

An Evaluation of the AAPCC Older Adult and Medicine Safety Pilot Program

June 2017



EVALUATION
SPECIALISTS 

EXECUTIVE SUMMARY

This report summarizes findings from an evaluation of the Older Adults and Medicine Safety (OAMS) pilot program, an intervention designed to provide education to older adults about safe storage and proper use of medications. The program was provided to non-institutionalized adults 65 years or older, living at home without nursing care, and mentally and physically able to manage their own medications without assistance. The pilot program and this evaluation ran from November 2016 through April 2017. Data to support the evaluation came from 603 program participants.

The OAMS program had strong immediate benefits to program participants. Following program participation, participants reported improvements in knowledge of targeted medication-related principles and positive intentions to engage in the targeted medication-related behaviors. Participants that benefited most were those who, prior to the program, did not report engaging in targeted behaviors or understanding the targeted principles. The benefits of participation occurred for individuals across gender and age groups. How the program was presented (PowerPoint presentation or flipchart) did not influence the extent that participants benefitted.

Key study findings include:

- A large proportion of the participants came to the program already reporting adherence to the targeted medication-related behaviors as well as knowledge of each of the targeted medication-related principles.
- Significant improvements occurred when comparing past behavior to intended future behavior for each of the seven targeted behaviors.
- Significant improvements occurred when comparing prior knowledge and post-program knowledge of two of the five targeted principles.
- Participants who were not practicing the targeted behaviors prior to the program had more room for improvement and, hence, benefitted significantly more than those who were.
- Similarly, participants who were not informed about targeted principles prior to the program benefitted significantly more than those who were. The majority of previously uninformed individuals showed knowledge of the targeted principles after the program.
- The program worked well across demographic groups. Women and men, and people of different ages, benefitted similarly to each other.
- The program worked well regardless of the visual presentation mode (PowerPoint or flipchart) used by Program Leaders.

Greater detail about the statistical results for the findings reported here are provided in this report's appendices.

¹ The term "significant" is used throughout this report to refer to a finding that was statistically significant, meaning that statistical analysis showed the finding to unlikely be due to chance.



OAMS PILOT PROGRAM DESCRIPTION

The objective of the OAMS pilot program was to provide education to older adults about safe storage and proper use of medications. The program delivered five core medicine safety messages in small group settings via scenarios and discussion questions. The American Association of Poison Control Centers (AAPCC) developed OAMS with support from McNeil Consumer Healthcare. A group of professional poison prevention educators from AAPCC centers provided advisory input into program development.

The program taught participants the importance of adhering to the following behaviors:

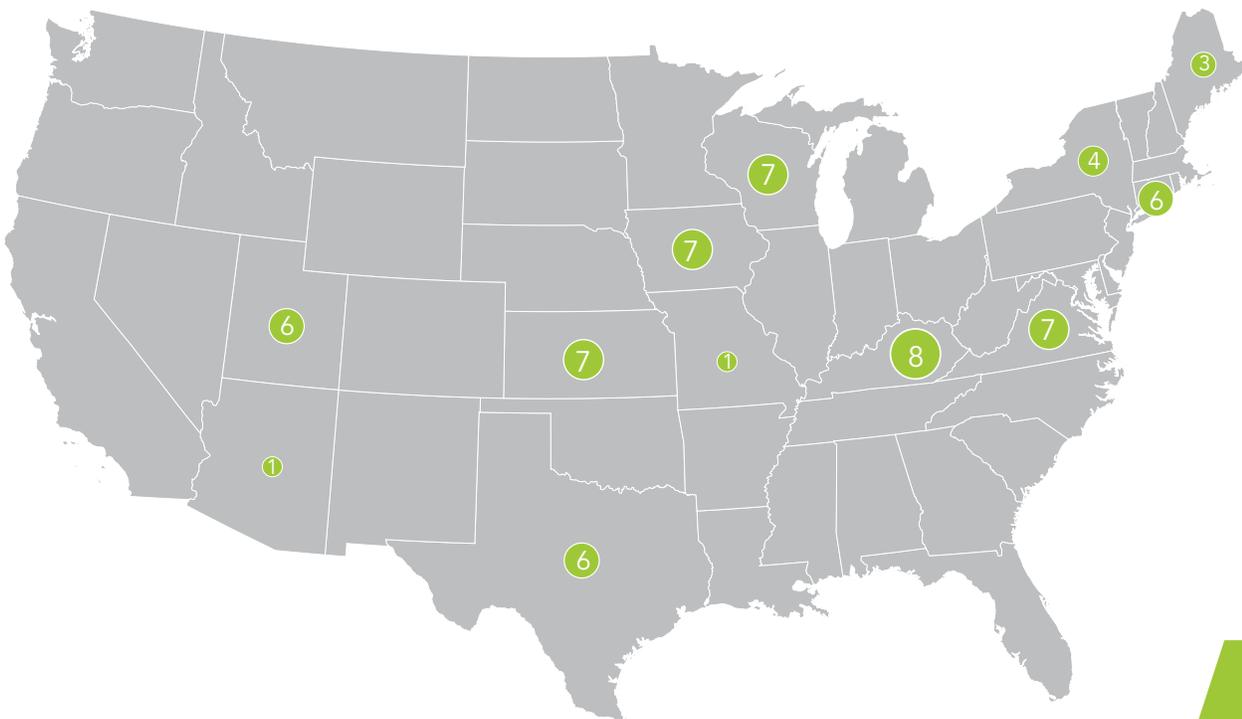
- Reading the entire label and instructions that come with all medications.
- Following all directions on the label of each medication.
- Keeping an up-to-date list of all:
 - prescription medications,
 - over the counter (OTC) medications,
 - vitamins, and
 - supplements.
- Keeping all medications in a place that is up, away, and out of sight of children.

The program also taught participants about the following medication-related principles:

- It is not okay to measure medicine with kitchen spoons and measuring spoons.
- It is not okay to take someone else's prescription medicine.
- Doctors should be made aware of all a patient's medications, regardless of who prescribed them.
- Vitamins and supplements can interact with medications and cause side effects.
- People can call a local poison control center with questions about their medications.



Program Leaders identified by AAPCC delivered sessions in community locations across the country, including libraries, senior centers, community/recreation centers, assisted living facilities, and senior meal sites. A total of 63 sessions were offered across the following states: Arizona, Connecticut, Iowa, Kansas, Kentucky, Maine, Missouri, New York, Texas, Utah, Virginia, and Wisconsin.

