



Final

CURRENT STATE OF FOOD PRODUCT OPEN DATES IN THE U.S.

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EXECUTIVE SUMMARY

Under contract to the U.S. Food and Drug Administration (FDA), Eastern Research Group, Inc. (ERG) conducted this study of food product open dates in the United States. The study mainly consists of four parts that:

- Examine regulatory and industry framework within which U.S. food manufacturers currently operate,
- Generate quantitative information on the current state of the use of open dates on all types of food labeling in the United States,
- Analyze industry practices on shelf-life testing and decision to open date to better qualify the observed results and further evaluate the potential consequences of adding or modifying open dates on food products, and
- Summarize the results of recent studies on consumer food handling and storage practices.

ERG generated the information sought through literature reviews, multiple (total of 5) in-store surveys of food products, and discussions with industry personnel and food trade organizations.

ES.1 Current Regulations and Guidelines on Open Dating of Food Products

Except for infant formula and some varieties of baby food, there are presently no Federal requirements for open date labeling of food products in the United States (FSIS, 2002). As of December 2002, however, 30 states have regulations mandating open dating of selected products, such as milk, eggs, and perishable packaged foods. These regulations vary among states. While the majority of states require or recommend a sell-by or pull date, some states suggest the use of expiration, best-if-used-by, and/or not-to-be-consumed-after dates. State regulations generally do not specify the exact label for the date (i.e., sell by versus use by) and format (i.e., month/day/year versus month/year).

In contrast to the United States, Japan and most other developed countries, such as the European Union member countries, require open dating of most food products. In most instances, the date represents the time after which the food manufacturer cannot guarantee product freshness. Although the exact requirements for open dating vary among countries, all require dates on most prepackaged products. Further, the majority of these regulations also specify the exact format for the date marking (i.e., day/month/year versus month/day/year) and occasionally specify the location of the date on the product labeling, such as the principal display panel.

ES.2 Supermarket Survey of Open Dates

ERG conducted a total of five supermarket surveys in which ERG staff visually inspected and recorded the type of dates and other product characteristics for various food products. The surveys covered both name brand and private label products and generated data on various other product characteristics, such as average unit prices, type of packaging, print size of open dates, and others. The surveys showed that more than half of name brands do not have any open dates. Further, among those name-brand products that are open dated, over 25 percent did not have an explanatory, such as “best if used by” or “sell by,” for the date. The surveys also showed that the prevalence of open dates and the type of dates vary significantly between brand name and private label products.

ES.3 Industry Practices; Shelf-life Testing, Decision to Open Date, and Other Considerations

To gain a better understanding of the decision making process and better qualify the survey findings, ERG interviewed executives of a number of food manufacturers. Due to the lack of a standardized open dating system, manufacturer responses varied widely. The majority of manufacturers, however, concurred on a few major factors, mainly perishability, shelf-life duration, existing regulations, and marketing considerations, that influence their decision to open date. Manufacturers indicated that addition or modification of an open date may require (1) changes in inventory control practices, (2) purchase or modification of in-line printing

equipment, (3) changes to label and/or package design, and/or (4) additional shelf-life testing for validation purposes depending on the specific requirements of any FDA regulation.

Manufacturers can extend the shelf life of their products during processing by many means, including heat, removal of water, and radiation. Further packaging technologies, such as the selection of impermeable packaging and gas injection, also extend product shelf life. Thus, ERG addressed the various food preservation techniques developed in recent years, such as ultra-high temperature (UHT) processing, controlled atmospheric packaging (CAP), and active packaging, in this section.

ES.4 Home Food Storage and Handling Practices

Proper home food storage and handling are highly relevant to the open date and paramount to ensuring the safety and quality of food products. If foods are improperly stored or mishandled, degradation in quality and pathogenic bacterial growth might occur before the open date on the package, rendering the open date meaningless. The current open dates on products generally reflect quality rather than safety of these products. The date on the package, therefore, only ensures good quality if and only if consumers handle and store the food according to the expectations of the manufacturer. Safety of the product is dependent partially on the processing of the product, over which the consumer has no control, and proper handling and storage practices of the consumer, over which the manufacturer has no control. Recent empirical studies indicate that most consumers do not properly handle and store food products. Further, there is some consumer confusion on the interpretation of food open dates.

SECTION ONE

CURRENT REGULATIONS AND GUIDELINES ON OPEN DATING OF FOOD PRODUCTS

At present, there is no uniform system of food product dating in the U.S. While there are no Federal open dating regulations (except for infant formula and some varieties of baby food), around 40 percent of states require some form of open dating on selected products, such as milk, eggs, and prepackaged perishable foods. Food manufacturers that export to Japan and other developed countries, such as Canada and the European Union member countries, also need to comply with various international regulations on open dating.

This section describes the regulatory and industry framework on open dating of food products within which U.S. food manufacturers currently function. Section 1.1 discusses the Federal regulations on open dating applicable to infant formula, some varieties of baby food and USDA-regulated products, such as meat and poultry. Section 1.2 describes the Uniform Open Dating Regulation developed by the National Institute of Standards and Technology (NIST), which has been adopted by some states for implementation. The various state regulations developed and promulgated by a variety of state departments, including the Department of Weights and Measures, the State Department of Health, Department of Agriculture, and the Department of Commerce, are discussed in Section 1.3. Section 1.4 examines open dating regulations of select countries that U.S. food manufacturers typically export. Finally, Section 1.5 concludes with a discussion of various guidelines and recommendations put forth by a number of food industry organizations, such as the National Food Processors Association (NFPA).

1.1 Federal Regulations

Except for infant formula and some varieties of baby food under FDA inspection, there are no Federal regulations for open dating of food products. Infant formula and some baby food are required to bear a use-by date under 21 CFR §107.20(c).

“A ‘use by _____’ date, the blank to be filled in with the month and year selected by the manufacturer, packer, or distributor of the infant formula on the basis of tests or other information showing that the infant formula, until that date, under the conditions of handling, storage, preparation, and use prescribed by label directions, will (1) when consumed, contain not less than the quantity of each nutrient, as set forth on its label; and (2) otherwise be of an acceptable quality...”

Additionally USDA regulations permit the addition of an open date to the regulated product’s (meat and poultry) labeling under the USDA generic label provisions, 9 CFR §317.5(b)(9)(xii) for meat products and 9 CFR §381.133(b)(9)(xii) for poultry products. Under 9 CFR §317.8(b)(32), a calendar date may be shown on labeling when declared in accordance with the provisions of this paragraph:

“(i) The calendar date shall express the month of the year and the day of the month for all products and also the year in the case of products hermetically sealed in metal or glass containers, dried or frozen products, or any other products that the Administrator finds should be labeled with the year because the distribution and marketing practices with respect to such products may cause a label without a year identification to be misleading.

(ii) Immediately adjacent to the calendar date shall be a phrase explaining the meaning of such date, in terms of ‘packing’ date, ‘sell by’ date, or ‘use before’ date, with or without a further qualifying phrase, e.g., ‘for maximum freshness’ or ‘for best quality’, and such phrases shall be approved by the Administrator as prescribed in §317.4.”

USDA regulation 9 CFR §381.129(c) contains similar provisions for poultry products.

1.2 National Institute of Standards and Technology (NIST)

The National Institute of Standards and Technology (NIST) is a non-regulatory federal agency within the U.S. Commerce Department’s Technology Administration. One of NIST’s missions is to develop and promote uniformity among the states concerning local weights and measures laws, standards, and practices (NIST, 2002a and Labuza and Szybist, 1999). To help accomplish this mission, NIST’s Office of Weights and Measures (OWM) has established the National Conference on Weights and Measures (NCWM) in 1905. The NCWM is a professional “standards” writing organization of state and local weights and measures officials and

representatives of business, industry, consumer groups, and Federal agencies. OWM partners with the NCWM to develop standards in the form of uniform laws, regulations, and methods of practice, which are then published by NIST.

As early as 1973, the NIST (then known as the National Bureau of Standards) devised the Model State Open Dating Regulations for food products. NCWM adopted and periodically updates these model regulations (now known as the Uniform Open Dating Regulation). NCWM also publishes the status of their adoption by contacting each state's Weights and Measures office.

The NCWM Uniform Open Dating Regulation, published in NIST Handbook 130, provides two options for implementation by the states. One option requires open dating on all perishable foods; the other option permits voluntary open dating of such foods. Under the latter (voluntary) case, the open dating needs to conform to the uniform regulation, including the manner in which the date is determined, the date format, and the placement of the open date on the product's packaging (NIST, 2002b). Appendix A provides the full text of the NCWM standard.

As of September 2000, only New Hampshire and Oklahoma have fully adopted the NCWM standard (See Table 1-1). Further, the states of Arkansas and Michigan have also adopted the NCWM standard but have chosen not to automatically incorporate the updates to Handbook 130 into their existing regulations. Out of the 46 remaining states, two (Arizona and Delaware), use the NCWM standard as a guideline, 24 and the District of Columbia have some other law or regulation in force applicable to open dating of certain types of food products (see Section 1.3); and 19 do not mandate any form of open dating.

1.3 State Regulations

The open dating of food products is controlled by a variety of state departments, including the Department of Weights and Measures, the State Department of Health, Department of Agriculture, Department of Commerce among others. As of December 2002, some form of

Table 1-1: Status of Adoption of NCWM Uniform Open Dating Regulation, by States and the District of Columbia (as of September 2000)

State	Status of Adoption
Alabama	Law or regulation in force, but not based on NCWM standard
Alaska	Not adopted
Arizona	NCWM standard is not a regulation but is used as a guide
Arkansas	Law or regulation in force, NCWM standard used as basis of adoption from an earlier year
California	Law or regulation in force, but not based on NCWM standard
Colorado	Not adopted
Connecticut	Law or regulation in force, but not based on NCWM standard
Delaware	NCWM standard is not a regulation but is used as a guide
District of Columbia	Law or regulation in force, but not based on NCWM standard
Florida	Law or regulation in force, but not based on NCWM standard
Georgia	Law or regulation in force, but not based on NCWM standard
Idaho	Not adopted
Illinois	Not adopted
Indiana	Not adopted
Iowa	Not adopted
Kansas	Not adopted
Kentucky	Law or regulation in force, but not based on NCWM standard
Louisiana	Not adopted
Maine	Not adopted
Maryland	Law or regulation in force, but not based on NCWM standard
Massachusetts	Law or regulation in force, but not based on NCWM standard
Michigan	Law or regulation in force, NCWM standard used as basis of adoption from an earlier year
Minnesota	Law or regulation in force, but not based on NCWM standard
Mississippi	Law or regulation in force, but not based on NCWM standard
Missouri	Not adopted
Montana	Law or regulation in force, but not based on NCWM standard
Nebraska	Law or regulation in force, but not based on NCWM standard
Nevada	Not adopted
New Hampshire	NCWM standard fully adopted and updated with each edition of Handbook 130
New Jersey	Law or regulation in force, but not based on NCWM standard
New Mexico	Law or regulation in force, but not based on NCWM standard
New York	Law or regulation in force, but not based on NCWM standard
North Carolina	Law or regulation in force, but not based on NCWM standard
North Dakota	Not adopted
Ohio	Law or regulation in force, but not based on NCWM standard
Oklahoma	NCWM standard fully adopted and updated with each edition of Handbook 130
Oregon	Law or regulation in force, but not based on NCWM standard
Pennsylvania	Law or regulation in force, but not based on NCWM standard
Rhode Island	Not adopted [a]
South Carolina	Not adopted
South Dakota	Law or regulation in force, but not based on NCWM standard
Tennessee	Not adopted
Texas	Not adopted
Utah	Not adopted
Vermont	Not adopted
Virginia	Law or regulation in force, but not based on NCWM standard
Washington	Law or regulation in force, but not based on NCWM standard

Table 1-1: Status of Adoption of NCWM Uniform Open Dating Regulation, by States and the District of Columbia (as of September 2000)

West Virginia	Law or regulation in force, but not based on NCWM standard	
Wisconsin	Law or regulation in force, but not based on NCWM standard	
Wyoming	Not adopted	
Totals	Law or regulation in force, but not based on NCWM standard	25
	NCWM standard fully adopted and updated with each edition of Handbook 130	2
	Law or regulation in force, NCWM standard used as basis of adoption from an earlier year	2
	NCWM standard is not a regulation but is used as a guide	2
	Not adopted	19

Source: NIST, 2002b; Labuza and Szybist (1999) as updated by ERG in 2002

[a] The NIST handbook reports Rhode Island as having an open dating law or regulation in force, but not based on the NCWM standard. ERG's check did not identify any open dating laws in Rhode Island.

open date labeling is required in nearly 60 percent of the states (see Table 1-2). The range of food products covered by these state regulations, however, varies. Of the 30 states requiring some form of open dating, 13 (43 percent) have regulations limiting coverage to milk and milk products only. Around 20 percent (6 out of 30) have open dating regulations applicable to all perishable products. Only one state, the Commonwealth of Massachusetts, regulates perishable, semi-perishable, and long-shelf-life foods. Other types of food products regulated by the remaining states include eggs, reduced-oxygen-packaged food, smoked salmon, and prewrapped sandwiches.

The type of date labeling required or recommended for use also varies. While the majority of states require or recommend a sell-by or pull date, a minority of states suggest the use of expiration, best-if-used-by, and/or not-to-be-consumed-after dates. The exact label for the date (i.e., sell by versus use by) and format (i.e., month/day/year versus month/year), however, are rarely specified in the state regulations.

There is no uniformity among states regarding how open dates are to be determined. For example, Montana requires "... any container of [grade A raw milk to be] marked with a pull date of [no more than] 12 days after pasteurization." By contrast, the sell-by period for grade A milk in Maryland is established at 14 days after packing.

In addition to the mandated open dates in various states, some food manufacturers voluntarily open date their products without any regulatory impetus. The type of date labels and formats adopted, however, vary widely among manufacturers. Some manufacturers use a sell-by date, others use best-if-used-by or use-by dates, and some do not specify the type of open date placed on their labeling at all. The observed variability in open dating practices is mainly due to lack of uniform guidance on (1) which products to open date, (2) which date to use, (3) how and where in the product packaging/labeling to display the date, and (4) how to scientifically determine the date (OTA, 1979).

1.4 International Regulations

Most developed countries require open dating of food products where the date represents the time after which the food manufacturer cannot guarantee the freshness of its product. The exact requirements for open dating vary among countries. Some countries require dates on perishable products (i.e., those with a shelf life of 90 days or less) whereas others require dates on most prepackaged foods, including frozen goods. Most of these regulations also specify the exact format for the date marking (i.e., day/month/year versus month/day/year) and, occasionally, where the date must appear on the product's labeling, such as the principal display panel.

1.4.1 European Union

The EU directive 2000/13/EC, which repeals the original directive 79/112/EEC and its subsequent amendments, mandates open dating of food products and provides the procedure for date marking on food labeling. Under the directive, many types of food products are required to indicate the "date of minimum durability" on their labeling. This is usually expressed as "best before" or "best before end of," followed by the date until which the food will keep its "specific properties when properly stored." Foods that are highly perishable are required to bear a "use-before" or "use-by" date. The date needs to indicate (1) the day and month if the shelf life of the product is less than 3 months, (2) the month and year if the shelf life of the product is more than

Table 1-2: Summary of Open Date Labeling Regulations by States and the District of Columbia

State	Primary Products	Type of Open Date	Source
Alabama	Potentially hazardous foods (includes dairy products, meat, poultry, fish, shellfish, and any food capable of supporting rapid growth of infectious or toxigenic microorganisms)	Not specified	Department of Agriculture and Industries Agricultural Chemistry, § 80-1-22-.28
Alaska	Voluntary		
Arizona	Eggs	Expiration Sell by Buy thru	Arizona Revised Statutes, § 3-719
Arkansas	Voluntary		
California	Milk and milk products	Sell by	California Food and Agricultural Code, § 36004
Colorado	Voluntary		
Connecticut	Milk, cream, yogurt, cream cheese, cottage cheese, ricotta cheese, and sour cream	Sell by	Connecticut General Statutes, § 22-197b
Delaware	Voluntary		
District of Columbia	Pasteurized fluid milk, fresh meat, poultry, fish, bread products, eggs, butter, cheese, cold meat cuts, mildly processed pasteurized products, and potentially hazardous pre-wrapped foods sold in food-retail operations	Pull	District of Columbia Municipal Regulations, Title 23, § 2505
Florida	Milk and milk products	Sell by	Florida Statute, Title 33, § 502.042
Georgia	Food products in package form	Not specified	Georgia Department of Agriculture Weights and Measures Rules, § 40-7-1-.26
Hawaii	Milk and milk products	Sell by	State of Hawaii Department of Health Administrative Rule, Title 11, § 11-15-39
Idaho	Voluntary		
Illinois	Voluntary		
Indiana	Voluntary		
Iowa	Voluntary		
Kansas	Voluntary		
Kentucky	Milk and milk products	Not specified	Kentucky Administrative Regulations, 902 KAR 50:080
Louisiana	Voluntary		
Maine	Voluntary		
Maryland	Milk products	Sell by	Maryland Code, Title 21, § 21-426
Massachusetts	Perishable and semi-perishable food products	Sell by Best if used by	Commonwealth of Massachusetts, 105 CMR 520.119

Table 1-2: Summary of Open Date Labeling Regulations by States and the District of Columbia

Michigan	Smoked fish	Not to be sold after Not to be consumed after	Department of Agriculture, Food and Dairy Division, Regulation No. 569 Smoked Fish
Minnesota	Perishable foods other than meat, poultry, frozen foods, and fresh fruit and vegetables	Not specified	Minnesota Statutes, Chapter 31, § 31.781 – 31.783
Mississippi	Eggs	Expiration	Mississippi Department of Agriculture and Commerce, Egg Marketing Law and Regulation, Regulation No. 1
Missouri	Voluntary		
Montana	Milk and milk products other than buttermilk	Pull Sell by Not to be sold after	Administrative Rules of Montana, Fluid Milk and Grade A Milk Products, Sub-Chapter 2, § 32.8.202
Nebraska	Eggs and reduced oxygen packaged food	For eggs, packed on For reduced oxygen packaged foods, sell by or use by	Nebraska Statutes, Chapter 81 and Chapter 2, § 81-2,272.27 and § 2-3509
Nevada	Voluntary		
New Hampshire	Refrigerated prewrapped sandwiches and perishable foods	Expiration Sell by	New Hampshire Department of Agriculture, Markets and Food, Chapter 438, § Agr 1413.04 and NIST Handbook
New Jersey	Milk and milk products	Sell by Not to be sold after	New Jersey State Department of Health, § 8:21-10.1
New Mexico	Milk and milk products	Pull	New Mexico Department of Agriculture, Title 21, § 34.5
New York	Milk and milk products (for NYC only)	Not specified	New York City Health Code, § 111.33
North Carolina	Smoked fish	Packing	North Carolina Administrative Code, Title 02, § 0507
North Dakota	Voluntary		
Ohio	Perishable food products other than fresh fruits and vegetables, meat and poultry, food products in non-consumer packages (bulk foods), and packaged perishable foods sold from businesses that conduct less than \$100,000 in sales each year	Sell before Sell by Similar terminology	Ohio Department of Agriculture Regulation 901, § 3-57-04
Oklahoma	Voluntary		
Oregon	Packaged perishable food products	Not specified	Oregon Revised Statutes, Chapter 616, § 616.815
Pennsylvania	Milk	Sell by Not to be sold after	Pennsylvania Code, Title 7, Part III, § 59.22
Rhode Island	Voluntary		
South Carolina	Voluntary		

Table 1-2: Summary of Open Date Labeling Regulations by States and the District of Columbia

South Dakota	Eggs	Exp	South Dakota Department of Agriculture: Law 39-11, § 12:26:10
Tennessee	Voluntary		
Texas	Voluntary		
Utah	Voluntary		
Vermont	Voluntary		
Virginia	Milk and milk products	Pull	Virginia Administrative Code, § 2 VAC 5-490-40
Washington	Perishable packaged food products	Pull	Revised Code of Washington, § 69.04.905
West Virginia	Perishable food products	Not specified	West Virginia Code, § 47-1-9 and NIST Handbook 130
Wisconsin	Smoked fish	Sell by	Wisconsin Administrative Code, Chapter ATCP, § 70.22
Wyoming	Voluntary		

Source: Adopted from Labuza and Szybist (1999) and subsequently updated by ERG in 2002

3 months but less than 18 months, and (3) the year if the shelf life of the product is greater than 18 months. The open date needs to be followed by storage conditions, which must be placed near the date, if this information is necessary to maintain freshness for the specified period (Directive 2000/13/EC, 2000).

1.4.2 Canada

Canada requires a “best-before” date on all prepackaged foods with a durable life of 90 days or less, except for prepackaged fresh fruits and vegetables, individual portions of food served by restaurants, and airlines, vending machine foods, and donuts. The regulations define the “best before” date as the period during which the food will retain its normal wholesomeness, palatability, and nutritional value under appropriate storage conditions. The date is required to be presented in a year, month, day format. The date may be placed anywhere on the label, including the bottom of the product container, as long as a clear indication of its location is shown elsewhere on the label.

Foods that are packaged at retail establishments may be labeled with either a best-before date along with any necessary storage instructions or a packing date with shelf-life information. This information may be included on the label or on a poster next to the food (CFIA, 2000).

1.4.3 Japan

On April 1, 1995, Japan started enforcing a new date marking system for all food products, including raw, processed, dried, canned, and frozen foods. The Japanese regulations require the product to bear a “best before” or an “expiry of consumption” date, with the latter being used for highly perishable foods that should be consumed soon after manufacture due to quality degradation. The best-before date, however, is not meant to imply the last day to consume the product but rather to serve as a guideline for consumers (CSPI, 1998).

Prior to 1995, Japanese regulations allowed food products to bear either a pack date or the date on which the food was produced. Due to consumer confusion, Japan changed its law in 1995 to clarify the use of date markings on food labels (CSPI, 1998).

1.4.4 Australia and New Zealand

Under the Australia New Zealand Food Standards Code, all packaged food with a shelf life of less than two years that is for retail sale or to be used for catering purposes must bear an open date. An open date is also required if the purchaser requests the information. Under the standard, the open date marking must be accompanied by a “best before” statement. If the food item, however, needs to be consumed within a certain period for health or safety reasons, the food label needs to bear a “use by” statement. Prior to the new standard (Standard No. 1.2.5), which was promulgated on December 20, 2000, the regulations allowed use-by and best-before date statements to be used interchangeably on food labels. The current standard restricts the use of allowed date statements to make it easier for consumers to distinguish between products that need to be consumed by a certain time for health or safety reasons and those that do not. Further, it is the manufacturer who needs to determine which date marking term should be used on their foods.

The standard also prescribes the exact format of the date marking (i.e., day, month, year) in uncoded numbers, except for the month, which may be expressed in letters. The standard exempts foods with less than 3 months of shelf life from including the year and those with more than 3 months from including the day.

The previous standard allowed manufacturers to use a “packed-on” date as the sole date mark on foods with a shelf life of 90 days or more. The current standard eliminated this option because a packed-on date was judged not to provide consumers with a clear indication of how long the food can be stored. Under the new standard, manufacturers are only allowed to use a packed-on date only if it is accompanied by a best-before or use-by date, as applicable (FSANZ, 2002).

1.4.5 Codex Alimentarius

The Codex Alimentarius Commission, created in 1963 by the Food and Agricultural Organization (FAO) of the United Nations (UN) and the World Health Organization (WHO), develops food standards, guidelines and related texts such as codes of practice under the Joint FAO/WHO Food Standards Programme. The organization’s main objectives are protecting the health of the consumers, ensuring fair trade practices in the food trade, and promoting coordination of all food standards work undertaken by international governmental and non-governmental organizations. The organization has published guidelines for date marking of foods in 1985 that were subsequently revised in 1991 (Codex Stan 1, 1991).

The guidelines recommend the declaration of the “date of minimum durability” for prepackaged food products, except for fresh fruits and vegetables, wines, beverages containing 10 percent or more alcohol in volume, baked goods, vinegar, food grade salt, confectionary products, and chewing gum. The date needs to consist at least of the day and month for products with a minimum durability of less than two months, and the month and year for products with a minimum durability greater than two months. The food label should have either a “best-before” date if the day is indicated or a “best-before-end” date in other cases. Further, the regulations require the date to be declared in uncoded numerical sequence with the day followed by the month and year. In those countries where such use will not confuse consumers, the month may be displayed by letters instead. The best-before date is not meant to imply the last day to consume the product, but rather serve as a guideline for consumers.

1.5 Other Voluntary Guidelines

In addition to the above regulations, a number of food trade associations have their own guidances/recommendations regarding open date labeling. In the winter of 2001, ERG contacted various food industry associations to inquire (1) whether they have any guidance on open-date labeling for their member companies and (2) how widely these guidances were adopted. Among the associations contacted, only two, the Food Marketing Institute (FMI) and the National Food Processors Association (NFPA), indicated having formal guidelines (see Table 1-3). Additionally, Association of Food Industries, International Dairy-Deli-Bakery Association, and Specialty Coffee Association of America noted having informal recommendations for their member companies. The majority of the associations contacted, however, stated that they do not advise their members on open-date labeling.¹ None of the organizations contacted were able to comment on the extent of adoption of their respective guidelines among their members.

FMI, whose membership comprises food retailers and wholesalers in the United States and overseas, supports the use of voluntary sell-by dates with accompanying best-if-used-by information. FMI further recommends that the sell-by dates use alphabetic month designations or abbreviations rather than numbers because they are more easily understood by consumers. The guidelines also encourage manufacturers to label shipping cartons with the same sell-by date information as appears on the retail sale units.

NFPA voluntary open dating guidelines are somewhat different than those of FMI. First, NFPA does not endorse one type of date labeling (i.e., sell by versus use by) over another. NFPA argues that the exact date labeling statement should be left to the food manufacturer who is in the most knowledgeable position to determine it. For those manufacturers that choose to place open dates on their products, however, NFPA recommends the use of month/day/year (MMDDYY) format, either in alphanumeric or numeric notation. For products with shelf life of three months or less, the date may omit the year. For products with shelf life greater than three months, the date may exclude the day of the month.

¹ Some of these organizations indicated that if inquired, they would most likely refer the company to FMI and/or NFPA for advice on open date labeling.

Table 1-3: Summary of Voluntary Guidelines and Informal Recommendations by Food Trade Organizations on Open Date Labeling of Food Products

Organization Name	Voluntary Open-Dating Guidelines/Informal Recommendations
Association of Food Industries	Informally recommend open dating of olive oil (Eckhardt, 2001).
Food Marketing Institute (FMI)	Support a voluntary “sell by” date accompanied by “best-if-used-by” information (FMI, 2001). See Appendix B.
International Dairy-Deli-Bakery Association	Informally recommend manufacturers’ guidelines (sell/pull by) for foods that are put on display in the supermarket, such as deli meats.
National Food Processors Association (NFPA)	For refrigerated and frozen foods, indicates that manufacturers are in the most knowledgeable position to establish the shelf life and consequently the specific date labeling information that is most useful to the consumer. To harmonize date labeling among food products, supports a month/day/year (MMDDYY) format, either alphanumeric or numeric (NFPA, 1999). See Appendix C.
Specialty Coffee Association of America	Encourage their members to put a “born-on” date on their products (Lingle, 2001)

SECTION TWO

SUPERMARKET SURVEY OF OPEN DATES

Many food products currently have some type of dating. Such dating is either voluntary or required by state governments as noted in the previous section. There is, however, no comprehensive data (public or private) that describes the share of food products and brands that use some form of open dating on their label or packaging.² Hence, ERG undertook a study to generate a database that characterizes the current product dating practices in the food industry. More specifically, ERG conducted a total of five supermarket surveys in which ERG staff visually inspected and recorded the type of dates and other product characteristics for various food products. This section describes the survey design and reports selected results.

Section 2.1 outlines the survey objective. Section 2.2 describe the survey universe and the sampling frame used for the study. Section 2.3 summarizes the survey procedures; the survey method, determination of the unit of analysis (brand versus SKU), and the identification of prominence-related characteristics, such as date location and print size. Section 2.4 presents the sample design and selection methodology and discusses the attainable significance levels for parameters of interest. The survey protocol is outlined in Section 2.5. Section 2.6 summarizes the disposition of the name brand and private label surveys. Section 2.7 presents selected survey results; the extent of open dating, type and format of open dates currently used on food labeling, and prominence scores. Finally, survey limitations are addressed in Section 2.8.

2.1 Survey Objective

The primary survey objective was to generate a database of FDA-regulated food products that will enable the Agency to describe the share of products and brands that use some form of open product dating, including:

² The only study identified is a small scope survey of perishable refrigerated products by Labuza et al. (2001) where the explanation of open dates are recorded for a total of 204 perishable products.

- “Sell-by” dates that indicate how long the product can be displayed for sale,
- “Best-if-used-by” or “best-before” dates that recommend a time period for peak flavor and quality,
- “Use-by” or “expiration” dates that indicate the last date recommended for the use of the product for peak flavor, quality, and/or safety, and
- Any other types of dates, such as unspecified dates (those that are not accompanied by any type of explanatory phrase).

A secondary survey objective was to characterize the prominence of food product dates by collecting relevant information, such as packaging type and print size, on date prominence. Overall, the survey was designed to aid FDA in understanding the current state of open dates used on the labeling and packaging of a wide variety of food products.

2.2 Survey Universe and Sample Frame

The universe for the study was all food products, name brand and private label. Excluded from the study universe were:

- Products not regulated by FDA, except for some prepackaged meat and poultry products regulated by the United States Department of Agriculture (USDA),
- Products currently subject to federal open-dating regulations, such as infant formula and some varieties of baby food,
- Fresh-cut fruits and vegetables,³
- Store-packaged foods (i.e., foods that are minimally processed at the store and subsequently packaged on location), such as certain types of deli cheeses,⁴
- Pet foods, and

³ The IRI database, which was the sample frame for the study, did not contain any observations on fresh-cut fruits and vegetables.

⁴ There is no variability in open dating practices among different store-packaged brands. Typically, in a given store, all store brands bear the same type of date labeling since the open dating policy is set by the store management. For example, all store packed deli cheeses in Supermarket A had “sell-by” dates along with packed-on information. Further, IRI database does not contain any observations on store-packed retail unit sales.

- Alcoholic beverages.

The sample frame for the study was partially based on InfoScan® Custom Store Tracking database provided by Information Resources, Inc. (IRI). The database consisted of scanner data collected weekly from more than 32,000 supermarket, drug, and mass merchandiser outlets across the U.S. and is current as of January 2, 2000 – the most recent version available to FDA under its contract with IRI (IRI, 2002). The database provided detailed information on average unit prices, sales volumes, and other measures at the product, brand, and Universal Product Code (UPC) levels.

