

Evaluation of
40ml ALU Bottle Dropper
as a poison prevention package for
Liquid Sciences

By

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November 14, 2015

Liquid Sciences
28 Hammond, Suite E
Irvine, CA 92618

Attention: Steven Jaksch

Herein is our report evaluating the 40ml Alu Bottle Dropper as a Poison Protection Package for **Liquid Sciences**.

The test unit was evaluated using the Consumer Product Safety Commission Protocol and Standards. The study indicates the 40ml **ALU Bottle Dropper** fulfills the requirements for a Poison Prevention Package as per the current Code of Federal Regulations (C.F.R.) Title 16, Part 1700.20.

After you have had an opportunity to read the report, I shall be pleased to review it with you.

Sincerely,
BITNER ASSOCIATES, Inc.

A handwritten signature in black ink, appearing to read "John Bitner", written in a cursive style.

John Bitner
President

TABLE OF CONTENTS

- I. SUMMARY
- II. INTRODUCTION
- III. PROCEDURE
- IV. TEST PARAMETERS
- V. PHOTOGRAPH OF UNIT
- VI. RESULTS AND DISCUSSION
- VII. CONCLUSION
- VIII. TABLES
- IX. INTERVIEWERS

I. SUMMARY

Report to: Liquid Sciences
28 Hammond, Suite E
Irvine, CA 92618

Date: November 14, 2015
Samples of: **40ml ALU Bottle Dropper**

Contract No.: 1371-216
Samples Received: November 7, 2015
Submitted by: Steven Jaksch

Objective

Liquid Sciences submitted the **40ml ALU Bottle Dropper** for a study to determine if the bottle/closure is in compliance with the Consumer Product Safety Commission's (CPSC) current protocol and standards for poison prevention packaging Code of Federal Regulations (C.F.R.) Title 16, Part 1700.20.

Procedures

The protocol for evaluation of packaging for poison prevention (current C.F.R. Title 16, Part 1700.20) was strictly adhered to for this study.

Panelists

In the course of this study 100 children (42 to 51 months of age) and 100 seniors (50 to 70 year-olds, 70% female) were employed.

Results

Results of the study indicate that the meets **the standards for poison prevention packaging** according to current C.F.R. Title 16, Part 1700.20.

II. INTRODUCTION

Liquid Sciences wished to determine if **ALU Bottle Dropper** fulfills the Consumer Product Safety Commission's (CPSC) current standards and protocol for poison prevention packaging set forth in the Code of Federal Regulations Title 16, Part 1700.20. Bitner Associates is a recognized testing laboratory facility for testing child-resistant packaging according to CPSC protocol was requested to evaluate the packaging using the above protocol.

Bitner Associates is an independent testing laboratory and has been evaluating child-resistant packaging for both industry and government for over twenty five years. The company is recognized as a leader in the field by virtue of having employed hundreds of thousands of panelists and evaluated thousands of packaging concepts for child-resistance. Bitner Associates utilizes standard operating procedures (SOP's) along with quality assurance programs consistent with those acknowledged and supported by the Consumer Product Safety Commission and Environmental Protection Agency.

In the course of this evaluation, the packaging was tested with panels consisting of 100 seniors (50 to 70 year-olds, 70% female) and 100 children (42 to 51 months of age, evenly distributed) obtained from nursery schools, day care centers and civic groups. The data derived from the study were assembled in a meaningful fashion and reviewed to determine whether the packaging met the cited standards for poison prevention packaging presented herein.

III. PROCEDURE

The following standard and protocol was adhered to in this study.

Protocol

Code of Federal Regulations Title 16, Part 1700:

1700.20 Testing procedure for testing special packaging.

(a) Test protocols - (1) General requirements - (i) Requirements for packaging. As specified in §1700.15(b), special packaging is required to meet the child test requirements and the applicable adult test requirements of this §1700.20.

(ii) Condition of packages to be tested. (A) Tamper-resistant feature. Any tamper-resistant feature of the package to be tested shall be removed prior to testing unless it is part of the package's child-resistant design. Where a package is supplied to the consumer in an outer package that is not part of the package's child-resistant design, one of the following situations applies.

(1) In the child test, the package is removed from the outer package, and the outer package is not given to the child.

(2) In both the adult tests, if the outer package bears instructions for how to open or properly re-secure the package, the package shall be given to the test subject in the outer package. The time required to remove the package from the outer packages is not counted in the times allowed for attempting to open and, if appropriate, reclose the package.

(3) In both the adult tests, if the outer package does not bear any instructions relevant to the test, the package will be removed from the outer package, and the outer package is not given to the test subject.

(B) Reclosable packages - adult tests. In both the adult tests, re-closable packages, if assembled by the testing agency, shall be properly secured at least 72 hours prior to beginning the test to allow the materials (e.g., the closure liner) to "take a set." If assembled by the testing agency, torque-dependent closures shall be secured at the same on-torque as applied on the packaging line. Application torques must be recorded in the test report. All packages shall be handled so that no damage or jarring will occur during storage or transportation. The packages shall not be exposed to extreme conditions of heat or cold. The packages shall be tested at room temperature.

(2) Child test - (i) Test subjects. (A) Selection criteria. Use from 1 to 4 groups of 50 children, as required under the sequential testing criteria in Table 1. No more than 20 percent of the children in each group shall be tested at or obtained from any given site. Each group of children shall be randomly selected as to age, subject to the limitations set forth below. Thirty percent of the children in each group shall be of age 42-44 months, 40 percent of the children in each group shall be of age 45-48 months, and 30 percent of the children in each group shall be of age 49-51 months. The children's ages shall be calculated as follows:

(1) Arrange the birth date and test date by the numerical designations for month, day, and year.