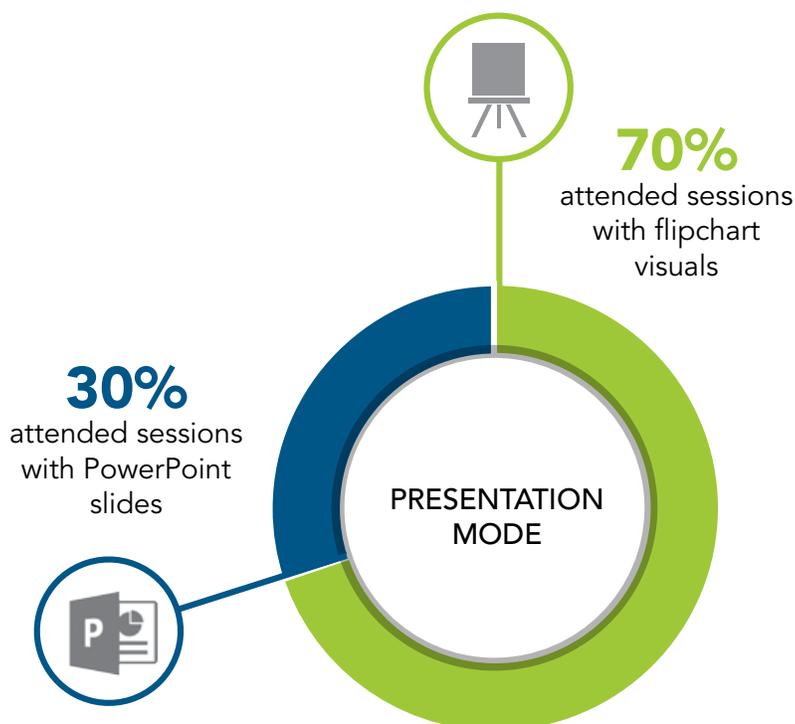
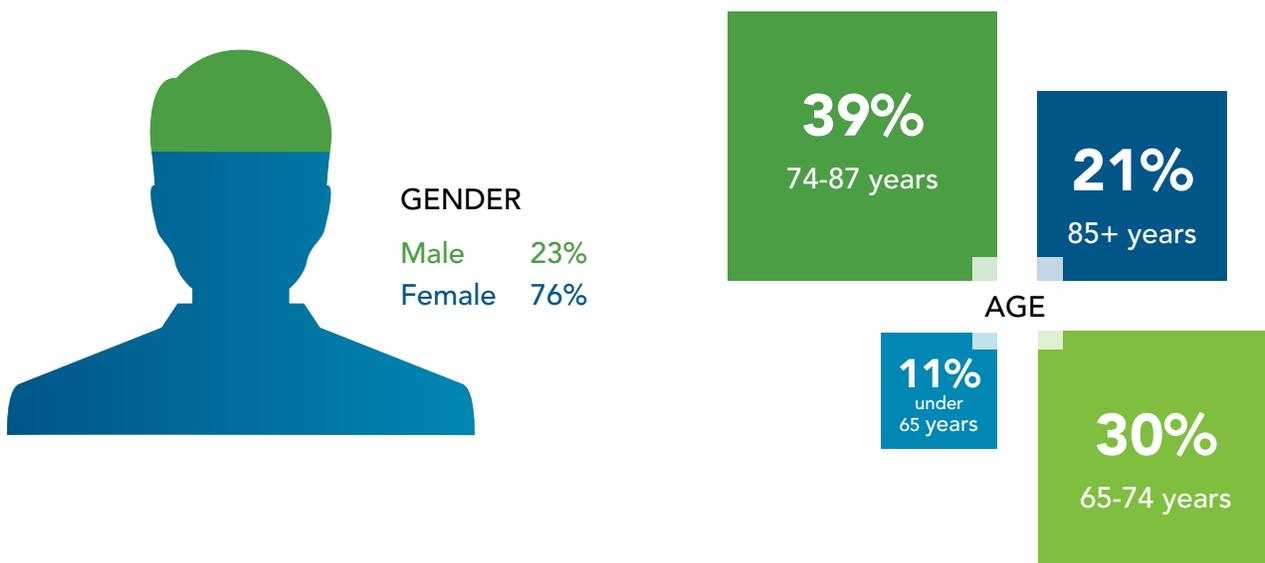


The OAMS program was designed to last for 75 minutes without a break. Program Leaders presented materials either using an enlarged flipchart or projected PowerPoint slides.



OAMS PILOT PROGRAM PARTICIPANTS

Six hundred and three participants were included in the evaluation of the program. Three quarters were women, and most were between the ages of 65 and 84, although one fifth were over age 85. Seventy percent of the participants attended sessions with flipchart visuals; the remaining 30% attended sessions with PowerPoint slides.