The IRI database contained observations on a total of 162 product categories. Out of the 162 categories, however, 13 were out of scope (see Table 2-1). Table 2-2 presents the number of brands and shelf-keeping units (SKUs) in the study universe for the remaining 149 product categories covered by the survey. From the table, shelf-stable products constituted the majority (around 64 percent) of brands in the universe. The next largest product types included refrigerated and frozen products with 12.4 and 11.2 percent of brands, respectively. Finally, dairy goods comprised approximately 6.0 and baked goods around 7.0 percent of all brands.

Table 2-1: IRI Product Categories Excluded from the Study Universe

Product Category Name	Average 1999 Price per Unit	1999 Dollar Sales
Anti-smoking products	\$38.18	\$93,494,872
Baby food	\$0.61	\$831,770,368
Baby formula/electrolytes	\$5.18	\$2,108,935,808
Baking cups/paper	\$0.81	\$19,445,914
Beer & ale	\$5.93	\$6,119,421,952
Fresh eggs	\$1.17	\$2,020,901,760
Frozen baby food	\$1.61	\$20,251
Frozen pet foods	\$2.73	\$10,756,553
Laxatives	\$4.29	\$166,500,048
Liquor	\$11.61	\$1,219,394,560
Vitamins	\$6.90	\$811,639,232
Wine	\$7.31	\$3,231,647,232
Wine coolers	\$4.04	\$223,636,544

Source: IRI, 2000

Table 2-2: Number of Brands and SKUs in the Study Universe, by IRI Product Category

Major Product Category	Product Category Name	1999 Price Per Unit (\$)	1999 Dollar Sales (\$)	Total Number of [a]	
				Brands	SKUs
Baked Goods	Bakery Snacks	\$1.18	\$782,610,560	584	4,573
Baked Goods	English Muffins	\$1.83	\$394,211,616	187	1,063
Baked Goods	Fresh Bread & Rolls	\$1.45	\$7,318,640,640	3,320	27,536
Baked Goods	Pastry/Doughnuts	\$2.05	\$1,245,309,184	1,306	13,456
Baked Goods	Pies & Cakes	\$3.59	\$633,648,128	786	11,302
	Subtotal	NA	\$10,374,420,128	6,183	57,930
	Percent of Total	NA	6.0%	6.8%	10.8%
Dairy	Butter [c]	\$2.48	\$1,100,782,720	242	643
Dairy	Cheese [c]	\$2.44	\$7,445,292,032	2,192	12,583
Dairy	Cottage Cheese [c]	\$2.03	\$835,356,928	311	1,605
Dairy	Creams/Creamers [c]	\$1.54	\$1,029,482,880	398	1,725
Dairy	Milk [c]	\$2.18	\$10,178,941,952	1,749	10,630
Dairy	Sour Cream [c]	\$1.32	\$560,797,248	334	982
Dairy	Yogurt [c]	\$0.79	\$1,866,088,064	334	4,636
	Subtotal	NA	\$23,016,741,824	5,560	32,804
	Percent of Total	NA	13.3%	6.1%	6.1%
Frozen	Frozen Appetizers/Snack Rolls	\$2.30	\$507,276,672	436	1,669
Frozen	Frozen Baked Goods	\$1.62	\$385,644,352	213	850
Frozen	Frozen Breakfast Food	\$2.00	\$896,854,400	232	1,017
Frozen	Frozen Coffee Creamer	\$1.03	\$14,694,131	9	38
Frozen	Frozen Cookies	\$3.16	\$982,508	5	27
Frozen	Frozen Corn On The Cob	\$1.93	\$119,758,056	53	146
Frozen	Frozen Desserts/Topping [c]	\$2.00	\$760,473,152	281	1,423
Frozen	Frozen Dinners/Entrees	\$2.17	\$5,296,635,392	1,396	8,357
Frozen	Frozen Dough	\$2.30	\$97,712,272	121	442
Frozen	Frozen Fruit	\$1.97	\$197,919,728	124	809
Frozen	Frozen Meat	\$3.17	\$830,513,408	693	2,576
Frozen	Frozen Novelties	\$2.71	\$1,895,250,944	943	6,217
Frozen	Frozen Pasta	\$2.37	\$246,881,984	211	1,596
Frozen	Frozen Pies	\$2.70	\$382,106,336	132	765
Frozen	Frozen Pizza	\$2.72	\$2,288,266,240	442	3,139
Frozen	Frozen Plain Vegetables	\$1.38	\$1,619,696,768	700	3,856
Frozen	Frozen Pot Pies	\$1.03	\$309,377,664	91	333
Frozen	Frozen Potatoes/Onions	\$2.01	\$857,746,176	184	1,198
Frozen	Frozen Poultry	\$4.16	\$1,544,325,888	409	2,905
Frozen	Frozen Prepared Vegetables	\$1.50	\$110,828,424	33	141
Frozen	Frozen Seafood	\$4.42	\$994,737,920	915	6,011
Frozen	Frozen Side Dishes	\$1.79	\$236,725,008	286	1,097
Frozen	Ice Cream/Sherbet [c]	\$3.36	\$4,342,927,872	1,615	21,249
Frozen	Frozen Juices	\$1.24	\$1,053,067,712	307	1,084
Frozen	Other Frozen Foods	\$2.24	\$81,811,848	376	1,002
	Subtotal	NA	\$25,072,214,855	10,207	67,947
	Percent of Total	NA	14.5%	11.2%	12.6%
Refrigerated	All Other Deli [c]	\$3.81	\$273,202,176	282	1,100
Refrigerated	Baked Goods	\$1.81	\$156,849,360	300	1,834
Refrigerated	Breakfast Meats [c]	\$2.37	\$2,300,651,264	884	3,441
Refrigerated	Canned Ham	\$4.72	\$98,478,008	67	185
Refrigerated	Cheesecakes [c]	\$3.39	\$38,651,208	91	666

Table 2-2: Number of Brands and SKUs in the Study Universe, by IRI Product Category

Major Product Category	Product Category Name	1999 Price Per Unit (\$)	1999 Dollar Sales (\$)	Total Number of [a]	
				Brands	SKUs
Refrigerated	Desserts [c]	\$2.03	\$500,680,480	171	1,604
Refrigerated	Dinner Sausage	\$2.71	\$1,089,196,800	829	4,020
Refrigerated	Dough/Biscuit Dough	\$1.48	\$1,333,905,920	128	742
Refrigerated	Egg Substitutes	\$3.97	\$1,134,305	11	15
Refrigerated	Entree/Side Dishes	\$2.34	\$2,461,538,304	1,726	8,492
Refrigerated	Frankfurters	\$1.86	\$1,560,278,528	525	2,562
Refrigerated	Juice/Beverage	\$2.34	\$4,249,889,792	2,043	7,615
Refrigerated	Juice/Drink Concentrate	\$5.00	\$775,287	5	18
Refrigerated	Lard	\$2.25	\$2,888,368	19	26
Refrigerated	Luncheon Meats [c]	\$2.03	\$2,925,825,536	838	7,528
Refrigerated	Lunches [c]	\$1.96	\$668,668,160	30	433
Refrigerated	Margarine/Spreads/Butter Blend [c]	\$1.24	\$1,294,911,872	181	793
Refrigerated	Meat Pies	\$4.29	\$23,909,190	56	208
Refrigerated	Other Refrigerated Products	\$2.54	\$223,294,080	609	1,826
Refrigerated	Pasta	\$2.73	\$146,101,104	134	1,054
Refrigerated	Pickles/Relish [c]	\$2.79	\$157,874,000	227	508
Refrigerated	Pizza	\$2.95	\$174,731,840	280	1,773
Refrigerated	Refrigerated Dips [c]	\$1.72	\$335,106,272	522	2,382
Refrigerated	Tortilla/Eggroll/Wonton Wrap	\$1.37	\$190,704,416	327	1,277
Refrigerated	Salad Dressing [c]	\$2.48	\$147,048,880	160	931
Refrigerated	Seafood	\$3.57	\$204,103,584	514	1,910
Refrigerated	Spreads [c]	\$2.14	\$96,069,088	400	1,221
	Subtotal	NA	\$20,656,467,822	11,359	54,164
	Percent of Total	NA	11.9%	12.4%	10.1%
Shelf-Stable	All Other Breakfast Food	\$1.98	\$567,286,336	72	541
Shelf-Stable	Aseptic Juices	\$2.01	\$644,551,872	169	1,281
Shelf-Stable	Baked Beans	\$0.77	\$425,481,376	109	509
Shelf-Stable	Baking Mixes	\$1.21	\$1,151,023,616	631	2,557
Shelf-Stable	Baking Needs [b]	\$1.68	\$1,062,671,872	723	3,068
Shelf-Stable	Baking Nuts	\$2.71	\$317,359,168	285	2,224
Shelf-Stable	Bottled Juices	\$1.84	\$3,233,740,544	2,264	9,722
Shelf-Stable	Bottled Water	\$1.09	\$1,400,605,696	1,331	5,238
Shelf-Stable	Breadcrumbs/Batters	\$1.68	\$224,738,432	387	1,027
Shelf-Stable	Canned Juices	\$1.39	\$713,628,416	486	2,132
Shelf-Stable	Canned/Bottled Fruit	\$1.17	\$1,625,857,792	1,028	4,258
Shelf-Stable	Caramel/Taffy Apples & Kits	\$1.86	\$54,631,552	71	324
Shelf-Stable	Carbonated Beverages	\$1.66	\$12,504,856,576	1,159	15,218
Shelf-Stable	Chocolate Candy (Non-Seasonal)	\$1.12	\$1,751,595,008	1,647	8,314
Shelf-Stable	Cocktail Mixes	\$3.31	\$95,952,640	197	863
Shelf-Stable	Cocoa Mixes	\$2.08	\$314,200,864	152	992
Shelf-Stable	Coffee	\$3.85	\$2,871,482,624	1,292	9,447
Shelf-Stable	Coffee Creamer	\$2.08	\$268,436,384	53	323
Shelf-Stable	Cold Cereal	\$2.94	\$7,008,012,800	571	3,682
Shelf-Stable	Cookies	\$2.04	\$3,795,641,088	2,189	17,151
Shelf-Stable	Crackers	\$2.05	\$3,146,878,208	1,300	6,655
Shelf-Stable	Croutons	\$1.42	\$124,631,688	130	537
Shelf-Stable	Dessert Toppings	\$1.83	\$243,636,832	221	743
Shelf-Stable	Dinners	\$1.23	\$2,711,622,912	956	4,155

Table 2-2: Number of Brands and SKUs in the Study Universe, by IRI Product Category

Major Product Category	Product Category Name	1999 Price Per Unit (\$)	1999 Dollar Sales (\$)	Total Number of [a]	
				Brands	SKUs
Shelf-Stable	Dip	\$2.15	\$142,977,424	277	856
Shelf-Stable	Dried Fruit	\$2.05	\$435,777,728	618	3,455
Shelf-Stable	Drink Mixes	\$0.57	\$629,298,880	149	1,114
Shelf-Stable	Dry Beans/Vegetables	\$1.07	\$222,675,232	630	3,066
Shelf-Stable	Dry Fruit Snacks	\$1.78	\$403,339,136	175	721
Shelf-Stable	Evaporated/Condensed Milk	\$0.87	\$292,862,880	54	185
Shelf-Stable	Flour/Meal	\$1.51	\$543,885,504	626	2,310
Shelf-Stable	Frosting	\$1.44	\$235,129,552	42	285
Shelf-Stable	Gelatin/Pudding Mixes	\$0.84	\$649,643,584	227	1,830
Shelf-Stable	Gravy/Sauce Mixes	\$1.04	\$870,452,352	809	2,987
Shelf-Stable	Gum	\$0.85	\$507,086,848	660	2,824
Shelf-Stable	Hot Cereal	\$2.60	\$741,752,000	191	944
Shelf-Stable	Ice Cream Cones/Mixes	\$1.61	\$86,943,000	75	364
Shelf-Stable	Instant Potatoes	\$1.48	\$303,309,280	128	618
Shelf-Stable	Isotonics	\$1.71	\$698,602,944	213	1,755
Shelf-Stable	Jellies/Jams/Honey	\$2.15	\$792,964,224	1,135	7,292
Shelf-Stable	Juice/Drink Concentrate	\$1.61	\$135,553,696	104	429
Shelf-Stable	Marshmallows	\$1.09	\$112,172,792	47	231
Shelf-Stable	Mayonnaise	\$2.21	\$1,071,071,808	164	710
Shelf-Stable	Meat	\$1.22	\$610,765,568	396	1,356
Shelf-Stable	Mexican Foods	\$1.43	\$942,919,616	644	3,319
Shelf-Stable	Mexican Sauce	\$2.18	\$857,982,336	1,092	4,078
Shelf-Stable	Milk Flavoring/Drink Mixes	\$1.84	\$27,820,670	29	88
Shelf-Stable	Misc. Snacks	\$1.98	\$204,746,416	931	5,385
Shelf-Stable	Mustard & Ketchup	\$1.51	\$750,544,384	636	2,152
Shelf-Stable	Non-Chocolate Candy (Non-Seasonal)	\$1.06	\$791,077,952	2,692	17,151
Shelf-Stable	Non-Fruit Drinks	\$1.99	\$261,557,920	193	747
Shelf-Stable	Oriental Food	\$1.75	\$265,989,760	703	2,446
Shelf-Stable	Pancake Mixes	\$1.69	\$152,218,304	143	503
Shelf-Stable	Pasta	\$0.98	\$1,226,059,648	953	8,911
Shelf-Stable	Peanut Butter	\$2.37	\$771,225,664	335	1,015
Shelf-Stable	Pickles/Relish/Olives	\$1.66	\$1,398,725,376	1,844	10,937
Shelf-Stable	Pizza Products	\$1.19	\$84,189,360	128	262
Shelf-Stable	Popcorn/Popcorn Oil	\$2.01	\$574,149,376	357	1,629
Shelf-Stable	Powdered Milk	\$4.82	\$61,714,908	38	138
Shelf-Stable	Rice	\$1.51	\$1,048,206,400	632	3,212
Shelf-Stable	Rice/Popcorn Cakes	\$1.85	\$152,350,544	75	683
Shelf-Stable	Salad Dressings	\$2.08	\$1,426,722,176	714	4,428
Shelf-Stable	Salad Toppings	\$1.81	\$150,399,808	134	342
Shelf-Stable	Salty Snacks	\$1.68	\$6,257,760,256	3,672	23,978
Shelf-Stable	Sauce	\$1.71	\$1,092,857,472	2,962	6,586
Shelf-Stable	Seafood	\$1.13	\$1,626,024,832	798	4,031
Shelf-Stable	Seasonal/Assorted Candy	\$1.28	\$878,045,696	3,245	22,745
Shelf-Stable	Shortening & Oil	\$2.73	\$1,499,999,360	783	3,178
Shelf-Stable	Snack Bars/Granola Bars	\$2.14	\$963,483,968	411	2,161
Shelf-Stable	Snack Nuts/Seeds	\$2.47	\$781,692,288	1,059	8,892
Shelf-Stable	Soup	\$0.86	\$3,528,969,472	836	5,603
Shelf-Stable	Spaghetti/Italian Sauce	\$1.86	\$1,380,715,648	538	2,840

Table 2-2: Number of Brands and SKUs in the Study Universe, by IRI Product Category

Major Product Category	Product Category Name	1999 Price Per Unit (\$)	1999 Dollar Sales (\$)	Total Number of [a]	
				Brands	SKUs
Shelf-Stable	Spices/Seasonings	\$1.91	\$1,548,984,576	2,222	19,181
Shelf-Stable	Stuffing Mixes	\$1.71	\$267,192,128	108	429
Shelf-Stable	Sugar	\$1.64	\$1,152,847,872	188	673
Shelf-Stable	Sugar Substitutes	\$2.55	\$203,047,552	75	359
Shelf-Stable	Syrup/Molasses	\$2.42	\$548,962,560	615	2,134
Shelf-Stable	Tea – Bags/Loose	\$2.49	\$638,327,872	460	3,582
Shelf-Stable	Tea – Instant Tea Mixes	\$3.42	\$263,115,792	71	619
Shelf-Stable	Tea – Ready-To-Drink	\$1.36	\$450,121,920	296	1,649
Shelf-Stable	Tomato Products	\$0.59	\$849,168,640	451	1,925
Shelf-Stable	Vegetables	\$0.65	\$2,249,723,392	1,587	7,554
Shelf-Stable	Vinegar	\$1.65	\$222,382,368	474	1,812
Shelf-Stable	Weight Control/Nutrition Liquid/Powder	\$3.88	\$519,705,792	507	2,191
Shelf-Stable	Weight Control Candy/Tablets	\$7.03	\$29,258,320	325	747
Subtotal		NA	\$93,845,777,122	58,099	324,588
Percent of Total		NA	54.3%	63.6%	60.4%
Total		NA	\$172,965,621,751	91,408	537,433

Source: IRI, 2000

NA = Not applicable

[a] The counts include all private label brands and SKUs. Note that private labels of different label owners for a given brand (i.e., 8-ounce apple sauce) are not differentiated in the IRI database.

[b] Some brands for the product category are refrigerated.

[c] Classified as a chilled ready-to-eat product.

The universe statistics on private labels (i.e., the total number of private labels) are not readily available from the IRI database because of the manner in which IRI collects and reports data on private labels. In the IRI database, all private labels are lumped together and are not differentiated by, for example, label owner, such as Stop & Shop, Shaws, Purity, etc. Thus, the tables do not report the universe statistics by name brand and private label products separately.

2.3 Survey Procedures

2.3.1 Survey Method

The study presented a unique challenge in terms of determining the most appropriate survey method. A survey of food manufacturers would have been of limited value because (1) product dating practices are mostly unit-specific rather than manufacturer-specific, (2) product dating practices tend to vary by the plant in which a given product is packaged, and (3)

prominence characteristics associated with a product date, such as position and print size, are only directly observable for most products. Thus, ERG decided on a supermarket survey in which a selection of food products would be visually inspected and dating practices enumerated in various supermarkets.

2.3.2 Determination of the Unit of Analysis: Brand versus Shelf-Keeping Unit (SKU)

The IRI database, the sample frame for the study, contained observations on food products at the product, brand, and UPC levels. To determine the most appropriate unit of analysis for the survey, ERG conducted a pilot survey at a local supermarket in the first phase of the study. Using a UPC-level food product list compiled from the IRI database, ERG assessed:

- The ease with which the surveyor can relate the products displayed on the supermarket shelves to those on the list,
- Whether different shelf keeping units (SKUs) for the same brand may reasonably be expected to have identical type of product dating, and
- Whether use of handheld electronic devices, such as a Personal Digital Assistant (PDA) or a laptop computer, might improve survey efficiency among other factors.

The results of the pilot survey pointed towards the use of “brand” as the unit of analysis for the study. First, it was difficult to correspond a UPC-level entry on the survey form to a product on the shelf. Second, the pilot survey results showed little inter-brand variability in open dating (i.e., different SKUs for a given brand tended to have the same type of open date). For these reasons, brand was selected as the unit of analysis for the survey. To capture any potential inter-brand variability, however, ERG decided to sample up to five SKUs per brand (see Section 2-5 for a detailed discussion of the survey protocol).

2.3.3 Determination of Prominence-Related Characteristics

From a consumer perspective, the prominence of a given date is of high importance. An open date on a product's labeling is of little value if the date is stamped on an inconspicuous location and is not easily identifiable by the consumer prior to purchase. Thus, FDA wanted to be able to characterize the relative prominence of open dates for the various food products in the survey sample. To adequately capture factors that influence prominence, ERG conducted an in-house mini survey in which participants were asked to assign a prominence score (1 = not prominent to 10 = highly prominent) to the date markings observed on various types of food products. The survey was also administered to a small number of FDA personnel at the Center for Food Safety and Applied Nutrition (see Appendix D).

An analysis of the survey results showed that subjective prominence scores vary substantially among individuals. For example, degree of prior familiarity with the product highly influences the prominence rating of a date. Surveyors, who regularly purchase a given product, know where to look for the date and subsequently rate the prominence of the date higher than those who are encountering the product for the first time during the survey. Hence, a subjectively assigned prominence score to a given product will not be too informative unless accompanied by objectively observable characteristics, such as print size, location, and other relevant information. Thus, for the survey, ERG defined the following five prominence components for data collection purposes:

- Type of packaging,
- Print size,
- Location (i.e., position of the date on the product labeling),
- Background (i.e., a specially designated area for the date), and
- Prominence score (1 = not prominent to 10 = highly prominent).

To include prominence information not captured by the above five fields, the survey also included a "comment" field. ERG instructed the surveyors to record any relevant prominence-related information in the field, such as whether the date was embossed, obscured by the color

scheme used (dark letters on dark background), or separated from the date label statement (i.e., “fresh till date stamped on the bottom of the container” appearing on the principal display panel and the date appearing on the bottom). To minimize inter-surveyor variability in assigning prominence scores, ERG held in-house training sessions where surveyors were indirectly encouraged to agree on prominence scores for a small sample of food products, if possible. Additionally, it was noted that explicitly recording directly observable product characteristics, such as print size and location, tended to improve the consistency of prominence scores across surveyors.

2.4 Sample Design and Selection Methodology

Typically, the desired sample size is determined at the beginning of a study by assessing the level of precision needed and other relevant characteristics of the population to be surveyed (i.e., estimated variances of the primary variables of interest for the study). For example, in surveys involving stratified random sampling without replacement (SRSWR), the following formula is generally used to compute the desired sample size, n , for each strata, i :

$$(2-1) \quad n_i = \frac{z_{\alpha/2}^2 S(y_i)^2}{e_i^2 + \frac{z_{\alpha/2}^2 S(y_i)^2}{N_i}}$$

where

$i = 1$ to m (where m is the total number of strata),

n = Sample size,

y = Variable of interest,

$S(\cdot)^2$ = Estimated variance of the variable of interest,

N = Population size,

z = z -value (from normal probability tables), and

α = Significance level desired, and

e = Margin of error as specified by the survey designer.

Additionally, in large populations, the estimated variance of a study variable y_i (e.g., percentage of brands with open dates or percentage of brands with use-by dates) is computed as:

$$(2-2) \quad S(y_i)^2 \approx p_i(1-p_i)$$

which attains its maximal value when $p_i = 0.5$ (i.e., when percentage of brands with open dates is 50 percent). When no a priori information is available on the expected value of the variance, the maximal value of 50 percent is used. Finally, the $100(1-\alpha)\%$ confidence interval (CI) for the population mean, y_i , for strata i is expressed as:

$$(2-3) \quad [\bar{y}_i - e_i, \bar{y}_i + e_i]$$

For this study, however, issues related to sample size and statistical precision did not come into play during the design stage of the study because it was not practical to employ typical statistical sampling methods to draw a sample from the IRI database, the sampling frame. First, the IRI database included entries for products discontinued since 1999 and lacked observations on products new to the market. Second, the entries for regional brands in the IRI database were not distinguishable from those of national brands. Due to these factors and the fact that the range of product offerings at any given supermarket varies by geography, location-specific consumer preferences, and other considerations, a randomly drawn sample (stratified by product category) from the IRI database would not have maximized the probability of finding the selected brands at the store where the survey was to be conducted. Hence, to ensure that the majority of product brands will be available at the supermarket, ERG limited its sample frame to those product brands with at least \$3.0 million in dollar sales for the 1999 calendar year. This method eliminated the majority of regional brands unlikely to be available at the store.

Despite the necessary deviation from the preferred survey sampling methodology, it was possible to back-calculate the level of precision afforded by the sample sizes obtained for each

product category at the conclusion of each supermarket survey. Rewriting equation (2-1), the margin of error, e_i , for a given product category can be expressed as:

$$(2-4) \quad e_i = z_{\alpha/2} \sqrt{\left(1 - \frac{n_i}{N_i}\right) \frac{S(y_i)}{\sqrt{n_i}}}$$

Using the percentage of products with open dates by product category tabulated from the initial supermarket survey data, y_i , ERG estimated $S(y_i)$ by equation (2-4). ERG then calculated the sample size estimates that would yield a 10 percent margin of error at the 95 and 90 percent significance levels, by product category.⁵ After identifying those product categories where the attained sample sizes did not enable estimates with desired confidence levels, ERG then conducted a second supermarket survey covering only those product categories with inadequate sample sizes. The second survey mainly covered shelf-stable and frozen products since approximately 74 percent and 60 percent of the product categories lacked a sufficient number of observations to achieve 10 percent margin of error at the 95 percent significance level, respectively.⁶

Due to the manner in which IRI collects and reports data on private labels, ERG was not able to compute the desired sample sizes for private label brands by product category from the IRI database (also see Section 2.2). Nonetheless, ERG generated the sampling frame for private label products by first limiting its sampling universe to brands with reported 1999 sales of \$3.0 million or more and then subsetting private label brand entries in the list (i.e., entries that contained the phrase “Private label”, “No name” or “No brand”). The method maximized the probability of identifying the private label entry at the supermarket since private label products with high sales volumes are more likely to be sold under the label of the surveyed supermarkets.

⁵ Typically, the rule of thumb in most surveys is to set the margin or error, e , at 3 percent. However, ERG judged that a larger confidence interval was more practical to strike a workable balance between precision and survey cost.

2.5 Survey Protocol

In the first stage, ERG contacted a number of regional supermarkets via telephone to ask for their participation in the study. The prospective participants were also mailed an information letter explaining the nature of the study (see Appendix E). For each survey, ERG then sent two to three staff members trained in the survey protocol to the location daily during the course of a week. Each member of the surveying team was provided with paper forms formatted for easy data entry (see Appendix F). Once at the store, the surveyors identified themselves to the store manager and clarified any remaining questions, if any, about the study.

The surveyors then recorded the open date and its prominence characteristics for name brand and private label products according to the following directions:

Name Brand Products:

- (1) Identify on the supermarket shelf the product brand listed on the data entry form. If the product brand is not on the shelf, check the “Not in store” box in the data entry form and move on to the next product brand entry.
- (2) If there are 5 or less shelf-keeping units (SKUs) for the product brand identified in (1), then select all SKUs. If there are more than 5 SKUs for the product brand, then select up to 5 SKUs for the brand. Ensure that the selection of SKUs reflects product variety and packaging size. For example, if there are 2 different flavors, a and b, and 5 different packaging sizes, 1 through 5, per flavor for a brand, X, on the shelf (i.e., 10 SKUs), the selections $\{X_{a1}, X_{a2}, X_{a3}, X_{a4}, X_{a5}\}$ and $\{X_{b1}, X_{b2}, X_{b3}, X_{b4}, X_{b5}\}$ should be avoided. The selected SKUs should reflect, to the extent possible, the maximum variety for the product brand.
- (3) Record the number of SKUs selected in the “Number of SKUs Sampled” field.
- (4) For each SKU selected:
 - (a) Record the type of date by checking the appropriate date box. If the product date does not correspond to any that is listed, record the type of date (verbatim) under the “Other” column.
 - (b) Record the type of packaging in the “Type of Packaging” column using the following conventions:

⁶ Note that selection of a different variable of interest, such as the percentage of products with “sell by” dates by product category, would necessarily result in different sample size estimates.

C = Can	PST = Plastic tray
GB = Glass bottle/jar	FT = Styrofoam tray
PSB = Plastic bottle	PSW = Plastic wrapped
BX = Box	PW = Paper wrapped
PBG = Paper bag	AW = Foil wrapped
PSBG = Plastic bag	P = Packet (envelope)
CRT = Carton	PC = Plastic container
T = Tube	CC = Cardboard container

If the packaging does not confirm to one of the above conventions, indicate the type of packaging (verbatim) in the space provided.

- (c) Assign and record the score for the date's font size under the "Size of Print" column in accordance with the following:⁷

- 1 = Font sizes less than or equal to 2.0 mm
- 2 = Font sizes greater than 2.0 mm but less than or equal to 4.0 mm
- 3 = Font sizes greater than 4.0 mm

Use the attached font ruler for cases where the font size category cannot be easily gauged.

- (d) Record the location of the date on the packaging under the "Location" column using the following conventions:

F = Front	TS = Along top seam or edge
B = Back	BS = Along bottom seam or edge
T = Top	SS = Along side seam or edge
BT = Bottom	TB = Tab
S = Side	

If the location of the date does not confirm to one of the above conventions, indicate the location of the date label (verbatim) in the space provided.

- (e) Under the "Background" column, record

- 1 = If there is a specially designated area for the date, such as a different colored background, a boxed area, etc.
- 0 = Otherwise.

- (f) Assign and record an overall prominence score for the date under the "Prominence" column using a 1 to 10 (1 = not prominent to 10 = highly prominent) scale.

⁷ The selection of the range for the print size reflects the variety of font sizes observed in the food products sampled.

- (g) If all SKUs selected have the same type of date and identical prominence characteristics, only complete the first line on the data entry form for the brand.
- (h) If any of the prominence characteristics 4(a) through (f) require further clarification or scrutiny, provide your comments on the back of the data entry form denoting each comment with the product identifier (“ERG Identifier”).

Private Label Products:

- (1) For some of the entries in the food list, the product brand is denoted as “Private Label”. If there is a private label (i.e., store-brand) product available on the shelf for the product category, record the name of the product underneath the “Private Label” heading.
- (2) Continue with steps (2) through (5) above for name brand products.

At the conclusion of each survey, ERG sent the participating supermarket a courtesy letter thanking them for their assistance and cooperation. ERG then entered all the data collected in each survey into an electronic searchable database. To resolve few problematic observations encountered during data entry (i.e., observations with missing information), ERG surveyors revisited the surveyed supermarkets and clarified the observations.

2.6 Survey Disposition

2.6.1 Name Brand Survey

With the initial supermarket survey of name brand products, ERG collected data on 142 out of the 149 IRI product categories (95.3 percent) in the study universe. Of the remaining seven product categories, four (frozen cookies, juice/drink concentrate – refrigerated, egg substitutes, and lard) did not have any “name” brands with national sales exceeding \$3.0 million and hence were excluded from the sample frame.⁸ Further, the supermarket where the initial survey was conducted did not have any name brands in three product categories (frozen dough, cheesecakes, and caramel/taffy apples and kits) on its shelves.

⁸ A name brand product refers to one such as Kraft Mac & Cheese whereas a private label product is an in-store brand such Supermarket A’s Mac & Cheese.

Overall, the initial name-brand survey generated observations on 1,644 products corresponding to 4,706 shelf-keeping units (SKUs). The distribution of brands sampled across the five main product types (i.e., baked goods, dairy, frozen, refrigerated, and shelf-stable) resembles that of the study universe with the majority (68 percent) being shelf-stable products. Further, frozen and refrigerated products comprise approximately 14.8 and 8.8 percent of the survey sample, respectively. The supermarket did not carry 64.9 percent (3,039 out of 4,683) of the name brands with reported annual sales of at least \$3.0 million for 1999.