(2) Subtract the month, day, and year numbers for the birth date from the respective numbers for the test date. This may result in negative numbers for the months or days.

(3) Multiply the difference in years by 12 to obtain the number of months in the difference in years, and add this value to the number of months that was obtained when the birth date was subtracted from the test date. This figure either will remain the same or be adjusted up or down by 1 month, depending on the number of days obtained in the subtraction of the birth date from the test date.

(4) If the number of days obtained by subtracting the days in the birth date from the days in the test date is +16 or more, 1 month is added to the number of months obtained above. If the number of days is -16 or less, subtract 1 month. If the number of days is between -15 and +15 inclusive, no change is made in the number of months.

(B) Gender distribution. The difference between the number of boys and the number of girls in each age range shall not exceed 10 percent of the number of children in that range. The children selected should have no obvious or overt physical or mental handicap. Each child's parent or guardian shall read and sign a consent form prior to the child's participation. (The Commission staff will not disregard the results of tests performed by other parties simply because informed consent for children is not obtained.)

Table 1. Number of Openings: Acceptance (Pass), Continue Testing, and Rejection (Fail) Criteria for the First 5 minutes and the Full 10 minutes of the Children's Protocol Test

| Test Panel | Cumulative number of children | Package Openings | | | | | |
|------------|-------------------------------|------------------|----------|------|-----------------|----------|------|
| | | First 5 minutes | | | Full 10 minutes | | |
| | | Pass | Continue | Fail | Pass | Continue | Fail |
| 1.... | 50 | 0 – 3 | 4 – 10 | 11+ | 0 – 5 | 6 – 14 | 15+ |
| 2.... | 100 | 4 – 10 | 11 – 18 | 19+ | 6 – 15 | 16 – 24 | 25+ |
| 3.... | 150 | 11 – 18 | 19 – 25 | 26+ | 16 – 25 | 26 – 34 | 35+ |
| 4.... | 200 | 19 – 30 | | 31+ | 26 – 40 | | 41+ |

(ii) Test failures. A test failure shall be any child who opens the special packaging or gains access to its contents. In the case of unit packaging, however, a test failure shall be any child who opens or gains access to the number of individual units which constitute the amount that may produce serious personal injury or serious illness, or a child who opens or gains access to more than 8 individual units, whichever number is lower, during the full 10 minutes of testing.

The number of units a child opens or gains access to is interpreted as the individual units from which the product has been or can be removed in whole or in part. The determination of the amount of substance that may produce serious personal injury or serious illness shall be based on a 25-pound child. Manufacturers or packagers intending to use unit packaging for a substance requiring special packaging are requested to submit such toxicological data to the Commission's Office of Compliance.

(iii) Sequential test. The sequential test is initially conducted using 50 children, and, depending on the results, the criteria in Table 1 determine whether the package is either child-

resistant or not child-resistant or whether further testing is required. Further testing is required if the results are inconclusive and involves the use of one or more additional groups of 50 children each, up to a maximum of 200 children. No individual shall administer the test to more than 30 percent of the children tested in each group. Table 1 gives the acceptance (pass), continue testing, and rejection (fail) criteria to be used for the first 5 minutes and the full 10 minutes of the children's test. If the test continues past the initial 50-child panel, the package openings shown in Table 1 are cumulative.

(iv) Test procedures. The children shall be divided into groups of two. The testing shall be done in a location that is familiar to the children; for example, their customary nursery school or regular kindergarten. No child shall test more than two special packages. When more than one special package is being tested, each package shall be of a different ASTM type and they shall be presented to the paired children in random order. This order shall be recorded. The children shall be tested by the procedure incorporated in the following test instructions:

Standardized Child Test Instructions

1. Reclosable packages, if assembled by the testing agency, shall be properly secured at least 72 hours prior to the opening described in instruction number 3 to allow the materials, (e.g. the closure liner), to "take a set." Application torques must be recorded in the test report.

2. All packages shall be handled so that no damage or jarring will occur during storage or transportation. The packages shall not be exposed to extreme conditions of heat or cold. The packages shall be tested at room temperature.

3. Reclosable packages shall be opened and properly re-secured one time (or more if appropriate), by the testing agency or other adult prior to testing. The opening and re-securing shall not be done in the presence of the children. (In the adult-re-securing test, the tester must not open and re-secure the package prior to the test.) If multiple openings/re-securing are to be used, each of four (4) testers shall open and properly re-secure one fourth of the packages once and then shall open and properly re-secure each package a second, third, fourth, through tenth (or other specified number) time, in the same sequence as the first opening and re-securing. The packages shall not be opened and re-secured again prior to testing. The name of each tester and the package numbers that he/she opens and re-secures shall be recorded and reported. It is not necessary for the tester to protocol test the packages that they opened and re-secured.

4. The child shall have no overt physical or mental handicaps. No child with a permanent or temporary illness, injury, or handicap that would interfere with his/her effective participation shall be included in the test.

5. The testing shall take place in a well-lighted location that is familiar to the children and that is isolated from all distractions.

6. The tester, or another adult, shall escort a pair of children to the test area. The tester shall seat the two children so that there is no visual barrier between the children and the tester.

7. The tester shall talk to the children to make them feel at ease.

8. The children shall not be given the impression that they are in a race or contest. They are not to be told that the test is a game or that it is fun. They are not to be offered a reward.

9. The tester shall record all data prior to, or after, the test so that full attention can be on

the children during the test period.

