed.

Ingredients

"Do you see this section (*refer to ingredients statement*)? What does this term **Active Ingredients** and the chemical name that follows it mean to you? What about the term **Inert Ingredients**?"

> probe for the value that this information provides them.

Signal Words

"I'm going to give you these three index cards to look at. Each one of them has a word on it that might be found on a pesticide label." *[Give respondent cards that have CAUTION, WARNING, or DANGER printed on them; cards should be randomly arranged.]*

1. "What do these words mean to you?"

> *probe for whether they perceive a difference in these 3 signal words.*

2. "In what way would one of these words impact how you PURCHASE a product? If "yes," ask "**In what way?**" "In what way would one of these words impact how you USE a product? If "yes," ask "**In what way?**"

3. "Does one word make you think the product will work better than either of the other words?"

Hazards to Humans and Domestic Animals

"What does this heading 'Hazards to Humans & Domestic Animals' mean to you? What does the information under it mean?"

VI. Label Improvement (5 minutes)

"Some people believe that there is too much information given on labels such as these. Others think that there is not enough information present, and some think that there is just the right amount. What is your opinion on this issue?"

"Do you have any suggestions on how these labels could be improved?"

VII. Closure

"The manufacturers of these products want to make sure that they are giving persons like yourself the information they need to facilitate choosing the right product for your needs and how to safely use and dispose of products once you have brought them home. What should my recommendation be to them to make sure they are fulfilling this goal?"

Thank respondent.

Discussion Guide for
One-on-One Interviews - Household Cleaners

I. Introduction/Warm Up (2 minutes)

Greet panelist. "We're talking to people today about products they use around their home. Let me emphasize that there are no right or wrong answers to any of the questions that I will ask you. I want your honest feedback. Let's start by you telling me something about yourself, your family, and your home."

II. Product Experience/Product Selection (what product types?) (10 minutes)

"Let's talk about some of the things you clean and disinfect around the house. Sometimes its easier to remember if we just mentally walk through your house room by room. How about starting in the kitchen? What kinds of things do you clean and disinfect in the kitchen?"

A. For each cleaning task, ask, "What kinds of products do you use (if any) to do this cleaning?"

(We're looking for product types here, not necessarily brands. If a brand name is given, ask "what type of product would you say that is?")

> repeat for bathroom, and then ask if any other cleaning products are used in other places in the home

(Get complete list of product types first, before going into detail for any of them. Likely you will get list of 4-6 types in the kitchen, and an additional 4-5 in the bathroom. It may help the discussion below if you keep track of the different products mentioned on cards so you don't have to try to remember everything mentioned)

B. For each type of product mentioned:

"How long have you used these types of product? Which one of these product types is newest to you?"

"How do you learn how to use this type of product?"

> probe specifically the one she has least experience with, or create a hypothetical situation where she was considering a new product type for the first time; probe until label is mentioned.

III. Label Information Used for Cleaning/Disinfecting Products (Unaided) (10 minutes)

"You mentioned the label for information about how to use the different products. What other information on the label can you remember?"

> probe at least until caution, first aid, and ingredient information (and hopefully disposal/recycling) are mentioned, asking her to think about the front label, and then the back label, if necessary. Write each major type of information mentioned on a card.

> get all types identified, then ask consumer to arrange cards in order of importance, and to talk about why she placed them in the order she did. Continuing to use the cards, ask:

A. "What label information do you typically consult in the store when purchasing one of these cleaning products?"

> probe for why that information is used in the store. Does it impact purchase?

B. "What label information do you consult at home when using one of these products?"

> probe for why that information is used at home. What impact does it have on usage?

C. "What other information do you know is on the label but you usually don't consult?"

> probe for what circumstances, if any, would lead to using that type of information

IV. In Depth Impressions of Label Content (Aided with Packages; note: place package on table, front label facing her) (15 minutes)

Refer to display of products. Select a pair of products that are both intended for the same use, one that makes a disinfectant claim and one that does not. These products should represent a type of product that the consumer has indicated that she/he uses.