At the conclusion of the initial supermarket survey, ERG back-calculated the level of precision afforded by the sample sizes obtained for each product category. ERG also computed the sample sizes necessary to yield a 10 percent margin of error at the 95 and 90 percent significance levels for all product categories. It was found that the sample sizes for the baked good and dairy product categories obtained with the initial survey were sufficient to provide estimates with 10 percent margin of error at the 95 percent significance level. The sample sizes obtained, however, were inadequate for a number of refrigerated, frozen, and shelf-stable product categories.

To overcome the data limitations of the initial survey, ERG conducted a second name-brand survey of limited scope at another local supermarket covering only those product categories (80 out of 149) with inadequate sample sizes.⁹ With this limited-scope survey, ERG collected data on 71 out of the 80 (89 percent) product categories. Overall, the survey generated observations on 338 name brands corresponding to 977 SKUs. The majority of the brands sampled (82.2 percent) with the second survey were shelf-stable products. Further, frozen and refrigerated products comprised around 15.7 and 2.1 percent of the survey sample, respectively. The second supermarket did not carry 73.0 percent (915 out of 1,253) of the name brands in the sample frame (i.e., those marked as “Not-in-store” during the initial survey). The second name-brand survey marginally improved sample sizes for the majority of product categories surveyed. The increase in sample sizes, however, served to meet the sample size goals (for 10 percent margin of error at 90 percent significance level) for a minority (6 out of 71) of the product

⁹ To maximize the probability of finding the selected brands (i.e., those marked as “Not-in-store” during the initial survey) at the supermarket, ERG first conducted a scoping analysis to identify a store with a different and/or wider selection of brands.

categories. For the remaining product categories with insufficient sample sizes, ERG combined multiple product categories to meet the precision goals of the survey.¹⁰ This reduced the total number of product categories from 142 to 73.

Combined, the two supermarket surveys generated observations on 1,982 name brands corresponding to 5,683 SKUs (see Table 2-3). Over 70 percent of the brands sampled with the two surveys is shelf-stable products. The next largest product category is frozen foods, comprising 15.0 percent of the survey sample. Around 8 percent of the sample consists of refrigerated products. Finally, dairy and baked goods comprise 4.9 and 2.5 percent of the survey sample, respectively. As with the initial survey, the distribution of brands sampled with the two surveys resembles that of the study universe. The supermarkets combined did not carry 57.7 percent (2,701 out of 4,683) of those name brands with reported annual sales of at least \$3.0 million for 1999.

Table 2-3: Name-Brand Survey Disposition: Number of Brands and SKUs, by Major Product Category

Major Product Category	Sample Frame Name Brands	Survey Sample		
		Number of Name Brands	Number of Name-Brand SKUs	Percent of Name Brands in Frame
Baked goods	288 (6.1%)	50 (2.5%)	143 (2.5%)	17.4%
Dairy	541 (11.6%)	97 (4.9%)	302 (5.3%)	17.9%
Frozen	735 (15.7%)	297 (15.0%)	924 (16.3%)	40.4%
Refrigerated	591 (12.6%)	151 (7.6%)	384 (6.8%)	25.6%
Shelf-stable	2,528 (54%)	1,387(70.0%)	3,930 (69.2%)	54.9%
Chilled RTE [a]	1,031 (22.0%)	268 (13.5%)	829 (14.6%)	26.0%
Total	4,683	1,982	5,683	42.3%

Source: ERG, 2002

Note: The figures in parentheses correspond to the percentage of total figure.

[a] The category consists of dairy, frozen, and refrigerated RTE products (noted in Table 2-2).

¹⁰ While the approach may result in some information loss, it is flexible (i.e., product categories can be defined according to different criteria for different study objectives) and workable. Note, however, that the degree of information loss increases if there is substantial variability in the prevalence of open dates and types of open dates among the individual product categories combined.

2.6.2 Private Label Survey

Many supermarkets only carry their own private label products. Hence, each supermarket survey can only generate data on a single private label. With the initial two supermarket surveys, ERG was able to collect data on brands for two private labels. To enable a better characterization of private label brands, ERG conducted three additional supermarket surveys of private label products. To capture any regional variation in dating practices, 2 out of the 5 private label surveys (PL Surveys 3 and 4) were conducted in states other than Massachusetts (New York and New Hampshire). Table 2-4 summarizes the disposition for each of the private label surveys by major product category.

With the exception of Supermarket C in which PL Survey 3 was conducted, each private label survey generated data on around 700 SKUs corresponding to approximately 200 brands. Supermarket C had a small private label with limited number of product lines. Combined the private label surveys generated observations on a total of 3,170 SKUs corresponding to 987 brands. In all five private label surveys, the distribution of the products sampled across the five main categories (i.e., baked goods, dairy, frozen, refrigerated, and shelf-stable) closely resembled that of the name brand product surveys with shelf-stable products constituting the majority (64.0 percent) of all private label brands sampled.

2.7 Selected Survey Results

ERG tabulated the survey results to analyze the following topics of interest for the study:

- Prevalence of open dating by product category for name-brand and private-label products,
- Type of open dating by product category for name-brand and private-label products,
- Type of date formats used by manufacturers, and
- Prominence characteristics of open dates.

Table 2-4: Private Label (PL) Survey Disposition: Number of Brands and SKUs by Major Product Category

Major Product Category	Sample Frame Brands	Survey Sample		
		Number of PL Brands	Number of PL SKUs	Percent of PL Brands in Frame
PL Survey 1				
Baked goods	10 (3.2%)	8 (3.9%)	35 (4.9%)	80.0%
Dairy	21 (6.7%)	14 (6.8%)	60 (8.3%)	66.7%
Frozen	52 (16.6%)	37 (18.0%)	111 (15.4%)	71.2%
Refrigerated	44 (14.1%)	17 (8.3%)	53 (7.4%)	38.6%
Shelf-stable	186 (59.4%)	130 (63.1%)	461 (64.0%)	69.9%
Chilled RTE [a]	43 (13.7%)	26 (12.6%)	100 (13.9%)	60.5%
Total	313	206	720	65.8%
PL Survey 2				
Baked goods	10 (3.2%)	9 (4.1%)	43 (5.7%)	90.0%
Dairy	21 (6.7%)	15 (6.8%)	63 (8.3%)	71.4%
Frozen	52 (16.6%)	31 (14.0%)	99 (13.1%)	59.6%
Refrigerated	44 (14.1%)	25 (11.3%)	90 (11.9%)	56.8%
Shelf-stable	186 (59.4%)	142 (64.0%)	462 (61.0%)	76.3
Chilled RTE [a]	43 (13.7%)	28 (12.6%)	114 (15.1%)	65.1%
Total	313	222	757	70.9%
PL Survey 3				
Baked goods	10 (3.2%)	8 (8.0%)	29 (13.2%)	80.0%
Dairy	21 (6.7%)	7 (7.0%)	13 (5.9%)	33.3%
Frozen	52 (16.6%)	4 (4.0%)	9 (4.1%)	7.7%
Refrigerated	44 (14.1%)	16 (16.0%)	40 (18.3%)	36.4%
Shelf-stable	186 (59.4%)	65 (65.0%)	128 (58.4%)	34.9%
Chilled RTE [a]	43 (13.7%)	15 (15.0%)	35 (16.0%)	34.9%
Total	313	100	219	31.9%
PL Survey 4				
Baked goods	10 (3.2%)	9 (3.9%)	37 (5.0%)	90.0%
Dairy	21 (6.7%)	15 (6.6%)	62 (8.3%)	71.4%
Frozen	52 (16.6%)	35 (15.3%)	103 (13.8%)	67.3%
Refrigerated	44 (14.1%)	23 (10.0%)	69 (9.2%)	52.3%
Shelf-stable	186 (59.4%)	147 (64.2%)	476 (63.7%)	79.0%
Chilled RTE [a]	43 (13.7%)	28 (12.2%)	111 (14.9%)	65.1%
Total	313	229	747	73.2%
PL Survey 5				
Baked goods	10 (3.2%)	10 (4.3%)	42 (5.8%)	100.0%
Dairy	21 (6.7%)	17 (7.4%)	58 (8.0%)	81.0%
Frozen	52 (16.6%)	32 (13.9%)	103 (14.2%)	61.5%
Refrigerated	44 (14.1%)	23 (10.0%)	68 (9.4%)	52.3%
Shelf-stable	186 (59.4%)	148 (64.3%)	456 (62.7%)	79.6%
Chilled RTE [a]	43 (13.7%)	29 (12.6%)	98 (13.5%)	67.4%
Total	313	230	727	73.5%
All PL Surveys				
Baked goods	10 (3.2%)	44 (4.5%)	186 (5.9%)	NA
Dairy	21 (6.7%)	68 (6.9%)	256 (8.1%)	NA
Frozen	52 (16.6%)	139 (14.1%)	425 (13.4%)	NA
Refrigerated	44 (14.1%)	104 (10.5%)	320 (10.1%)	NA
Shelf-stable	186 (59.4%)	632 (64.0%)	1,983 (62.6%)	NA
Chilled RTE [a]	43 (13.7%)	126 (12.8%)	458 (14.4%)	NA
Total	313	987	3,170	NA

Source: ERG, 2002

Note: The figures in parentheses correspond to the percentage of total figure.

[a] The category consists of dairy, frozen, and refrigerated RTE products (noted in Table 2-2).

The selected survey results are reported by type of manufacturer (i.e., name brand and private label) and major product category (i.e., baked, dairy, frozen, refrigerated, and shelf-stable products). More detailed tabulations by 73 product categories are available in Appendix G of the report.

2.7.1 Prevalence of Open Dating

One of the primary variables of interest for the study is the proportion of brands with open dates (i.e., any type of open date) overall and by product category. Among name brands, 53.3 percent (1,056 out of 1,982) of all products sampled do not have any type of an open date on their labeling and/or packaging. Further, around 3 percent of all name brands have “mixed” dates, that is where dating varies among different SKUs of a given brand (see Table 2-5). Interestingly, a lower percentage of private label brands (ranging from 11 to 48 percent or around 21 percent overall) lack any type of an open date (see Table 2-6). The percentage of brands with “mixed” dates, however are substantially higher for private label products (ranging from 11.3 percent to as high as 17.6 percent) than for name brand products for all private label products, except for those of Supermarket C (i.e., PL Survey 3). The observed inter-brand variability is potentially attributable to (1) the fact that the decision to open date may rest with the packaging plants rather than the manufacturer and/or label owner in certain cases, or (2) internal product dating/labeling policy changes due to changes in product brand management (Manufacturer A, 2002).

Table 2-5: Prevalence of Open Dating in Name Brand Products, by Major Product Category

Major Product Category	Number of Name Brands Sampled	Share of Name Brands With		
		“Mixed” Dates	No Open Dates	Open Dates
Baked goods	50	2.00%	0.00%	98.00%
Dairy	97	1.03%	0.00%	98.97%
Frozen	297	1.35%	80.47%	18.18%
Refrigerated	151	0.66%	1.99%	97.35%
Shelf-stable	1,387	3.10%	58.69%	38.21%
Chilled RTE [a]	268	1.12%	26.86%	72.01%
Total	1,982	2.52%	53.28%	44.20%

Source: ERG, 2002

[a] The category consists of dairy, frozen, and refrigerated RTE products (noted in Table 2-2).

Table 2-6: Prevalence of Open Dating in Private Label (PL) Products, by Major Product Category

Major Product Category	Number of PL Brands Sampled	Share of PL Brands With		
		"Mixed" Dates	No Open Dates	Open Dates
PL Survey 1				
Baked goods	8	0.00%	0.00%	100.00%
Dairy	14	0.00%	0.00%	100.00%
Frozen	37	24.32%	21.62%	54.05%
Refrigerated	17	0.00%	0.00%	100.00%
Shelf-stable	130	16.92%	27.69%	55.38%
Chilled RTE [a]	26	7.69%	3.85%	88.46%
Total	206	15.05%	21.36%	63.59%
PL Survey 2				
Baked goods	9	0.00%	0.00%	100.00%
Dairy	15	6.67%	0.00%	93.33%
Frozen	31	29.03%	22.58%	48.39%
Refrigerated	25	8.00%	0.00%	92.00%
Shelf-stable	142	19.01%	13.38%	67.61%
Chilled RTE [a]	28	14.29%	0.00%	85.71%
Total	222	17.57%	11.71%	70.72%
PL Survey 3				
Baked goods	8	0.00%	12.50%	87.50%
Dairy	7	0.00%	0.00%	100.00%
Frozen	4	0.00%	100.00%	0.00%
Refrigerated	16	0.00%	6.25%	93.75%
Shelf-stable	65	1.54%	64.62%	33.85%
Chilled RTE [a]	15	0.00%	13.33%	86.67%
Total	100	1.00%	48.00%	51.00%
PL Survey 4				
Baked goods	9	0.00%	0.00%	100.00%
Dairy	15	0.00%	0.00%	100.00%
Frozen	35	17.14%	2.86%	80.00%
Refrigerated	23	4.35%	0.00%	95.65%
Shelf-stable	147	12.93%	15.65%	71.43%
Chilled RTE [a]	28	7.14%	0.00%	92.86%
Total	229	11.35%	10.48%	78.17%
PL Survey 5				
Baked goods	10	0.00%	0.00%	100.00%
Dairy	17	0.00%	0.00%	100.00%
Frozen	32	18.75%	56.25%	25.00%
Refrigerated	23	0.00%	0.00%	100.00%
Shelf-stable	148	14.86%	33.11%	52.03%
Chilled RTE [a]	29	6.90%	0.00%	93.10%
Total	230	12.17%	29.13%	58.70%
All PL Surveys				
Baked goods	44	0.00%	2.27%	97.73%
Dairy	68	1.47%	0.00%	98.53%
Frozen	139	21.58%	27.34%	51.08%
Refrigerated	104	2.88%	0.96%	96.15%
Shelf-stable	632	14.40%	26.74%	58.86%
Chilled RTE [a]	126	7.94%	2.38%	89.68%
Total	987	12.66%	21.18%	66.16%

Source: ERG, 2002

[a] The category consists of dairy, frozen, and refrigerated RTE products (noted in Table 2-2).

Among frozen foods, while only 18.2 percent of name brands have open dates, over half (51.1 percent) of all private label brands are open-dated. Similarly for shelf-stable products, the private label brands are more likely to have open dates than name brands with 58.9 percent of all shelf-stable private label products carrying open dates versus 38.2 percent of name brands. There is, however, no significant difference in the extent of open dating between name and private label brands for baked goods, dairy, and refrigerated product categories.

The percentage of private label products that are open dated in Supermarket C, New Hampshire, (51.0 percent) is significantly lower than those in the remaining supermarkets. Further, the same percentage is significantly higher for the private label brands of Supermarket D, New York (78.2 percent). This indicates regional (state-to-state) variability in open dating practices, mainly for frozen and shelf-stable products.

2.7.2 Types of Open Dates

Another variable of interest for the study is the proportion of brands with a certain type of date (i.e., use by, sell by, expiration, best if used by, etc.). During the supermarket surveys, ERG surveyors recorded the open-date labeling of products with use-by, best-if-used-by, sell-by, expiration, and unspecified dates. When the date labeling on a product did not conform to any of these conventions, ERG surveyors recorded the exact open-date qualifier phrase in the “other” category. Upon completion of all the supermarket surveys, ERG classified all the verbatim entries in the “other” field into one of the existing date categories, if the open-date qualifier phrase had the same meaning (i.e., “better if used by” is essentially the same as “best if used by”), or into one of two additional date categories, “best when purchased by”, or “freeze by.”

Tables 2-7 and 2-8 present the type of open-date qualifier phrases observed in the name-brand and private label survey samples by major product category, respectively. Among all open-dated name brands, over 25 percent have unspecified dates, that is where the date is not accompanied by a qualifying phrase, such as “use by”, “sell by”, or other. Most (around 41 percent) open-dated name brands carry “best-if-used-by” dates. While the use of “sell-by” dates is more prevalent among perishable (i.e., baked, dairy, and refrigerated) goods, “best-if-used-by”

dates are more common among shelf-stable products. Additionally, there is inter-brand variability with respect to the type of open date qualifier phrase in around 5 percent of all name brands (that is where the date label statement varies among different SKUs of the same brand).

Table 2-7: Type of Open Dating Among Name-Brand Products by Major Product Category

Major Product Category	Percent Open Dated	Percentage of Open-dated Name Brands with							
		Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [a]
Baked goods	98.00%	0.0%	8.2%	0.0%	61.2%	0.0%	0.0%	26.5%	4.1%
Dairy	98.97%	7.3%	20.8%	8.3%	30.2%	1.0%	2.1%	24.0%	6.3%
Frozen	18.18%	3.7%	37.0%	0.0%	0.0%	0.0%	0.0%	57.4%	1.9%
Refrigerated	97.35%	12.9%	14.3%	2.7%	25.9%	1.4%	9.5%	19.7%	13.6%
Shelf-stable	38.21%	4.9%	56.4%	4.9%	4.5%	2.8%	0.0%	23.4%	3.0%
Chilled RTE [b]	72.01%	7.3%	17.6%	6.2%	23.3%	1.6%	3.6%	30.6%	9.8%
Total	44.20%	6.2%	41.6%	4.3%	13.8%	2.1%	1.8%	25.1%	5.1%

Source: ERG, 2002

[a] The date label qualifier phrase varies among different SKUs of the same brand.

[b] The category consists of dairy, frozen, and refrigerated RTE products (noted in Table 2-2).

The use of unspecified dates appears more predominant among private label brands (44.0 percent of all private labels) than among name brands (25.1 percent). While best-if-used-by dates are more common among name brands (41.6 percent), only 9.5 percent of all private label brands carry best-if-used-by dates. Nearly a quarter of private label brands carry sell-by dates whereas brands with sell-by dates comprise only 13.8 percent of the open-dated name brands. Interestingly, use-by and expiration dating are not very prevalent in either name-brand or private-label products. Approximately 6 percent of all name and private label brands carry use-by dates. Mostly refrigerated, dairy, and occasionally frozen products are likely to carry use-by dates. None of the private-label brands sampled carry freeze-by dates.

The data analysis also indicates that there is inter-brand variability with respect to the date qualifier in name brands as well as in private label brands. While only around 5 percent of name brands exhibit inter-brand variability, the figure is higher for private label brands at 13.8 percent.

Table 2-8: Type of Open Dating Among Private Label (PL) Products by Major Product Category

Major Product Category	Percent Open Dated	Percentage of Open-dated PL Brands with							
		Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [a]
PL Survey 1									
Baked goods	100.0%	0.0%	12.5%	0.0%	12.5%	0.0%	0.0%	50.0%	25.0%
Dairy	100.0%	7.1%	0.0%	0.0%	42.9%	0.0%	0.0%	28.6%	21.4%
Frozen	54.1%	5.0%	10.0%	0.0%	65.0%	0.0%	0.0%	20.0%	0.0%
Refrigerated	100.0%	5.9%	5.9%	0.0%	58.8%	5.9%	0.0%	11.8%	11.8%
Shelf-stable	55.4%	1.4%	13.9%	0.0%	13.9%	2.8%	0.0%	50.0%	18.1%
Chilled RTE [b]	88.5%	4.3%	8.7%	0.0%	43.5%	0.0%	0.0%	26.1%	17.4%
Total	63.6%	3.1%	10.7%	0.0%	30.5%	2.3%	0.0%	38.2%	15.3%
PL Survey 2									
Baked goods	100.0%	0.0%	11.1%	0.0%	66.7%	0.0%	0.0%	0.0%	22.2%
Dairy	93.3%	7.1%	14.3%	0.0%	42.9%	0.0%	0.0%	14.3%	21.4%
Frozen	48.4%	0.0%	13.3%	0.0%	6.7%	0.0%	0.0%	40.0%	40.0%
Refrigerated	92.0%	0.0%	13.0%	0.0%	56.5%	0.0%	0.0%	21.7%	8.7%
Shelf-stable	67.6%	11.5%	15.6%	0.0%	13.5%	0.0%	0.0%	43.8%	15.6%
Chilled RTE [b]	85.7%	4.2%	16.7%	0.0%	45.8%	0.0%	0.0%	16.7%	16.7%
Total	70.7%	7.6%	14.6%	0.0%	24.8%	0.0%	0.0%	35.0%	17.8%
PL Survey 3									
Baked goods	87.5%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Dairy	100.0%	0.0%	0.0%	0.0%	42.9%	0.0%	0.0%	57.1%	0.0%
Frozen	0.0%	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	93.8%	0.0%	0.0%	0.0%	80.0%	0.0%	0.0%	20.0%	0.0%
Shelf-stable	33.9%	0.0%	4.5%	0.0%	27.3%	0.0%	0.0%	54.5%	13.6%
Chilled RTE [b]	86.7%	0.0%	0.0%	0.0%	61.5%	0.0%	0.0%	38.5%	0.0%
Total	51.0%	0.0%	2.0%	0.0%	54.9%	0.0%	0.0%	37.3%	5.9%
PL Survey 4									
Baked goods	100.0%	0.0%	0.0%	0.0%	44.4%	0.0%	0.0%	22.2%	33.3%
Dairy	100.0%	0.0%	0.0%	0.0%	40.0%	0.0%	0.0%	26.7%	33.3%
Frozen	80.0%	3.6%	7.1%	0.0%	3.6%	0.0%	0.0%	57.1%	28.6%
Refrigerated	95.7%	9.1%	4.5%	0.0%	27.3%	0.0%	0.0%	31.8%	27.3%
Shelf-stable	71.4%	0.0%	12.4%	1.0%	3.8%	1.0%	0.0%	77.1%	4.8%
Chilled RTE [b]	92.9%	3.8%	3.8%	0.0%	26.9%	0.0%	0.0%	34.6%	30.8%
Total	78.2%	1.7%	8.9%	0.6%	11.7%	0.6%	0.0%	61.5%	15.1%
PL Survey 5									
Baked goods	100.0%	0.0%	10.0%	0.0%	90.0%	0.0%	0.0%	0.0%	0.0%
Dairy	100.0%	5.9%	0.0%	11.8%	41.2%	0.0%	0.0%	35.3%	5.9%
Frozen	25.0%	25.0%	12.5%	0.0%	0.0%	0.0%	0.0%	37.5%	25.0%
Refrigerated	100.0%	8.7%	4.3%	0.0%	65.2%	0.0%	0.0%	17.4%	4.3%
Shelf-stable	52.0%	26.0%	6.5%	2.6%	2.6%	0.0%	0.0%	51.9%	10.4%
Chilled RTE [b]	93.1%	7.4%	7.4%	7.4%	37.0%	0.0%	0.0%	33.3%	7.4%
Total	58.7%	18.5%	5.9%	3.0%	24.4%	0.0%	0.0%	39.3%	8.9%

Table 2-8: Type of Open Dating Among Private Label (PL) Products by Major Product Category

Major Product Category	Percent Open Dated	Percentage of Open-dated PL Brands with							
		Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [a]
All PL Surveys									
Baked goods	97.7%	0.0%	7.0%	0.0%	62.8%	0.0%	0.0%	14.0%	16.3%
Dairy	98.5%	4.5%	3.0%	3.0%	41.8%	0.0%	0.0%	29.9%	17.9%
Frozen	51.1%	5.6%	9.9%	0.0%	21.1%	0.0%	0.0%	40.8%	22.5%
Refrigerated	96.2%	5.0%	6.0%	0.0%	56.0%	1.0%	0.0%	21.0%	11.0%
Shelf-stable	58.9%	8.6%	11.8%	0.8%	9.4%	0.8%	0.0%	56.7%	11.8%
Chilled RTE [b]	89.7%	4.4%	8.0%	1.8%	40.7%	0.0%	0.0%	29.2%	15.9%
Total	66.2%	6.7%	9.5%	0.8%	24.7%	0.6%	0.0%	44.0%	13.8%

Source: ERG, 2002

NA = Not applicable

[a] Indicates that there is variability among SKUs of a given brand with respect to the type of open date qualifier phrase.

[b] The category consists of dairy, frozen, and refrigerated RTE products (noted in Table 2-2).

2.7.3 Types of Date Formats

Table 2-9 presents the types of date formats observed on the packaging and/or labeling of products in the survey sample. As evident from the table, there is no uniform, common date format adopted by food manufacturers. While some food products have an alphanumeric date, such as 12 JAN 02, others bear a numeric one, such as 02/12/02. Further, some date formats include separators, such as spaces, dashes, or slashes between elements whereas others do not.

In the survey sample, the majority of the open-dated products use the MMDDYY format. Further, the majority of the products dated in this manner use the three-letter designations for the month possibly because this is more easily understood by the consumers. Date formats bearing day and month conventions (i.e., MMDD or DDMM) are prevalent among perishable whereas those bearing month and year conventions (i.e., MMY Y or YYMM) are common among shelf-stable products. These formats observed in the survey data mostly conform to the NFPA, FMI, and NIST guidelines.

Table 2-9: Types of Date Formats Observed in the Survey Sample**Day, month, and year conventions**

JAN 12 2002	12 JAN 02	01-12-2002	2002 JAN 12
JAN 12 02	12 01 02	01-12-02	
JAN-12-02	12/01/02	01.12.2002	
JAN 12/02	12 JAN 2002	1-12-02	
Jan 12 2002	12 Jan 02	01 12 2002	
JAN-12-2002	12/JAN/02	01 12 02	
JAN/12/02		01.12.02	
JANUARY-12-2002		01 12-2002	
JAN 12; 02			
JAN 12, 2002			
JAN 2002 12			
JAN 12/2002			
JAN-12-02			
JAN 12-2002			
JAN.12.02			

Month and year conventions

JANUARY 2002	01/2002
JAN 2002	01/02
JAN 02	01 02
JAN 12	
JAN.2002	
JAN, 02	

Day and month conventions

JAN-12	01-12	12 JAN
	01 12	
	01/12	

Other conventions

2002	JAN
------	-----

Source: ERG, 2002

2.7.4 Prominence of Open Dates

As noted above, the prominence of a date is of high importance. In the survey sample, the majority of name as well as private label products rate moderately (around 5) for prominence, indicating that locating and comprehending a product's date is not very straightforward in most cases. Tables 2-10 and 2-11 present the mean and distribution statistics of surveyor-assigned prominence scores for name and private label brand products, respectively. From the tables, the average prominence score for name brand products (4.89) is slightly lower than that for private

label products (5.34). A two-tailed hypothesis test further reveals that the difference in the two means is statistically significant at the 95 percent confidence level. There is high degree of variability in prominence in both name and private label brands as indicated by the 34.9 percent and 35.6 percent relative standard deviations (RSDs), respectively.

Table 2-10: Mean Prominence Scores for Name Brand Products, by Major Product Category

Major Product Category	n [a]	Mean	Standard Deviation	Minimum	Maximum
Baked goods	142	5.0915	2.3577	1	9
Dairy	300	5.3567	1.2197	2	8
Frozen	192	4.5000	2.0337	1	9
Refrigerated	377	5.3289	1.8315	1	10
Shelf-stable	1,548	4.7287	1.5975	1	9
Chilled RTE [b]	492	5.2683	1.3483	1	8
Total	2,559	4.8937	1.7056	1	10

Source: ERG, 2002

[a] The figure is the total number of SKUs within the major product that have one type of an open date.

[b] The category consists of dairy, frozen, and refrigerated RTE products (noted in Table 2-2).

To gain some insight into the nature of the relationship between surveyor-assigned prominence scores and various product characteristics by type of packaging, ERG examined the magnitude of the Pearson correlation coefficients. For the analysis, ERG first rank ordered the location conventions from 1 to 9 as follows (where 9 = highly prominent date location and 1 = not prominent date location) since the “location” data were nonnumeric:

F (Front)	=	9
T (Top)	=	8
B (Back)	=	7
S (Side)	=	6
BT (bottom)	=	5
TS (Top seam)	=	4
BS (Bottom seam)	=	3
SS (Side seam)	=	2
TB (Tab)	=	1

Next, to be able to include those observations where the location field contained a verbatim entry, ERG classified the recorded date location into one of the above location fields,

Table 2-11: Mean Prominence Scores for Private Label Products, by Major Product Category

Major Product Category	n [a]	Mean	Standard Deviation	Minimum	Maximum
PL Survey 1					
Baked goods	35	6.4000	1.6663	4	8
Dairy	60	5.6333	0.8629	3	7
Frozen	69	4.5072	1.5683	1	8
Refrigerated	53	6.0189	1.9757	1	9
Shelf-stable	302	4.4636	1.6191	1	9
Chilled RTE [b]	82	5.4268	1.0065	1	7
Total	519	4.8947	1.7260	1	9
PL Survey 2					
Baked goods	43	6.8372	0.9742	4	8
Dairy	62	5.5484	1.9049	1	8
Frozen	67	5.4328	1.5098	2	8
Refrigerated	88	6.3977	1.7323	1	9
Shelf-stable	365	4.8575	2.2475	1	10
Chilled RTE [b]	100	5.5000	1.9096	1	8
Total	625	5.3408	2.1162	1	10
PL Survey 3					
Baked goods	28	6.3571	0.9114	5	8
Dairy	13	6.3077	1.4936	5	8
Frozen	0	NA	NA	NA	NA
Refrigerated	39	6.5641	1.3916	4	8
Shelf-stable	47	5.4681	2.0200	1	9
Chilled RTE [b]	29	6.3793	1.5449	4	8
Total	127	6.0866	1.6428	1	9
PL Survey 4					
Baked goods	37	6.8378	1.4046	3	8
Dairy	62	6.2258	1.4420	3	9
Frozen	95	5.1895	1.6131	0	8
Refrigerated	68	6.3676	1.4752	0	8
Shelf-stable	374	5.3369	1.9120	0	8
Chilled RTE [b]	92	6.0326	1.5721	0	9
Total	636	5.5991	1.8249	0	9
PL Survey 5					
Baked goods	42	5.7857	1.4573	1	8
Dairy	58	6.1552	1.0890	3	8
Frozen	40	5.1750	1.3566	1	7
Refrigerated	68	5.7206	1.4947	2	8
Shelf-stable	289	4.9343	2.0495	0	8
Chilled RTE [b]	85	5.9529	1.1640	2	8
Total	497	5.2757	1.8455	0	8
All PL Surveys					
Baked goods	185	6.4432	1.3706	1	8
Dairy	255	5.9098	1.4183	1	9
Frozen	271	5.0738	1.5712	0	8
Refrigerated	316	6.2025	1.6533	0	9
Shelf-stable	1,377	4.9383	2.0050	0	10
Chilled RTE [b]	388	5.7758	1.5126	0	9
Total	2,404	5.3386	1.9028	0	10

Source: ERG, 2002

NA = Not applicable

[a] The figure is the total number of SKUs within the major product that have one type of an open date.

[b] The category consists of dairy, frozen, and refrigerated RTE products (noted in Table 2-2).

where possible. Table 2-12 presents the computed Pearson coefficients between the surveyor-assigned prominence scores and the “size of print”, “location”, and “background” variables.