10. The tester shall use a stopwatch(s) or other timing device to time the number of seconds it takes the child to open the package and to time the 5-minute test periods.

11. To begin the test, the tester shall hand the children identical packages and say, "PLEASE TRY TO OPEN THIS FOR ME."

12. If a child refuses to participate after the test has started, the tester shall reassure the child and gently encourage the child to try. If the child continues to refuse, the tester shall ask the child to hold the package in his/her lap until the other child is finished. This pair of children shall not be eliminated from the results unless the refusing child disrupts the participation of the other child.

13. Each child shall be given up to 5 minutes to open his/her package. The tester shall watch the children at all times during the test. The tester shall minimize conversations with the children as long as they continue to attempt to open their packages. The tester shall not discourage the children verbally or with facial expressions. If a child gets frustrated or bored and stops trying to open his/her package, the tester shall reassure the child and gently encourage the child to keep trying (e.g., "please try to open the package").

14. The children shall be allowed freedom of movement to work on their packages as long as the tester can watch both children (e.g., they can stand up, get down on the floor, or bang or pry the package).

15. If a child is endangering himself or others at any time, the test shall be stopped and the pair of children eliminated from the final results.

16. The children shall be allowed to talk to each other about opening the packages and shall be allowed to watch each other try to open the packages.

17. A child shall not be allowed to try to open the other child's package.

18. If a child opens his/her package, the tester shall say, "THANK YOU," take the package from the child and put it out of the child's reach. The child shall not be asked to open the package a second time.

19. At the end of the 5-minute period, the tester shall demonstrate how to open the package if either child has not opened his or her package. A separate "demo" package shall be used for the demonstration.

20. Prior to beginning the demonstration, the tester shall ask the children to set their packages aside. The children shall not be allowed to continue to try to open their packages during the demonstration period.

21. The tester shall say, "WATCH ME OPEN MY PACKAGE."

22. Once the tester gets the children's full attention, the tester shall hold the demo package approximately two feet from the children and open the package at a normal speed as if the tester were going to use the contents. There shall be no exaggerated opening movements.

23. The tester shall not discuss or describe how to open the package.

24. To begin the second 5-minute period, the tester shall say, "NOW YOU TRY TO OPEN YOUR PACKAGES."

25. If one or both children have not used their teeth to try to open their packages during the first 5 minutes, the tester shall say immediately before beginning the second 5-minute period, "YOU CAN USE YOUR TEETH IF YOU WANT TO." This is the only statement that the tester shall make

about using teeth.

26. The test shall continue for an additional 5 minutes or until both children have opened their packages, whichever comes first.

27. At the end of the test period, the tester shall say, "THANK YOU FOR HELPING." If children were told that they could use their teeth, the tester shall say, "I KNOW I TOLD YOU THAT YOU COULD USE YOUR TEETH TODAY, BUT YOU SHOULD NOT PUT THINGS LIKE THIS IN YOUR MOUTH AGAIN." In addition, the tester shall say, "NEVER OPEN PACKAGES LIKE THIS WHEN YOU ARE BY YOURSELF. THIS KIND OF PACKAGE MIGHT HAVE SOMETHING IN IT THAT WOULD MAKE YOU SICK."

28. The children shall be escorted back to their classroom or other supervised area by the tester or another adult.

29. If the children are to participate in a second test, the tester shall have them stand up and stretch for a short time before beginning the second test. The tester shall take care that the children do not disrupt other tests in progress.

(3) Senior-adult panel - (i) Test subjects. Use a group of 100 senior adults. Not more than 24 percent of the senior adults tested shall be obtained from or tested at any one site. Each group of senior adults shall be randomly selected as to age, subject to the limitations set forth below. Twenty-five percent of the participants shall be 50-54 years of age, 25% of participants shall be 55-59 years of age, and 50% of the participants shall be 60-70 years old. Seventy percent of the participants of ages 50-59 and ages 60-70 shall be female (17 or 18 females shall be apportioned to the 50-54 year age group). No individual tester shall administer the test to more than 35% of the senior adults tested. The adults selected should have no obvious or overt physical or mental disability.

(ii) Screening procedures. Participants who are unable to open the packaging being tested in the first 5-minute time period, are given a screening test. The screening tests for this purpose shall use two packages with conventional (not child-resistant (CR) or "special") closures. One closure shall be a plastic snap closure and the other a continuous threaded (CT) plastic closure. Each closure shall have a diameter of 28 mm ∇ 18%, and the CT closures shall have been re-secured 72 hours before testing at 10 inch-pounds of torque. The containers for both the snap- and CT-type closures shall be round plastic containers, in sizes of 2 ounce ∇ ½ ounce for the CT-type closure and 8 drams ∇ 4 drams for the snap-type closure. Persons who cannot open and close both of the screening packages in 1-minute screening tests shall not be counted as participants in the senior-adult panel.

(iii) SAUE. The senior adult use effectiveness (SAUE) is the percentage of adults who both opened the package in the first (5-minute) test period and opened and (if appropriate) properly resecured the package in the 1-minute test period.

(iv) Test procedures. The senior adults shall be tested individually, rather than in groups of two or more. The senior adults shall receive only such printed instructions on how to open and properly secure the special packaging as will appear on or accompany the package as it is delivered to the consumer. The senior-adult panel is tested according to the procedure incorporated in the following senior-adult panel test instructions:

Test Instructions for Senior Test

The following test instructions are used for all senior tests. If non-reclosable packages are being tested, the commands to close the package are eliminated.