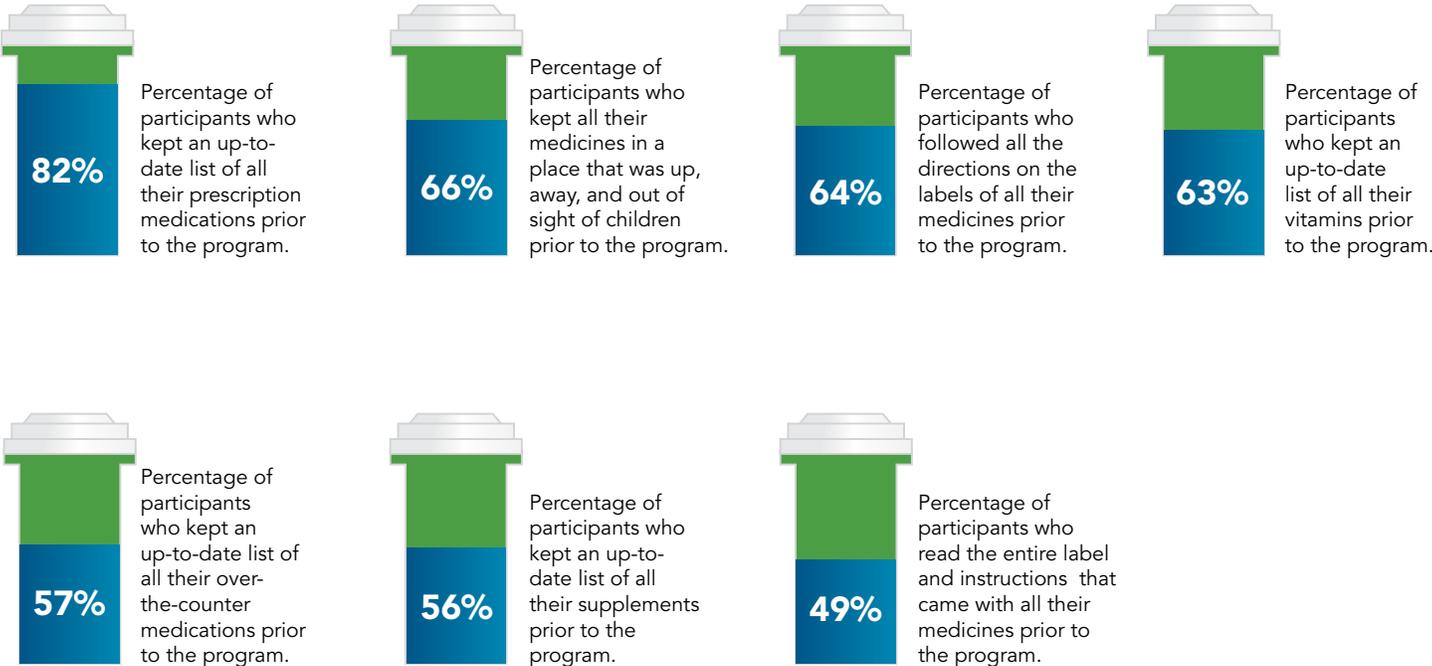


PRIOR PARTICIPANT BEHAVIOR AND KNOWLEDGE

Many participants understood the targeted medication-related principles and adhered to the targeted medication-related behaviors prior to the program. This information provides context about participants' learning needs, and how much room for improvement existed among participants before receiving the program.

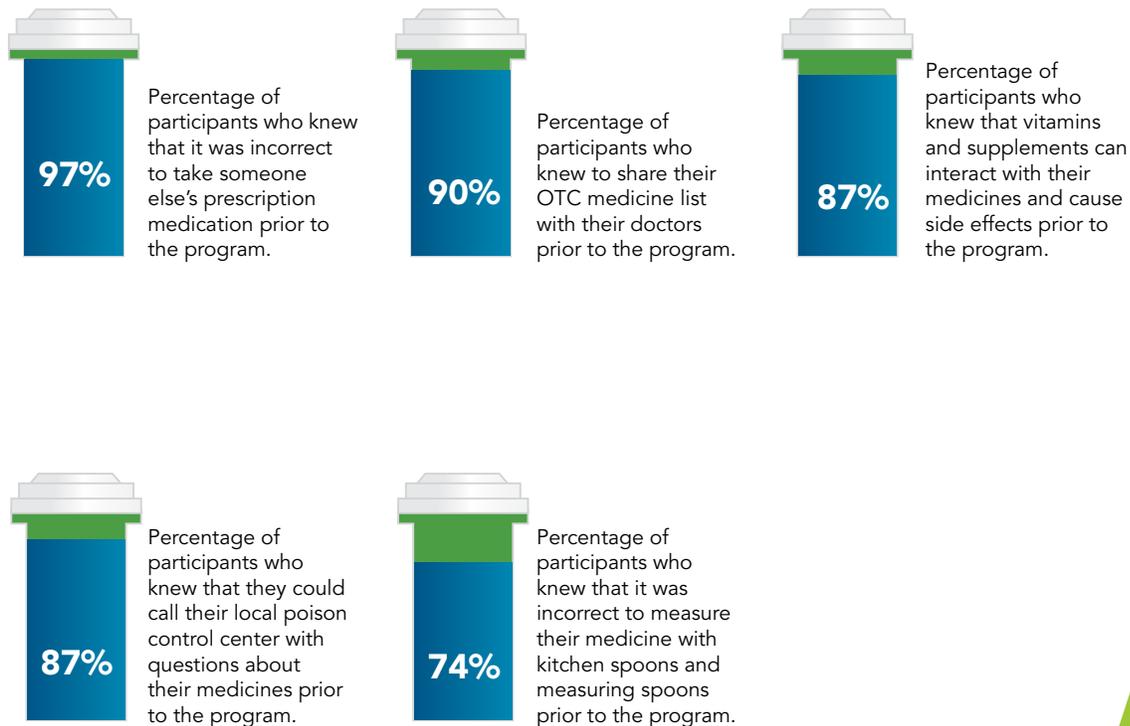
Medication-related behaviors before the program

About half or more of program participants reported already practicing each of the behaviors the program was designed to teach and/or reinforce. For instance, prior to program participation, 82% of participants kept an up-to-date list of all their prescription medications. This is shown in the first figure below. Similarly, participants reported already practicing each of the other targeted behaviors, as shown in the other figures in this section. The two most commonly reported behaviors practiced by participants prior to the program were 1) keeping an updated list of their prescription medications, and 2) keeping their medications away from children. The two least commonly reported behaviors were 1) keeping a list of supplements, and 2) reading the entire label and all the instructions of medications.



Medication-related knowledge before the program

Most participants already correctly understood each of the medication-related principles the program was designed to teach. For instance, prior to participating in the program, almost all (97%) participants understood that it was incorrect to take someone else's prescription medication. This is shown in the first figure below. Similarly, many participants reported already being informed of each of the other targeted principles, as shown in the other figures. The two principles most participants were informed of prior to the program were knowing 1) that it is incorrect to take someone else's prescription medication, and 2) to share their OTC medicine list with their doctors. The principle the fewest participants (74%) understood was that they should not measure their medication using kitchen or measuring spoons.



30%

participants who had the Poison Center Help Line number posted somewhere accessible prior to the program.

97%

participants who will have it posted somewhere accessible going forward.

OAMS PILOT PROGRAM IMPACTS ON PARTICIPANT BEHAVIOR AND KNOWLEDGE

As described above, many participants reported already practicing the targeted medication-related behaviors or understanding the targeted medication-related principles prior to the program. Such individuals had little room for improvement. Therefore, analysis occurred in two ways. First, analyses assessed program impacts on all participants together. Then, participants were split into two subgroups for each behavior and knowledge item: those who were versus were not practicing the targeted behavior or knowledgeable about the targeted principle prior to the program. Analysis then tested whether the groups differed in how much they improved on each specific behavior or knowledge item to determine if some participants (e.g., those with greater room for improvement) benefitted more than others.