"Let's take a look at the labels on one of the types of products you mentioned you use in your home. We're just going to use these products as samples to talk about in greater detail. It doesn't matter whether you've used these specific brands or not. Why don't you go ahead and spend a minute or two glancing through these two product labels."

A. "What is your **overall impression** of these labels?"

> probe for clarity, usefulness, ease of finding information.

- What features about these labels do you like?
- What things don't you like about one or both of them?
- Are there parts of one or both labels that you typically wouldn't look at?
- Show me the information on the labels that you would typically consult in the store when buying a product.
- Show me the information on the labels that you would typically consult at home when using it.

- Can you tell me about circumstances when you would use any other information on the labels?

B. "Can you find the sections that contain information on **how to use the product**?"

- Do you ever read this section of a label?

  > probe as to why.

- When are you most likely to read this section?
- How often would you consult this information when using this product?

  > probe for why/why not the use instructions are followed.

- Are these instructions understandable? Which parts could be confusing?

  > probe for why confusing.

- Is one of these less confusing than the other? (Why)
- How does this information impact which product you buy?
- Is this information more or less important on this type of product than on other types we've discussed today?

C. "Can you find the sections that contain information about **cautions and information about first aid**?"

- Do you ever read this section of a label? (Probe as to why)
- When are you most likely to read this section?
- How often would you consult this information when using this product?

  > probe for why/why not the use instructions are followed.

- Are these instructions understandable? Which parts could be confusing? (Probe for why confusing)
- How does this information impact which product you buy? (Probe, if consumer mentions product safety, risk, or environment, otherwise move on)
- What does the word (Caution, Warning, Danger) mean to you on a product like this? (depending on product)
- Suppose it said Warning (or Danger), What would that mean to you? (Probe for impact on behavior)
- What do these words "Hazards to Humans and Domestic Pets" mean to you about this product?
- Is this information more or less important on this type of product than on other types we've discussed today?

D. "Can you find any information about **storage and disposal**?"

- Do you ever read this section of a label? (Probe as to why)
- When are you most likely to read this section?
- How often would you consult this information when using this product?
- (Probe for why/why not the use instructions are followed)
- Are these instructions understandable? Which parts could be confusing? (Probe for why confusing)
- How does this information impact which product you buy? (Probe, if consumer mentions product safety, risk, or environment, otherwise move on)
- Is this information more or less important on this type of product than on other types we've discussed today?

E. "Can you find any information about **ingredients**?"

- Do you ever read this section of a label? (Probe as to why)
- When are you most likely to read this section?
- How often would you consult this information when using this product?
- Is this information understandable? Which parts could be confusing? (Probe for why confusing; specifically probe whether the respondent understands the "**Active/Inert**" information on the front label)
- How does this information impact which product you buy? (Probe, if consumer mentions product safety, risk, or environment, otherwise move on)
- Is this information more or less important on this type of product than on other types we've discussed today?

If time permits, go through same questions with a different product type.

V. Label Improvements (2 minutes)

"Can you think about any way the label itself causes you to read more or less of it?" (We're looking for format, size, etc.)

"Do you have any suggestions on how these labels could be improved?"

Thank panelist.

Discussion Guide for Combined One-on-One Interviews - Indoor Insecticides, Outdoor Pesticides, and Household Cleaners

Research Objectives: To understand the consumer needs and perceptions relevant to label information on all three categories of products being researched as part of the EPA Consumer Labeling Initiative. The information obtained from these multi-category one-on-ones will be considered as enrichment to the much larger base of single-category one-on-ones being conducted. By providing an opportunity for consumers to discuss all three categories at the same time, we hope to learn directly about the areas of difference and similarity which the single category work can uncover only indirectly.

Research Principles:

1. Panelists need to meet the recruitment criteria for all 3 of the individual category studies in order to qualify for this multi-category interview.
2. We will follow the general approach used for the single category interviews as much as possible for the multi-category interviews.
3. We will allow these interviews to go somewhat longer than 45 minutes if productive, since there is more information to be shared.