1. No adult with a permanent or temporary illness, injury, or disability which would interfere with his/her effective participation shall be included in the test.
2. Each adult shall read and sign a consent form prior to participating. Any appropriate language from the consent form may be used to recruit potential participants. The form shall include the basic elements of informed consent as defined in 16 CFR 1028.116. Before beginning the test, the tester shall say, "PLEASE READ AND SIGN THIS CONSENT FORM." If an adult cannot read the consent form for any reason (forgot glasses, illiterate, etc.), he/she shall not participate in the test.
3. Each adult shall participate individually and not in the presence of other participants or onlookers.
4. The tests shall be conducted in well-lighted and distraction-free areas.
5. Records shall be filled in before or after the test, so that the tester's full attention is on the participant during the test period. Recording the test times to open and resecure the packages are the only exceptions.
6. To begin the first 5-minute test period, the tester says, "I AM GOING TO ASK YOU TO OPEN AND PROPERLY CLOSE THESE TWO IDENTICAL PACKAGES ACCORDING TO THE INSTRUCTIONS FOUND ON THE CAP." (Specify other instruction locations if appropriate.)
7. The first package is handed to the participant by the tester, who says, "PLEASE OPEN THIS PACKAGE ACCORDING THE DIRECTIONS OF THE CAP." (Specify other instruction locations if appropriate.) If the package contains product, the tester shall say, "PLEASE EMPTY THE (PILLS, TABLETS, CONTENTS, ETC.) INTO THIS CONTAINER." After the participant opens the package, the tester says, "PLEASE CLOSE THE PACKAGE PROPERLY, ACCORDING TO THE INSTRUCTIONS OF THE CAP." (Specify other instruction locations if appropriate)
8. Participants are allowed up to 5 minutes to read the instructions and open and close the package. The tester uses a stopwatch(s) or other timing device to time the opening and resealing times. The elapsed times in seconds to open the package and to close the package are recorded on the data sheet as two separate times.
9. After 5 minutes, or when the participant has opened and closed the package, whichever comes first, the tester shall take all test materials from the participant. The participant may remove and replace the closure more than once if the participant initiates these actions. If the participant does not open the package and stops trying to open it before the end of the 5-minute period, the tester shall say, "ARE YOU FINISHED WITH THAT PACKAGE, OR WOULD YOU LIKE TO TRY AGAIN?" If the participant indicates that he/she is finished or cannot open the package and does not wish to continue trying skip to Instruction 13.
10. To begin the second test period, the tester shall give the participant another, but identical, package and say, "THIS IS AN IDENTICAL PACKAGE. PLEASE OPEN IT ACCORDING TO THE INSTRUCTIONS ON THE CAP." (Specify other instruction locations if appropriate.) If the package contains product, the tester shall say, "PLEASE EMPTY THE (PILLS, TABLETS, CONTENTS, ETC.) INTO THIS CONTAINER." After the participant opens the package, the tester says, "PLEASE CLOSE THIS

PACKAGE PROPERLY, ACCORDING TO THE INSTRUCTIONS ON THE CAP." (Specify other instruction locations if appropriate.)

11. The participants are allowed up to 1 minute (60 full seconds) to open and close the package. The elapsed times in seconds to open and to close the package are recorded on the data sheet as two separate times. The time that elapses between the opening of the package and the end of the instruction to close the package is not counted as part of the 1-minute test time.

12. After the 1-minute test, or when the participant has opened and closed the package, whichever comes first, the tester shall take all the test materials from the participant. The participant shall not be allowed to handle the package again. If the participant does not open the package and stops trying to open it before the end of the 1-minute period, the tester shall say, "ARE YOU FINISHED WITH THAT PACKAGE, OR WOULD YOU LIKE TO TRY AGAIN?" If the participant indicates that he/she is finished or cannot open the package and does not wish to continue trying, this shall be counted as a failure of the 1-minute test.

13. Participants who do not open the package in the first 5-minute test period are asked to open and close two non-child-resistant screening packages. The participants are given a 1-minute test period for each package. The tester shall give the participant a package and say, "PLEASE OPEN AND PROPERLY CLOSE THIS PACKAGE." The tester records the time for opening and closing, or 61 seconds, whichever is less, on the data sheet. The tester then gives the participant the second package and says, "PLEASE OPEN AND PROPERLY CLOSE THIS PACKAGE." The times to open and re-secure or 61 seconds, whichever is less, shall be recorded on the data sheet.

14. Participants who cannot open and re-secure both of the non-child-resistant screening packages are not counted as part of the 100-senior panel. Additional participants are selected and tested.

15. No adult may participate in more than two tests per sitting. If a person participates in two tests, the packages tested shall not be the same ASTM type of package.

16. If more adults in a sex or age group are tested than are necessary to determine SAUE, the last person(s) tested shall be eliminated from that group.

(4) Younger-adult panel. (i) One hundred adults, age 18 to 45 inclusive, with no overt physical or mental handicaps, and 70 percent of whom are female, shall comprise the test panel for younger adults. Not more than 35% of adults shall be obtained or tested at any one site. No individual tester shall administer the test to more than 35% of the adults tested. The adults shall be tested individually, rather than in groups of two or more. The adults shall receive only such printed instructions on how to open and properly re-secure the special packaging as will appear on the package as it is delivered to the consumer. Five minutes shall be allowed to complete the opening and, if appropriate, the re-securing process.

(ii) Records shall be kept of the number of adults unable to open and of the number of the other adults tested who fail to properly re-secure the special packaging. The number of adults who successfully open the special packaging and then properly re-secure the special packaging (if re-securing is appropriate) is the percent of adult-use effectiveness of the special packaging. In the case of unit packaging, the percent of adult-use effectiveness shall be the number of adults who successfully open a single (unit) package.