Intentions to practice proper medication-related behaviors after the program

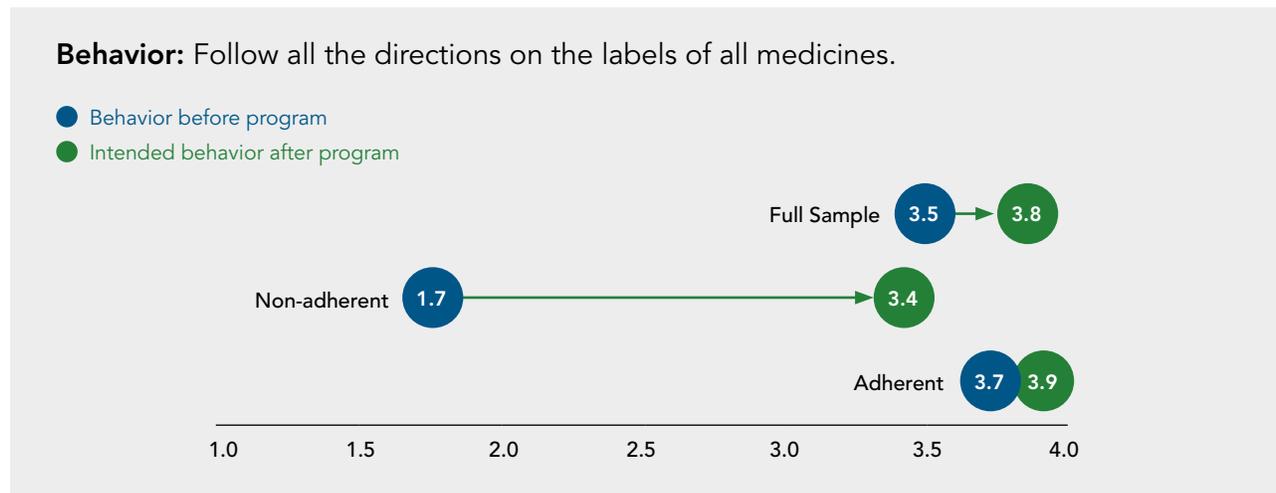
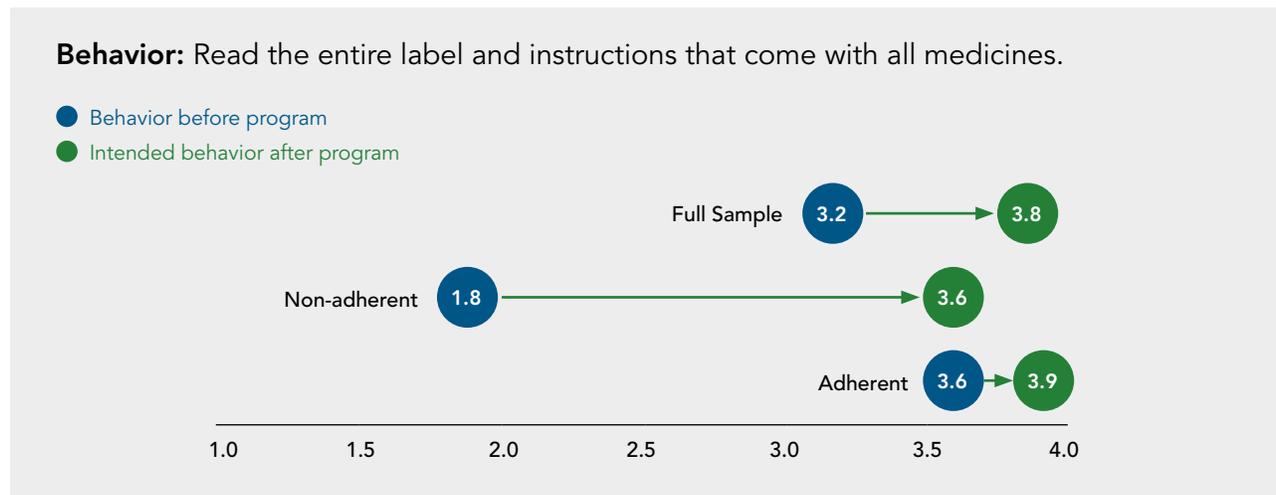
Analyses compared intended future behavior to participants' past behavior. Significant improvements occurred in each of the seven targeted behaviors for the full sample of participants. However, the amount of improvement for the full sample was limited because so many participants reported practicing these behaviors prior to the program.

Analyses comparing subgroups -- those adhering versus not adhering to the targeted behaviors prior to participating in the program -- shed greater light on the program's effects. As expected, the adherent subgroups (those who engaged in the behaviors prior to the program and had little room for improvement) showed smaller differences between their prior behavior and future intentions. In contrast, the nonadherent subgroups (those who did not engage in the behaviors prior to the program) showed very large improvements: they intended to practice the targeted behaviors much more in the future than they had in the past.

This pattern of program benefits resulted in positive outcomes for both the adherent and non-adherent groups. Although the amount of improvement was always significantly greater for the nonadherent groups than the adherent groups, both groups showed intentions to practice medication-related targeted behaviors following program participation. In other words, the adherent groups maintained intentions to continue practicing what they were already doing, while the non-adherent groups reported positive changes between their past behavior and future intentions related to practicing the targeted behaviors.



The following figure serves as an example. The top line illustrates the average improvement between prior and intended future behavior, for the full sample of participants. The following two lines in the figure illustrate average improvement for the non-adherent and adherent groups. As described above, the difference in the amount of improvement was always greater for the nonadherent than the adherent subgroups, with both groups looking fairly similar after the program. The other figures in this section show this same pattern for each of the other targeted behaviors.



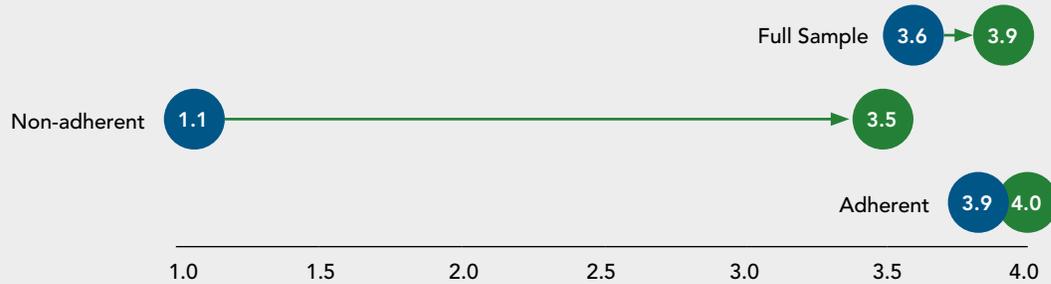
Four-Point scale: 1=None of my medications, 2=Some of my medications, 3=Most of my medications, 4=All of my medications.