Discussion Guide:

I. Introduction/Warm Up (2-3 minutes)

Greet panelist. "We're talking to people today about products they use around their home. We're going to be talking about a number of different types of products, including those you might use outside for problems with insects or weeds, those you might use inside the house for insects, and also those you use around the house for cleaning and disinfecting. Let me emphasize that there are no right or wrong answers to any of the questions that I will ask you. I want your honest feedback."

"Let's start by you telling me something about yourself, your family, your home, and your yard."

II. Product Experience/Product Selection (what product types?) (10 minutes)

"Let's talk about what kinds of products you use around your home." (NOTE: Category order should be rotated). "We'll start outside. What types of products do you use for insects or weeds?"

> *probe briefly what the problem was if not clear and get a feel for frequency of use and familiarity.*

"How about inside? What types of products do you use for any insects?"

> *probe briefly if purpose not clear; get a feel for frequency/familiarity.*

"And how about for cleaning and disinfecting? What types of products do you use in the bathroom? In the kitchen? Any others?"

> probe briefly amount of experience with products.

(We're looking for product types, not necessarily brands If a brand name is given, ask, " what type of product would you say that is?" We do not need an exhaustive list. For purposes of this warm-up, we just want to set the context and get the consumer thinking about the range of products she/he uses and give the interviewer a feel for whether this person uses just a few products vs. many different products It may help the discussion below if you keep track of the different products mentioned on cards so you don't have to try to remember everything mentioned)

"How do you learn how to use these types of product? For example, how would you find out how to use a new product you were going to use in your garden (or whatever is appropriate)? Is that the same for indoor products for insects? How about for cleaners?"

> probe to understand how the categories are different or the same on this.

If the package is not specifically mentioned for any category, probe "Where else might you find information about how to use it?" or as a last resort, bring up the package as a potential source of information.

III. Label Information Used for Cleaning/Disinfecting Products (Unaided) (15 minutes)

"You mentioned the package for information about how to use the different products. What other information on the container can you remember for any of these types of products?" Probe at least until caution, first aid, and ingredient information (and hopefully disposal/recycling) are mentioned, asking her to think about the front label, and then the back label, if necessary. *Write each major type of information mentioned on a card. Get all types identified, then ask consumer whether all of these types of information are on the packages of all of the types of products we're talking about. Listen for perceptions of how the categories differ on labeling. Ask about overall satisfaction with labeling.*

Ask consumer "If I were to ask you how important each of different types of information is to you, would it be the same for all the different types of products we've been talking about, or would it be different?" If the same, ask consumer to place cards with each type of information on an imaginary scale from "Very Important" to "Not at all important". *If different, ask her to do this for one category and then move cards for the other categories Listen to her talk about why she placed them in the order she did and why the categories are different for her. Continuing to use the cards, ask:*

"Pretend you're in a store and considering purchasing one of these types of products. Tell me what information on the package you typically consult **in the store.**" *(Listen to see if she/he discriminates between the categories; probe for reasons for differences)*

"Now pretend you have one of these products at home and are about to use it. What information on the package do you consult **at home when using** one of these products?" *(Listen to see if she/he discriminates between the categories; probe for reasons for differences)* "How well would you say you follow the directions? (Why/why not?) Where would you store these products?"

"And now pretend you're done using one of these products and ready to get rid of the package. What would you do? same for all types of products? Why/why not?"

IV. In Depth Impressions of Label Content (Aided with Packages; note: place several packages on table, front label facing her, representing a product type within each of the categories that the consumer has used. For the cleaners/disinfectants use a pair as before) (15 minutes)

"Let's take a look at the information on the packages of some of the types of products you mentioned you use in your home or outside. We're just going to use these products as samples to talk about in greater detail. It doesn't matter whether you've used these specific brands or not. Why don't you go ahead and spend a minute or two comparing the information on all these different products."