Table 2-12: Pearson Correlation Coefficients Between Prominence Score and Other Product Date Characteristics, by Type of Packaging

Type of Packaging [a]	n [b]	Correlation Between Prominence Score and		
		Size of Print	Location	Background
Box (BX)	1,234	0.0353	0.4682*	0.3707*
Can (C)	400	0.3950*	0.5009*	-0.0028
Cardboard Container (CC)	282	0.4271*	-0.0398	NA
Carton (CRT)	132	0.5457*	-0.1530	0.1047
Glass Bottle/Jar (GB)	376	0.2109*	0.3317*	0.2130*
Packet (P)	35	0.1802	0.6441	0.3268
Paper Bag (PBG)	50	0.5421*	0.1923*	-0.3719*
Plastic Container (PC)	503	0.0688	0.2517*	0.2086*
Plastic Bottle (PSB)	630	0.2399*	0.2613*	-0.1420*
Plastic Bag (PSBG)	779	0.3629*	0.2194*	0.0552
Plastic Tray (PST)	165	0.2897*	0.0622	0.3047*
Plastic Wrapped (PSW)	238	0.3925*	0.4201*	0.0749
Paper Wrapped (PW)	30	0.6362*	0.3281	-0.3086

Source: ERG, 2002

NA = Not applicable

* indicates that the correlation coefficient is significantly different than zero at the 95 percent confidence

level. The z-statistic, z , for the hypothesis test is computed as $z = (1/2) \ln \left(\frac{1 + \rho_i}{1 - \rho_i} \right) / \frac{1}{\sqrt{n-3}}$ where

ρ_i = correlation coefficient between prominence score and variable i = size of print, location, and background.

[a] Only those packaging types with 30 or more observations are included.

[b] Includes all name brand and private label observations at the SKU level.

As expected, the table indicates significant positive correlation between the prominence scores and print size across all package types, excluding boxes, packets/envelopes, and plastic containers. The table also shows some degree of correlation between prominence scores and location and background variables. Although some of computed coefficients are significantly different from 0 (no correlation) at the 95 percent confidence level, some of them do not have the expected sign (for example the existence of a specially designated background is inversely correlated with prominence for certain types of packaging). The results overall raise some questions about the reliability of surveyor-assigned prominence scores and point toward a spurious relationship rather than a predictive one.

2.8 Survey Limitations

Although the supermarket surveys generated substantial amount of data on name brand and private label products, survey results should be considered under the light of various limiting factors. First, the sample method for the survey differs from stratified random sampling without replacement since (1) only those products with reported 1999 sales of \$3.0 million or more are included, and (2) the data were collected from a small number of regional grocery stores. Second, the IRI database on which the survey list was based contained entries on products that have been discontinued since 1999 and lacked observations on products new to the market since 1999. Hence, the sampling frame for the study was not comprehensive although the conservative 10 percent sampling error margin may partially address this problem. Third, because a given entry was recorded by one surveyor, there is no simple method to assess the degree of prominence score variability due to interpersonal variability.

Despite its limitations, the compiled data is the only source that will enable the FDA to describe the share of brands with some form of open dating on their labeling, by product category. The data also enables the characterization of the different food product packaging types.

SECTION THREE

INDUSTRY PRACTICES: SHELF-LIFE DETERMINATION, OPEN-DATING DECISION, AND OTHER CONSIDERATIONS

As noted in Section Two, the nature and extent of open dating of food products in the United States varies widely by product type, manufacturer, and geography. To gain a better understanding of the manufacturer perspective on open-date labeling of food products, ERG interviewed six food manufacturers who agreed to participate in the study (see Appendix H for a list of interview topics).¹¹ ERG asked these manufacturers to describe the factors that influence their decision to include or exclude an open date on a product and the potential impact of adding/modifying an open date. Due to the lack of a standardized open-dating system, manufacturer replies varied widely. The majority of manufacturers, however, agreed on a few important factors that predominate their decisions to open date. Based on this input, ERG developed a basic framework to model the decision to open date at the firm level. For those products that are open dated, ERG further discussed with manufacturers the criteria for selecting the type of open-date labeling and any other important factors that affect the open-dating decision.

This section provides some insight to the manufacturers' decision to open date to better qualify the survey findings. Section 3.1 presents the model framework for the open-dating decision at the firm level. Section 3.2 addresses the criteria that influence the three components of an open date; the date qualifier phrase that typically accompanies a date, such as "use-by" or "sell-by," the date format, and product shelf life. Section 3.3 briefly discusses the potential impacts of any mandatory open-dating standards on the food industry. Finally, Section 3.4 discusses some of the new food preservation techniques for processing and packaging and their impacts on product shelf life.

¹¹ Of the six manufacturers contacted, two were manufacturers of perishable foods, two were of shelf-stable foods, one was a manufacturer of both perishable and shelf-stable foods, and one was a private label food manufacturer.

3.1 Modeling the Decision to Open Date

Food products have a built-in clock that determines shelf life. It determines food freshness and is product specific. Typically, a product's shelf life starts upon manufacture and continues with sufficient time left for the product to be held on the shelves, purchased, and consumed. The decision to open date is based mostly on the desire of a food manufacturer to communicate to the consumer the shelf life of its product. The manufacturer's main objective is to protect the consumer and the product's reputation.

The mode of deterioration that occurs first in a product is used to set the end of shelf life and in the majority of cases is sensory or nutrient based (OTA, 1979). Open dates are therefore usually based on quality and not safety. Each company has its own definition of the end of shelf life, with some accepting a predetermined degree of change and others finding that no change in quality is acceptable. These quality changes can include physical (texture and appearance), chemical (flavor, odor, and vitamin content), and microbiological (mold growth and other spoilage) changes. Products with a short shelf life will typically deteriorate in a way that is easily recognizable, such as products that become rancid or otherwise change flavor. For products with longer shelf lives, such as canned foods, these changes are often not as easily discernible and the most common form of deterioration is a loss of nutrients. The food manufacturers that ERG contacted generally indicated that the shorter the shelf life of a food product, the more necessary an open date becomes. A shorter shelf life makes it more likely that the product will be consumed after the shelf life ends (Manufacturers A, B, and C, 2002).

Manufacturers indicated that an open date is always needed on perishable products (Manufacturers B, C, and D, 2002).¹² Open dating is also mandated on some refrigerated and dairy foods in various states (see Section One). Not surprisingly, the supermarket survey results indicate that close to 100 percent of all perishable currently have open dates. For shelf-stable products, however, the decision to open date is more complex.¹³

¹² For the purposes of this discussion, perishable products are defined as all refrigerated and bakery products that are not frozen.

¹³ For the purposes of this discussion, shelf-stable products include products that are frozen.

Based on discussions with food manufacturers, a manufacturer j 's decision to open date a product i , D_{ij} , can be expressed as:

$$(3-1) \quad D_{ij} = \begin{cases} 1 & \text{if } j \text{ is perishable} \\ f_j(C_i, S_i, R_i) + \varepsilon_{ij} & \text{if } j \text{ is shelfstable} \end{cases}$$

where D_{ij} is the probability that product i manufactured by firm j will have an open date, C_i is the extent of non-price competition, S_i is the product shelf life, and R_i are any open-dating regulations applicable to product i . The variables that influence the open-dating decision for shelf-stable products are discussed below.

3.1.1 Non-price Competition (C)

Surveys indicate that consumers prefer open-date labeling on food products. For example, consumers tend to select a supermarket based on the number of products with open dates and consider it very important that dairy, bakery, deli, and other foods are purchased at peak freshness (CSPI, 1998). Manufacturers contacted by ERG reported the decision to place an open date on shelf stable products is often consumer driven (Manufacturers A, B, C, D, and F, 2002). The open date also provides manufacturers with an opportunity to compete on a basis other than price, by differentiating their product from rival (not open dated) products (Manufacturer A, 2002).¹⁴ For example, Green Giant and Campbell Soup, two canned product manufacturers, have recently added open dating to their canned foods in order to differentiate them from rival products (Manufacturers A and B, 2002). One of the manufacturers contacted also stated that although they currently do not have open dates on their frozen foods, they will probably add them in the future (Manufacturer C, 2002). These observations are in line with the desire of the food industry to maintain their brands through product differentiation, with products, packaging, and promotions responding to the needs of current generations (Martin and Rowan, 1999).

¹⁴ Products are differentiated when, due to differences in physical attributes, ancillary services, geographic location, information, and/or subjective image, one manufacturer's food products are clearly preferred by at least some buyers over rival products at a given price (Scherer and Ross, 1990).

Manufacturers of private label foods also indicated that their private label customers have requested open dates (Manufacturers C and F, 2002). The results of supermarket surveys conducted indicate that private label foods are more likely to have open dates than name brands overall. One manufacturer thought that this trend is largely due to a better understanding of current consumer preferences by their private label customers (Manufacturer B, 2002). Thus, private label food manufacturers might be more likely to use open dating to differentiate their products through non-price competition.

3.1.2 Product Shelf Life (S)

According to many manufacturers, whether one includes an open date on a shelf stable product is partially dependent on product perishability (Manufacturers A, B, C, and D, 2002). The less perishable (i.e., the longer the shelf life) the less likely that a manufacturer will open date. One manufacturer indicated that the less likelihood of shelf stable foods to have open dates might be in response to the tendency of consumers to view open dates on these products in the same manner as those on refrigerated foods. This is seen as a problem by manufacturers because refrigerated foods can spoil, whereas shelf stable foods generally do not but rather experience a degradation in quality (Manufacturer B, 2002). Further, the shelf life of many shelf-stable foods is mainly influenced by temperature (i.e., storage conditions) rather than time. Canned foods, for example, can last as long as 3 years or more from the time of manufacture. According to manufacturers, open dating canned foods presents a challenge due to consumer disbelief in a food product which can actually last that long. Many consumers may have little knowledge of the science of storage and thus may discard the product that has not yet spoiled (Manufacturer A, 2002). In conclusion, product shelf life is inversely related to the probability of including an open date on a shelf stable product.

3.1.3 Regulations (R)

As previously discussed (see section One), there are few regulations that require open-date labeling of food products in the United States. At the Federal level, only infant formula and some varieties of baby food are required to present a “use-by” date (FSIS, 2002). At the state

level, Massachusetts is the only state that requires a “sell-by” or “best-if-used-by” date for semi-perishable products (in addition to perishable products) and requires packagers of frozen or long shelf life products to comply with the dating specifications when they open date a product. Regulations therefore, only determine whether a shelf-stable product is open dated if it is affected by the Federal regulation on baby food or sold in Massachusetts.

Although manufacturers indicated that industry generally adheres to the industry guidelines on open dating, ERG judged that these guidelines do not typically influence the decision to place an open date on a shelf product. Guidelines generally do not advocate which shelf stable foods should be open dated.

3.1.4 Other Factors (ϵ)

In addition to the main factors discussed above, there also are other considerations that affect a manufacturer’s decision to open date, represented in equation 3-1 by the term, ϵ . They might occasionally influence the decision-making process at the margin, when all other factors are equal.

Manufacturers contacted indicated that there always is a way to place an open date on packaging and that packaging design is not typically a prohibitive factor (Manufacturer A, 2002). Space constraints or packaging material only marginally influence one’s decision to open date (Manufacturer B, 2002). Given that two manufacturers mentioned that space constraints can influence whether an open date will have a qualifying prefix, such as “sell by” or “use by,” however, it is conceivable that package design potentially influences the initial decision on open dating (Manufacturers C and D, 2002).

Two manufacturers also mentioned that a lack of printing or embossing equipment to put open dates on products is generally not a factor in open-dating decisions (Manufacturers A and B, 2002). Again, however, at the margin, these additional costs might make open dating less appealing, especially if the capital costs are significant. Also, a few manufacturers with space-

constrained packaging areas could lack the physical space to add printing or embossing equipment to the packaging line without substantial additional costs.

Finally, several manufacturers mentioned that individual brand manager preferences and company philosophy also play a significant role in whether a product is open dated (Manufacturers A and F, 2002).

3.2 Selection of the Type of Open Date

Once a manufacturer determines that an open date is necessary or desired, then he needs to determine:

- The date qualifier phrase, such as “use by” or “sell by,”
- The date format, and
- The product shelf life.

Each of the above components are further discussed in the following sections.

3.2.1 Date Qualifier Phrase

Many food processors place a qualifying prefix to the open date to help the consumer interpret the provided date. There is, however, a lack of industry consensus on what the qualifying prefix (although some recommendations are made in the literature for certain types of products) should be for products. Thus, the decision at the firm level is made jointly by a number of departments (Manufacturer E, 2002). Some manufacturers only place a date on the product, with no explanatory language. One manufacturer said they do not include a qualifying prefix due to space constraints or limitations of their equipment (Manufacturer D, 2002). Another manufacturer speculated that these manufacturers either intentionally want to leave the date open to interpretation or simply did not think through the associated problems with the absence of an explanatory language (Manufacturer A, 2002).

When a date qualifier phrase is used, the most common variations are “sell by” and “use by.” A “sell-by” date is defined as the recommended last date of sale that permits a subsequent period before deterioration of quality (NIST, 2002b). A “use-by” date is defined as the date prior to deterioration of quality (NIST, 2002b). Some variations on the “use by” phrase include “best if used by”, “best when purchased by”, “best before”, and “best by”. Other less common date qualifiers in use include “freeze by”, “packed on,” and “expiration” (see Section Two). A number of guidelines specify or recommend which date qualifier phrases to use (see Section One). Other influences that might determine the open-date qualifying phrase include marketing strategy, limitations of existing equipment and packaging, and shelf life. These factors are discussed further below.

There is wide variation in how a qualifying phrase is applied to open dates. Although the criteria listed below influence the selection of the date qualifying phrase, manufacturers also indicated that company preference also plays a large role in which qualifying phrases are used (Manufacturers D and F, 2002).

Marketing Strategy. Food manufacturers indicated that the language selected for the qualifying phrase is sometimes part of a company’s marketing strategy (Manufacturers A and D, 2002). If the qualifying phrase is modified, some companies conduct market tests to determine the subsequent impact on consumers (Manufacturer A, 2002). The selection of “born on” as the qualifying phrase to the freshness date on beer by Anheuser-Busch was marketing driven (Terhune, 1998). Pepsi Cola has also undertaken similar initiatives (Pepsi, 2003).

Limitations of Existing Equipment and Packaging. Jet printers used to print the open date on products are set for a certain number of letters and numbers (Manufacturer C, 2002). One manufacturer also stated that some of their products have only dates, without qualifying phrases, because their printing equipment or packaging cannot accommodate the qualifying phrase (Manufacturer D, 2002). Therefore, it is possible that existing equipment and/or package design might limit some manufacturers when selecting the qualifying phrase for the open date.

Product Shelf Life. Manufacturers indicated that the more perishable a product, the more definitive the wording needs to be to communicate that the product may not be edible after the open date has passed (Manufacturers B and C, 2002). Therefore, qualifying phrases, such as “sell by” and “use by,” are more common among perishable products (ERG, 2002). Manufacturers of shelf-stable products want to communicate to consumers that a product is of best quality when used by a certain date, rather than it being inedible at that time (Manufacturer A, 2002). Therefore, open dates on shelf-stable products, like canned items, often have qualifying phrases with more ambiguous language, such as “best before,” whereas a more perishable food may have the qualifying phrase “best if used by.”

3.2.2 Type of Date Format

The date format varies widely from product to product, as evident from Table 2-9. Food manufacturers indicated that there is no pattern to the selection of the date format (Manufacturers A, C, and F, 2002). In some cases, regulations specify the format but in most cases the selection is simply a matter of preference. One manufacturer indicated that his company changed the year presentation from 2 digits to 4 in the year 2000 because management thought the double zeros might not be recognized as the year 2000 (Manufacturer B, 2002). The current industry guidelines, however, do specify the date format (see Section One) and ERG’s survey data shows that majority of manufacturers adhere to these guidelines (see Section 2.7.3). Manufacturers also agreed that industry guidelines are generally followed.

3.2.3 Shelf-Life Determination

As outlined by Labuza (2002), the food shelf life, i.e., the period it will retain an acceptable level of eating quality from a safety and organoleptic point of view, depends on four main factors, namely formulation, processing, packaging, and storage conditions.

Formulation involves the selection of the most appropriate raw materials and functional ingredients that will increase the appeal and ensure safety and integrity of the food during its intended shelf life. It also includes making sure that the raw materials and ingredients have not

lost their shelf life. Key factors include the moisture content, pH, and the addition of microbial preservatives and antioxidants. *Processing* subjects the formulated materials and ingredients to conditions that are unfavorable or inhibitory to undesirable deteriorative reactions and promotive to desirable physical and chemical changes thus giving the food product its final form and characteristics (except in the relatively few cases where post processing aging is necessary, such as in wines and hard cheeses). Finally, the *packaging microenvironment* and *storage conditions* will determine the extent to which a product will retain its intended attributes. The important parameters are gas composition (oxygen, carbon dioxide, inert gases, ethylene, etc.), the relative humidity, pressure or mechanical stresses, light, and temperature.

All four factors are critical but their relative importance depends on the perishability of the food item. A properly stored perishable food typically has under 14 days of shelf life due to biochemical (enzymatic/senescence) or microbial decay. With aseptic technology and controlled atmosphere/modified atmosphere packaging (CAP/MAP), however, such foods may last up to 90 days. Semi-perishable foods, such as some cheeses and frozen desserts, have shelf lives of up to 6 months. Shelf-stable (i.e., nonperishable) foods like canned foods might last from 6 months to as long as 3 years under proper storage conditions (Labuza, 2002). Nutrition labeling is also taken into account because the values on the label are required to be within established statistical limits by law at the time of the sale of the food (OTA, 1979). One manufacturer indicated research is conducted during product development to determine the length of time before vitamin levels go below requirements (Manufacturer C, 2002). The open date is selected on the basis of product analysis throughout its shelf life, tests, and other information. Manufacturers will generally add a margin of error to the shelf life estimate to make sure that deterioration does not occur before the open date has passed. Some of the science behind food dating is uncertain, however and there is much variation in the shelf life assigned to similar products. Further, open dates are not absolute because they are also dependent on handling and storage conditions.

Shelf-life Testing. Directly determining and monitoring shelf life can take several years (i.e., the entire shelf life of the product) to complete testing. Shelf-life samples have to be subjected to conditions that simulate the normal storage and distributions conditions with sampling performed at set intervals to determine when their quality becomes unacceptable. Short-life fresh or refrigerated foods may require daily examination until they become

unacceptable, while shelf-stable products such as canned foods might need evaluation once every few months. Batches might be tested during product development as well as part of an ongoing surveillance system. (Man and Jones, 2000). Unless there is some inherent variability in a food product (such as meats), firms usually do not undertake any ongoing testing once shelf life is established.

Many of the food manufacturers contacted by ERG conducted direct shelf life determinations in conjunction with accelerated shelf-life testing (ASLT) (Manufacturers A, B, and C, 2002). The objective in ASLT is to store the finished product/package combination under some test abuse condition, examine the product periodically until the end of shelf life occurs, and then use these results to project product shelf life under true distribution conditions (Labuza, 2002). Some manufacturers use historic multiplication factors to obtain actual shelf life from the abuse condition results. The multiplication factors are based on previous studies of similar products that correlate accelerated shelf-life testing results to the results of real-time shelf testing. The method performs well as long as one is cautious in interpreting and extrapolating the results to other conditions. For example, when the product/package system is tested, the package also controls shelf life, so the true shelf life of the food itself is in fact unknown. If a new package with different permeabilities to oxygen, water, carbon dioxide is chosen, the prior results may not be applicable. If the ASLT conditions are chosen properly, however, then shelf life under any “known” distribution should be predictable based on fundamental principles of food quality loss modeling. Obviously, ASLT is much more advantageous for shelf-stable foods than directly determining shelf life due to the time investment required for the latter.

Part of the shelf-life testing for refrigerated products includes challenge studies (Manufacturer C, 2002). A challenge study is the laboratory simulation of what may happen to a food during its life and may involve inoculation with specific microorganisms and/or storage at abuse temperatures (Man and Jones, 2000). Challenge studies tend to be costly. One manufacturer mentioned looking into the microbiological shelf life of one product with great detail and spending hundreds of thousands of dollars (Manufacturer C, 2002). Labuza (2002) notes that food manufacturers may also utilize other methods of shelf-life estimation, as listed below:

- *Literature Values* – Some manufacturers estimate the shelf life of a new product based on published data, such as that of the U.S. Army or of Labuza (1982). Publicly available data on shelf life are, however, quite limited, and most shelf-life data on engineered foods are proprietary. Companies typically use such proprietary data to generate shelf-life estimates for product line extensions. One manufacturer also commented that they sometimes use data already available for similar lines of products and only do limited additional real time shelf-life studies to confirm the initial data (Manufacturer F, 2002).
- *Distribution Turnover* – Some manufacturers use the known distribution times for similar products as the shelf life for the new product. This method does not entail shelf-life testing but requires data on the duration of consumer home storage. Manufacturers usually obtain the distribution time estimates either from their own line of similar products or by breaking the pack-day code of similar products of competitors. The method cannot be used if no similar products exist in the market.
- *Distribution Abuse Test* – A manufacturer can sometimes employ the distribution test method if he is confident of its product's shelf life or if the product is already on the market. The method involves collecting product samples at various retail outlets and storing them in the laboratory under home-use conditions. Some manufacturers have utilized this method when states or countries instituted new open-dating regulations. This method estimates product shelf life based on distribution turnover and home-storage conditions.
- *Consumer Complaints* –Manufacturers contacted reported that most consumers use the toll-free number and/or mailing address on product packaging to report problems with a product (Manufacturers A, B, and D, 2002). A smaller number of consumers report their complaints to grocery stores, of which some are addressed internally and others are passed on directly to the manufacturer. When addressed internally, some stores will also notify the manufacturer of the incident, but this practice varies by store. Manufacturers maintain this data, including the type of complaint, location, and other information, in an electronic database that they will examine periodically.
- Manufacturers indicated that they use consumer complaints as a management tool and investigate any trends (Manufacturers A, B, and D, 2002). Labuza (2002) states that it is commonly accepted that for every caller, there are 50 to 60 others with similar complaints that do not call. An analysis of the data by an R&D food scientist can sometimes indicate the appropriate shelf-life estimate. A manufacturer of dairy products contacted stated that they may reduce the open date of a product based on consumer complaints (Manufacturer D, 2002). For shelf-stable products, however, consumer complaints are usually not related to shelf life because consumers finish shelf-stable products before shelf-life issues arise (Manufacturer A, 2002). This approach, therefore, appears to complement, rather than act as a substitute to, other available shelf-life determination methods.

3.3 Potential Impacts of an Open-dating Regulation

Although many manufacturers are already using open dates, impacts of a mandatory open-dating standard might vary by sector and will be dependent on the specific requirements of the regulation. Some examples of the specific impacts that a regulation might have are discussed below.

3.3.1 Modification of Inventory Control

Given that inventory control practices are tightly linked to the shelf life of a product, a mandatory open-dating standard may affect the inventory control practices of some manufacturers. One manufacturer indicated that they would incur huge costs if required to put a 2-year open date on canned foods (where there is none currently) because shelf turnover would be slower than shelf life and unsold products would need to be discarded. Seasonal products might be especially impacted due to long warehousing necessary to supply future stock. Further, the distribution chain typically operates on a first-in-first-out (FIFO) basis for inventory control, which may result in additional costs for distributors and retailers to remove out-of-date stock if open dates are required on products that did not previously have them.

A qualifying phrase requirement may also have implications for inventory control products that currently have open dates. Coded dates are generally used for proper stock rotation at the manufacturer level and distributor level, whereas retailers may or may not rely on open dates for stock rotation (Manufacturer B, 2002). A “sell by” date can be used in the stock rotation by the retailer and is useful for products that retailers must move quickly due to short shelf life. For such products, if an open date is changed from “sell by” to “use by,” retailers might incur costs to revise inventory control procedures and product waste may result if the date is interpreted in the same way as a “sell by” date. A “use by” date, as currently used in the industry, is more arbitrary and not as useful for stock rotation purposes. One food manufacturer indicated that retailers may have a system as to how many days before the use by date the product should be rotated but that these determinations are likely subjective (Manufacturer A, 2002).

3.3.2 Purchase or Modification of Printing Equipment

Some manufacturers might not have the necessary equipment to open date products. One manufacturer reported that jet printers that open date products cost from \$40,000 to \$50,000. Even if manufacturers do have the necessary equipment, additional lines of text or requirements for a particular location may require substantial modifications to current equipment. Some manufacturers indicated that the prefix and the date format can be modified at little cost, although line speed issues may be encountered, depending on the extent of the change (Manufacturers B and C, 2002).

3.3.3 Modification of Label and Package Design

Another impact of a mandatory open-dating standard is that some packages and labels may require modification in order to add an open date to the labeling. One manufacturer stated that some of their products have only dates, without qualifying phrases, because their printing equipment or packaging cannot accommodate the phrase (Manufacturer D, 2002). Other impacts may include a decrease in the availability of small packaging that may not have the added space required for an open date.

3.3.4 Incremental Shelf-Life Testing Costs

Manufacturers that currently do not have open dates typically have some knowledge of the shelf life of their product for product management reasons and also to ensure that it at least exceeds the time spent in distribution. A mandated open-dating standard could require these manufacturers to conduct more rigorous testing and to document the results. Reported estimates for shelf-life testing range from \$100,000 for perishable products to \$200,000 for shelf-stable products (OTA, 1979). The shelf-life testing costs, however, are likely to be much lower at present.

For those manufacturers that currently have open dates, a mandated open-dating standard may result in more rigorous shelf-life testing. For example, a manufacturer can conceivably change its method of shelf-life testing from distribution turnover to ASLT or real-time testing

depending on the stringency of regulatory requirements on accepted shelf-life testing protocols. Additionally, manufacturers may need to incur recordkeeping expenses as they might need to document and maintain their shelf-life study data and reports. Two manufacturers contacted indicated that changing to a “use-by” date from a “sell-by” date would require either additional testing or a study to determine a reasonable time for the pantry load, or the time spent in home storage (Manufacturers C and B, 2002). Manufacturers contacted, however, reported that they do not do home storage studies because they assume home storage conditions are not within their control and vary widely (Manufacturers A, B, and D, 2002). Some manufacturers will do elevated heat storage or take the product through freeze/thaw cycles to test how the product holds up under extreme conditions (Manufacturer B, 2002). In general, however, manufacturers indicated that they assume consumers know how to store and rotate stock and do not take home storage conditions into account when setting the open date.

3.4 New Food Preservation Techniques

Shelf life of foods can be extended during processing by many means, including heat, removal of water, and radiation. Packaging techniques, such as the selection of impermeable packaging and gas injection, also extend shelf life. Due to variation in products, the solution has to be determined individually for each product and requires striking a balance between retaining the sensory characteristics of a food and extending shelf life. Many new food preservation techniques have been developed in recent years and the most prevalent ones that are used for ready-to-eat foods (although not exclusively) are discussed below.

3.4.1 Processing Technologies

Ultra High Temperature (UHT) Processing. UHT involves the rapid heating of food to 140 degrees Celsius, which is then maintained for a few seconds. The product is cooled rapidly and placed in sterile, airtight containers to preserve sterility. Paperboard-foil-plastic laminates are commonly used for packaging, which have as many as 6 layers of material. The process keeps bacterial content extremely low. UHT can extend shelf life for milk to 3-6 months at room temperature (Deis, 2002). UHT is also used to extend the shelf life of other dairy

products and fruit juices. The processing costs more than conventional methods but the lower cost of distribution makes the technology appealing.

High Pressure Processing (HPP). HPP has been gaining popularity as a way to extend shelf life of foods in recent years due to its reduced processing time, energy requirements, and minimal heat penetration (allowing processing directly in the packaging), in comparison to thermal techniques. This technique inactivates most pathogenic bacteria by using ultra-high pressure of 30,000 to 130,000 pounds per square inch for a specified temperature and time. Studies on juice have shown that HPP can destroy food pathogens, such as *Salmonella* and *E. Coli*, without changing the food's sensory characteristics (Deis, 2002). HPP can potentially double shelf life (Martin, 2002). Worldwide, HPP is most commonly used for manufacture of orange juice, guacamole, salsa, sliced ham, seafood, jellies, and fruit desserts.

Other Processing Technologies. Many other nonthermal processes are also being studied as possible methods for extending shelf life. For example, pulsed light technology, which uses a broadband white light from a xenon gas lamp to provide fast pulses that are 80,000 times brighter than sunlight, is currently being studied to sterilize meat, fish, and vegetables (Deis, 2002). Similarly, pulsed electric fields technology (PEF) uses very short pulses of high intensity electric fields that inactivate microorganisms by rupturing their cell walls. While pulsed electric fields kill vegetative organisms, it does not kill spores and therefore is not a sterilization technique (Hegenbart, 1996). PEF has been studied in milk, juice, and eggs. UV light is also being explored. Further, the Tennessee Valley Authority recently announced a new food processing technology that uses ozone to extend the shelf life of fresh fruits and vegetables (TVA, 2001). The ozone technology destroys spoilage bacteria while ensuring a safer product because it does not leave a chemical residue. Following a four-year development period, the product will be put in use at Strickland Produce in Nashville, TN.

3.4.2 Packaging Technologies

The most recent advancements in packaging technology include controlled atmospheric packaging (CAP), modified atmospheric packaging (MAP), and active packaging, as described

further below. These three packaging approaches change the in-package atmospheric composition, thereby increasing product shelf life. There is, however, some confusion in the industry about the true definition of CAP and MAP, with many experts using the terms synonymously. The definitions of CAP and MAP for the purposes of this discussion are based on the 2001 FDA Food Code.

Controlled Atmospheric Packaging (CAP). The 2001 FDA Food Code defines CAP as (FDA, 2001a):

“...packaging, in which the atmosphere of a package of food is modified so that until the package is opened, its composition is different from the air, and continuous control of that atmosphere is maintained, such as by using oxygen scavengers or a combination of total replacement of oxygen, non-respiring food, and impermeable packaging material.”

CAP is used primarily for processed foods, such as potato chips. The packaging material is selected to provide a high barrier to keep the desired blend of gases (commonly nitrogen and carbon dioxide) in and oxygen and moisture out. By modifying the atmospheric composition in the package, oxidative reactions are slowed and growth rates of spoilage organisms are reduced, thereby extending shelf life.

Modified Atmospheric Packaging (MAP). The 2001 FDA Food Code defines MAP as (FDA, 2001a):

“...packaging, in which the atmosphere of a package of food is modified so that its [initial] composition is different from air but the atmosphere may change over time due to the permeability of the packaging material or the respiration of the food. MAP includes: reduction in the proportion of oxygen, total replacement of oxygen, or an increase in the proportion of other gases such as carbon dioxide or nitrogen...”

As with CAP, the three gases most commonly used with MAP are oxygen, nitrogen, and carbon dioxide. Active modification is defined as replacement of gases in the package with the desired mixture of gases, while passive modification uses principles of product respiration and gas diffusion through the packaging film to naturally develop the desired combination of gases

(FDA, 2001b). MAP is often used for produce, to allow the gas mixture in the package to change as food respire. The rate of respiration of a fruit or vegetable is inversely proportional to its shelf life. MAP reduces the rate of respiration, as well as reducing the rate of oxidation and the growth of spoilage bacteria as CAP does, therefore extending shelf life.