Behavior: Keep an up-to-date list of all prescription medications.

● Behavior before program

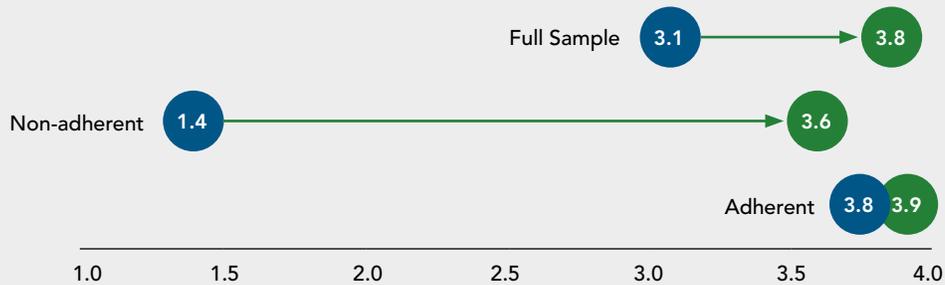
● Intended behavior after program



Behavior: Keep an up-to-date list of all OTC medications.

● Behavior before program

● Intended behavior after program



Behavior: Keep an up-to-date list of all vitamins.

● Behavior before program

● Intended behavior after program

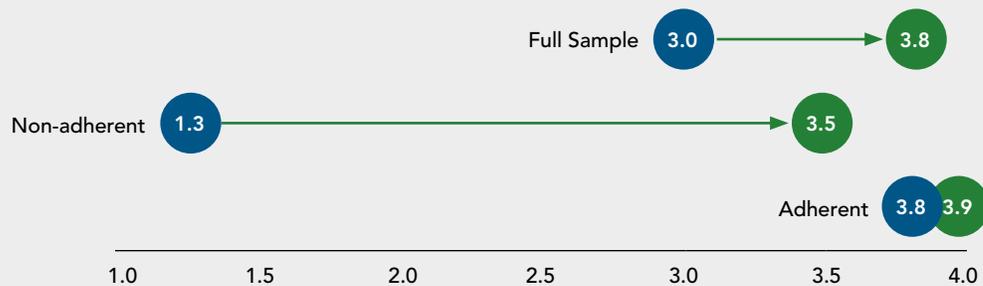


Four-Point scale: 1=None of my medications, 2=Some of my medications, 3=Most of my medications, 4=All of my medications.



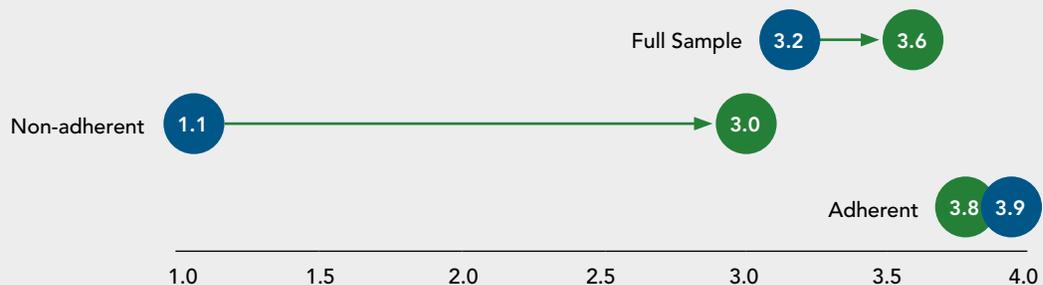
Behavior: Keep an up-to-date list of all supplements.

- Behavior before program
- Intended behavior after program



Behavior: Keep all medicines in a place that is up, away, and out of sight of children.

- Behavior before program
- Intended behavior after program



Four-Point scale: 1=None of my medications, 2=Some of my medications, 3=Most of my medications, 4=All of my medications.



Medication-related knowledge after the program

Significant improvements occurred in two of the five targeted principles for the full sample of participants. These two principles were 1) understanding that it is incorrect to use kitchen and measuring spoons to measure their medicine, and 2) understanding that people can call their local poison control center with questions about their medications. However, here too, the amount of change for the full sample was small because so many participants already reported accurate knowledge of the targeted principles prior to participating in the program. Improvements in the remaining three targeted principles were not significant in the full sample.

Analyses comparing subgroups – those who understood versus those who did not understand the targeted principles prior to participating in the program - showed positive program benefits across all five targeted principles. As anticipated, the two groups showed significantly different amounts of improvements. Most importantly, the uninformed groups (those participants who did not understand the principle prior to the program) showed very large improvements on all five targeted principles. For their part, the informed participants (those participants who understood the principle prior to the program) maintained their understanding about all principles following the program, with only a very small, and probably not meaningful, number answering incorrectly at that time.

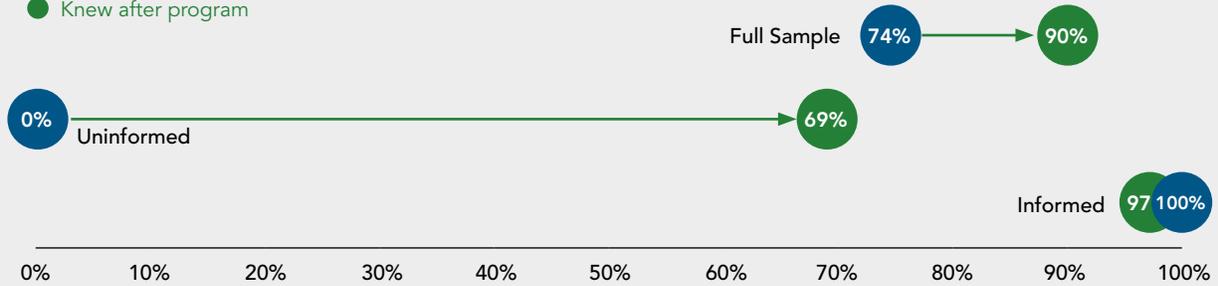
This pattern of program benefits resulted in positive outcomes for both the informed and uninformed groups. Although the amount of improvement was significantly greater for the uninformed groups than the informed groups across all five medication-related principles, both groups ended with the majority showing knowledge of the targeted medication-related principles. Despite the large increases in the percent of uninformed participants acquiring the intended knowledge, a minority still appeared to have not gained understanding of these principles. Overall, the informed groups maintained understanding of the principles while a large (but not total) percentage of the uninformed groups acquired the targeted knowledge.