(iii) Adult-use effectiveness of not less than 90 percent.

IV. TEST PARAMETERS

The Package

Test package was **ALU Bottle Dropper..** Test Bottles were empty.

Opening Instructions on closure top panel _

PUSH DOWN WHILE TURNING CLOSE TIGHTLY

Panelists

In the child testing phase of this study, 100 children between the ages of 42 and 51 months distributed into three age groups (42-44, 45-48, and 49-51 months, evenly distributed by sex) were employed. The 100 Bottles used for child testing were previously tested by seniors.

Seniors (100) employed in the study also satisfied the requirements of the protocol, with ages ranging from 50 to 70 years of age divided into three age groups (50-54, 55-59, and 60-70 years old with 70% female).

Test supervisor(s)

Test supervisor(s) were instructed to conduct the evaluation of the packaging in strict accordance with the current C.F.R. Title 16, Part 1700.20. To ensure these procedures were adhered to, our complete quality system was followed, including periodic observations throughout the package evaluation.

PHOTO: 40 ml ALU Bottle Dropper 18/400 Closure



SPECIFICATIONS _ Drawings available on request

Bottle: 40ml

Material: Aluminum

Overcap/Innecap:

Overcap Material: Polypropylene

Innecap Material: Polyethylene

Dropper: Rubber

Pipette: Glass

V. RESULTS AND DISCUSSION

Results of this study appear in the tables section of the report. These tables represent a compilation of all data obtained during the study. For clarity in presentation and discussion of this information, the following features will be used as the major points of discussion:

- * Child-resistant effectiveness
- * Senior-use effectiveness – Senior Re-closing
- * Meeting current Code of Federal Regulations Title 16, Part 1700.20

Child-resistant effectiveness

Results of the package evaluation by the 100 child panelists appear in Table 1 of the report. From Table 1 it will be noted that 0 children opened the package before demonstration and one of the children opened the package following demonstration for a total of one child successfully able to remove the closure. This represents a child-resistant effectiveness of **99%**

Senior Adult Use Effectiveness

Senior panel consisted of 70 females and 30 males. Results of the senior test appear in Table 2 of this report. A total of 25 of the 25 seniors in the 50 to 54 year old age group were successful in opening and re-closing the first package and opening and properly closing the second package, 25 of the 25 seniors in the 55 to 59 year old age group were successful, and 50 of the 50 seniors were successful in the 60 to 70 year old age group. The SAUE was calculated at **100%**.

Meeting current C.F.R. Title 16, Part 1700.20.

Liquid Sciences's ALU Bottle Dropper Consumer Product Safety Report meets the standards for poison prevention packaging evaluation according to current C.F.R. Title 16, Part 1700.20.

VI. CONCLUSION

report data presented demonstrates that the **ALU Bottle Dropper** fulfills the requirements for poison prevention packaging according to the current Code of Federal Regulations Title 16, Part 1700.20.

EVALUATION OF THE ALU BOTTLE DROPPER AS A CHILD-RESISTANT PACKAGE FOR LIQUID SCIENCES CORPORATION

Table 1. Package opening test evaluated by children 42 to 51 months of age for child resistant effectiveness

| Age in Months | Males | Females | Total | Successful Panelists | | | | |
|---------------|-----------|-----------|------------|----------------------|----------|---------------------|----------|----------|
| | | | | Before Demonstration | | After Demonstration | | |
| | Males | Females | Total | Males | Females | Males | Females | Total |
| 42-44 | 14 | 16 | 30 | 0 | 0 | 0 | 0 | 0 |
| 45-48 | 20 | 20 | 40 | 0 | 0 | 0 | 0 | 0 |
| 49-51 | 14 | 16 | 30 | 0 | 0 | 0 | 1 | 1 |
| TOTAL | 48 | 52 | 100 | 0 | 0 | 0 | 1 | 1 |

CHILD-RESISTANT EFFECTIVENESS = 99%

| CHILD DATA: 42 – 44 months | | | | | |
|----------------------------|------|-----|--------|--------------|----------------------------------|
| | PKG# | AGE | GENDER | TIME to OPEN | COMMENTS |
| 1. | 108 | 42 | M | | Liked the silver color |
| 2. | 113 | 42 | M | | Pulled and bit the top |
| 3. | 85 | 42 | M | | Played with rubber stopper |
| 4. | 84 | 44 | M | | Twisted cap repeatedly |
| 5. | 87 | 44 | M | | Banged on table |
| 6. | 92 | 43 | M | | Swung bottle from plunger |
| 7. | 99 | 42 | M | | Squeezed rubber top |
| 8. | 88 | 42 | M | | Squeezed rubber top |
| 9. | 127 | 42 | M | | Bent and squeezed rubber stopper |
| 10. | 43 | 42 | M | | Squeezed rubber top |
| 11. | 14 | 42 | M | | Twisted/ pulled |
| 12. | 91 | 42 | M | | Twisted and pulled |
| 13. | 126 | 42 | M | | Squeezed rubber top |
| 14. | 79 | 44 | M | | Bit the rubber |
| 15. | 74 | 42 | F | | Shook head while biting it |
| 16. | 125 | 43 | F | | Turned and Pulled |
| 17. | 105 | 43 | F | | Pulled at top |
| 18. | 130 | 44 | F | | Wonder why |