"Which of these packages do you think you would read most closely? Why? Show me what information on each one you would definitely read, and tell me when you think you would be reading it." Consumers will likely be most comfortable talking about one product at a time, rather than jumping back and forth between them. For the first product, question briefly about potential confusions, ease of following, likelihood of reading, when read, etc. After discussing the first type of product, concentrate on subsequent products on how she/he would use the information similarly or differently, and why.

Specific probes for specific sections:

How to use the product

"How would you normally use this product?"

> *probe for why/why not the use instructions are understood/followed.*

Probe the phrase "It is a violation of Federal law.. ." "What does that mean to you?" On subsequent categories, try to understand whether the language has the same meaning in all categories.

Precautions and information about first aid

"Has consumer ever had an incident which required use of this information? (Describe)"

"If someone accidentally got this in their eyes/swallowed some, would one of these packages make it easier to find out what to do? (Why?)"

"What does the word (Caution, Warning, Danger) mean to you on a product like this? (depending on product). Suppose it said Warning (or Danger), What would that mean to you?"

> *probe for impact on behavior.*

"What do these words '**Hazards to Humans and Domestic Animals**' mean to you about this product?"

Storage and disposal

"What does this information about storage and disposal mean to you?"

> *probe for why/why not the use instructions are understood/followed*

Ingredients

"What does the '**Active/Inert**' information on the front mean to you?"

Understand the consumer usage of the chemical ingredient information and percentages. Does this differ by category?

V. Label Improvements (2 minutes or more, as long as productive)

"Can you think about any way the label itself causes you to read more or less of it?" (*We're looking for format, size, etc., but we will not lead the consumer in this direction*)

"Do you have any suggestions on how these labels could be improved?"

"Do you think there might be a better way to arrange the information to make it most useful?"

"Is there any information you would like to see on the label that isn't here?"

"Is there any information on the label that you don't think needs to be here?"

Thank panelist.

Appendix G

Task Force Members

Co-Chairs
Mary Dominiak
Pollution Prevention Division (7409)
Office of Pollution Prevention and Toxics

Steve Morrill
Registration Division (7505W)
Office of Pesticide Programs

Non-EPA
Conner Byestewa
Colorado River Indian Tribes

Bill Cotreau
National Institute of Health

Mike Dershowitz, Attorney
Federal Trade Commission

Jackie Elder
Consumer Product Safety Commission

Ken Falci
Food and Drug Administration

Carmen Milanez
California Office of Environmental Health and Hazard Assessment

John Miller
Vermont Agency of Natural Resources

Mary Eilen Setting, Chief
Maryland Department of Agriculture

Mario Teisl
Food and Drug Administration

Richard Williams
Food and Drug Administration

EPA
Julie Lynch
Pollution Prevention Division (7409)
Office of Pollution Prevention and Toxics

Dan Brown
Office of Air Quality Planning and Standards

Charlotte Cottrill
Office of Research and Development (8105)

Glenda Dugan
Region IX, Air and Toxics Division

Michael Firestone
Office of Prevention, Pesticides and Toxic Substances (7101)

Pep Fuller
Office of Prevention, Pesticides and Toxic Substances (7101)

Mary Beth Gleves
Office of General Counsel (2333R)

Jeff Kempter
Office of Pesticide Programs (7505C)

Arnold Layne
Office of Prevention, Pesticides and Toxic Substances (7101)

Dwight Peavey
Region I

Shruti Sanghavi
Office of Compliance (2225A)

Task Force Support
Tom Towers
Department of Labor
Occupational Safety and Health Administration

Appendix H

EPA Partners

Bayer Corp.
Bioserv Inc.
California Department of Pesticide Regulation
Chemical Producers and Distributors Association
Chemical Producers and Distributors Association/AgrEvo
Chemical Producers and Distributors Association/Dragon
Chemical Specialties Manufacturers Association
Dow Brands
Fried, Frank, Harris, Shriver & Jacobson
North American Hazardous Materials Management Association
Reckitt & Colman
RISE - Responsible Industry for a Sound Environment
Rod Products Company Inc.
S.C. Johnson Wax, Inc.
Scotts
Solaris Group
The Clorox Company
The Dial Corporation
The Procter & Gamble Company
United Industries