The following figure illustrates these findings. The top line illustrates the percent change in the targeted principle for the full sample of participants. The following two lines in the figure illustrate percent change for the uninformed and informed groups. As expected, the difference in the amount of change was always significantly larger for the uninformed compared to the informed subgroups. The rest of the figures in this section show this same pattern for each of the other targeted principles.



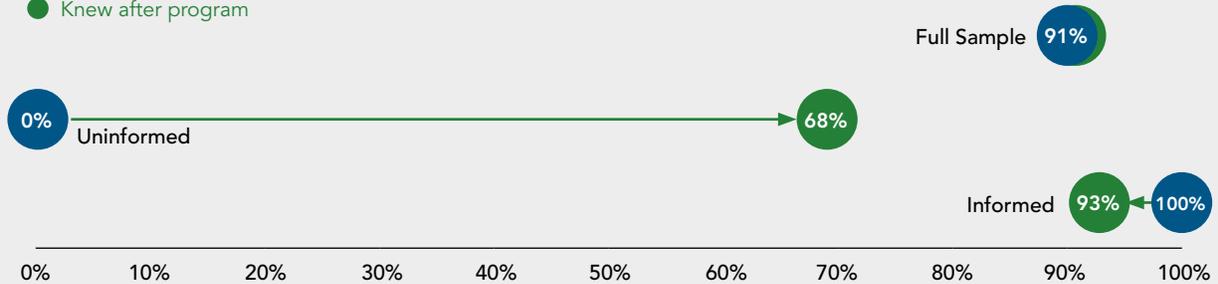
Principle: It is okay for me to measure my medicine with my kitchen spoons and measuring spoons.

- Knew before program
- Knew after program



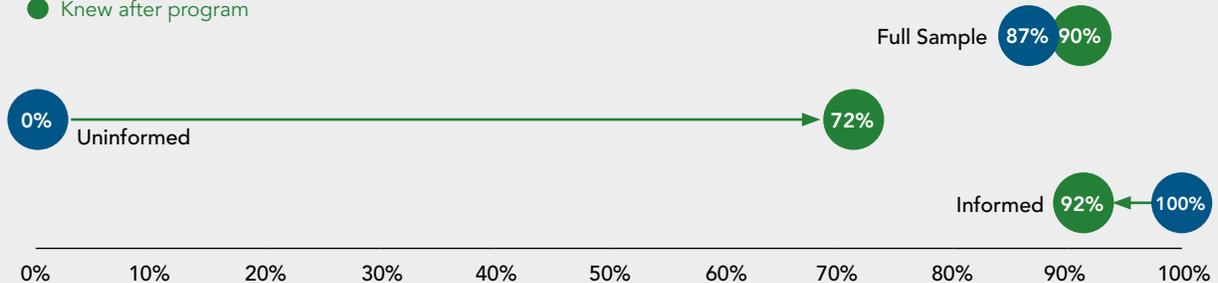
Principle: My doctor doesn't need to know about the medicines that he/she didn't prescribe for me.

- Knew before program
- Knew after program



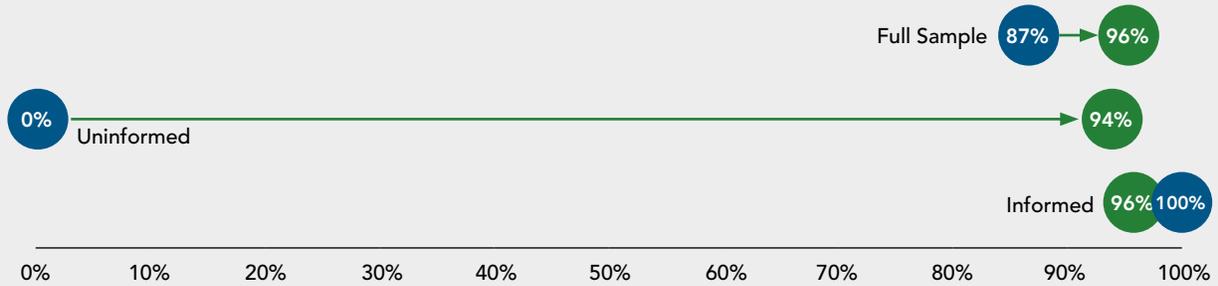
Principle: Vitamins and supplements can interact with my medicines and cause side effects.

- Knew before program
- Knew after program



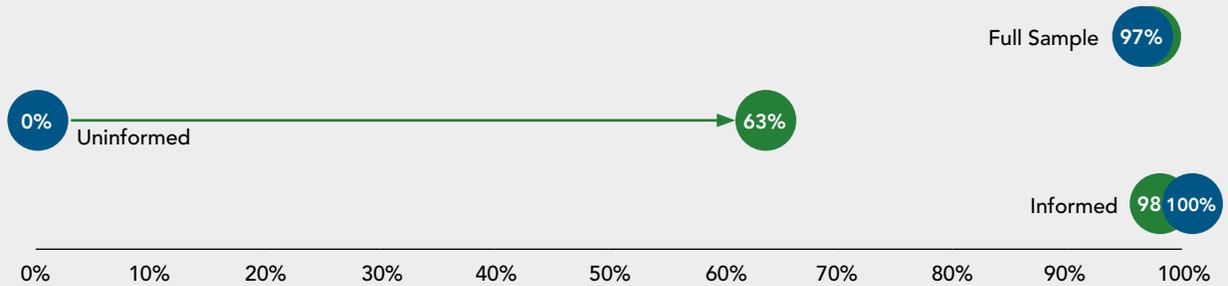
Principle: I can call my local poison control center if I have questions about my medicines.

- Knew before program
- Knew after program



Principle: It is okay for me to take someone else's prescription medication.

- Knew before program
- Knew after program



OAMS PILOT PROGRAM IMPACTS AND PARTICIPANT CHARACTERISTICS

Women and men benefited similarly from the program, as did participants of different ages.

No statistically significant differences were found when comparing program effects across participant gender and age groups.

Receiving the program via PowerPoint versus flipchart generally was not related to amount of benefit.