Shelf Life of Products with CAP/MAP. CAP/MAP more than triples the shelf life of products (Man and Jones, 2000). For example, bread, which has a shelf life of 7 days if air packaged, lasts 21 days with CAP/MAP (Blakistone, as cited in Xiong, 1999). Coffee only lasts 3 days in air packaging but can be stored for up to 18 months with CAP/MAP (Blakistone, as cited in Man and Jones, 2000). This type of packaging can be applied to many different products and the extension of shelf life will vary with the properties of the food.

Trends in Gases Used in CAP/MAP. Companies in the U.K. have recently started using argon instead of nitrogen gas in CAP/MAP applications. Compared to nitrogen-packaged foods, argon-packaged foods, such as chips, processed meats, and lettuce, show 25 percent improvement in shelf life and quality (Wagner, 2001). Fresh pizza showed a 40 to 50 percent improvement in shelf life. The improvements in shelf life can be attributed to a more efficient removal of oxygen. Argon is denser than nitrogen and thus fills space more completely. Further, it inhibits enzymes that increase the rate of oxidation, making the product safer. It also enhances the effect of carbon dioxide thereby minimizing its use, which is advantageous because carbon dioxide ruins flavor and freshness. Companies are currently introducing the technology in the U.S.

Active Packaging. Active packaging is a form of packaging that employs material that interacts with the packaging environment to extend shelf life. It has only recently gained popularity and is often combined with other packaging technologies, such as CAP or MAP. Each food has its own optimal gas composition and humidity level that maximizes shelf life. Active packaging systems create or maintain this atmosphere, with applications that include oxygen scavenging, desiccation, antimicrobial activity, and ethylene absorption.

Oxygen scavenging is usually done by means of a chemical barrier or oxygen absorbing material that absorbs oxygen, thus reducing or eliminating oxidation. Examples include oxygen

absorbing plastic, enzyme reactor surfaces, and packets of iron oxides. Oxygen scavengers can extend the number of days until visible mold up to 60 days (Hegenbart, 1992). This is three times the shelf life that can be provided by CAP alone.

Desiccant sachets and films can control the humidity inside packaging, which can build up due to product respiration or water evaporating from moist foods. These desiccants can be used to control humidity for low moisture products like cookies, to keep them crisp, as well as for high moisture products like meat.

Microbial agents are often incorporated into films that are part of packaging. Some examples include carbon dioxide and sulfur dioxide. Among the newer active packaging technologies, Boston-based AgION Technologies, L.L.C., recently launched its silver-based natural inorganic antimicrobial film. Moisture in the air causes a controlled release of silver ions at a slow and measured rate that is said to effectively maintain an antimicrobial surface of a variety of packaging films, thereby increasing shelf life (Martin, 2002).

Ethylene is a compound produced by fruits and vegetables as part of their metabolic cycle and causes ripening and aging. To extend the shelf life of these products, ethylene produced by the product can be absorbed by incorporating a chemical reagent into the packaging film, which traps it. Small sachets can also be used. The reacting chemical of ethylene is usually potassium permanganate (CSIRO/AFISC, 1994).

The research in active packaging technologies is ongoing. For example, the shelf life of fresh fruits and vegetables can be extended using an edible film of polysaccharides (Man and Jones, 2000). Recent edible film research has focused on combining proteins, polysaccharides, waxes and lipids (Hegenbart, 1996). Packaging films that respond to environmental cues (e.g. temperature) to change permeability are also being developed. The “Intelimer” film has a temperature switch point at which the permeation of the film changes dramatically (Man and Jones, 2000). In addition, new antimicrobial films are also either already available or will soon be on the market. Other applications being investigated include the use of enzymes, which are very useful in processing food and improving products (Foodtech Source Forum, 2001).

SECTION FOUR

HOME FOOD STORAGE AND HANDLING PRACTICES

Home food storage and handling practices are an essential part of the shelf life of a product. To maintain food quality and safety at home, it is important to store products at the proper humidity and temperature and to prevent contamination with pathogenic microbes. In setting the open date for a product, manufacturers will take into account reasonable expectations for consumer storage of foods. If foods are improperly stored or mishandled, however, degradation in quality and pathogenic bacterial growth might occur before the open date on the package, rendering the open date meaningless. Further, as noted previously, the current open dates on products generally reflect quality rather than safety of these products. The date on the package, therefore, only ensures good *quality* if and only if consumers handle and store food according to the expectations of the manufacturer. Safety of the product is dependent partially on the processing of the product, over which the consumer has no control, and proper handling and storage practices of the consumer, over which the manufacturer has no control.

Proper home food storage and handling are highly relevant to the open date and paramount to ensuring the safety and quality of food products. Recent empirical studies, summarized in Table 4-1, however, indicate that most consumers do not handle or store food properly. Further, there is some consumer confusion on the interpretation of food open dates.

Sections 4.1 and 4.2 address home food handling and storage practices for ready-to-eat (RTE) and other products before and after opening, respectively. Section 4.3 discusses consumer understanding of open dates. Finally, Section 4.4 briefly evaluates the reliability of the studies conducted on home food handling and storage practices.

4.1 Home Food Storage and Handling Practices Before Opening

Home practices that affect shelf life before the opening a product include product handling from the time of purchase until the transport home and where, for how long, and at

Table 4-1: Recent Studies on Home Food Storage and Handling Practices

Name	Author/Sponsor, Year	Sample Size	Type
Consumer Handling of Ready-to-Eat Foods After Purchase	Godwin/FDA, 2003	551	Personal interview
Consumer Food Handling in the Home: A Review of Food Safety Studies	Redmond and Griffith, 2003	Various	Various
Changes in Consumer Knowledge, Behavior, and Confidence Since the 1996 PR/HACCP Final Rule	FSIS/RTI, 2002	64	Focus group
Safety of Consumer Handling of Fresh Produce from the Time of Purchase to the Plate: A Comprehensive Consumer Survey	LiCohen and Bruhn, 2002	624	Mail survey
Home Food Safety Survey	ADA/ConAgra Foods, 2001	1,594	Online survey
Perishable Refrigerated Products and Home Practices Survey	Labuza, Szybist, and Peck, 2001	101 and 37	Hand-out survey
Food Safety Survey	FDA/FSIS, 2001	4,482	Telephone survey
A Camera's View of Consumer Food Handling and Preparation Practices	Anderson et. al/FDA, 2000	99	Direct observation
AMIF Refrigerated Foods Survey	AMIF, 2000	1,000+	Hand-out survey
Food Safety Knowledge and Behavior of Expanded Food and Nutrition Education Participants in Arizona	Meer and Misner, 2000	286	Hand-out survey
Prevalence of High-Risk Food Consumption and Food-Handling Practices Among Adults: A Multi-State Survey, 1996 to 1997	Shiferaw et. Al/ FoodNet Working Group, 2000	7,493	Telephone survey
Home Food Safety Survey	Audits International, 2000	115	Direct Observation
Home Food Safety Benchmark Survey	ADA/ConAgra Foods, 1999	1,000	Telephone survey
HACCP and the Home: The Need for Consumer Education	Beard, 1991	30	Personal interviews
Prevention/NBC Today Survey	Anonymous, 1997	1,285	Telephone survey
Assessment of the Standard of Consumer Food Safety Behavior	Worsfold and Griffith, 1997	108	Direct observation
Consumer Handling of Chilled Foods: A Survey of Time and Temperature Conditions	MAFF/FRPERC, 1991	252	Personal interviews/ self-observation
Food Discards: Nature, Reasons for Discard, and Relationship to Household Variables	VanDeReit, 1985	242	Personal interview/ Hand-out survey

what temperature the product is stored in the home until opening. The majority of studies identified in the literature are on chilled foods. Because consumer handling and storage are highly relevant to the quality and safety of chilled foods, there is relatively little information available on consumer handling and storage practices regarding pantry foods.

4.1.1 Product Handling During Transport

Temperature. Products, especially chilled and frozen foods, can be exposed to temperatures that result in quality and safety degradation while the consumer is shopping or during transport home. A recent survey on home refrigeration practices shows that only 7 percent of respondents use coolers or ice packs to keep food cold (Godwin, 2003).

Several studies have found significant and dangerous increase in the temperature of foods during transport home. A study recently completed by the American Meat Institute Foundation (AMIF) shows that the temperature of refrigerated foods rises approximately 8 to 10 degrees Fahrenheit in summer months during the trip home (AMIF, 1999). The types of food products in the AMIF study included prepackaged lunch meat, ground beef, sliced deli meat, ice cream, milk, whipped topping, potato salad, and fresh fish. Additionally, the study also shows that the temperature increase could be as high as 15 to 20 degrees Fahrenheit for long trips on hot days.

In their U.K. study, Worsfold and Griffith (1997) find that 45 percent of 108 consumers transport chilled foods without an insulated bag. The practice results in increases in food temperatures to levels that are insufficient to halt bacterial growth despite short transport times with most trips lasting half an hour or less. The findings from a recent survey of home refrigeration practices in the U.S. are also similar with 83 percent of respondents returning from the grocery store in 20 minutes or less (Godwin, 2003).

Another U.K study compares the temperatures of unprotected food samples transported in the back of a car to those transported in an insulated cool box with ice packs. The study finds that after an hour, the unprotected food sample is 16 degrees Celsius higher than the insulated sample which remains relatively stable at the store temperature (MAFF/FRPERC, 1991). The study results may not be directly transferable to the U.S. due to geographical differences. Nonetheless, the studies show that consumers may fail to take proper measures to ensure safe food temperatures during transport home and that food temperatures can climb to dangerous levels, even during short trips.

Cross-contamination. To guard against cross-contamination from food sources that harbor bacteria, such as raw meat and chicken, food should be separated from other grocery items during transport home. While only one study is currently available on the subject, results indicate that consumers do not take steps to prevent cross-contamination when purchasing and transporting food. When Licohen and Bruhn (2002) asked consumers how they prefer to pack fresh produce in a grocery bag, less than a third responded that they separated produce from those items that are possible sources of dangerous bacteria, such as meat, poultry, and fish. In fact, more than half of respondents indicated that they had no special requirements for packing produce. Contamination by pathogenic bacteria can render produce unsafe to eat.

While the Licohen and Bruhn (2002) study is on produce, the issue may also be applicable to food products other than produce. For example, Anderson et al. (2000) provides anecdotal evidence from their study where research assistants observed that grocery store personnel did not properly bag raw meat products that may have resulted in cross-contamination.

4.1.2 Storage Location

Storage location also affects the shelf life of a product. Environmental factors, such as temperature and humidity, can trigger reaction mechanisms that lead to food degradation. Some products last longer when refrigerated as it inhibits bacterial growth. Further, location within a refrigerator can also make a difference. For example, MAFF/FRPERC (1991) study finds that the temperature within a refrigerator varies with the top constituting the warmest and the middle coolest location. FDA, therefore, recommends storing egg products in their carton in the refrigerator, instead of in the refrigerator door. Certain types of produce like potatoes should be stored in a cool and dry place. Shelf-stable foods, on the other hand, can be stored at room temperature.

In a survey of home refrigeration practices, most participants reported that they store foods that require refrigeration in the refrigerator (Godwin, 2003). A small number of consumers, however, reported storing such products in pantries or on counters. Similarly, shelf-stable foods, such as vegetable oil and peanut butter, are kept in the pantry by most consumers. A

small percentage of consumers, however, refrigerate these items. Bread storage practices vary, with around 1/3rd of consumers storing it in the refrigerator, 1/3rd in the pantry, and the remaining 1/3rd on the counter. The majority of participants reported that they store raw vegetables and fruits in the refrigerator. In a study focusing on consumer handling of fresh fruits and vegetables, most survey participants also responded that they store fresh produce in the refrigerator (LiCohen and Bruhn, 2002). Apples and melons were more likely to be stored at room temperature (42 and 24 percent of respondents, respectively).

In the Godwin (2003) study, survey respondents were most likely to store uncooked meat in the front of the refrigerator, with roughly equal numbers of respondents storing it on the top, middle, and bottom shelves. Further, almost 28 percent of respondents reported keeping eggs in the refrigerator door shelves contrary to FDA recommendations. In the Licohen and Bruhn (2002) study, consumers reported storing meat, poultry, and fish in a variety of locations in their refrigerators. Almost half stored these products in the recommended locations, a meat-poultry drawer or bottom shelf (to prevent cross-contamination), while 23 percent stored these products above other foods, and 9 percent placed items where there was room in the refrigerator. Anderson et al. (2000) observed that consumers mostly stored raw meat on the middle (42 percent) or top shelf (21 percent) of their refrigerator. Only 24 percent stored meat in its proper location, the bottom shelf of the refrigerator.

Overall, the studies indicate that some, but not all, consumers store foods properly to ensure maximum quality and ensure safety. There is, however, a small percentage of consumers that fail to store foods properly, possibly due to a lack of knowledge on proper refrigeration storage locations.

4.1.3 Duration of Storage

FDA and a number of other organizations provide food storage guidelines. These guidelines, however, often vary in what is considered an acceptable storage time for a food. Moreover, the guidelines do not provide any information relating the storage time to the open dates provided on packages, therefore making the interpretation somewhat confusing. For

example, if eggs have a recommended storage time of 3 weeks from the time of purchase (which is the assumption that most of the guidelines appear to make), an egg carton with a remaining sell-by date of one day would be stored for the same amount of time as another egg carton with a remaining sell-by date of two weeks. Finally, very few guidelines provide any information on the storage time after the product is opened.

Table 4-2 summarizes the studies on the food storage practices of consumers. Most of these studies appear to measure storage time from the time of purchase to the time of consumption or discard.

Godwin (2003) conducted a survey of home refrigeration practices among 551 consumers. Respondents were asked a number of questions regarding 31 different foods, including how long it is stored in the refrigerator (see Table 4-2). Most responses are within the recommended ranges for storing products. The range of storage time is the same for all products presented in Table 4-2 because out of the 5 answers provided in the survey, at least one respondent always chose the shortest storage time and another the longest storage time.

Labuza et al. (2001) evaluated the home storage practices of 37 households for refrigerated products. In many cases, these products were either consumed prior to reaching the open date or discarded. There were, however, a few products, such as milk and ground beef, that were consumed after the storage time exceeded the generally recommended storage duration. In the study, only six out of the 204 perishable refrigerated products evaluated were discarded, of which four were milk. Temperature abuse was suspected to have been a contributing factor, although it was not certain why these products were discarded prior to use.

Beard (1991) conducted a study of the storage time of products in the pantries of 30 households. The study found that consumer rotation of products in the pantry was poor, especially for baking products, dry goods, condiments, and breakfast cereals. Juices and coffee also presented a concern. Poor product rotation tended to result in quality degradation, with higher consumer complaints about staleness, rancidity, and insect infestation.

Table 4-2: Consumer Storage Time of Food Products

Study	Product	Storage Time		
		Average	Range	Guideline[a]
Godwin (2003)	Luncheon meat	4-7 days	0 to 3 months+	3 to 14 days
	Eggs	1-2 weeks	0 to 3 months+	21 to 35 days
	Raw vegetables	4-7 days	0 to 3 months+	1 to 30 days
	Fluid milk	4-7 days	0 to 3 months+	5 to 7 days
	Fruit	4-7 days	0 to 3 months+	1 to 30 days
	Butter	1-2 weeks	0 to 3 months+	1 to 3 months
	Mayonnaise/salad dressing	3-4 weeks	0 to 3 months+	2 months
	Tortillas	1-2 weeks	0 to 3 months+	3 to 21 days
	Bread	4-7 days	0 to 3 months+	3 to 21 days
	Catsup	3-4 weeks	0 to 3 months+	NA
	Fruit juice	4-7 days	0 to 3 months+	Varies
	Fresh soft cheese	1-2 weeks	0 to 3 months+	1 week
	Hard cheese	1-2 weeks	0 to 3 months+	3 to 24 weeks
Labuza et. al (2001)	Milk	6.3 days	1 to 21 days	5 to 7 days
	Orange Juice	8.9 days	4 to 14 days	21 days
	Ground Beef	4.8 days[c]	1 to 22 days	1 to 2 days
	Yogurt	5.4 days	0 to 19 days	7 to 28 days
	Pre-cut salads	5.6 days	0 to 17 days	NA
	Eggs	8.7 days	1 to 17 days	21 to 35 days
Beard (1991)	Canned goods	12.3 weeks	1 to 104 weeks	1 year or more
	Ethnic foods	10.9 weeks	1 to 52 weeks	NA
	Condiments	11.6 weeks	1 to 156 weeks	24 weeks or more
	Baking products	21.6 weeks	1 to 260 weeks	Varies
	Dry Goods/pasta, mixes	17.7 weeks	1 to 156 weeks	1 year or more
	Breakfast cereals	12.0 weeks	1 to 150 weeks	1 year
	Cookies, crackers, snacks	7.6 weeks	0.3 to 26 weeks	16 to 52 weeks
	Coffee, juices, beverages	36.3 weeks	1 to 156 weeks	Varies
VanDeReit (1985)	Raw fruits and vegetables	14 days[d]	1 to 60 days	1 to 30 days
	Cooked fruits and vegetables	14 days[d]	1 to 60 days	NA
	Cooked meat, fish, and poultry	9 days[d]	1 to 60 days	1 to 7 days
	Dry cereals	8 days[d]	1 to 60 days	1 year
	Moist cooked cereals	6 days[d]	1 to 60 days	NA
	Cooked meat/cereal dishes	2 days[d]	1 to 60 days	1 to 7 days
	Cultured dairy products	13 days[d]	1 to 60 days	1 to 4 weeks

[a] Based on data from FDA, USDA, Colorado State University Cooperative Extension, Clemson Extension, and Cooking Light Magazine. Dates sometimes combine after opening and unopened storage times because studies do not indicate if and when products have been opened.

[b] Most frequently reported storage time.

[c] Average storage time and range become 0.5 and 0-1 days, if 5 responses are removed from the calculation.

[d] Median storage times.

NA = Not available

VanDeReit (1985) conducted a survey of 242 households in Oregon to learn more about discard practices. In the study, median storage times for uncooked and cooked items were recorded and varied from 2 to 14 days, depending on the product. Many consumers in this study

mentioned that they frequently forgot about foods stored in their refrigerators until past their peak.

As Table 4-2 illustrates, the average storage time of most products in the 3 studies falls within recommended storage guidelines, with the exception of soft cheese in the Godwin (2003) study, beef in the Labuza et al. (2001) study, and cooked meat, fish, and poultry in the VanDeReit (1985) study. The range of storage times, however, shows that a number of consumers store products for a period beyond that recommended for quality and safety reasons.

4.1.4 Storage Temperature

Existing studies of storage temperature only encompass refrigeration. FDA advises that refrigerator temperatures should be set at 40 degrees Fahrenheit or below to halt bacterial growth and ensure product quality and safety. There are numerous studies that have evaluated refrigerator temperatures in homes. While results vary, the majority of studies show that a significant portion of refrigerators in consumers' homes are set at temperatures higher than the recommended 40 degrees Fahrenheit (see Table 4-3). Further, many of the studies conclude that the majority of consumers lack awareness of proper refrigerator temperatures.

The lack of proper refrigeration temperatures in homes may partially be explained by the lack of built-in thermometers in many consumer refrigerators. For example, Godwin (2003) found that only 28 percent of survey respondents have a built-in thermometer in their refrigerator. Labuza et al. (2001) found that only 8 out of 101 refrigerators tested had a thermometer and only 7 out of 97 homes had a thermometer in the freezer. A survey conducted by the American Dietetic Association (ADA) and ConAgra Foods (2001) showed that 67 percent of consumers do not own a refrigerator thermometer. Further, Beard (1991) found that out of 14 home refrigerators and 11 freezers, only 7 refrigerators and 1 freezer had thermometers.

Table 4-3: Studies on Home Refrigerator Temperatures

Study	% Of Homes with Refrigerator Temperatures Above 40° F	Consumer Knowledge on Adequate Refrigerator Temperatures
Godwin (2003)	NA	35% reported that temperature should be between 33 to 40° F and 47% did not know what the ideal refrigerator temperature is
Redmond and Griffith (2003)	NA	45% to 60 % of consumers lack knowledge about adequate refrigeration temperatures
ADA/ConAgra (2001)	NA	60% of respondents knew temperature should be 40° F
Labuza et. al (2001)	46% greater than 42° F	75% of respondents know temperature should be 40° F
Anderson et. Al (2000)	29% greater than 40° F	30% of subjects reported not knowing the proper setting and 12% thought the recommended temperature should be greater than 40° F
Meer and Misner (2000)	13% 45° F or higher	69% of respondents do not know the temperature of refrigerator
AMIF (2000)	27% above 41° F	NA
Worsfold and Griffith (1997)	58% above 40° F	NA
VanDeReit (1985)	21% above 50° F	Most are unaware of proper refrigeration temperatures

NA = Not applicable

4.2 Home Food Storage and Handling Practices After Opening

Home practices that affect the shelf life of a product after opening a product include sanitation practices, handling of the product, where it is stored, for how long, and at what temperature. Very few studies have investigated consumer practices after opening of a product. The few available studies on sanitation practices, food handling, and storage time are discussed below.

4.2.1 Sanitation Practices

Proper sanitation practices include washing hands before touching food, separating foods, and cleaning workspaces after meal preparation. If consumers do not practice proper sanitation after opening a product, spoilage of a product can occur due to cross-contamination. Although the 2001 FDA/FSIS Food Safety Survey shows that the self-reported use of many sanitation practices has increased in recent years, observed behavior still indicates a need for improvement

in hand-washing practices and prevention of cross-contamination with pathogenic bacteria from ready-to-eat foods and food preparation surfaces (Redmond and Griffith, 2003; FSIS/RTI, 2002; FDA/FSIS, 2001).

According to the 2000 International Home Food Safety Survey, 29 percent of participants observed neglected to wash their hands each year (Daniels et. al, 2000). Clean dishes and pans were not allowed to dry properly to prevent bacterial growth in 10 percent of households and cross-contamination was also an issue in 10 percent of households. Further, Anderson et. al (2000) videotaped consumers to observe in-home food handling practices and found only 45 percent of consumers washed their hands before starting food preparation and of those, only 84 percent used soap. In addition, 33 percent of consumers did not wash their hands after handling raw meat, a major source of cross-contamination. The majority of consumers also did not separate workspace for handling raw meat and ready-to-eat foods and 77 percent of those observed marinated food on the kitchen counter, providing a possible cross-contamination hazard. Finally, although 70 percent of consumers attempted to clean work surfaces, most of the attempts were inadequate.

4.2.2 Food Handling

Food handling practices, such as proper and timely refrigeration and proper thawing, also influence the quality and safety of food. Godwin (2003) reported that more than half of survey respondents thaw frozen food on the counter and only 10 percent thaw frozen food in the refrigerator. In a study by Meer and Misner (2000), raw animal products were thawed on the counter by 21 percent of respondents. Further, 22 percent of survey participants reported that they occasionally leave perishable foods at room temperature for over two hours. In the Anderson et. al. (2000) study, 18 percent of participants reported that they thaw meat products outside the refrigerator or in the microwave. Thus, while these are reported rather than observed behaviors, current food handling practices are far from adequate.

4.2.3 Storage Duration

There are very few studies on storage practices after opening a product. Most of the studies included in Section 4.1.3 address the storage time of a product from the time of purchase until the time of complete consumption. The FDA/FSIS Food Safety Survey conducted in 2001 investigates storage times after opening for a limited number of food products. The survey responses reported are weighted to the Census population. The study indicates that cooked meats are usually kept for 1 to 3 days (71 percent of respondents). Further, consumers generally keep hot dogs a week or less after opening (68 percent of respondents) and 13 percent keeps hot dogs in the freezer. The majority of respondents also kept cold cuts for a week or less after opening (78 percent of respondents). Soft cheeses, such as Brie and Camembert, tended to be kept for longer periods than meats after opening. The majority of respondents (69 percent) consumed prepared salads within 3 days (whether the product was opened is irrelevant to this product). These numbers generally show that the majority of consumers finish products within the FDA recommended guidelines with the exception of a small, but not insignificant, minority.

4.3 Consumer Understanding of Open Dates

Consumers report that they often rely on food labels for food safety information, including expiration dates (FSIS/RTI, 2002). In the Godwin (2003) study, 64 percent of survey respondents reported that they routinely check expiration dates on food items. In a study regarding the handling and storage of refrigerated products by consumers (Labuza et. al, 2001), 85 percent of survey participants reported they either always look at open dates on refrigerated products or often do. Almost 2/3rd of respondents indicated that the open date is reliable or extremely reliable in regards to the actual shelf life of refrigerated foods. In 2000 Home Food Safety Study by Audits International, however, 41 percent of respondents indicated having used a product past its use-by date, implying that some consumers may not pay attention to the open date at all (Daniels et. al, 2000).

While consumers recognize the importance of food dates, many have trouble deciphering the meaning of open dates. For example, the majority in the Godwin (2003) study thought that expiration dates indicate that the food is no longer safe to consume. Further, 40 percent of

respondents in the Labuza et. al (2001) study thought the sell-by date meant the last day the product should be used or eaten. Similarly, in a 1997 telephone survey of 1,285 adults conducted by Prevention/NBC Today, 64 percent thought the expiration date refers to the last day the food can be safely sold and 31 percent said it refers to the last day food can be safely eaten (NCB Today/Prevention, 1997).

4.4 Evaluation of Studies on Home Practices

The consumer home practice studies cited in this section have some limitations. First, many are based on surveys of self-reported practices, which might not correspond to actual behavior. Anderson et al. (2000) found that the proportion of consumers, who actually implement safe food-handling procedures, is much smaller than the proportion of consumers that report implementing safe food-handling procedures. For example, although 87 percent of participants reported that they wash their hands before food preparation, only 45 percent actually did so when observed. Thus, self-reported practices might not accurately reflect true behavior.

Second, most studies on home food storage and handling practices suffer from non-random and small sample sizes precluding the generalization of study results to the general population. For example, the Labuza et. al (2001) study just focused on a small, primarily upper-class neighborhood in Minnesota. Sample sizes were limited to 101 participants for the first part of the survey (refrigeration temperatures) and 37 participants for the second part (home storage time). The Anderson et. al (2000) study consisted of only 99 subjects that were residents in a small urban area in the Western U.S. Further, in the 2000 Audits International Home Safety study, household selection was not random, as all participants were volunteers. Finally, Worsfold and Griffith (1997) recruited only 108 subjects, all of whom were female, to assess food safety behaviors.

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APPENDIX A

NATIONAL CONFERENCE ON WEIGHTS AND MEASURES (NCWM) UNIFORM OPEN DATING REGULATION

Uniform Open Dating Regulation

as adopted by
The National Conference on Weights and Measures *

1. Background

Numerous State and local jurisdictions have provided for, or are considering, mandatory open dating of certain packaged commodities. Additionally, many commodities in the marketplace are now voluntarily open dated. Lack of uniformity between jurisdictions could impede the orderly flow of commerce.

In 1985, the National Conference on Weights and Measures, in concert with the Association of Food and Drug Officials, wrote a new Uniform Regulation. It resolved the differences in the independent versions developed by the two organizations independently.

The regulation provides two options for implementation by the States. One requires open dating on all perishable foods. The other permits voluntary open dating of such foods. In the latter (voluntary) case, the open dating must then conform to the uniform regulation. Notes to § 1.1. and 3.1. indicate the alternative wording for the voluntary version of the Regulation.

2. Status of Promulgation

The table beginning on page ___ shows the status of adoption of the Uniform Open Dating Regulation.

Section 1. Purpose, Scope, and Application

1.1. Purpose . ^[NOTE 1, see page 1] -- The purpose of this regulation is to prescribe mandatory uniform date labeling of prepackaged, perishable foods and to prescribe optional uniform date labeling that must be used whenever a packager elects to use date labeling on prepackaged foods that are not perishable. Open dating is intended for use and understanding by both distributors and consumers when judging food qualities.

***NOTE 1:** Alternatively, this regulation may be adopted to require uniformity of open dating of perishable foods whenever a packager voluntarily elects to use date labeling. In such instance, Sections 1.1. and 3.1. are reworded in the following manner:*

* The National Conference on Weights and Measures is supported by the National Institute of Standards and Technology in partial implementation of its statutory responsibility for "cooperation with the States in securing uniformity in weights and measures laws and methods of inspection."

1.1. Purpose. *The purpose of this regulation is to prescribe uniform date labeling that must be used whenever a packager elects to use date labeling on a prepackaged food. Open date labeling is intended for use and understanding by both distributors and consumers when judging food qualities.*

3.1. "Sell By" Date. *If a retail food establishment elects to sell or offer for sale a prepackaged perishable food identified with a "sell by" date, the "sell by" date used must be as prescribed by this regulation.*

1.2. Scope and Application . -- This regulation prescribes the manner of date labeling, the method of determining the appropriate date, required records, responsible persons, and the foods subject to this regulation. This regulation provides for the permissible sale of a regulated food after the expiration of the date on the label. This regulation does not apply to any food that is not prepackaged or is exempted by § 8.

Section 2. Definitions

2.1. "Sell By" Date . -- "Sell by" date means a recommended last date of sale that permits a subsequent period before deterioration of qualities described in 2.2., 2.3., and 2.4.

2.2. Perishable Food . -- "Perishable food " means any food having a significant risk of spoilage, loss of value, or loss of palatability within 60 days of the date of packaging.

2.3. Semi-perishable Food . -- "Semi-perishable food " means any food for which a significant risk of spoilage, loss of value, or loss of palatability occurs only after a minimum of 60 days, but within 6 months, after the date of packaging.

2.4. Long Shelf-life Food . -- " Long shelf-life food" means any food for which a significant risk of spoilage, loss of value, or loss of palatability does not occur sooner than 6 months after the date of packaging, including foods preserved by freezing, dehydrating, or being placed in a hermetically sealed container.

2.5. Prepackaged . -- "Prepackaged " means packaged prior to being displayed or offered for retail sale.

2.6. "Best If Used By" Date . -- "Best if used by" date means a date prior to deterioration of qualities described in 2.3. and 2.4.

2.7. Person . -- "Person" means an individual, partnership, association, or corporation.

Section 3. Sale of Perishable Food and Date Determination

3.1. "Sell By" Date .^[NOTE 1, see page] -- A retail food establishment shall not sell or offer for sale a prepackaged perishable food unless it is identified with a "sell by" date as prescribed by this regulation.

3.2. Sale after Expiration of "Sell By" Date

3.2.1. Advertisement . -- Perishable food shall not be offered for sale after the "sell by" date unless it is wholesome and advertised in a conspicuous manner as being offered for sale after the recommended last date of sale. The placement of a sign, sticker, or tag is acceptable for such advertising if it is easily readable and clearly identifies the perishable food as having passed the recommended last date of sale.