| CHILD DATA: 42 – 44 months continued | | | | | |
|--------------------------------------|------|-----|--------|--------------|-------------------------------|
| | PKG# | AGE | GENDER | TIME to OPEN | COMMENTS |
| 19. | 73 | 44 | F | | Shook/ twisted |
| 20. | 38 | 42 | F | | Rolled on table |
| 21. | 169 | 42 | F | | Lost interest fast |
| 22. | 181 | 42 | F | | Twisted cap |
| 23. | 176 | 43 | F | | Twisted cap |
| 24. | 185 | 42 | F | | Squeezed rubber top |
| 25. | 193 | 42 | F | | Constant conversation |
| 26. | 70 | 43 | F | | Squeezed rubber top |
| 27. | 09 | 42 | F | | Bit on the rubber part |
| 28. | 25 | 42 | F | | Shook bottle. Played with Top |
| 29. | 14 | 44 | F | | Rolled it on table |
| 30. | 67 | 42 | F | | Played with top |

| CHILD DATA: 45 – 48 months | | | | | |
|----------------------------|------------|-----------|----------|--------------|-------------------------|
| | PKG# | AGE | GENDER | TIME to OPEN | COMMENTS |
| 1. | 83 | 46 | M | | Commented on color |
| 2. | 80 | 45 | M | | Tried to pull and twist |
| 3. | 136 | 48 | M | | Tried to pull and twist |
| 4. | 104 | 47 | M | | Twisted cap |
| 5. | 101 | 45 | M | | Played with cap. |
| 6. | 78 | 46 | M | | Wanted me to do it |
| 7. | 174 | 48 | M | | Pulled real hard |
| 8. | 194 | 48 | M | | Banged on table |
| 9. | 182 | 46 | M | | Squeezed rubber top |
| 10. | 186 | 47 | M | | Rolled in hand |
| 11. | 183 | 48 | M | | Tried to pull off |
| 12. | 187 | 49 | M | | Twisted |
| 13. | 177 | 48 | M | | Shook |
| 14. | 195 | 46 | M | | Pulled off outer cap |
| 15. | 178 | 45 | M | | Twisted |
| 16. | 196 | 47 | M | | Squeezed rubber top |
| 17. | 171 | 46 | M | | Trying real hard |
| 18. | 184 | 45 | M | | Shook/twisted/pulled. |
| 19. | 191 | 45 | M | | Tried to pull and twist |
| 20. | 188 | 47 | M | | Played with cap. |
| 21. | 103 | 47 | F | | Said bottle was cold |
| 22. | 111 | 48 | F | | Pushed and pulled. |
| 23. | 140 | 47 | F | | Tried to pull and twist |
| 24. | 112 | 45 | F | | Squeezed rubber top |
| 25. | 109 | 47 | F | | Played with cap. |
| 26. | 66 | 48 | F | | Tried to pull and twist |
| 27. | 17 | 48 | F | | Liked the coloe |
| 28. | 24 | 46 | F | | Rolled it in hand |
| 29. | 58 | 45 | F | | Tried to pull and twist |

| CHILD DATA: 45 – 48 months continued | | | | | |
|---|-------------|------------|---------------|---------------------|---------------------------|
| | PKG# | AGE | GENDER | TIME to OPEN | COMMENTS |
| 30. | 45 | 45 | F | | Squeezed rubber top |
| 31. | 190 | 46 | F | | Tried to pull and twist |
| 32. | 198 | 45 | F | | Tried to pull and twist |
| 33. | 189 | 48 | F | | Squeezed rubber top |
| 34. | 200 | 45 | F | | Squeezed rubber top |
| 35. | 199 | 46 | F | | Played with cap. |
| 36. | 197 | 45 | F | | Played with cap. |
| 37. | 173 | 48 | F | | Twisted top over and over |
| 38. | 180 | 46 | F | | Bit on the rubber |
| 39. | 192 | 45 | F | | Twisted top/shook. |
| 40. | 175 | 47 | F | | Tried to pull and twist |

| CHILD DATA: 49 – 51 months | | | | | |
|-----------------------------------|-------------|------------|---------------|---------------------|----------------------------------|
| | PKG# | AGE | GENDER | TIME to OPEN | COMMENTS |
| 1. | 118 | 49 | M | | Tried to pull and twist |
| 2. | 71 | 49 | M | | Squeezed rubber top |
| 3. | 119 | 50 | M | | Played with cap. |
| 4. | 02 | 51 | M | | Tried to pull and twist |
| 5. | 49 | 50 | M | | Rolled on table |
| 6. | 06 | 50 | M | | Wanted to know what was inside |
| 7. | 03 | 49 | M | | Pulled and twisted rubber top |
| 8. | 48 | 50 | M | | Turned upside down |
| 9. | 55 | 51 | M | | Tried to pull and twist |
| 10. | 44 | 51 | M | | Played with cap. |
| 11. | 15 | 49 | M | | Squeezed rubber top |
| 12. | 28 | 49 | M | | Played with cap. |
| 13. | 56 | 51 | M | | Pulling at the top |
| 14. | 18 | 50 | M | | Squeezed rubber top |
| 15. | 49 | 51 | F | | Bit the rubber |
| 16. | 29 | 51 | F | | Tried to pull and twist |
| 17. | 35 | 49 | F | | Pulled on rubber only |
| 18. | 179 | 51 | F | | Squeezed rubber top |
| 19. | 01 | 49 | F | | Played with cap. |
| 20. | 32 | 50 | F | | Wanted me to do it for her |
| 21. | 124 | 49 | F | | Twisted over and over |
| 22. | 123 | 50 | F | | Shook/ twisted. Thought it stuck |
| 23. | 115 | 49 | F | | Played with top |
| 24. | 137 | 50 | F | 8:13 | Pushed down and twisted |
| 25. | 10 | 51 | F | | “TOO HARD” |
| 26. | 60 | 49 | F | | Squeezed rubber top |
| 27. | 39 | 50 | F | | Tried to pull and twist |
| 28. | 68 | 51 | F | | Twisted/ shook |
| 29. | 62 | 49 | F | | Twisted and bent rubber top |
| 30. | 50 | 50 | F | | Squeezed rubber top |