One significant finding related to the type of visuals used by the Program Leaders. Those who viewed the program on PowerPoint as opposed to flipchart reported more change in their intentions to keep an up-to-date list of all their vitamins. Given this is the sole significant finding about the presentation mode, it may be due to chance and should be interpreted with caution.



97%

of the participants learned something new

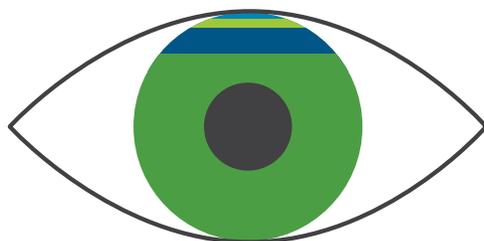
98%

of the participants would recommend the program to a friend

PARTICIPANT PERCEPTIONS OF THE PROGRAM

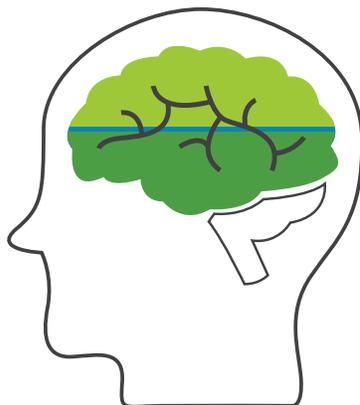
Participants responded very favorably about the program. Most reported they learned something new and would recommend the program to a friend. Participants also reported it was easy to see the program visuals, and analysis showed this was true regardless of whether they viewed them via PowerPoint or flipchart.

How well were you able to see the program?



- 1% I couldn't see the visuals
- 3% Not well
- 12% Okay
- 84% Very well

How much did you learn from this program?



- 48% A lot of new information
- 3% Nothing new
- 49% Some new information

Percent of participants who have or will post the Poison Help Line number somewhere accessible.

- Before program
- After program



PARTICIPANT RECOMMENDATIONS FOR PROGRAM IMPROVEMENT

In an open-ended question asking for suggested program improvements, many participants expressed gratitude and satisfaction with the program. For instance, one participant said *“Keep up the great work. Older people need to be reminded often.”* Another said *“The program was great and the presenter did an awesome job.”* Several participants had specific recommendations for program improvement.

Program Content

Eight participants suggested additional content be provided. Suggested additions included:

- Be explicit about not taking double-doses without doctor permission,
- Provide a list of medications that should not be taken together,
- Provide more sample calls to the PC hotline,
- Provide information on tick bites and related medications,
- Make figures more relevant to the specific population of older adults (rather than presenting national numbers), and
- List the poison center websites on the slideshow in addition to the website for AAPCC.

Program Facilitation

Six participants offered suggestions on the facilitation of the program. For instance, one participant responded *“I think [the instructor] should interact more with the participants to make sure we are in the conversation.”* Comments included:

- Display the presentation on a larger screen,
- Shorten the program,
- Engage the participants more, and
- Have the presenter slow down.

Program Promotion

Four participants suggested the program be more heavily promoted to make other older adults aware of it. For instance, one participant responded *“Go to as many different locations as you can. This was an educational presentation. Very informative.”*

Additional Suggestions

Two participants requested that the program provide takeaways such as a pillbox and a wallet-sized medication list. Other suggestions related specifically to the evaluation materials (the pre-test and post-test questionnaires) that were only a part of the program for the pilot.



PROGRAM RECOMMENDATIONS

The OAMS program had strong immediate benefits to program participants. This is particularly true for people lacking knowledge about the targeted medication-related principles or not practicing the targeted medication-related behaviors prior to the program. The benefit for others is likely a reinforcement of the importance of program-targeted behaviors and reminders of the medication-related principles. The following recommendations to increase the impact and cost effectiveness of the OAMS pilot program are offered based on these evaluation findings.

- Pay special attention to recruiting participants who are not already adherent to the targeted behaviors and/or informed in the targeted principles to ensure program resources are used efficiently.
- Display program visuals using PowerPoint/projector, rather than flipchart, as a cost-savings measure that does not jeopardize participant benefit.
- Future evaluations of the program would benefit from collecting follow-up data from participants to assess whether the positive intentions and achieved knowledge do, in fact, result in longer-term adherence to the targeted medication-related behaviors.
- Future evaluations should also pay special attention to whether individuals who remain uninformed following the program have specific characteristics. Such information may help inform program improvements targeted to such individuals.



APPENDIX: METHODS

The American Association of Poison Control Centers contracted with Evaluation Specialists (ES) to develop a questionnaire to assess the impact of the Older Adults and Medicine Safety Pilot Program. ES designed the instrument to collect participant behaviors and knowledge both immediately prior to the program (pre-test), and immediately following it (post-test).

The program was administered to 755 participants in centers across the country. 690 program participants submitted questionnaires. Of these, 603 completed at least 50% of both the pre-test and post-test questions. These 603 were included in the analysis.

ES cleaned and compiled these data, and assessed change over time on key outcome variables using Generalized Estimating Equations (GEE) as the statistical approach. GEE is a regression procedure that applies the generalized linear model to multilevel data. GEE has flexibility that made it well-suited to these analyses. First, GEE analyses can be adapted to a variety of data types, including ordinal, linear, and binary distributions. Second, GEE is robust to covariance matrix choices thereby avoiding incorrect results due to misspecification. Further, the data analyst can choose from a variety of assumptions, allowing the selection of the best-fitting covariance matrix.

To assess the level of program impact on various types of participants, ES included predictors into the statistical model representing preintervention knowledge/behavior, gender, age, and presentation mode. As described in this report, preintervention knowledge and behavior were categorized into two groups depending on whether participants came with targeted medication-related behaviors and knowledge. For behavior, one group (the adherent participants) was those who reported that they exhibited the positive behavior with either 'none of their medications' or 'some of their medications'. The other group (the "nonadherent" participants) was those who reported that they exhibited the positive behavior with either "most of their medications" or 'all of their medications'. For knowledge, the "uninformed" group was those participants who responded incorrectly to the knowledge questions during the pre-test. The "informed" group was those who responded correctly to the knowledge questions during the pre-test.