Appendix J

Stakeholders Commenting on the *Federal Register* Notice

Stakeholder Group #1
Individual advocacy groups, environmental groups, consumers, health and safety professionals/ organizations, and international groups

R. Fairey, private individual
N. Ford, private individual
E. Knake, University of Illinois at Urbana-Champaign
S. Bendix, Bendix Environmental Research Inc.
A. Beitling, private individual
P. Dickey, Washington Toxics Coalition
P. Rowland, private individual
A. Cooke, North Carolina Coop Extension Service
N. Grier, NW Coalition for Alternatives to Pesticides, and:
- P. Orum, Working Group on Community Right-to-Know
- J. Feldman, National Coalition Against the Misuse of Pesticides
- J. Villbrecht, Action Now (CA)
- A. Spalt, Agricultural Resources Center (NC)
- M. Gregory, Arizona Toxics Information
- N. Fitzpatrick, Audubon Naturalists Society (MD)
- J. Lennett, Boston Women's Health Book Collective
- M. Sweiger and Linda Allinder: Bring Urban Recycling to Nashville Today
- J. Brown, Business and Professional People for the Public Interest (IL)
- B. Kociolek, Cancer Prevention Coalition (IL)
- M. Bender, Carolina Farm Stewardship Association (NC)
- G. Edwards, Central Sierra Watershed Coalition (CA)
- J. Buckley, Central Sierra Environmental Resource Center (CA)
- L. Plumlee, MD, Chemical Sensitivities Disorders Association (MD)
- W. Hauter, Citizen Action (DC)
- J. Chernow, Citizens Against Pesticides (WI)
- M. Clark, Citizens for Environmental Protection (MI)
- A. Medbery, Colorado Pesticide Network
- D.A. Larson, Communities for a Better Environment (CA)
- R. Leonard, Community Nutrition Institute
- E. Alstay, Eclectic Institute (OR)
- D. Monsma, Environmental Action (MD)
- P. Montague, Environmental Research Foundation (MD)
- R. Wiles, Environmental Working Group (DC)
- B. Joyce, Friends of the Coquille River (OR)
- C. Gilfillan, Friends of the Earth (DC)
- A. Culver, Government Purchasing Project (DC)
- C. Weidner, Grassroots the Organic Way (PA)
- B. Howell, Howell's Pest Control (OK)