EVALUATION OF ALU BOTTLE DROPPER REPORT FOR LIQUID SCIENCES

Table 2. Package opening test evaluated by adults 50 to 70 years of age for senior effectiveness

| | Panelists Tested | Successful Panelists | | TOTAL FAILURES |
|------------------|------------------|----------------------|-----------------------------------|----------------|
| | | First Opening | Second Opening and Second Closing | |
| 50-54 years old: | | | | |
| Females | 17 | 17 | 17 | 0 |
| Males | 8 | 8 | 8 | 0 |
| Subtotal | 25 | 25 | 25 | 0 |
| 55-59 years old: | | | | |
| Females | 17 | 17 | 17 | 0 |
| Males | 8 | 8 | 8 | 0 |
| Subtotal | 25 | 25 | 25 | 0 |
| 60-70 years old: | | | | |
| Females | 35 | 35 | 35 | 0 |
| Males | 15 | 15 | 15 | 0 |
| Subtotal | 50 | 50 | 50 | 0 |
| TOTAL | 100 | 100 | 100 | 0 |

SENIOR-USE EFFECTIVENESS (SAUE) = 100%

ADULT RESECURING 100%

| SENIOR ADULT: 50 - 54 YEARS | | | | | | |
|------------------------------------|-------|-------|-----|--------|-----------|--------------|
| | PKG # | PKG # | AGE | GENDER | PASS/FAIL | TIME TO OPEN |
| 1. | 139 | 85 | 53 | M | PASS | :09/:07 |
| 2. | 128 | 111 | 53 | M | PASS | :18/:12 |
| 3. | 110 | 101 | 50 | M | PASS | :08/:09 |
| 4. | 102 | 71 | 52 | M | PASS | :13/:08 |
| 5. | 121 | 125 | 54 | M | PASS | :20/:07 |
| 6. | 114 | 113 | 51 | M | PASS | :13/:18 |
| 7. | 80 | 124 | 52 | M | PASS | :17/:13 |
| 8. | 117 | 126 | 51 | M | PASS | :16/:20 |
| 9. | 94 | 91 | 52 | F | PASS | :16/:13 |
| 10. | 82 | 92 | 54 | F | PASS | :11/:11 |
| 11. | 111 | 127 | 51 | F | PASS | :18/:14 |
| 12. | 36 | 44 | 53 | F | PASS | :10/:07 |
| 13. | 23 | 01 | 54 | F | PASS | :07/:09 |
| 14. | 57 | 48 | 54 | F | PASS | :07/:10 |
| 15. | 13 | 35 | 51 | F | PASS | :08/:11 |

| SENIOR ADULT: 50 - 54 YEARS continued | | | | | | |
|--|--------------|--------------|------------|---------------|------------------|---------------------|
| | PKG # | PKG # | AGE | GENDER | PASS/FAIL | TIME TO OPEN |
| 16. | 08 | 45 | 50 | F | PASS | :09/:09 |
| 17. | 07 | 29 | 54 | F | PASS | :10/:09 |
| 18. | 18 | 49 | 50 | F | PASS | :07/:10 |
| 19. | 05 | 17 | 51 | F | PASS | :09/:09 |
| 20. | 27 | 18 | 52 | F | PASS | :10/:08 |
| 21. | 12 | 56 | 53 | F | PASS | :14/:16 |
| 22. | 11 | 32 | 54 | F | PASS | :07/:09 |
| 23. | 51 | 28 | 50 | F | PASS | :08/:08 |
| 24. | 21 | 70 | 50 | F | PASS | :10/:07 |
| 25. | 54 | 09 | 54 | F | PASS | :08/:08 |

| SENIOR ADULT: 55 - 59 YEARS | | | | | | |
|------------------------------------|--------------|--------------|------------|---------------|------------------|---------------------|
| | PKG # | PKG # | AGE | GENDER | PASS/FAIL | TIME TO OPEN |
| 1. | 72 | 84 | 58 | M | PASS | :17/:11 |
| 2. | 77 | 78 | 57 | M | PASS | :22/:18 |
| 3. | 98 | 119 | 58 | M | PASS | :21/:17 |
| 4. | 107 | 104 | 58 | M | PASS | :11/:15 |
| 5. | 134 | 99 | 55 | M | PASS | :16/:09 |
| 6. | 132 | 118 | 55 | M | PASS | :22/:19 |
| 7. | 97 | 108 | 57 | M | PASS | :25/:18 |
| 8. | 76 | 73 | 56 | M | PASS | :22/:15 |
| 9. | 64 | 43 | 56 | F | PASS | :12/:05 |
| 10. | 63 | 06 | 58 | F | PASS | :12/:10 |
| 11. | 65 | 25 | 59 | F | PASS | :12/:06 |
| 12. | 40 | 24 | 57 | F | PASS | :16/:13 |
| 13. | 50 | 14 | 57 | F | PASS | :07/:08 |
| 14. | 61 | 03 | 57 | F | PASS | :47/:11 |
| 15. | 69 | 67 | 58 | F | PASS | :06/:07 |
| 16. | 59 | 02 | 58 | F | PASS | :29/:08 |
| 17. | 20 | 04 | 59 | F | PASS | :12/:07 |
| 18. | 22 | 66 | 58 | F | PASS | :17/:13 |
| 19. | 68 | 30 | 57 | F | PASS | :09/:08 |
| 20. | 47 | 62 | 57 | F | PASS | :09/:08 |
| 21. | 31 | 55 | 56 | F | PASS | :11/:09 |
| 22. | 37 | 33 | 57 | F | PASS | :10/:10 |
| 23. | 19 | 41 | 55 | F | PASS | :10/:10 |
| 24. | 26 | 60 | 55 | F | PASS | :10/:11 |
| 25. | 53 | 38 | 57 | F | PASS | :09/:09 |