3.2.2. Responsibility for advertisement . -- The retailer or final seller is responsible for the advertisement, described in § 3.2.1., of a perishable food offered for sale after the recommended last date of sale.

3.3. Determination of "Sell By" Date

3.3.1. Reasonable Period for Consumption . -- A manufacturer, processor, packer, repacker, retailer, or other person who prepackages perishable food, shall determine a date that allows a reasonable period after sale for consumption of the food without physical spoilage, loss of value, or loss of palatability. A reasonable period for consumption shall consist of at least one third of the approximate total shelf life of the perishable food.

3.3.2. Responsibility for "Sell By" Date . -- A retailer who purchases prepackaged perishable food may upon written agreement with the person prepackaging such food determine, identify, and be responsible for the "sell by" date placed on or attached to each package of such food.

3.4. Manner of Expressing Date

3.4.1. Month and day, or day of week . -- A person described in § 3.3.1. or 3.3.2. shall place or attach to each package of perishable food a date by month and day. However, bakery products with a shelf-life of not more than 7 days may be dated with the day of the week representing the last recommended day of sale.

3.4.2. The term "Sell By" . -- The "sell by" date shall be displayed with the term "sell by" or words of similar import immediately preceding or immediately over the designated date unless a prominent notice is on the label describing the date as a "sell by" date and indicating the location of the date.

3.4.3. Abbreviation of weekday . -- If the day of the week is solely designated as provided in § 3.4.1., the name of the day may be abbreviated by the use of either the first two or first three letters of the name of the day.

3.4.4. Expression of month and day . -- Except as provided for in § 3.4.1., the date shall be designated by:

- (a) the first three letters of the month, preceded or followed by a numeral indicating the calendar day, or
- (b) the month represented numerically followed by a numeral designation of the calendar day.

The month and day designation shall be separated by a period, slash, dash, or spacing. When a numeral designation of the first nine days of the month is used, the number shall include a zero as the first digit; for example, 01 or 03. (Amended 1987)

3.4.5. Expression of the year . -- The "sell by" date may include the year following the day if such year is expressed as a two or four digit number separated as described in § 3.4.4.

Section 4. Sale of Semi-perishable and Long Shelf-life Food

4.1. "Best If Used By" Date . -- A manufacturer, processor, packer, repacker, or other person who prepackages semi-perishable or long shelf-life food may place upon or attach to the package an open date providing it is designated by the "best if used by" date .

4.2. Sale after Expiration of "Best If Used By" Date . -- A retail food establishment may sell or offer for sale food beyond the designated "best if used by" date provided the food is wholesome and the sensory physical quality standards for that food have not significantly diminished.

4.3. Manner of Expressing Date . -- The "best if used by" date as required by § 4.1. shall be placed upon or attached to each container or package and be limited to the terms "best if used by" or words of similar import followed by or immediately over the date designated by the month and year unless a prominent notice is on the label describing the date as a "best if used by" date and indicating the location of the date. The date shall be designated by the first three letters of the month followed by a numeral indicating the year. The use of the day of the month is permissible provided that the day of the month is placed prior to the month; for example, 30 Jun 81.

Section 5. Placement of the Date

The date, whether "sell by" or "best if used by," shall be printed, stamped, embossed, perforated, or otherwise shown on the package, label on the package, or tag attached to the package in a manner that is easily readable and separate from other information, graphics, or lettering so as to be clearly visible to a prospective purchaser. The date shall not be superimposed on other required information or obscured by other information, graphics, or pricing. Regardless of the type size used, the date shall be easily readable. These requirements do not preclude a supplemental notice elsewhere on a package describing and/or indicating the location of the date.

Section 6. Factors for the Date Determination

A person who, as provided for in this regulation, places either the "sell by" date or "best if used by" date on a package shall determine the date by taking into consideration the food quality, characteristics, formulation, processing impact, packaging or container and other protective wrapping or coating, customary transportation, and storage and display conditions. For purposes of calculating this date, home storage conditions shall be considered to be similar to those in the usual retail store except that the date for refrigerated food may be calculated by using a home storage temperature standard of 40° F (4.4° C).

Section 7. Records

A person who is responsible for establishing the date for perishable, semi-perishable, and long shelf-life food shall keep a record of the method used for the determination of that date. A record revision is necessary whenever a factor affecting date determination is altered. Such record shall be retained for not less than 6 months after the most recent "sell by" or "best if used by" date and be available during normal business hours for examination upon request by (insert agency name).

Section 8. Exemptions

8.1. This regulation does not apply to perishable fruits or vegetables in a container permitting sensory examination.

8.2. This regulation does not apply to prepackaged perishable foods open dated according to requirements of Federal law or regulation.

Section 9. Preemption of Local, County, and Municipal Ordinance

A municipality or county shall not adopt or impose standards or requirements other than those provided for in this regulation.

Section 10. Effective Date

This regulation shall become effective on and after (insert appropriate date).

APPENDIX B

FOOD MARKETING INSTITUTE (FMI) POLICY STATEMENT ON OPEN DATING

Food Marketing Institute (FMI) Policy Statement on Open Dating

Introduction

The members of the Food Marketing Institute (FMI)** support a **voluntary** uniform dating system using only **one** date, a “**sell by**” date, with appropriate “best if used by” information related to that date. This type of freshness dating will help achieve greater consumer understanding through a **uniform** system and maximum quality products through good stock rotation at the store and warehouse level.

Guidelines

The Food Marketing Institute **recommends** that the following system of declaration be used on those items which are open dated.

1. All applicable food products should bear a “sell by” date.
2. “Sell by dates using alphabetic month designations or abbreviations, e.g., Jan 93, rather than numbers are preferred because they are more easily understood by consumers.
3. When “best if used by” information is included it should relate to the “sell by” date. For example, a yogurt carton label might state that the product is “best of used within 7 days after the date stamped on end of package.”
4. When space permits, specific care information concerning time, temperature, and humidity for quality control may appear on the label as well as the “sell by” date and “best if used by” information.
5. Manufacturers should be encouraged to label shipping cartons with the same “sell by” date information as appears on the retail sale units.

Adopted by the Food Marketing Institute Board of Directors October, 1983

** *The Food Marketing Institute (FMI) is a nonprofit association conducting programs in research, education, industry relations, and public affairs on behalf of its 1,500 members – food retailers and wholesalers and their customers in the United States and around the world. FMI’s domestic member companies operate approximately 19,000 retail food stores with a combined annual sales volume of \$190 billion – more than half of all grocery store sales in the United States. FMI’s retail membership is composed of large multi-store chains, small regional firms, and independent supermarkets. Its international membership includes 250 members from 60 countries.*

APPENDIX C

NATIONAL FOOD PROCESSORS ASSOCIATION (NFPA) GUIDELINES FOR VOLUNTARY OPEN DATING OF FOODS

Guidelines for Voluntary Open Dating of Foods

(excerpts from the NFPA booklet)

II. Introduction

Shelf Stable Foods

... It is important to distinguish voluntary open dating for shelf stable foods from the container code marking requirement of low-acid canned foods specified at 21 CFR §113.60©. While the regulations require that low-acid canned food containers be marked with date information, including year packed, day packed, and the period during which it is packed, this information does not need to be in a form decipherable by consumers, nor does it necessarily provide information on the durability of the shelf-stable food.

Refrigerated and Frozen Foods

... Manufacturers are in the most knowledgeable position to establish the shelf life and consequently the specific date labeling information that is most useful to the consumer. It is recognized that many factors will influence the shelf life. These include, but are not limited to: the temperature of storage, the composition of the product, the degree of processing, the nature of the ingredients, and the packaging system (inclusive of the packaging atmosphere).

V. Recommended Presentations

To harmonize date labeling and to keep within the cultural norm in the United States, MMDDYY format is recommended, either alphanumeric or numeric (e.g., JA3199 or 013199).

Products With a Shelf Life of Three Months or Less

For products with a shelf life of three months or less, the date may be expressed as MMDD or optionally as MMDDYY. The year may be omitted. For products intended for sale overseas, such products should meet the cultural and regulatory requirements of the particular country in which the product is being sold.

Products With a Shelf Life of Over Three Months

For products with a shelf life over three months, the date may be expressed as MMY or as MMDDYY. The day of the month may be omitted. For products intended for sale overseas, such products should meet the cultural and regulatory requirement of the particular country in which the product is being sold.

APPENDIX D

OPEN DATE PROMINENCE SURVEY AND RESULTS

Product Sample No. 1



Product Sample No. 2



Product Sample No. 3



Product Sample No. 4



Product Sample No. 5



Product Sample No. 6



Product Sample No. 7



Product Sample No. 8



Product Sample No. 9



Product Sample No. 10



Product Sample No. 11



Product Sample No. 12



Product Sample No. 13



Product Sample No. 14



Product Sample No. 15



Product Sample No. 16



Product Sample No. 17



Product Sample No. 18



Product Sample No. 19



Product Sample No. 20



Table D-1: Prominence Score Statistics (FDA and ERG Surveys Combined)

Product Sample	Mean	Median	Minimum	Maximum	Variance
1	4.50	4	1	7	3.32
2	5.33	5	3	9	3.18
3	7.72	8	3	10	3.15
4	7.17	7.5	3	10	4.85
5	5.94	6	3	10	3.11
6	4.00	4	2	6	2.12
7	3.67	4	1	7	3.41
8	3.72	3.5	2	7	2.57
9	4.22	4	2	7	2.07
10	5.06	5	3	10	3.47
11	5.71	6	2	8	2.35
12	2.19	1	0	7	4.30
13	7.24	7	5	10	2.69
14	6.24	7	3	9	3.07
15	5.29	5	2	9	5.10
16	6.47	7	4	10	3.76
17	3.29	3	1	8	3.35
18	3.59	3	1	7	2.76
19	5.00	5	2	8	3.50
20	5.47	5	1	10	6.01

Table D-2: Spearman Rank Correlation Coefficients Between Survey Respondents (n = 18)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1																	
2	.38	1																
3	.61	.60	1															
4	.55	.47	.74	1														
5	.31	.23	.25	.42	1													
6	.58	.71	.73	.77	.40	1												
7	.76	.54	.78	.59	.14	.69	1											
8	.80	.37	.63	.53	.36	.47	.58	1										
9	.55	.26	.62	.72	.24	.60	.46	.46	1									
10	.40	.00	.52	.68	.39	.34	.33	.51	.65	1								
11	.48	-.3	.47	.34	.10	.04	.26	.33	.61	.60	1							
12	.46	-.0	.49	.52	.18	.30	.12	.63	.78	.53	.60	1						
13	.55	.24	.46	.43	.34	.37	.28	.52	.63	.57	.64	.61	1					
14	.53	.18	.51	.53	.41	.38	.23	.53	.74	.63	.61	.67	.79	1				
15	.58	.03	.49	.47	.26	.33	.30	.51	.74	.66	.45	.63	.66	.77	1			
16	.64	.12	.59	.47	.20	.39	.37	.63	.69	.57	.75	.70	.79	.83	.82	1		
17	.41	-.1	.25	.37	.25	.14	.06	.44	.47	.58	.74	.62	.75	.70	.60	.61	1	
18	.64	.34	.41	.48	.38	.46	.47	.45	.42	.27	.74	.23	.43	.46	.44	.60	.29	1

APPENDIX E

INFORMATION LETTER SENT TO PARTICIPATING SUPERMARKETS

Date

Name

Title

Company Name

Company Address

Re: FDA-sponsored study on food product dating practices

Dear _____,

Eastern Research Group, Inc. (ERG) has been contracted by the U.S. Food and Drug Administration (FDA) to conduct a study on food product dating practices of manufacturers (Contract No. 223-01-2461). The study is being directed by [FDA Project Officer Name \(Phone Number, E-mail Address\)](#) of Center for Food Safety and Applied Nutrition (CFSAN) at FDA.

The study is intended to provide the Agency with data on the nature and extent of open dating of food products by surveying food product date labels in a supermarket. Basically, the survey involves the systematic examination of different shelf-keeping units in several different product categories, and would require the presence of one or two of our surveyors in your store for several hours a day for a period of two to five days. In our experience thus far, our surveys have not been disruptive to store operations or shopping activities in any way.

We hope to conduct such a survey in an area [Company Name](#) supermarket during _____. Specifically, we are looking for a supermarket with a large variety of brands, and would appreciate it greatly if you could recommend such a [Company Name](#) store for us to visit. As I mentioned, our surveyors simply look at a product's date (or lack of date) and then place the product back on the shelf. Their activity is quite innocuous and has not proven to be an inconvenience either to shoppers or employees.

Your participation in this study would be greatly appreciated. Please feel free to contact [ERG Project Manager Name \(Phone Number, E-mail Address\)](#), should you have any questions/concerns about the survey. Thank you very much for your attention and consideration to this matter. I look forward to hearing from you soon.

Sincerely,

[ERG Project Manager Name](#)

APPENDIX F

SAMPLE SURVEY DATA ENTRY FORM

Figure F-1: Sample Survey Data Entry Form

Brand/Name	ERG Identifier	Not in Store	Number of SKUs Sampled	No date (A)	Use-by (B)	Best-if used-by (C)	Sell-by (D)	Expiration (Exp) (E)	Unspecified (F)	Other (G)	Type of Packaging (H)	Size of Print (I)	Location (J)	Background (K)	Prominence (L)
Category Name	CANNED/BOTTLED FRUIT			Supermarket Product Aisle _____											
LUCKY LEAF APPLE SAUCE/FRUIT SAUCE	6	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	<input type="checkbox"/>	_____
SKU #1	_____			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	<input type="checkbox"/>	_____
SKU #2	_____			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	<input type="checkbox"/>	_____
SKU #3	_____			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	<input type="checkbox"/>	_____
SKU #4	_____			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	<input type="checkbox"/>	_____
SKU #5	_____			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	<input type="checkbox"/>	_____
MOTT'S NICKLODORON BLUES CLUES APPLE SAUCE/FRUIT SAUCE	3	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	<input type="checkbox"/>	_____
SKU #1	_____			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	<input type="checkbox"/>	_____
SKU #2	_____			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	<input type="checkbox"/>	_____
SKU #3	_____			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	<input type="checkbox"/>	_____
SKU #4	_____			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	<input type="checkbox"/>	_____
SKU #5	_____			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	<input type="checkbox"/>	_____
MUSSELMANN FRUIT N SAUCE APPLE SAUCE/FRUIT SAUCE	3	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	<input type="checkbox"/>	_____
SKU #1	_____			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	<input type="checkbox"/>	_____
SKU #2	_____			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	<input type="checkbox"/>	_____
SKU #3	_____			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	<input type="checkbox"/>	_____
SKU #4	_____			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	<input type="checkbox"/>	_____
SKU #5	_____			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	<input type="checkbox"/>	_____

APPENDIX G

SELECTED SURVEY RESULTS FOR NAME BRAND AND PRIVATE LABEL PRODUCTS, BY DETAILED PRODUCT CATEGORY

Table G-1: Prevalence of Open Dating in Name Brand Products, by Product Category

Major Product Category	Product Category	Name Brands Sampled	Share of Name Brands with		
			"Mixed" Dates	No Open Dates	Open Dates
Baked Goods	Bakery Snacks	13	0.00%	0.00%	100.00%
Baked Goods	English Muffins	1	0.00%	0.00%	100.00%
Baked Goods	Fresh Bread & Rolls	26	3.85%	0.00%	96.15%
Baked Goods	Pastry/Doughnuts	8	0.00%	0.00%	100.00%
Baked Goods	Pies & Cakes	2	0.00%	0.00%	100.00%
Dairy	Butter	4	0.00%	0.00%	100.00%
Dairy	Cheese	46	2.17%	0.00%	97.83%
Dairy	Cottage Cheese	4	0.00%	0.00%	100.00%
Dairy	Creams/Creamers	6	0.00%	0.00%	100.00%
Dairy	Milk	15	0.00%	0.00%	100.00%
Dairy	Sour Cream	4	0.00%	0.00%	100.00%
Dairy	Yogurt	18	0.00%	0.00%	100.00%
Frozen	Fz Coffee Creamer	1	0.00%	100.00%	0.00%
Frozen	Fz Deserts/Ice Cream	101	1.98%	71.29%	26.73%
Frozen	Fz Dinners/Entrees	34	0.00%	94.12%	5.88%
Frozen	Fz Dough/Baked Goods/Other [a]	20	0.00%	55.00%	45.00%
Frozen	Fz Meat/Poultry/Pot Pies [a]	33	3.03%	81.82%	15.15%
Frozen	Fz Pasta	6	0.00%	83.33%	16.67%
Frozen	Fz Pizza	16	0.00%	100.00%	0.00%
Frozen	Fz Seafood	8	0.00%	100.00%	0.00%
Frozen	Fz Side Dishes/Appetizers/Other [a]	19	0.00%	84.21%	15.79%
Frozen	Fz Vegetables/Fruits [a]	49	2.04%	97.96%	0.00%
Frozen	Juices – Frozen	10	0.00%	30.00%	70.00%
Refrigerated	All Other Deli	2	0.00%	0.00%	100.00%
Refrigerated	Baked Goods – Rfg	1	0.00%	0.00%	100.00%
Refrigerated	Breakfast Meats	11	0.00%	0.00%	100.00%
Refrigerated	Cheesecakes	NA	NA	NA	NA
Refrigerated	Desserts – Rfg	6	0.00%	0.00%	100.00%
Refrigerated	Dinner Sausage	7	0.00%	0.00%	100.00%
Refrigerated	Dough/Biscuit Dough – Rfg	5	0.00%	0.00%	100.00%
Refrigerated	Entree/Side Dishes [a]	10	0.00%	10.00%	90.00%
Refrigerated	Frankfurters	18	0.00%	0.00%	100.00%
Refrigerated	Luncheon Meats	22	0.00%	0.00%	100.00%
Refrigerated	Lunches – Rfg	4	0.00%	0.00%	100.00%
Refrigerated	Margarine/Spreads/Butter Blen	17	0.00%	0.00%	100.00%
Refrigerated	Meat Pies	1	0.00%	0.00%	100.00%
Refrigerated	Other Rfg Products [a]	34	2.94%	5.88%	91.18%
Refrigerated	Pasta – Rfg	2	0.00%	0.00%	100.00%
Refrigerated	Pickles/Relish – Rfg	2	0.00%	0.00%	100.00%
Refrigerated	Rfg Dips	4	0.00%	0.00%	100.00%
Refrigerated	Rfg Tortilla/Eggroll/Wontn Wrap	1	0.00%	0.00%	100.00%
Refrigerated	Salad Dressing – Rfg	1	0.00%	0.00%	100.00%
Refrigerated	Seafood – Rfg	2	0.00%	0.00%	100.00%
Refrigerated	Spreads – Rfg	1	0.00%	0.00%	100.00%
Shelf-Stable	All Other Breakfast Food	4	0.00%	0.00%	100.00%
Shelf-Stable	Baking Needs/Stuffing/Bread Products [a] [b]	110	6.36%	60.00%	33.64%
Shelf-Stable	Baking Nuts	1	100.00%	0.00%	0.00%
Shelf-Stable	Bottled Water	6	0.00%	0.00%	100.00%
Shelf-Stable	Canned Goods [a]	128	4.69%	78.91%	16.41%
Shelf-Stable	Caramel/Taffy Apples & Kits	NA	NA	NA	NA

Table G-1: Prevalence of Open Dating in Name Brand Products, by Product Category

Major Product Category	Product Category	Name Brands Sampled	Share of Name Brands with		
			"Mixed" Dates	No Open Dates	Open Dates
Shelf-Stable	Chocolate Candy (Non-Seas)	46	0.00%	95.65%	4.35%
Shelf-Stable	Cold Cereal	93	0.00%	0.00%	100.00%
Shelf-Stable	Condiments/Sauces/Salad Dressings [a]	144	2.78%	56.94%	40.28%
Shelf-Stable	Cookies	55	0.00%	83.64%	16.36%
Shelf-Stable	Dip – Ss	2	0.00%	0.00%	100.00%
Shelf-Stable	Dry Beans/Vegetables	1	0.00%	100.00%	0.00%
Shelf-Stable	Dry Snacks [a]	136	2.94%	58.82%	38.24%
Shelf-Stable	Gum	16	0.00%	100.00%	0.00%
Shelf-Stable	Hot Beverages/Beverage Condiments [a]	107	2.80%	69.16%	28.04%
Shelf-Stable	Hot Cereal	6	16.67%	0.00%	83.33%
Shelf-Stable	Juices/Drink Mixes/Other Beverages [a]	174	4.60%	51.72%	43.68%
Shelf-Stable	Marshmallows	1	0.00%	0.00%	100.00%
Shelf-Stable	Mayonnaise	7	0.00%	0.00%	100.00%
Shelf-Stable	Non Chocolate Candy(Non-Seas)	21	0.00%	100.00%	0.00%
Shelf-Stable	Non-Fruit Drinks – Ss	4	0.00%	0.00%	100.00%
Shelf-Stable	Pancake, Desert, & Ice Cream Supplies/Candy [a]	97	3.09%	73.20%	23.71%
Shelf-Stable	Pizza Products	2	0.00%	0.00%	100.00%
Shelf-Stable	Powdered Milk	1	0.00%	0.00%	100.00%
Shelf-Stable	Salty Snacks	50	0.00%	10.00%	90.00%
Shelf-Stable	Spices/Seasonings	15	0.00%	100.00%	0.00%
Shelf-Stable	Sugar	3	0.00%	100.00%	0.00%
Shelf-Stable	Unclassified/Other [a]	120	5.00%	57.50%	37.50%
Shelf-Stable	Vegetables	30	0.00%	100.00%	0.00%
Shelf-Stable	Weight Con/Nutrition Liq/Pwd	NA	NA	NA	NA
Shelf-Stable	Weight Control Candy/Tablets	1	0.00%	0.00%	100.00%
Total		1,982	2.52%	53.28%	44.20%

Source: ERG, 2002

NA = Not applicable

[a] Indicates that the category is revised by collapsing a number of IRI product categories.

[b] Some brands for the product category are refrigerated.

Table G-2: Prevalence of Open Dating in Private Label Products of Supermarket A (PL 1 Survey), by Product Category

Major Product Category	Product Category	PL 1 Brands Sampled	Share of PL 1 Brands with		
			"Mixed" Dates	No Open Dates	Open Dates
Baked Goods	Bakery Snacks	NA	NA	NA	NA
Baked Goods	English Muffins	1	0.00%	0.00%	100.00%
Baked Goods	Fresh Bread & Rolls	3	0.00%	0.00%	100.00%
Baked Goods	Pastry/Doughnuts	2	0.00%	0.00%	100.00%
Baked Goods	Pies & Cakes	2	0.00%	0.00%	100.00%
Dairy	Butter	1	0.00%	0.00%	100.00%
Dairy	Cheese	7	0.00%	0.00%	100.00%
Dairy	Cottage Cheese	1	0.00%	0.00%	100.00%
Dairy	Creams/Creamers	1	0.00%	0.00%	100.00%
Dairy	Milk	2	0.00%	0.00%	100.00%
Dairy	Sour Cream	1	0.00%	0.00%	100.00%
Dairy	Yogurt	1	0.00%	0.00%	100.00%
Frozen	Fz Coffee Creamer	1	0.00%	100.00%	0.00%
Frozen	Fz Deserts/Ice Cream	6	33.33%	16.67%	50.00%
Frozen	Fz Dinners/Entrees	1	0.00%	100.00%	0.00%
Frozen	Fz Dough/Baked Goods/Other [a]	3	0.00%	33.33%	66.67%
Frozen	Fz Meat/Poultry/Pot Pies [a]	1	0.00%	100.00%	0.00%
Frozen	Fz Pasta	1	100.00%	0.00%	0.00%
Frozen	Fz Pizza	1	0.00%	100.00%	0.00%
Frozen	Fz Seafood	1	0.00%	100.00%	0.00%
Frozen	Fz Side Dishes/Appetizers/Other [a]	3	0.00%	33.33%	66.67%
Frozen	Fz Vegetables/Fruits [a]	13	46.15%	0.00%	53.85%
Frozen	Juices – Frozen	6	0.00%	0.00%	100.00%
Refrigerated	All Other Deli	1	0.00%	0.00%	100.00%
Refrigerated	Baked Goods – Rfg	NA	NA	NA	NA
Refrigerated	Breakfast Meats	1	0.00%	0.00%	100.00%
Refrigerated	Cheesecakes	NA	NA	NA	NA
Refrigerated	Desserts – Rfg	1	0.00%	0.00%	100.00%
Refrigerated	Dinner Sausage	1	0.00%	0.00%	100.00%
Refrigerated	Dough/Biscuit Dough - Rfg	2	0.00%	0.00%	100.00%
Refrigerated	Entree/Side Dishes [a]	6	0.00%	0.00%	100.00%
Refrigerated	Frankfurters	NA	NA	NA	NA
Refrigerated	Luncheon Meats	1	0.00%	0.00%	100.00%
Refrigerated	Lunches – Rfg	NA	NA	NA	NA
Refrigerated	Margarine/Spreads/Butter Blen	1	0.00%	0.00%	100.00%
Refrigerated	Meat Pies	NA	NA	NA	NA
Refrigerated	Other Rfg Products [a]	2	0.00%	0.00%	100.00%
Refrigerated	Pasta – Rfg	NA	NA	NA	NA
Refrigerated	Pickles/Relish – Rfg	NA	NA	NA	NA
Refrigerated	Rfg Dips	1	0.00%	0.00%	100.00%
Refrigerated	Rfg Tortilla/Eggroll/Wontn Wrap	NA	NA	NA	NA
Refrigerated	Salad Dressing – Rfg	NA	NA	NA	NA
Refrigerated	Seafood – Rfg	NA	NA	NA	NA
Refrigerated	Spreads – Rfg	NA	NA	NA	NA
Shelf-Stable	All Other Breakfast Food	1	0.00%	0.00%	100.00%
Shelf-Stable	Baking Needs/Stuffing/Bread Products [a] [b]	17	5.88%	23.53%	70.59%
Shelf-Stable	Baking Nuts	NA	NA	NA	NA
Shelf-Stable	Bottled Water	2	0.00%	0.00%	100.00%
Shelf-Stable	Canned Goods [a]	14	14.29%	28.57%	57.14%

Table G-2: Prevalence of Open Dating in Private Label Products of Supermarket A (PL 1 Survey), by Product Category

Major Product Category	Product Category	PL 1 Brands Sampled	Share of PL 1 Brands with		
			"Mixed" Dates	No Open Dates	Open Dates
Shelf-Stable	Caramel/Taffy Apples & Kits	NA	NA	NA	NA
Shelf-Stable	Chocolate Candy (Non-Seas)	1	0.00%	0.00%	100.00%
Shelf-Stable	Cold Cereal	1	0.00%	0.00%	100.00%
Shelf-Stable	Condiments/Sauces/Salad Dressings [a]	12	41.67%	25.00%	33.33%
Shelf-Stable	Cookies	1	100.00%	0.00%	0.00%
Shelf-Stable	Dip – Ss	NA	NA	NA	NA
Shelf-Stable	Dry Beans/Vegetables	NA	NA	NA	NA
Shelf-Stable	Dry Snacks [a]	11	9.09%	0.00%	90.91%
Shelf-Stable	Gum	NA	NA	NA	NA
Shelf-Stable	Hot Beverages/Beverage Condiments [a]	10	20.00%	40.00%	40.00%
Shelf-Stable	Hot Cereal	1	0.00%	0.00%	100.00%
Shelf-Stable	Juices/Drink Mixes/Other Beverages [a]	15	20.00%	46.67%	33.33%
Shelf-Stable	Marshmallows	1	0.00%	0.00%	100.00%
Shelf-Stable	Mayonnaise	1	0.00%	0.00%	100.00%
Shelf-Stable	Non Chocolate Candy(Non-Seas)	3	0.00%	0.00%	100.00%
Shelf-Stable	Non-Fruit Drinks - Ss	NA	NA	NA	NA
Shelf-Stable	Pancake, Desert, & Ice Cream Supplies/Candy [a]	10	10.00%	10.00%	80.00%
Shelf-Stable	Pizza Products	NA	NA	NA	NA
Shelf-Stable	Powdered Milk	1	0.00%	0.00%	100.00%
Shelf-Stable	Salty Snacks	4	25.00%	0.00%	75.00%
Shelf-Stable	Spices/Seasonings	4	0.00%	100.00%	0.00%
Shelf-Stable	Sugar	2	0.00%	100.00%	0.00%
Shelf-Stable	Unclassified/Other [a]	8	25.00%	12.50%	62.50%
Shelf-Stable	Vegetables	10	30.00%	60.00%	10.00%
Shelf-Stable	Weight Con/Nutrition Liq/Pwd	NA	NA	NA	NA
Shelf-Stable	Weight Control Candy/Tablets	NA	NA	NA	NA
Total		206	15.05%	21.36%	63.59%

Source: ERG, 2002

NA = Not applicable

[a] Indicates that the category is revised by collapsing a number of IRI product categories.

[b] Some brands for the product category are refrigerated.