M. Ross, Illinois Pesticide Education Network
J.H. Christensen and M. Ritchie, Institute for Agriculture and Trade Policy (MN)
C. Slatin, MPH, Jewish Labor Committee, Health and Safety Committee (MA)
B. Craven, Kansas Natural Resources Council
F. Kirchenmann and C. Raffensperger, Kirschenmann Family Farms, Inc. (ND)
R. Seydel, La Montanita Coop (NM)
C. Valencic, Legal Environmental Assistance Foundation, Inc. (FL)
S. Lauria, Living School Association (CA)
J. Baker, Mckenzie Guardians (OR)
A. Donnay, MCS Referral and Resources, Inc.
M. Kaufman, Michigan Organic Food and Farm Alliance
A. Hedges, Montana Environmental Information Center
W. Gordon, Mothers and Others for a Livable Planet
C. Brickey, National Campaign for Pesticide Policy Reform (DC)
M. Lamielle, National Center for Environmental Health Strategies (NJ)
S. Molloy, National Coalition for the Chemically Injured (AZ)
M. Marra, National Wildlife Federation (DC)
J. Nogaki, New Jersey Environmental Federation
J.C. Moore, New York Coalition for Alternatives to Pesticides
D. Bady, Ohio Valley Environmental Coalition
M. Hubbard, Oregon National Resources Council
G. Larison, Organic Growers of Michigan
J.W. Craddick, M.D., Partners for Health (OR)
E. Hickey, Pesticide Action Network North America (CA)
L. Conklin, People for Healthy Forests (CA)
H. Cantino, Rural Action, Inc., Pesticide Reform (OH)
S. Brower, Safe Alternatives for our Forest Environment (CA)
J.L. Viehweg, Safer Pest Control Project (IL)
J. Jewell, Seattle Tilth Association (WA)
H. Vinton, Southern Research and Development Corporation (LA)
C. Tucker, Southern Sustainable Agriculture Working Group (SC)
J. Boyer, Sustainable Development Program, Appalachian State University (NC)
B. McGuire, Tennessee Citizen Action
S. Lewis, The Good Neighbor Project (MA)
F. Oyoung, Tuolumne Group, Sierra (CA)
B. Randall, Ph.D., Urban Harvest Community Gardens and Orchards (TX)
C. Hartmann, U.S. Public Interest Research Group (DC)
E. Louden, Washington Toxics Coalition (WA)
J.L. Stegmaier, Well Mind Association of Greater Washington (MD)
P. Safchuck, White Lung Association (MD)
Professor C. Levenstein, Work Environment Policy (MA)
M. Miller, World Wildlife Fund (WI)
M.S. Robson, Washington State University Co-op Extension
J. Halloran and S. Marquardt, Consumers Union

J.F. Wasik, *Consumers Digest Magazine*
M. Breitenberg, NIST
R. Troetschler, Pesticide Task Force Press
M. MacDonald, Women's Network on Health & the Environment
*G.A. Peters
*A. Medbery
* Research Triangle Institute
K. Feeney, Gildea Resource Center, Community Environment Council
Approximately 3,000 pre-printed post cards from private individuals. They were addressed to EPA Administrator Carol Browner, urging the Administrator to "tell the truth about pesticides" and stating that "Consumers have the right to know."
N. Wuerth, private individual
H.A. Shumway, private individual
T.M. Cushing, private individual
W.P. Bowe, private individual
S. Hartry, private individual
W. Kispert, private individual
L.M. Johnson, private individual
M.M. Giese, private individual
R. Troetschler, Sierra Club/Loma Prieta Chapter
G. Ottone, private individual
A.T. Talcott, private individual
E. O'Nan, Protect All Children's Environment

Stakeholder Group #2
International, Federal, State and local agencies

B. Johnson, City of Santa Monica
S.M. Marcus, New Jersey Poison Information and Education System
M.R. Peil, Minnesota Department of Agriculture
*T. Diangson, Seattle Solid Waste Utility
J.A. White, Wisconsin Department of Agriculture, Trade & Consumer Protection
*A. Frahm and G. Gensler, Local Hazardous Waste Management Program/King Co., Washington
Scholtz, RAL: German Federal Environmental Agency
*M. Losman, Swedish Society for Nature Conservation
B. Tegethoff, Arbeitsgemeinschaft der Verbraucherverbände e.V.
*A. Legault, Environment Canada
P. McCarron, Solid Waste Management Coordinating Board (MN)
C.W. Williams, Minnesota Pollution Control Agency
*S. Patrick, Minnesota Pollution Control Agency
K. Dahlquist, Tri-County Solid Waste Management Commission
M. Steinwachs, Household Hazardous Waste Project
J. Twiton, Household Hazardous Waste Project
R. Amonker and W. Cheek, Household Hazardous Waste Project

M. Lourdes Alcobia, Instituto do Consumidor
A. Frahm, Local Hazardous Waste Management Program
J. Mingo, Island County Solid Waste

Stakeholder Group #3
Manufacturers of consumer household products and associated trade organizations, and EPA Partners

*C.M. Bergholz, The Procter & Gamble Company
S.S. Kellner, Chemical Specialties Manufacturers Association
L.E. Oldendorf, American Society of Safety Engineers
J. Versweyveld, Lab Safety Supply
F.H. Brewer, Johnson Wax
*M. Bender, North American Hazardous Materials Management Association
C. Kavanaugh, Wilsonart International
*D.P. Ward, Solaris Group of Monsanto
*W.W. Bradley, Nonprescription Drug Manufacturers Association
C.B. Bussey, Ciba-Geigy

Stakeholder Group #4
Retailers
M. Eisen, The Home Depot

* Submitted additional research materials, which are included in the summary where relevant.