| SENIOR ADULT: 60 - 70 YEARS | | | | | | |
|------------------------------------|--------------|--------------|------------|---------------|------------------|---------------------|
| | PKG # | PKG # | AGE | GENDER | PASS/FAIL | TIME TO OPEN |
| 1. | 106 | 88 | 67 | M | PASS | :09/:06 |
| 2. | 133 | 140 | 65 | M | PASS | :11/:07 |
| 3. | 18 | 87 | 60 | M | PASS | :21/:10 |
| 4. | 75 | 130 | 67 | M | PASS | :20/:11 |
| 5. | 95 | 105 | 60 | M | PASS | :17/:08 |
| 6. | 89 | 109 | 65 | M | PASS | :09/:10 |
| 7. | 90 | 115 | 65 | M | PASS | :10/:09 |
| 8. | 116 | 123 | 61 | M | PASS | :22/:10 |
| 9. | 93 | 79 | 67 | M | PASS | :15/:10 |
| 10. | 122 | 103 | 67 | M | PASS | :28/:13 |
| 11. | 100 | 136 | 63 | M | PASS | :27/:20 |
| 12. | 120 | 137 | 64 | M | PASS | :16/:07 |
| 13. | 131 | 80 | 67 | M | PASS | :18/:14 |
| 14. | 96 | 83 | 68 | M | PASS | :24/:17 |
| 15. | 135 | 74 | 64 | M | PASS | :14/:10 |
| 16. | 138 | 112 | 62 | F | PASS | :12/:20 |
| 17. | 52 | 46 | 61 | F | PASS | :08/:10 |
| 18. | 16 | 58 | 62 | F | PASS | :09/:11 |
| 19. | 42 | 15 | 61 | F | PASS | :11/:07 |
| 20. | 34 | 39 | 62 | F | PASS | :09/:10 |
| 21. | 141 | 169 | 62 | F | PASS | :08/:07 |
| 22. | 149 | 181 | 60 | F | PASS | :11/:12 |
| 23. | 150 | 176 | 63 | F | PASS | :15/:16 |
| 24. | 145 | 1854 | 65 | F | PASS | :08/:09 |
| 25. | 156 | 193 | 67 | F | PASS | :09/:09 |
| 26. | 159 | 174 | 64 | F | PASS | :06/:09 |
| 27. | 162 | 194 | 62 | F | PASS | :08/:08 |
| 28. | 142 | 182 | 66 | F | PASS | :12/:09 |
| 29. | 146 | 186 | 61 | F | PASS | :12/:06 |
| 30. | 164 | 183 | 63 | F | PASS | :11/:09 |
| 31. | 157 | 187 | 62 | F | PASS | :14/:07 |
| 32. | 160 | 177 | 60 | F | PASS | :49/:44 |
| 33. | 143 | 195 | 63 | F | PASS | :32/:27 |
| 34. | 148 | 178 | 60 | F | PASS | :16/:12 |
| 35. | 151 | 196 | 60 | F | PASS | :06/:08 |
| 36. | 152 | 171 | 62 | F | PASS | :13/:13 |
| 37. | 147 | 184 | 61 | F | PASS | :11/:10 |
| 38. | 165 | 191 | 60 | F | PASS | :11/:09 |
| 39. | 144 | 188 | 66 | F | PASS | :15/:13 |

| SENIOR ADULT: 60 - 70 YEARS continued | | | | | | |
|--|--------------|--------------|------------|---------------|------------------|---------------------|
| | PKG # | PKG # | AGE | GENDER | PASS/FAIL | TIME TO OPEN |
| 40. | 153 | 190 | 67 | F | PASS | :14/:10 |
| 41. | 166 | 198 | 68 | F | PASS | :15/:15 |
| 42. | 170 | 189 | 62 | F | PASS | :14/:14 |
| 43. | 172 | 200 | 60 | F | PASS | :16/:14 |
| 44. | 168 | 199 | 60 | F | PASS | :14/:15 |
| 45. | 155 | 197 | 61 | F | PASS | :17/:12 |
| 46. | 154 | 173 | 64 | F | PASS | :16/:16 |
| 47. | 163 | 180 | 60 | F | PASS | :14/:06 |
| 48. | 158 | 192 | 61 | F | PASS | :09/:06 |
| 49. | 161 | 175 | 60 | F | PASS | :24/:10 |
| 50. | 167 | 179 | 60 | F | PASS | :16/:13 |

GENERAL OBSERVATIONS:

SENIORS

The majority of the seniors had little trouble opening the bottom. Several commented that it was hard to push down and had to try several times to push it to get it to work.

CHILDREN

The Children were concentrating on squeezing the rubber top over and over and *pulling* and twisting. Some of the children were very frustrated that they could not get it open. The one child who did so twisted the cap for 8 min and pulled and off it came. One child did pull the outer ring off.

Test Supervisors

- Debbie Brooks
- Jen Burton
- Julie Ford
- Debra Gallichio
- Jeremy Brooks