Table G-3: Prevalence of Open Dating in Private Label Products of Supermarket B (PL 2 Survey), by Product Category

Major Product Category	Product Category	PL 2 Brands Sampled	Share of PL 2 Brands with		
			"Mixed" Dates	No Open Dates	Open Dates
Baked Goods	Bakery Snacks	1	0.00%	0.00%	100.00%
Baked Goods	English Muffins	1	0.00%	0.00%	100.00%
Baked Goods	Fresh Bread & Rolls	3	0.00%	0.00%	100.00%
Baked Goods	Pastry/Doughnuts	2	0.00%	0.00%	100.00%
Baked Goods	Pies & Cakes	2	0.00%	0.00%	100.00%
Dairy	Butter	1	0.00%	0.00%	100.00%
Dairy	Cheese	7	14.29%	0.00%	85.71%
Dairy	Cottage Cheese	1	0.00%	0.00%	100.00%
Dairy	Creams/Creamers	2	0.00%	0.00%	100.00%
Dairy	Milk	2	0.00%	0.00%	100.00%
Dairy	Sour Cream	1	0.00%	0.00%	100.00%
Dairy	Yogurt	1	0.00%	0.00%	100.00%
Frozen	Fz Coffee Creamer	1	0.00%	100.00%	0.00%
Frozen	Fz Deserts/Ice Cream	4	50.00%	0.00%	50.00%
Frozen	Fz Dinners/Entrees	NA	NA	NA	NA
Frozen	Fz Dough/Baked Goods/Other [a]	3	0.00%	66.67%	33.33%
Frozen	Fz Meat/Poultry/Pot Pies [a]	2	50.00%	0.00%	50.00%
Frozen	Fz Pasta	NA	NA	NA	NA
Frozen	Fz Pizza	1	0.00%	0.00%	100.00%
Frozen	Fz Seafood	1	0.00%	100.00%	0.00%
Frozen	Fz Side Dishes/Appetizers/Other [a]	1	0.00%	100.00%	0.00%
Frozen	Fz Vegetables/Fruits [a]	13	46.15%	7.69%	46.15%
Frozen	Juices – Frozen	5	0.00%	20.00%	80.00%
Refrigerated	All Other Deli	1	0.00%	0.00%	100.00%
Refrigerated	Baked Goods – Rfg	3	0.00%	0.00%	100.00%
Refrigerated	Breakfast Meats	2	50.00%	0.00%	50.00%
Refrigerated	Cheesecakes	1	0.00%	0.00%	100.00%
Refrigerated	Desserts – Rfg	1	0.00%	0.00%	100.00%
Refrigerated	Dinner Sausage	1	0.00%	0.00%	100.00%
Refrigerated	Dough/Biscuit Dough - Rfg	3	0.00%	0.00%	100.00%
Refrigerated	Entree/Side Dishes [a]	6	0.00%	0.00%	100.00%
Refrigerated	Frankfurters	1	100.00%	0.00%	0.00%
Refrigerated	Luncheon Meats	2	0.00%	0.00%	100.00%
Refrigerated	Lunches – Rfg	NA	NA	NA	NA
Refrigerated	Margarine/Spreads/Butter Blen	1	0.00%	0.00%	100.00%
Refrigerated	Meat Pies	NA	NA	NA	NA
Refrigerated	Other Rfg Products [a]	2	0.00%	0.00%	100.00%
Refrigerated	Pasta – Rfg	NA	NA	NA	NA
Refrigerated	Pickles/Relish – Rfg	NA	NA	NA	NA
Refrigerated	Rfg Dips	1	0.00%	0.00%	100.00%
Refrigerated	Rfg Tortilla/Eggrll/Wontn Wrap	NA	NA	NA	NA
Refrigerated	Salad Dressing – Rfg	NA	NA	NA	NA
Refrigerated	Seafood – Rfg	NA	NA	NA	NA
Refrigerated	Spreads – Rfg	NA	NA	NA	NA
Shelf-Stable	All Other Breakfast Food	2	0.00%	0.00%	100.00%
Shelf-Stable	Baking Needs/Stuffing/Bread Products [a] [b]	19	15.79%	10.53%	73.68%
Shelf-Stable	Baking Nuts	NA	NA	NA	NA
Shelf-Stable	Bottled Water	1	0.00%	0.00%	100.00%
Shelf-Stable	Canned Goods [a]	16	25.00%	18.75%	56.25%

Table G-3: Prevalence of Open Dating in Private Label Products of Supermarket B (PL 2 Survey), by Product Category

Major Product Category	Product Category	PL 2 Brands Sampled	Share of PL 2 Brands with		
			"Mixed" Dates	No Open Dates	Open Dates
Shelf-Stable	Caramel/Taffy Apples & Kits	NA	NA	NA	NA
Shelf-Stable	Chocolate Candy (Non-Seas)	NA	NA	NA	NA
Shelf-Stable	Cold Cereal	1	100.00%	0.00%	0.00%
Shelf-Stable	Condiments/Sauces/Salad Dressings [a]	18	16.67%	0.00%	83.33%
Shelf-Stable	Cookies	1	100.00%	0.00%	0.00%
Shelf-Stable	Dip – Ss	NA	NA	NA	NA
Shelf-Stable	Dry Beans/Vegetables	NA	NA	NA	NA
Shelf-Stable	Dry Snacks [a]	11	18.18%	9.09%	72.73%
Shelf-Stable	Gum	NA	NA	NA	NA
Shelf-Stable	Hot Beverages/Beverage Condiments [a]	11	27.27%	0.00%	72.73%
Shelf-Stable	Hot Cereal	1	0.00%	0.00%	100.00%
Shelf-Stable	Juices/Drink Mixes/Other Beverages [a]	14	21.43%	0.00%	78.57%
Shelf-Stable	Marshmallows	1	0.00%	0.00%	100.00%
Shelf-Stable	Mayonnaise	1	0.00%	0.00%	100.00%
Shelf-Stable	Non Chocolate Candy(Non-Seas)	3	0.00%	0.00%	100.00%
Shelf-Stable	Non-Fruit Drinks - Ss	NA	NA	NA	NA
Shelf-Stable	Pancake, Desert, & Ice Cream Supplies/Candy [a]	11	18.18%	9.09%	72.73%
Shelf-Stable	Pizza Products	NA	NA	NA	NA
Shelf-Stable	Powdered Milk	NA	NA	NA	NA
Shelf-Stable	Salty Snacks	6	0.00%	0.00%	100.00%
Shelf-Stable	Spices/Seasonings	4	0.00%	50.00%	50.00%
Shelf-Stable	Sugar	2	0.00%	100.00%	0.00%
Shelf-Stable	Unclassified/Other [a]	8	25.00%	0.00%	75.00%
Shelf-Stable	Vegetables	11	27.27%	72.73%	0.00%
Shelf-Stable	Weight Con/Nutrition Liq/Pwd	NA	NA	NA	NA
Shelf-Stable	Weight Control Candy/Tablets	NA	NA	NA	NA
Total		222	17.57%	11.71%	70.72%

Source: ERG, 2002

NA = Not applicable

[a] Indicates that the category is revised by collapsing a number of IRI product categories.

[b] Some brands for the product category are refrigerated.

Table G-4: Prevalence of Open Dating in Private Label Products of Supermarket C (PL 3 Survey), by Product Category

Major Product Category	Product Category	PL 3 Brands Sampled	Share of PL 3 Brands with		
			"Mixed" Dates	No Open Dates	Open Dates
Baked Goods	Bakery Snacks	1	0.00%	0.00%	100.00%
Baked Goods	English Muffins	NA	NA	NA	NA
Baked Goods	Fresh Bread & Rolls	3	0.00%	33.33%	66.67%
Baked Goods	Pastry/Doughnuts	2	0.00%	0.00%	100.00%
Baked Goods	Pies & Cakes	2	0.00%	0.00%	100.00%
Dairy	Butter	1	0.00%	0.00%	100.00%
Dairy	Cheese	4	0.00%	0.00%	100.00%
Dairy	Cottage Cheese	NA	NA	NA	NA
Dairy	Creams/Creamers	NA	NA	NA	NA
Dairy	Milk	2	0.00%	0.00%	100.00%
Dairy	Sour Cream	NA	NA	NA	NA
Dairy	Yogurt	NA	NA	NA	NA
Frozen	Fz Coffee Creamer	NA	NA	NA	NA
Frozen	Fz Deserts/Ice Cream	2	0.00%	100.00%	0.00%
Frozen	Fz Dinners/Entrees	1	0.00%	100.00%	0.00%
Frozen	Fz Dough/Baked Goods/Other [a]	NA	NA	NA	NA
Frozen	Fz Meat/Poultry/Pot Pies [a]	NA	NA	NA	NA
Frozen	Fz Pasta	NA	NA	NA	NA
Frozen	Fz Pizza	NA	NA	NA	NA
Frozen	Fz Seafood	NA	NA	NA	NA
Frozen	Fz Side Dishes/Appetizers/Other [a]	NA	NA	NA	NA
Frozen	Fz Vegetables/Fruits [a]	NA	NA	NA	NA
Frozen	Juices – Frozen	1	0.00%	100.00%	0.00%
Refrigerated	All Other Deli	1	0.00%	0.00%	100.00%
Refrigerated	Baked Goods – Rfg	2	0.00%	0.00%	100.00%
Refrigerated	Breakfast Meats	1	0.00%	0.00%	100.00%
Refrigerated	Cheesecakes	1	0.00%	0.00%	100.00%
Refrigerated	Desserts – Rfg	NA	NA	NA	NA
Refrigerated	Dinner Sausage	NA	NA	NA	NA
Refrigerated	Dough/Biscuit Dough - Rfg	1	0.00%	0.00%	100.00%
Refrigerated	Entree/Side Dishes [a]	5	0.00%	0.00%	100.00%
Refrigerated	Frankfurters	NA	NA	NA	NA
Refrigerated	Luncheon Meats	1	0.00%	0.00%	100.00%
Refrigerated	Lunches – Rfg	1	0.00%	0.00%	100.00%
Refrigerated	Margarine/Spreads/Butter Blen	1	0.00%	0.00%	100.00%
Refrigerated	Meat Pies	NA	NA	NA	NA
Refrigerated	Other Rfg Products [a]	2	0.00%	50.00%	50.00%
Refrigerated	Pasta – Rfg	NA	NA	NA	NA
Refrigerated	Pickles/Relish – Rfg	NA	NA	NA	NA
Refrigerated	Rfg Dips	NA	NA	NA	NA
Refrigerated	Rfg Tortilla/Eggroll/Wontn Wrap	NA	NA	NA	NA
Refrigerated	Salad Dressing – Rfg	NA	NA	NA	NA
Refrigerated	Seafood – Rfg	NA	NA	NA	NA
Refrigerated	Spreads – Rfg	NA	NA	NA	NA
Shelf-Stable	All Other Breakfast Food	NA	NA	NA	NA
Shelf-Stable	Baking Needs/Stuffing/Bread Products [a] [b]	6	0.00%	16.67%	83.33%
Shelf-Stable	Baking Nuts	NA	NA	NA	NA
Shelf-Stable	Bottled Water	1	0.00%	0.00%	100.00%
Shelf-Stable	Canned Goods [a]	11	0.00%	81.82%	18.18%

Table G-4: Prevalence of Open Dating in Private Label Products of Supermarket C (PL 3 Survey), by Product Category

Major Product Category	Product Category	PL 3 Brands Sampled	Share of PL 3 Brands with		
			"Mixed" Dates	No Open Dates	Open Dates
Shelf-Stable	Caramel/Taffy Apples & Kits	NA	NA	NA	NA
Shelf-Stable	Chocolate Candy (Non-Seas)	1	0.00%	0.00%	100.00%
Shelf-Stable	Cold Cereal	NA	NA	NA	NA
Shelf-Stable	Condiments/Sauces/Salad Dressings [a]	5	0.00%	60.00%	40.00%
Shelf-Stable	Cookies	1	0.00%	100.00%	0.00%
Shelf-Stable	Dip – Ss	1	0.00%	0.00%	100.00%
Shelf-Stable	Dry Beans/Vegetables	NA	NA	NA	NA
Shelf-Stable	Dry Snacks [a]	5	20.00%	60.00%	20.00%
Shelf-Stable	Gum	NA	NA	NA	NA
Shelf-Stable	Hot Beverages/Beverage Condiments [a]	5	0.00%	60.00%	40.00%
Shelf-Stable	Hot Cereal	NA	NA	NA	NA
Shelf-Stable	Juices/Drink Mixes/Other Beverages [a]	6	0.00%	100.00%	0.00%
Shelf-Stable	Marshmallows	NA	NA	NA	NA
Shelf-Stable	Mayonnaise	1	0.00%	0.00%	100.00%
Shelf-Stable	Non Chocolate Candy(Non-Seas)	2	0.00%	100.00%	0.00%
Shelf-Stable	Non-Fruit Drinks - Ss	NA	NA	NA	NA
Shelf-Stable	Pancake, Desert, & Ice Cream Supplies/Candy [a]	5	0.00%	0.00%	100.00%
Shelf-Stable	Pizza Products	NA	NA	NA	NA
Shelf-Stable	Powdered Milk	NA	NA	NA	NA
Shelf-Stable	Salty Snacks	NA	NA	NA	NA
Shelf-Stable	Spices/Seasonings	NA	NA	NA	NA
Shelf-Stable	Sugar	1	0.00%	100.00%	0.00%
Shelf-Stable	Unclassified/Other [a]	6	0.00%	83.33%	16.67%
Shelf-Stable	Vegetables	8	0.00%	100.00%	0.00%
Shelf-Stable	Weight Con/Nutrition Liq/Pwd	NA	NA	NA	NA
Shelf-Stable	Weight Control Candy/Tablets	NA	NA	NA	NA
Total		100	1.00%	48.00%	51.00%

Source: ERG, 2002

NA = Not applicable

[a] Indicates that the category is revised by collapsing a number of IRI product categories.

[b] Some brands for the product category are refrigerated.

Table G-5: Prevalence of Open Dating in Private Label Products of Supermarket D (PL 4 Survey), by Product Category

Major Product Category	Product Category	PL 4 Brands Sampled	Share of PL 4 Brands with		
			"Mixed" Dates	No Open Dates	Open Dates
Baked Goods	Bakery Snacks	1	0.00%	0.00%	100.00%
Baked Goods	English Muffins	NA	NA	NA	NA
Baked Goods	Fresh Bread & Rolls	3	0.00%	0.00%	100.00%
Baked Goods	Pastry/Doughnuts	3	0.00%	0.00%	100.00%
Baked Goods	Pies & Cakes	2	0.00%	0.00%	100.00%
Dairy	Butter	1	0.00%	0.00%	100.00%
Dairy	Cheese	6	0.00%	0.00%	100.00%
Dairy	Cottage Cheese	1	0.00%	0.00%	100.00%
Dairy	Creams/Creamers	2	0.00%	0.00%	100.00%
Dairy	Milk	3	0.00%	0.00%	100.00%
Dairy	Sour Cream	1	0.00%	0.00%	100.00%
Dairy	Yogurt	1	0.00%	0.00%	100.00%
Frozen	Fz Coffee Creamer	1	0.00%	0.00%	100.00%
Frozen	Fz Deserts/Ice Cream	6	16.67%	0.00%	83.33%
Frozen	Fz Dinners/Entrees	NA	NA	NA	NA
Frozen	Fz Dough/Baked Goods/Other [a]	3	33.33%	0.00%	66.67%
Frozen	Fz Meat/Poultry/Pot Pies [a]	1	100.00%	0.00%	0.00%
Frozen	Fz Pasta	NA	NA	NA	NA
Frozen	Fz Pizza	1	0.00%	0.00%	100.00%
Frozen	Fz Seafood	1	0.00%	0.00%	100.00%
Frozen	Fz Side Dishes/Appetizers/Other [a]	2	50.00%	0.00%	50.00%
Frozen	Fz Vegetables/Fruits [a]	14	14.29%	7.14%	78.57%
Frozen	Juices – Frozen	6	0.00%	0.00%	100.00%
Refrigerated	All Other Deli	1	0.00%	0.00%	100.00%
Refrigerated	Baked Goods – Rfg	2	0.00%	0.00%	100.00%
Refrigerated	Breakfast Meats	1	0.00%	0.00%	100.00%
Refrigerated	Cheesecakes	NA	NA	NA	NA
Refrigerated	Desserts – Rfg	1	0.00%	0.00%	100.00%
Refrigerated	Dinner Sausage	1	0.00%	0.00%	100.00%
Refrigerated	Dough/Biscuit Dough - Rfg	3	0.00%	0.00%	100.00%
Refrigerated	Entree/Side Dishes [a]	3	0.00%	0.00%	100.00%
Refrigerated	Frankfurters	1	0.00%	0.00%	100.00%
Refrigerated	Luncheon Meats	1	0.00%	0.00%	100.00%
Refrigerated	Lunches – Rfg	1	0.00%	0.00%	100.00%
Refrigerated	Margarine/Spreads/Butter Blen	1	100.00%	0.00%	0.00%
Refrigerated	Meat Pies	NA	NA	NA	NA
Refrigerated	Other Rfg Products [a]	5	0.00%	0.00%	100.00%
Refrigerated	Pasta – Rfg	NA	NA	NA	NA
Refrigerated	Pickles/Relish – Rfg	NA	NA	NA	NA
Refrigerated	Rfg Dips	NA	NA	NA	NA
Refrigerated	Rfg Tortilla/Eggroll/Wontn Wrap	NA	NA	NA	NA
Refrigerated	Salad Dressing – Rfg	NA	NA	NA	NA
Refrigerated	Seafood – Rfg	1	0.00%	0.00%	100.00%
Refrigerated	Spreads – Rfg	1	0.00%	0.00%	100.00%
Shelf-Stable	All Other Breakfast Food	1	0.00%	0.00%	100.00%
Shelf-Stable	Baking Needs/Stuffing/Bread Products [a] [b]	20	0.00%	10.00%	90.00%
Shelf-Stable	Baking Nuts	NA	NA	NA	NA
Shelf-Stable	Bottled Water	1	0.00%	0.00%	100.00%
Shelf-Stable	Canned Goods [a]	16	18.75%	43.75%	37.50%

Table G-5: Prevalence of Open Dating in Private Label Products of Supermarket D (PL 4 Survey), by Product Category

Major Product Category	Product Category	PL 4 Brands Sampled	Share of PL 4 Brands with		
			"Mixed" Dates	No Open Dates	Open Dates
Shelf-Stable	Caramel/Taffy Apples & Kits	NA	NA	NA	NA
Shelf-Stable	Chocolate Candy (Non-Seas)	NA	NA	NA	NA
Shelf-Stable	Cold Cereal	1	0.00%	0.00%	100.00%
Shelf-Stable	Condiments/Sauces/Salad Dressings [a]	16	18.75%	6.25%	75.00%
Shelf-Stable	Cookies	1	100.00%	0.00%	0.00%
Shelf-Stable	Dip – Ss	NA	NA	NA	NA
Shelf-Stable	Dry Beans/Vegetables	1	0.00%	100.00%	0.00%
Shelf-Stable	Dry Snacks [a]	12	0.00%	0.00%	100.00%
Shelf-Stable	Gum	NA	NA	NA	NA
Shelf-Stable	Hot Beverages/Beverage Condiments [a]	11	27.27%	0.00%	72.73%
Shelf-Stable	Hot Cereal	1	0.00%	0.00%	100.00%
Shelf-Stable	Juices/Drink Mixes/Other Beverages [a]	17	5.88%	5.88%	88.24%
Shelf-Stable	Marshmallows	1	0.00%	0.00%	100.00%
Shelf-Stable	Mayonnaise	1	0.00%	0.00%	100.00%
Shelf-Stable	Non Chocolate Candy(Non-Seas)	3	33.33%	0.00%	66.67%
Shelf-Stable	Non-Fruit Drinks - Ss	NA	NA	NA	NA
Shelf-Stable	Pancake, Desert, & Ice Cream Supplies/Candy [a]	8	12.50%	0.00%	87.50%
Shelf-Stable	Pizza Products	NA	NA	NA	NA
Shelf-Stable	Powdered Milk	1	100.00%	0.00%	0.00%
Shelf-Stable	Salty Snacks	7	0.00%	0.00%	100.00%
Shelf-Stable	Spices/Seasonings	4	0.00%	25.00%	75.00%
Shelf-Stable	Sugar	2	50.00%	0.00%	50.00%
Shelf-Stable	Unclassified/Other [a]	10	30.00%	0.00%	70.00%
Shelf-Stable	Vegetables	11	9.09%	90.91%	0.00%
Shelf-Stable	Weight Con/Nutrition Liq/Pwd	NA	NA	NA	NA
Shelf-Stable	Weight Control Candy/Tablets	NA	NA	NA	NA
Total		229	11.35%	10.48%	78.17%

Source: ERG, 2002

NA = Not applicable

[a] Indicates that the category is revised by collapsing a number of IRI product categories.

[b] Some brands for the product category are refrigerated.

Table G-6: Prevalence of Open Dating in Private Label Products of Supermarket E (PL 5 Survey), by Product Category

Major Product Category	Product Category	PL 5 Brands Sampled	Share of PL 5 Brands with		
			"Mixed" Dates	No Open Dates	Open Dates
Baked Goods	Bakery Snacks	1	0.00%	0.00%	100.00%
Baked Goods	English Muffins	1	0.00%	0.00%	100.00%
Baked Goods	Fresh Bread & Rolls	3	0.00%	0.00%	100.00%
Baked Goods	Pastry/Doughnuts	3	0.00%	0.00%	100.00%
Baked Goods	Pies & Cakes	2	0.00%	0.00%	100.00%
Dairy	Butter	1	0.00%	0.00%	100.00%
Dairy	Cheese	8	0.00%	0.00%	100.00%
Dairy	Cottage Cheese	1	0.00%	0.00%	100.00%
Dairy	Creams/Creamers	2	0.00%	0.00%	100.00%
Dairy	Milk	3	0.00%	0.00%	100.00%
Dairy	Sour Cream	1	0.00%	0.00%	100.00%
Dairy	Yogurt	1	0.00%	0.00%	100.00%
Frozen	Fz Coffee Creamer	NA	NA	NA	NA
Frozen	Fz Deserts/Ice Cream	5	40.00%	0.00%	60.00%
Frozen	Fz Dinners/Entrees	NA	NA	NA	NA
Frozen	Fz Dough/Baked Goods/Other [a]	4	50.00%	0.00%	50.00%
Frozen	Fz Meat/Poultry/Pot Pies [a]	2	0.00%	50.00%	50.00%
Frozen	Fz Pasta	NA	NA	NA	NA
Frozen	Fz Pizza	1	100.00%	0.00%	0.00%
Frozen	Fz Seafood	1	100.00%	0.00%	0.00%
Frozen	Fz Side Dishes/Appetizers/Other [a]	1	0.00%	0.00%	100.00%
Frozen	Fz Vegetables/Fruits [a]	13	0.00%	92.31%	7.69%
Frozen	Juices – Frozen	5	0.00%	100.00%	0.00%
Refrigerated	All Other Deli	1	0.00%	0.00%	100.00%
Refrigerated	Baked Goods – Rfg	1	0.00%	0.00%	100.00%
Refrigerated	Breakfast Meats	1	0.00%	0.00%	100.00%
Refrigerated	Cheesecakes	1	0.00%	0.00%	100.00%
Refrigerated	Desserts – Rfg	1	0.00%	0.00%	100.00%
Refrigerated	Dinner Sausage	1	0.00%	0.00%	100.00%
Refrigerated	Dough/Biscuit Dough - Rfg	3	0.00%	0.00%	100.00%
Refrigerated	Entree/Side Dishes [a]	6	0.00%	0.00%	100.00%
Refrigerated	Frankfurters	1	0.00%	0.00%	100.00%
Refrigerated	Luncheon Meats	1	0.00%	0.00%	100.00%
Refrigerated	Lunches – Rfg	NA	NA	NA	NA
Refrigerated	Margarine/Spreads/Butter Blen	1	0.00%	0.00%	100.00%
Refrigerated	Meat Pies	NA	NA	NA	NA
Refrigerated	Other Rfg Products [a]	4	0.00%	0.00%	100.00%
Refrigerated	Pasta – Rfg	NA	NA	NA	NA
Refrigerated	Pickles/Relish – Rfg	NA	NA	NA	NA
Refrigerated	Rfg Dips	1	0.00%	0.00%	100.00%
Refrigerated	Rfg Tortilla/Eggroll/Wontn Wrap	NA	NA	NA	NA
Refrigerated	Salad Dressing – Rfg	NA	NA	NA	NA
Refrigerated	Seafood – Rfg	NA	NA	NA	NA
Refrigerated	Spreads – Rfg	NA	NA	NA	NA
Shelf-Stable	All Other Breakfast Food	1	0.00%	0.00%	100.00%
Shelf-Stable	Baking Needs/Stuffing/Bread Products [a] [b]	18	11.11%	27.78%	61.11%
Shelf-Stable	Baking Nuts	NA	NA	NA	NA
Shelf-Stable	Bottled Water	1	100.00%	0.00%	0.00%
Shelf-Stable	Canned Goods [a]	17	23.53%	35.29%	41.18%

Table G-6: Prevalence of Open Dating in Private Label Products of Supermarket E (PL 5 Survey), by Product Category

Major Product Category	Product Category	PL 5 Brands Sampled	Share of PL 5 Brands with		
			"Mixed" Dates	No Open Dates	Open Dates
Shelf-Stable	Caramel/Taffy Apples & Kits	NA	NA	NA	NA
Shelf-Stable	Chocolate Candy (Non-Seas)	1	0.00%	100.00%	0.00%
Shelf-Stable	Cold Cereal	1	0.00%	0.00%	100.00%
Shelf-Stable	Condiments/Sauces/Salad Dressings [a]	20	10.00%	50.00%	40.00%
Shelf-Stable	Cookies	1	100.00%	0.00%	0.00%
Shelf-Stable	Dip – Ss	NA	NA	NA	NA
Shelf-Stable	Dry Beans/Vegetables	NA	NA	NA	NA
Shelf-Stable	Dry Snacks [a]	10	10.00%	0.00%	90.00%
Shelf-Stable	Gum	NA	NA	NA	NA
Shelf-Stable	Hot Beverages/Beverage Condiments [a]	11	27.27%	27.27%	45.45%
Shelf-Stable	Hot Cereal	1	0.00%	0.00%	100.00%
Shelf-Stable	Juices/Drink Mixes/Other Beverages [a]	18	11.11%	11.11%	77.78%
Shelf-Stable	Marshmallows	1	0.00%	0.00%	100.00%
Shelf-Stable	Mayonnaise	1	0.00%	0.00%	100.00%
Shelf-Stable	Non Chocolate Candy(Non-Seas)	3	0.00%	100.00%	0.00%
Shelf-Stable	Non-Fruit Drinks - Ss	NA	NA	NA	NA
Shelf-Stable	Pancake, Desert, & Ice Cream Supplies/Candy [a]	10	0.00%	20.00%	80.00%
Shelf-Stable	Pizza Products	NA	NA	NA	NA
Shelf-Stable	Powdered Milk	1	100.00%	0.00%	0.00%
Shelf-Stable	Salty Snacks	6	0.00%	0.00%	100.00%
Shelf-Stable	Spices/Seasonings	4	0.00%	100.00%	0.00%
Shelf-Stable	Sugar	2	50.00%	50.00%	0.00%
Shelf-Stable	Unclassified/Other [a]	9	33.33%	22.22%	44.44%
Shelf-Stable	Vegetables	11	9.09%	90.91%	0.00%
Shelf-Stable	Weight Con/Nutrition Liq/Pwd	NA	NA	NA	NA
Shelf-Stable	Weight Control Candy/Tablets	NA	NA	NA	NA
Total		230	12.17%	29.13%	58.70%

Source: ERG, 2002

NA = Not applicable

[a] Indicates that the category is revised by collapsing a number of IRI product categories.

[b] Some brands for the product category are refrigerated.

Table G-7: Type of Open Dating Among Name-Brand Products by Major Product Category

Major Product Category	Product Category	Number of Open-Dated Name Brands	Percentage of Open Dated Name Brands with							
			Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [c]
Baked Goods	Bakery Snacks	13	0.0%	23.1%	0.0%	61.5%	0.0%	0.0%	15.4%	0.0%
Baked Goods	English Muffins	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Baked Goods	Fresh Bread & Rolls	25	0.0%	0.0%	0.0%	72.0%	0.0%	0.0%	20.0%	8.0%
Baked Goods	Pastry/Doughnuts	8	0.0%	12.5%	0.0%	37.5%	0.0%	0.0%	50.0%	0.0%
Baked Goods	Pies & Cakes	2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Dairy	Butter	4	0.0%	0.0%	75.0%	0.0%	0.0%	0.0%	25.0%	0.0%
Dairy	Cheese	45	6.7%	44.4%	11.1%	15.6%	0.0%	4.4%	8.9%	8.9%
Dairy	Cottage Cheese	4	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Dairy	Creams/Creamers	6	16.7%	0.0%	0.0%	33.3%	16.7%	0.0%	16.7%	16.7%
Dairy	Milk	15	20.0%	0.0%	0.0%	60.0%	0.0%	0.0%	20.0%	0.0%
Dairy	Sour Cream	4	0.0%	0.0%	0.0%	25.0%	0.0%	0.0%	50.0%	25.0%
Dairy	Yogurt	18	0.0%	0.0%	0.0%	55.6%	0.0%	0.0%	44.4%	0.0%
Frozen	Fz Coffee Creamer	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Deserts/Ice Cream	27	0.0%	14.8%	0.0%	0.0%	0.0%	0.0%	85.2%	0.0%
Frozen	Fz Dinners/Entrees	2	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Frozen	Fz Dough/Baked Goods/Other [a]	9	0.0%	66.7%	0.0%	0.0%	0.0%	0.0%	22.2%	11.1%
Frozen	Fz Meat/Poultry/Pot Pies [a]	5	20.0%	80.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Frozen	Fz Pasta	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Frozen	Fz Pizza	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Seafood	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Side Dishes/Appetizers/Other [a]	3	33.3%	0.0%	0.0%	0.0%	0.0%	0.0%	66.7%	0.0%
Frozen	Fz Vegetables/Fruits [a]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Juices – Frozen	7	0.0%	57.1%	0.0%	0.0%	0.0%	0.0%	42.9%	0.0%
Refrigerated	All Other Deli	2	0.0%	0.0%	0.0%	50.0%	0.0%	50.0%	0.0%	0.0%
Refrigerated	Baked Goods – Rfg	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Refrigerated	Breakfast Meats	11	18.2%	9.1%	0.0%	36.4%	0.0%	27.3%	0.0%	9.1%
Refrigerated	Cheesecakes	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Desserts – Rfg	6	16.7%	0.0%	0.0%	0.0%	0.0%	0.0%	83.3%	0.0%
Refrigerated	Dinner Sausage	7	14.3%	0.0%	0.0%	71.4%	0.0%	0.0%	14.3%	0.0%
Refrigerated	Dough/Biscuit Dough - Rfg	5	0.0%	20.0%	0.0%	0.0%	0.0%	0.0%	20.0%	60.0%
Refrigerated	Entree/Side Dishes [a]	9	0.0%	44.4%	0.0%	0.0%	0.0%	33.3%	0.0%	22.2%

Table G-7: Type of Open Dating Among Name-Brand Products by Major Product Category

Major Product Category	Product Category	Number of Open-Dated Name Brands	Percentage of Open Dated Name Brands with								
			Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [c]	
Refrigerated	Frankfurters	18	44.4%	0.0%	0.0%	44.4%	0.0%	5.6%	5.6%	0.0%	
Refrigerated	Luncheon Meats	22	9.1%	9.1%	0.0%	40.9%	0.0%	4.5%	18.2%	18.2%	
Refrigerated	Lunches – Rfg	4	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Refrigerated	Margarine/Spreads/Butter Blen	17	0.0%	5.9%	23.5%	0.0%	11.8%	0.0%	11.8%	47.1%	
Refrigerated	Meat Pies	1	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	
Refrigerated	Other Rfg Products [a]	31	9.7%	19.4%	0.0%	22.6%	0.0%	6.5%	35.5%	6.5%	
Refrigerated	Pasta – Rfg	2	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	
Refrigerated	Pickles/Relish – Rfg	2	50.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Refrigerated	Rfg Dips	4	0.0%	25.0%	0.0%	25.0%	0.0%	0.0%	50.0%	0.0%	
Refrigerated	Rfg Tortlla/Eggrll/Wontn Wrap	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	
Refrigerated	Salad Dressing – Rfg	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	
Refrigerated	Seafood – Rfg	2	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	
Refrigerated	Spreads – Rfg	1	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Shelf-Stable	All Other Breakfast Food	4	25.0%	50.0%	0.0%	25.0%	0.0%	0.0%	0.0%	0.0%	
Shelf-Stable	Baking Needs/Stuffing/Bread Products [a] [b]	37	0.0%	54.1%	2.7%	5.4%	13.5%	0.0%	18.9%	5.4%	
Shelf-Stable	Baking Nuts	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Shelf-Stable	Bottled Water	6	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	
Shelf-Stable	Canned Goods [a]	21	9.5%	38.1%	0.0%	0.0%	0.0%	0.0%	47.6%	4.8%	
Shelf-Stable	Caramel/Taffy Apples & Kits	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Shelf-Stable	Chocolate Candy (Non-Seas)	2	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Shelf-Stable	Cold Cereal	93	1.1%	93.5%	0.0%	0.0%	0.0%	0.0%	4.3%	1.1%	
Shelf-Stable	Condiments/Sauces/Salad Dressings [a]	58	5.2%	36.2%	22.4%	5.2%	1.7%	0.0%	22.4%	6.9%	
Shelf-Stable	Cookies	9	0.0%	22.2%	0.0%	66.7%	0.0%	0.0%	11.1%	0.0%	
Shelf-Stable	Dip – Ss	2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	
Shelf-Stable	Dry Beans/Vegetables	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Shelf-Stable	Dry Snacks [a]	52	1.9%	67.3%	0.0%	11.5%	1.9%	0.0%	13.5%	3.8%	
Shelf-Stable	Gum	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Shelf-Stable	Hot Beverages/Beverage Condiments [a]	30	6.7%	70.0%	0.0%	0.0%	0.0%	0.0%	16.7%	6.7%	
Shelf-Stable	Hot Cereal	5	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

Table G-7: Type of Open Dating Among Name-Brand Products by Major Product Category

Major Product Category	Product Category	Number of Open-Dated Name Brands	Percentage of Open Dated Name Brands with							
			Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [c]
Shelf-Stable	Juices/Drink Mixes/Other Beverages [a]	76	10.5%	28.9%	0.0%	1.3%	0.0%	0.0%	59.2%	0.0%
Shelf-Stable	Marshmallows	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Mayonnaise	7	0.0%	42.9%	28.6%	0.0%	0.0%	0.0%	0.0%	28.6%
Shelf-Stable	Non Chocolate Candy(Non-Seas)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Non-Fruit Drinks - Ss	4	25.0%	50.0%	0.0%	25.0%	0.0%	0.0%	0.0%	0.0%
Shelf-Stable	Pancake, Desert, & Ice Cream Supplies/Candy [a]	23	8.7%	21.7%	34.8%	4.3%	4.3%	0.0%	21.7%	4.3%
Shelf-Stable	Pizza Products	2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Powdered Milk	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Salty Snacks	45	0.0%	62.2%	2.2%	4.4%	0.0%	0.0%	28.9%	2.2%
Shelf-Stable	Spices/Seasonings	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Sugar	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Unclassified/Other [a]	45	0.0%	77.8%	2.2%	2.2%	0.0%	0.0%	17.8%	0.0%
Shelf-Stable	Vegetables	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Weight Con/Nutrition Liq/Pwd	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Weight Control Candy/Tablets	1	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
Total		876	6.2%	41.6%	4.3%	13.8%	2.1%	1.8%	25.1%	5.1%

Source: ERG, 2002

NA = Not applicable

[a] Indicates that the category is revised by collapsing a number of IRI product categories.