August Stakeholder Meeting Participants

Amy Breedlove, EPA
Maureen Breitenberg, NIST/DoC
James L. Connaughton, US SubTAG3 to ISO TC207
Charlotte Cottrill, EPA
Madelyne Cromwell, CSPI
Ramé Cromwell, EPA
William Currie, International Pest Management Institute
Mary Dominiak, EPA
Jim Downing, EPA
Mark Eisen, Home Depot
Ron Grandon, Pesticides and Toxic Chemical News
Luis Hernandez, Barrera Associates
Joanne Holcher, Citizens for a Better Environment
Brian Johnson, Environmental Programs Division, Santa Monica CA
Ryan Johnson, Student
Jim Jones, EPA
Elizabeth Knee, Jellinek, Schwartz and Connolly, Inc.
Ven McDonald
John Miller, Vermont Agency of Natural Resources
Jim Moore, New York Coalition for Alternatives to Pesticides
Steve Morrill, EPA
Paul Orum, Work Group for the Community Right to Know
Sally Patrick, Minnesota Pollution Control Agency
Steve Risotto, Center for Emissions Control
Sandy Schubert, National Coalition Against the Misuse of Pesticides
Jim Versweyveld, Lab Safety Supply
Arthur Weissman, Green Seal
Traci Williams, Self American U

Stakeholders Submitting Written Comments During Phase I Development

Lawrence (Joe) E. Allred, S.C. Johnson Wax, Inc.
Carol Belew, Region VIII
Carolyn Bergholtz and Cathy Satter, The Procter & Gamble Company
Amy Breedlove, EPA/OPP
Dan Brown, EPA/OAQPS
Linda Brown, Scientific Certification Systems
Citizens for a Better Environment
Charlotte Cottrill, EPA
Bridget Crudo, The Dial Corporation
Glenda Dugan, EPA Region IX
Jay Feldman; National Coalition Against the Misuse of Pesticides
Luetta Flournoy, EPA Region VII
Annette Frahm, Local Hazardous Waste Management Program in King County
Jean Frane, EPA/OPP
Norma Grier, NW Coalition for Alternatives to Pesticides
Michelle Herity-Stephens, The Dial Corporation
Brigid Klein, Chemical Specialities Manufacturers Association
Bill McCormick, The Clorox Company
Mike Mendelsohn, EPA/OPP
John Miller, Vermont Agency of Natural Resources
Mike Novak, Chemical Producers and Distributors Association
Paul Orum, Working Group on Community Right-to-Know
Sally Patrick, Minnesota Pollution Control Agency
Julie Spagnoli, Bayer Corp.
Mario Teisl, Food and Drug Administration
Dennis Ward, Solaris Group of Monsanto
Approximately 3,000 pre-printed post cards from private individuals. They were addressed to EPA Administrator Carol Browner, urging the Administrator to "tell the truth about pesticides" and stating that "Consumers have the right to know."

Appendix K

PEER REVIEW
OF THE DRAFT
CONSUMER LABELING INITIATIVE
PHASE 1 REPORT

Background

EPA requested a peer review of the Draft Report for the following reasons. The use of qualitative research methods are a new and unique approach for EPA, and we were looking for feedback. In addition, because qualitative research is not intended to provide answers but to identify issues to be addressed, and due to the complexity of this project, EPA wanted to evaluate the work we have done so far, before continuing with Phase II. With those goals in mind, five independent experts in public opinion and marketing research were asked to peer review the draft Consumer Labeling Initiative Phase I Report.

Document Reviewed

The peer review was done on the "Draft Consumer Labeling Initiative Phase I Report," dated August 21, 1996. The draft report contained, primarily, a summary and discussion of the Stakeholder comments received, a summary of the literature review, a summary of the findings of the qualitative research, and a section on summary findings and next steps. In addition, it contained copies of the various participant screeners; the discussion guides for the one-on-one interviews; and lists of the Task Force members, EPA Partners, and Stakeholder comment providers.

Peer Reviewers

The peer review was conducted by five independent reviewers external to EPA. Reviewers were selected based on their expertise and experience in the fields of public opinion, marketing research, and communications. Reviewers included: Carolyn Raffensperger of the Science and Environmental Health Network; Naomi Kulakow of the Food and Drug Administration, Center for Food Safety and Applied Nutrition, Office of Scientific Analysis and Support, Division of Market Studies; Dr. Hans Wolff of Hans J. Wolff and Associates; Dr. Judith Bradbury of Battelle Pacific Northwest Laboratory; and, Dr. Everett M. Rogers of the University of New Mexico.

Charge to Reviewers

Reviewers were asked to respond to questions relating to the study design, methodology, and implementation; quality of the literature review, screeners, and discussion guides; and relevance of the findings and recommendations. They were also encouraged to provide additional comments as they wished.

Summary of Comments

Generally, the reviewers believed that the report was complete and that the research provided extensive insight into consumer opinions about, and understanding of, labels. Comments on quality of the

literature review varied. Some thought the review was good, others thought it fell short by not providing enough analysis Several comments were received cautioning EPA about the importance of choosing the correct methodology for the next phase. A few comments were received expressing uncertainty about what next steps were being planned. Finally, EPA received mixed comments about whether quantification of the results from the qualitative phase should be the next major step or not. The following comments generally characterize some of the feedback received from the peer reviewers.

Study Design

Several reviewers commented on the need to include representation from, and address the differing needs of the following: specific ethnic groups and/or non-English speakers, such as Hispanics and Native Americans; non-pesticide purchasers; and geographic areas such as the southeast and northwest.

Goals

The goals of empowering consumers and improving consumer understanding were clearly addressed in the study design and literature review and both of those sections provided relevant information. However, the pollution prevention goal was not as clearly addressed.

Quantification

The complexity of this project arises from the fact that a large amount of research is required before any format can even be developed and tested.

It will likely take considerable time to conduct formative and outcome evaluation, especially if EPA tests the ability of various populations to understand label content and comply with directions for use/disposal in both indoor or outdoor environments.

The results of the qualitative research seem so complete that one wonders why EPA sees the need to spend the time and funds on extensive quantitative research before undertaking the final and most challenging phase of research, i.e., label design and testing in real-life settings. Under ideal circumstances, there may be justification for conducting additional quantitative research, but given the costs and time needed to finish this phase this seems unrealistic. Completing the quantitative research runs the risk of slowing or stopping eventual action should funds become depleted or the current leadership change.

One reviewer questioned why the existing literature and expertise at FDA and EPA were not sufficient to move into a testing phase.

Next Steps

Further research should attempt to quantify the percent of consumers who never or rarely read beyond the brand name

One reviewer pointed out that no matter how simple, concise, or readable labels may become, it seems highly unlikely that they will have the power to motivate consumers to use them appropriately without additional support from a highly visible media campaign that raises public awareness about key messages on different kinds of products.

Another agreed that the next step should focus on assessing consumer comprehension. He also mentioned that labeling alternatives will be evaluated during this phase. The reviewer was unclear, however, as to how these alternatives will be generated and evaluated.

One suggested that EPA consider the use of focus groups *after*, as well as before, the implementation of the quantitative research. "This approach can be very useful in assisting in *explaining* the results from surveys."

Finally, one stated that the issue of whether warnings influence consumers not to purchase a product should be investigated, as well as how to overcome the lack of understanding of chemical ingredients by consumers.