[b] Some brands for the product category are refrigerated.

[c] Indicates that there is variability among SKUs of a given brand with respect to the type of open date qualifier phrase.

Table G-8: Type of Open Dating Among PL Brands of Supermarket A (PL Survey 1), by Major Product Category

Major Product Category	Product Category	Number of Open-Dated PL 1 Brands	Percentage of Open Dated PL 1 Brands with							
			Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [c]
Baked Goods	Bakery Snacks	NA	NA	NA	NA	NA	NA	NA	NA	NA
Baked Goods	English Muffins	1	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Baked Goods	Fresh Bread & Rolls	3	0.0%	0.0%	0.0%	33.3%	0.0%	0.0%	0.0%	66.7%
Baked Goods	Pastry/Doughnuts	2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Baked Goods	Pies & Cakes	2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Dairy	Butter	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Dairy	Cheese	7	14.3%	0.0%	0.0%	28.6%	0.0%	0.0%	28.6%	28.6%
Dairy	Cottage Cheese	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Dairy	Creams/Creamers	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Dairy	Milk	2	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Dairy	Sour Cream	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Dairy	Yogurt	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Frozen	Fz Coffee Creamer	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Deserts/Ice Cream	3	0.0%	33.3%	0.0%	33.3%	0.0%	0.0%	33.3%	0.0%
Frozen	Fz Dinners/Entrees	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Dough/Baked Goods/Other [a]	2	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%
Frozen	Fz Meat/Poultry/Pot Pies [a]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Pasta	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Pizza	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Seafood	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Side Dishes/Appetizers/Other [a]	2	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	50.0%	0.0%
Frozen	Fz Vegetables/Fruits [a]	7	14.3%	0.0%	0.0%	71.4%	0.0%	0.0%	14.3%	0.0%
Frozen	Juices – Frozen	6	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	All Other Deli	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Baked Goods – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Breakfast Meats	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Cheesecakes	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Desserts – Rfg	1	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Dinner Sausage	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Dough/Biscuit Dough - Rfg	2	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	50.0%	0.0%
Refrigerated	Entree/Side Dishes [a]	6	16.7%	0.0%	0.0%	66.7%	0.0%	0.0%	0.0%	16.7%

Table G-8: Type of Open Dating Among PL Brands of Supermarket A (PL Survey 1), by Major Product Category

Major Product Category	Product Category	Number of Open-Dated PL 1 Brands	Percentage of Open Dated PL 1 Brands with							
			Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [c]
Refrigerated	Frankfurters	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Luncheon Meats	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Refrigerated	Lunches – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Margarine/Spreads/Butter Blen	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Refrigerated	Meat Pies	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Other Rfg Products [a]	2	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Pasta – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Pickles/Relish – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Rfg Dips	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Rfg Tortlla/Eggrll/Wontn Wrap	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Salad Dressing – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Seafood – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Spreads – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	All Other Breakfast Food	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Baking Needs/Stuffing/Bread Products [a] [b]	12	0.0%	8.3%	0.0%	8.3%	0.0%	0.0%	66.7%	16.7%
Shelf-Stable	Baking Nuts	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Bottled Water	2	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	50.0%
Shelf-Stable	Canned Goods [a]	8	0.0%	37.5%	0.0%	12.5%	12.5%	0.0%	37.5%	0.0%
Shelf-Stable	Caramel/Taffy Apples & Kits	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Chocolate Candy (Non-Seas)	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Shelf-Stable	Cold Cereal	1	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Shelf-Stable	Condiments/Sauces/Salad Dressings [a]	4	0.0%	0.0%	0.0%	25.0%	0.0%	0.0%	25.0%	50.0%
Shelf-Stable	Cookies	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Dip – Ss	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Dry Beans/Vegetables	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Dry Snacks [a]	10	10.0%	30.0%	0.0%	10.0%	0.0%	0.0%	30.0%	20.0%
Shelf-Stable	Gum	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Hot Beverages/Beverage Condiments [a]	4	0.0%	25.0%	0.0%	0.0%	0.0%	0.0%	25.0%	50.0%
Shelf-Stable	Hot Cereal	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%

Table G-8: Type of Open Dating Among PL Brands of Supermarket A (PL Survey 1), by Major Product Category

Major Product Category	Product Category	Number of Open-Dated PL 1 Brands	Percentage of Open Dated PL 1 Brands with							
			Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [c]
Shelf-Stable	Juices/Drink Mixes/Other Beverages [a]	5	0.0%	20.0%	0.0%	40.0%	0.0%	0.0%	20.0%	20.0%
Shelf-Stable	Marshmallows	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Mayonnaise	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Non Chocolate Candy(Non-Seas)	3	0.0%	0.0%	0.0%	66.7%	0.0%	0.0%	0.0%	33.3%
Shelf-Stable	Non-Fruit Drinks - Ss	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Pancake, Desert, & Ice Cream Supplies/Candy [a]	8	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	87.5%	12.5%
Shelf-Stable	Pizza Products	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Powdered Milk	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Shelf-Stable	Salty Snacks	3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Spices/Seasonings	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Sugar	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Unclassified/Other [a]	5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Vegetables	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Weight Con/Nutrition Liq/Pwd	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Weight Control Candy/Tablets	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total		131	3.1%	10.7%	0.0%	30.5%	2.3%	0.0%	38.2%	15.3%

Source: ERG, 2002

NA = Not applicable

[a] Indicates that the category is revised by collapsing a number of IRI product categories.

[b] Some brands for the product category are refrigerated.

[c] Indicates that there is variability among SKUs of a given brand with respect to the type of open date qualifier phrase.

Table G-9: Type of Open Dating Among PL Brands of Supermarket B (PL Survey 2), by Major Product Category

Major Product Category	Product Category	Number of Open-Dated PL 2 Brands	Percentage of Open Dated PL 2 Brands with								
			Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [c]	
Baked Goods	Bakery Snacks	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	
Baked Goods	English Muffins	1	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Baked Goods	Fresh Bread & Rolls	3	0.0%	0.0%	0.0%	33.3%	0.0%	0.0%	0.0%	66.7%	
Baked Goods	Pastry/Doughnuts	2	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	
Baked Goods	Pies & Cakes	2	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	
Dairy	Butter	1	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Dairy	Cheese	6	16.7%	0.0%	0.0%	50.0%	0.0%	0.0%	16.7%	16.7%	
Dairy	Cottage Cheese	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	
Dairy	Creams/Creamers	2	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	
Dairy	Milk	2	0.0%	50.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	
Dairy	Sour Cream	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	
Dairy	Yogurt	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	
Frozen	Fz Coffee Creamer	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Frozen	Fz Deserts/Ice Cream	2	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	
Frozen	Fz Dinners/Entrees	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Frozen	Fz Dough/Baked Goods/Other [a]	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	
Frozen	Fz Meat/Poultry/Pot Pies [a]	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	
Frozen	Fz Pasta	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Frozen	Fz Pizza	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	
Frozen	Fz Seafood	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Frozen	Fz Side Dishes/Appetizers/Other [a]	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Frozen	Fz Vegetables/Fruits [a]	6	0.0%	16.7%	0.0%	16.7%	0.0%	0.0%	0.0%	66.7%	
Frozen	Juices – Frozen	4	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	
Refrigerated	All Other Deli	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	
Refrigerated	Baked Goods – Rfg	3	0.0%	33.3%	0.0%	66.7%	0.0%	0.0%	0.0%	0.0%	
Refrigerated	Breakfast Meats	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	
Refrigerated	Cheesecakes	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	
Refrigerated	Desserts – Rfg	1	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Refrigerated	Dinner Sausage	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	
Refrigerated	Dough/Biscuit Dough - Rfg	3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	
Refrigerated	Entree/Side Dishes [a]	6	0.0%	16.7%	0.0%	83.3%	0.0%	0.0%	0.0%	0.0%	

Table G-9: Type of Open Dating Among PL Brands of Supermarket B (PL Survey 2), by Major Product Category

Major Product Category	Product Category	Number of Open-Dated PL 2 Brands	Percentage of Open Dated PL 2 Brands with							
			Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [c]
Refrigerated	Frankfurters	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Luncheon Meats	2	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	50.0%
Refrigerated	Lunches – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Margarine/Spreads/Butter Blen	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Refrigerated	Meat Pies	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Other Rfg Products [a]	2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%
Refrigerated	Pasta – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Pickles/Relish – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Rfg Dips	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Rfg Tortlla/Eggrll/Wontn Wrap	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Salad Dressing – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Seafood – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Spreads – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	All Other Breakfast Food	2	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	50.0%	0.0%
Shelf-Stable	Baking Needs/Stuffing/Bread Products [a] [b]	14	7.1%	14.3%	0.0%	14.3%	0.0%	0.0%	28.6%	35.7%
Shelf-Stable	Baking Nuts	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Bottled Water	1	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Shelf-Stable	Canned Goods [a]	9	11.1%	22.2%	0.0%	11.1%	0.0%	0.0%	44.4%	11.1%
Shelf-Stable	Caramel/Taffy Apples & Kits	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Chocolate Candy (Non-Seas)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Cold Cereal	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Condiments/Sauces/Salad Dressings [a]	15	33.3%	20.0%	0.0%	0.0%	0.0%	0.0%	33.3%	13.3%
Shelf-Stable	Cookies	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Dip – Ss	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Dry Beans/Vegetables	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Dry Snacks [a]	8	0.0%	37.5%	0.0%	12.5%	0.0%	0.0%	37.5%	12.5%
Shelf-Stable	Gum	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Hot Beverages/Beverage Condiments [a]	8	0.0%	12.5%	0.0%	37.5%	0.0%	0.0%	25.0%	25.0%
Shelf-Stable	Hot Cereal	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%

Table G-9: Type of Open Dating Among PL Brands of Supermarket B (PL Survey 2), by Major Product Category

Major Product Category	Product Category	Number of Open-Dated PL 2 Brands	Percentage of Open Dated PL 2 Brands with							
			Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [c]
Shelf-Stable	Juices/Drink Mixes/Other Beverages [a]	11	36.4%	0.0%	0.0%	36.4%	0.0%	0.0%	0.0%	27.3%
Shelf-Stable	Marshmallows	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Mayonnaise	1	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Shelf-Stable	Non Chocolate Candy(Non-Seas)	3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Non-Fruit Drinks - Ss	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Pancake, Desert, & Ice Cream Supplies/Candy [a]	8	0.0%	12.5%	0.0%	0.0%	0.0%	0.0%	87.5%	0.0%
Shelf-Stable	Pizza Products	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Powdered Milk	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Salty Snacks	6	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Spices/Seasonings	2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Sugar	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Unclassified/Other [a]	6	0.0%	16.7%	0.0%	0.0%	0.0%	0.0%	66.7%	16.7%
Shelf-Stable	Vegetables	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Weight Con/Nutrition Liq/Pwd	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Weight Control Candy/Tablets	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total		157	7.6%	14.6%	0.0%	24.8%	0.0%	0.0%	35.0%	17.8%

Source: ERG, 2002

NA = Not applicable

[a] Indicates that the category is revised by collapsing a number of IRI product categories.

[b] Some brands for the product category are refrigerated.

[c] Indicates that there is variability among SKUs of a given brand with respect to the type of open date qualifier phrase.

Table G-10: Type of Open Dating Among PL Brands of Supermarket C (PL Survey 3), by Major Product Category

Major Product Category	Product Category	Number of Open-Dated PL 3 Brands	Percentage of Open Dated PL 3 Brands with							
			Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [c]
Baked Goods	Bakery Snacks	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Baked Goods	English Muffins	NA	NA	NA	NA	NA	NA	NA	NA	NA
Baked Goods	Fresh Bread & Rolls	2	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Baked Goods	Pastry/Doughnuts	2	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Baked Goods	Pies & Cakes	2	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Dairy	Butter	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Dairy	Cheese	4	0.0%	0.0%	0.0%	25.0%	0.0%	0.0%	75.0%	0.0%
Dairy	Cottage Cheese	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dairy	Creams/Creamers	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dairy	Milk	2	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Dairy	Sour Cream	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dairy	Yogurt	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Coffee Creamer	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Deserts/Ice Cream	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Dinners/Entrees	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Dough/Baked Goods/Other [a]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Meat/Poultry/Pot Pies [a]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Pasta	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Pizza	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Seafood	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Side Dishes/Appetizers/Other [a]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Vegetables/Fruits [a]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Juices – Frozen	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	All Other Deli	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Baked Goods – Rfg	2	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Breakfast Meats	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Cheesecakes	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Desserts – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Dinner Sausage	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Dough/Biscuit Dough - Rfg	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Entree/Side Dishes [a]	5	0.0%	0.0%	0.0%	60.0%	0.0%	0.0%	40.0%	0.0%

Table G-10: Type of Open Dating Among PL Brands of Supermarket C (PL Survey 3), by Major Product Category

Major Product Category	Product Category	Number of Open-Dated PL 3 Brands	Percentage of Open Dated PL 3 Brands with							
			Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [c]
Refrigerated	Frankfurters	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Luncheon Meats	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Lunches – Rfg	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Margarine/Spreads/Butter Blen	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Refrigerated	Meat Pies	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Other Rfg Products [a]	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Pasta – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Pickles/Relish – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Rfg Dips	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Rfg Tortlla/Eggrll/Wontn Wrap	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Salad Dressing – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Seafood – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Spreads – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	All Other Breakfast Food	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Baking Needs/Stuffing/Bread Products [a] [b]	5	0.0%	20.0%	0.0%	0.0%	0.0%	0.0%	80.0%	0.0%
Shelf-Stable	Baking Nuts	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Bottled Water	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Shelf-Stable	Canned Goods [a]	2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Caramel/Taffy Apples & Kits	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Chocolate Candy (Non-Seas)	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Cold Cereal	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Condiments/Sauces/Salad Dressings [a]	2	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	50.0%	0.0%
Shelf-Stable	Cookies	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Dip – Ss	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Dry Beans/Vegetables	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Dry Snacks [a]	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Gum	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Hot Beverages/Beverage Condiments [a]	2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%
Shelf-Stable	Hot Cereal	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table G-10: Type of Open Dating Among PL Brands of Supermarket C (PL Survey 3), by Major Product Category

Major Product Category	Product Category	Number of Open-Dated PL 3 Brands	Percentage of Open Dated PL 3 Brands with								
			Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [c]	
Shelf-Stable	Juices/Drink Mixes/Other Beverages [a]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Marshmallows	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Mayonnaise	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Shelf-Stable	Non Chocolate Candy(Non-Seas)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Non-Fruit Drinks - Ss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Pancake, Desert, & Ice Cream Supplies/Candy [a]	5	0.0%	0.0%	0.0%	80.0%	0.0%	0.0%	0.0%	0.0%	20.0%
Shelf-Stable	Pizza Products	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Powdered Milk	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Salty Snacks	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Spices/Seasonings	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Sugar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Unclassified/Other [a]	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
Shelf-Stable	Vegetables	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Weight Con/Nutrition Liq/Pwd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Weight Control Candy/Tablets	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total		51	0.0%	2.0%	0.0%	54.9%	0.0%	0.0%	37.3%	5.9%	

Source: ERG, 2002

NA = Not applicable

[a] Indicates that the category is revised by collapsing a number of IRI product categories.

[b] Some brands for the product category are refrigerated.

[c] Indicates that there is variability among SKUs of a given brand with respect to the type of open date qualifier phrase.

Table G-11: Type of Open Dating Among PL Brands of Supermarket D (PL Survey 4), by Major Product Category

Major Product Category	Product Category	Number of Open-Dated PL 4 Brands	Percentage of Open Dated PL 4 Brands with							
			Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [c]
Baked Goods	Bakery Snacks	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Baked Goods	English Muffins	NA	NA	NA	NA	NA	NA	NA	NA	NA
Baked Goods	Fresh Bread & Rolls	3	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Baked Goods	Pastry/Doughnuts	3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	33.3%	66.7%
Baked Goods	Pies & Cakes	2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%
Dairy	Butter	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Dairy	Cheese	6	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	16.7%	83.3%
Dairy	Cottage Cheese	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Dairy	Creams/Creamers	2	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Dairy	Milk	3	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Dairy	Sour Cream	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Dairy	Yogurt	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Frozen	Fz Coffee Creamer	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Frozen	Fz Deserts/Ice Cream	5	0.0%	20.0%	0.0%	0.0%	0.0%	0.0%	80.0%	0.0%
Frozen	Fz Dinners/Entrees	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Dough/Baked Goods/Other [a]	2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%
Frozen	Fz Meat/Poultry/Pot Pies [a]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Pasta	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Pizza	1	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Frozen	Fz Seafood	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Frozen	Fz Side Dishes/Appetizers/Other [a]	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Frozen	Fz Vegetables/Fruits [a]	11	9.1%	0.0%	0.0%	0.0%	0.0%	0.0%	27.3%	63.6%
Frozen	Juices – Frozen	6	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Refrigerated	All Other Deli	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Baked Goods – Rfg	2	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	50.0%	0.0%
Refrigerated	Breakfast Meats	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Refrigerated	Cheesecakes	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Desserts – Rfg	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Refrigerated	Dinner Sausage	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Dough/Biscuit Dough - Rfg	3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Refrigerated	Entree/Side Dishes [a]	3	0.0%	33.3%	0.0%	33.3%	0.0%	0.0%	0.0%	33.3%

Table G-11: Type of Open Dating Among PL Brands of Supermarket D (PL Survey 4), by Major Product Category

Major Product Category	Product Category	Number of Open-Dated PL 4 Brands	Percentage of Open Dated PL 4 Brands with							
			Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [c]
Refrigerated	Frankfurters	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Luncheon Meats	1	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Lunches – Rfg	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Refrigerated	Margarine/Spreads/Butter Blen	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Meat Pies	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Other Rfg Products [a]	5	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	40.0%	40.0%
Refrigerated	Pasta – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Pickles/Relish – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Rfg Dips	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Rfg Tortlla/Eggrll/Wontn Wrap	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Salad Dressing – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	Seafood – Rfg	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Spreads – Rfg	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	All Other Breakfast Food	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Baking Needs/Stuffing/Bread Products [a] [b]	18	0.0%	11.1%	0.0%	16.7%	0.0%	0.0%	72.2%	0.0%
Shelf-Stable	Baking Nuts	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Bottled Water	1	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
Shelf-Stable	Canned Goods [a]	6	0.0%	16.7%	0.0%	0.0%	0.0%	0.0%	83.3%	0.0%
Shelf-Stable	Caramel/Taffy Apples & Kits	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Chocolate Candy (Non-Seas)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Cold Cereal	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Shelf-Stable	Condiments/Sauces/Salad Dressings [a]	12	0.0%	25.0%	0.0%	0.0%	0.0%	0.0%	75.0%	0.0%
Shelf-Stable	Cookies	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Dip – Ss	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Dry Beans/Vegetables	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Dry Snacks [a]	12	0.0%	33.3%	0.0%	0.0%	0.0%	0.0%	58.3%	8.3%
Shelf-Stable	Gum	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Hot Beverages/Beverage Condiments [a]	8	0.0%	12.5%	0.0%	12.5%	0.0%	0.0%	75.0%	0.0%
Shelf-Stable	Hot Cereal	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%

Table G-11: Type of Open Dating Among PL Brands of Supermarket D (PL Survey 4), by Major Product Category

Major Product Category	Product Category	Number of Open-Dated PL 4 Brands	Percentage of Open Dated PL 4 Brands with								
			Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [c]	
Shelf-Stable	Juices/Drink Mixes/Other Beverages [a]	15	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Marshmallows	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Mayonnaise	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Non Chocolate Candy(Non-Seas)	2	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%
Shelf-Stable	Non-Fruit Drinks - Ss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Pancake, Desert, & Ice Cream Supplies/Candy [a]	7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Pizza Products	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Powdered Milk	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Salty Snacks	7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Spices/Seasonings	3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Sugar	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Unclassified/Other [a]	7	0.0%	14.3%	14.3%	0.0%	0.0%	0.0%	0.0%	71.4%	0.0%
Shelf-Stable	Vegetables	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Weight Con/Nutrition Liq/Pwd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Weight Control Candy/Tablets	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total		179	1.7%	8.9%	0.6%	11.7%	0.6%	0.0%	61.5%	15.1%	

Source: ERG, 2002

NA = Not applicable

[a] Indicates that the category is revised by collapsing a number of IRI product categories.

[b] Some brands for the product category are refrigerated.

[c] Indicates that there is variability among SKUs of a given brand with respect to the type of open date qualifier phrase.

Table G-12: Type of Open Dating Among PL Brands of Supermarket E (PL Survey 5), by Major Product Category

Major Product Category	Product Category	Number of Open-Dated PL 5 Brands	Percentage of Open Dated PL 5 Brands with							
			Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [c]
Baked Goods	Bakery Snacks	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Baked Goods	English Muffins	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Baked Goods	Fresh Bread & Rolls	3	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Baked Goods	Pastry/Doughnuts	3	0.0%	33.3%	0.0%	66.7%	0.0%	0.0%	0.0%	0.0%
Baked Goods	Pies & Cakes	2	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Dairy	Butter	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Dairy	Cheese	8	12.5%	0.0%	0.0%	12.5%	0.0%	0.0%	62.5%	12.5%
Dairy	Cottage Cheese	1	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Dairy	Creams/Creamers	2	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Dairy	Milk	3	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Dairy	Sour Cream	1	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Dairy	Yogurt	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Frozen	Fz Coffee Creamer	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Deserts/Ice Cream	3	0.0%	33.3%	0.0%	0.0%	0.0%	0.0%	66.7%	0.0%
Frozen	Fz Dinners/Entrees	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Dough/Baked Goods/Other [a]	2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%
Frozen	Fz Meat/Poultry/Pot Pies [a]	1	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Frozen	Fz Pasta	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Pizza	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Seafood	NA	NA	NA	NA	NA	NA	NA	NA	NA
Frozen	Fz Side Dishes/Appetizers/Other [a]	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Frozen	Fz Vegetables/Fruits [a]	1	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Frozen	Juices – Frozen	NA	NA	NA	NA	NA	NA	NA	NA	NA
Refrigerated	All Other Deli	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Baked Goods – Rfg	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Breakfast Meats	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Refrigerated	Cheesecakes	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Desserts – Rfg	1	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Dinner Sausage	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Refrigerated	Dough/Biscuit Dough - Rfg	3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Refrigerated	Entree/Side Dishes [a]	6	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%

Table G-12: Type of Open Dating Among PL Brands of Supermarket E (PL Survey 5), by Major Product Category

Major Product Category	Product Category	Number of Open-Dated PL 5 Brands	Percentage of Open Dated PL 5 Brands with								
			Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [c]	
Refrigerated	Frankfurters	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	
Refrigerated	Luncheon Meats	1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	
Refrigerated	Lunches – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Refrigerated	Margarine/Spreads/Butter Blen	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	
Refrigerated	Meat Pies	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Refrigerated	Other Rfg Products [a]	4	25.0%	0.0%	0.0%	75.0%	0.0%	0.0%	0.0%	0.0%	
Refrigerated	Pasta – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Refrigerated	Pickles/Relish – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Refrigerated	Rfg Dips	1	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Refrigerated	Rfg Tortlla/Eggrll/Wontn Wrap	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Refrigerated	Salad Dressing – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Refrigerated	Seafood – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Refrigerated	Spreads – Rfg	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Shelf-Stable	All Other Breakfast Food	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	
Shelf-Stable	Baking Needs/Stuffing/Bread Products [a] [b]	11	18.2%	9.1%	0.0%	0.0%	0.0%	0.0%	72.7%	0.0%	
Shelf-Stable	Baking Nuts	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Shelf-Stable	Bottled Water	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Shelf-Stable	Canned Goods [a]	7	0.0%	42.9%	0.0%	0.0%	0.0%	0.0%	28.6%	28.6%	
Shelf-Stable	Caramel/Taffy Apples & Kits	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Shelf-Stable	Chocolate Candy (Non-Seas)	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Shelf-Stable	Cold Cereal	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	
Shelf-Stable	Condiments/Sauces/Salad Dressings [a]	8	37.5%	0.0%	0.0%	25.0%	0.0%	0.0%	12.5%	25.0%	
Shelf-Stable	Cookies	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Shelf-Stable	Dip – Ss	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Shelf-Stable	Dry Beans/Vegetables	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Shelf-Stable	Dry Snacks [a]	9	11.1%	0.0%	22.2%	0.0%	0.0%	0.0%	55.6%	11.1%	
Shelf-Stable	Gum	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Shelf-Stable	Hot Beverages/Beverage Condiments [a]	5	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	80.0%	0.0%	
Shelf-Stable	Hot Cereal	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	

Table G-12: Type of Open Dating Among PL Brands of Supermarket E (PL Survey 5), by Major Product Category

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			Use by	Best if used by	Best when purchased by	Sell by	Expiration	Freeze by	Unspecified	Mixed [c]
Shelf-Stable	Juices/Drink Mixes/Other Beverages [a]	14	64.3%	7.1%	0.0%	0.0%	0.0%	0.0%	28.6%	0.0%
Shelf-Stable	Marshmallows	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Mayonnaise	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Non Chocolate Candy(Non-Seas)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Non-Fruit Drinks – Ss	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Pancake, Desert, & Ice Cream Supplies/Candy [a]	8	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	37.5%	12.5%
Shelf-Stable	Pizza Products	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Powdered Milk	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Salty Snacks	6	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Spices/Seasonings	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Sugar	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Unclassified/Other [a]	4	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Shelf-Stable	Vegetables	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Weight Con/Nutrition Liq/Pwd	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf-Stable	Weight Control Candy/Tablets	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total		135	18.5%	5.9%	3.0%	24.4%	0.0%	0.0%	39.3%	8.9%

Source: ERG, 2002

NA = Not applicable

[a] Indicates that the category is revised by collapsing a number of IRI product categories.

[b] Some brands for the product category are refrigerated.

[c] Indicates that there is variability among SKUs of a given brand with respect to the type of open date qualifier phrase.

APPENDIX H

LIST OF TOPICS USED AS A GUIDE DURING DISCUSSIONS WITH INDUSTRY PERSONNEL ON OPEN DATING PRACTICES

ERG used the following list of questions to interview industry representatives on individual firm practices. The interviews conducted were semi-structured in nature where ERG adjusted its questioning during the interview process based on interviewee responses. Some of the questions were not applicable to some food manufacturers and hence were omitted from discussions.

1. To the extent possible, can you describe the factors that influence a food processor's decision to include/exclude an open date on its products?
2. Can you describe the factors that influence a food processor's decision regarding the type of open date (i.e., sell-by, use-by, expiration, etc.) used on their products?
3. Given that open dating regulations for certain types of products vary from one state to another, how do food processors adjust their dating practices according to the state where the final product will be sold?
4. What criteria do food processors use in assigning product dates? In your opinion, are NFPA and/or NIST guidances closely adhered to?
5. How do food processors validate the adopted product dating criteria and what are the estimated costs of such validation? Does the validation (number of tests conducted) vary by the type of date qualifier phrase used? In other words, does changing the qualifier phrase from, for example "Sell by" to "expiration" imply any additional shelf-life testing? Why or why not?
6. How does the use of open dating affect label design and what types of labeling changes would be required if product dating were added or modified?
7. What are the implications of the addition or modification of product dating for production processes? Would additional or modified equipment be necessary? Can you explain.
8. What type of implications does the type of open date (i.e., sell-by, use-by, expiration, etc.) have on inventory control both by the producer and by the retailer or distributor?
9. How do you determine the date format to use? What are the various factors that influence the type of date format (MMDDYY versus MMYYYY, etc.) that you place on a product?
10. How does nutrition labeling on a product factor into the open date?