Appendix: GEE Results – Intended Behaviors

	Previous Behavior		Intended Behavior		Change ^a		
	Mean	SD	Mean	SD	Chi-square ^b	p	d ^c
Read the entire label and instructions that come with all medications	3.23	.89	3.81	.57	230.59	.000	.64
Follow all the directions on the labels of all medications	3.51	.76	3.84	.53	114.04	.000	.43
Keep an up-to-date list of all prescription medications	3.62	.91	3.92	.42	62.28	.000	.35
Keep an up-to-date list of all OTC medications.	3.13	1.15	3.82	.59	170.22	.000	.61
Keep an up-to-date list of all vitamins.	3.18	1.19	3.81	.64	133.22	.000	.54
Keep an up-to-date list of all supplements.	2.99	1.27	3.76	.73	162.01	.000	.62
Keep all medications in a place that is up, away, and out of sight of children.	3.18	1.25	3.61	.96	72.69	.000	.35

^a The statistical results for change tests whether previous and intended behavior differed from each other in a statistically significant ($p < .05$) way.

^b The df for each item was 1.

^c Interpretation of Cohen's d: .20 = small, .50 = medium, and .80 or larger = large effects.

Appendix: GEE Results – Knowledge (Full Sample)

	Pre-Test	Post-Test	Change ^a		
	% Correct	% Correct	Chi-square ^b	p	Δ
It is okay for me to measure my medicine with my kitchen spoons and measuring spoons.	74%	90%	77.15	.000	+16%
It is okay for me to take someone else's prescription medicine.	97%	97%	.125	.724	0%
My doctor doesn't need to know about the medications that he/she didn't prescribe for me.	91%	91%	.038	.845	0%
Vitamins and supplements can interact with my medications and cause side effects.	87%	90%	2.8	.094	+3%
I can call my local poison control center if I have questions about my medications.	87%	96%	28.86	.000	+9%

^a The statistical results for change tests whether pre-program and post-program knowledge differed from each other in a statistically significant ($p < .05$) way. The Covariates X Change results test whether the difference between pre-program and post-program knowledge differed due to gender, age, pre-program knowledge, and mode of presentation.

^b The df for each item was 1.



Appendix: GEE Results – Intended Behaviors - Differential change by subgroups

	Previous Behavior		Future intentions		Subgroup X change ^a		
	Mean	SD	Mean	SD	Chi-square ^b	p	d ^c
Read the entire label and instructions that come with all medications							
Pre-Program Adherence					65.29	.00	
Non-Adherent	1.77	.42	3.55	.85			2.07
Adherent	3.62	.49	3.87	.45			.43
Gender					.42	.52	
Female	3.29	.86	3.84	.48			.64
Male	3.07	.96	3.67	.78			.58
Age					.41	.52	
<64	3.30	1.01	3.74	.72			.59
65-74	3.23	.86	3.81	.58			.59
75-84	3.21	.92	3.83	.49			.68
>84	3.28	.78	3.79	.57			.64
Mode					.19	.66	
Flipchart	3.25	.88	3.80	.58			.62
Powerpoint	3.21	.91	3.80	.58			.63

	Previous Behavior		Future intentions		Subgroup X change ^a		
	Mean	SD	Mean	SD	Chi-square ^b	p	d ^c
Follow all the directions on the labels of all medications							
Pre-Program Adherence					36.72	.00	
Non-Adherent	1.73	.45	3.40	1.03			1.79
Adherent	3.72	.45	3.89	.41			.30
Gender					2.11	.15	
Female	3.53	.74	3.84	.52			.40
Male	3.43	.81	3.83	.59			.54
Age					.08	.78	
<64	3.43	.95	3.74	.72			.48
65-74	3.52	.68	3.81	.58			.33
75-84	3.53	.77	3.83	.49			.39
>84	3.47	.72	3.79	.57			.38
Mode					.00	.96	
Flipchart	3.52	.76	3.84	.50			.44
Powerpoint	3.51	.74	3.81	.59			.37



	Previous Behavior		Future intentions		Subgroup X change ^a		
	Mean	SD	Mean	SD	Chi-square ^b	p	d ^c
Keep an up-to-date list of all prescription medications							
Pre-Program Adherence					50.71	.00	
Non-Adherent	1.14	.35	3.51	.25			5.92
Adherent	3.92	.27	3.96	.25			.11
Gender					.45	.50	
Female	3.66	.87	3.94	.34			.33
Male	3.49	1.03	3.84	.61			.37
Age					.18	.67	
<64	3.13	1.37	3.80	.73			.53
65-74	3.67	.83	3.92	.35			.34
75-84	3.68	.79	3.92	.38			.31
>84	3.65	.88	3.95	.33			.34
Mode					.13	.71	
Flipchart	3.62	.91	3.91	.42			.33
Powerpoint	3.66	.84	3.92	.42			.34

	Previous Behavior		Future intentions		Subgroup X change ^a		
	Mean	SD	Mean	SD	Chi-square ^b	p	d ^c
Keep an up-to-date list of all OTC medications							
Pre-Program Adherence					71.72	.00	
Non-Adherent	1.37	.49	3.61	.88			2.39
Adherent	3.77	.42	3.91	.38			.27
Gender					1.95	.16	
Female	3.18	1.11	3.85	.53			.60
Male	2.99	1.25	3.69	.77			.58
Age					.55	.46	
<64	2.74	1.34	3.66	.87			.74
65-74	2.94	1.23	3.80	.60			.66
75-84	3.32	.99	3.87	.49			.54
>84	3.22	1.11	3.83	.55			.61
Mode					.16	.69	
Flipchart	3.13	1.15	3.80	.62			.59
Powerpoint	3.18	1.12	3.86	.49			.59



	Previous Behavior		Future intentions		Subgroup X change ^a		
	Mean	SD	Mean	SD	Chi-square ^b	p	d ^c
Keep an up-to-date list of all vitamins							
Pre-Program Adherence					64.25	.00	
Non-Adherent	1.27	.44	3.54	.99			2.10
Adherent	3.85	.36	3.93	.32			.18
Gender					.12	.73	
Female	3.23	1.16	3.84	.58			.55
Male	3.02	1.28	3.72	.79			.52
Age					1.05	.31	
<64	2.88	1.43	3.70	.86			1.19
65-74	3.01	1.27	3.81	.63			.60
75-84	3.34	1.05	3.84	.57			.51
>84	3.26	1.12	3.82	.56			.51
Mode					4.34	.04	
Flipchart	3.19	1.18	3.76	.71			.49
Powerpoint	3.13	1.21	3.90	.41			.65

	Previous Behavior		Future intentions		Subgroup X change ^a		
	Mean	SD	Mean	SD	Chi-square ^b	p	d ^c
Keep an up-to-date list of all supplements							
Pre-Program Adherence					55.56	.00	
Non-Adherent	1.25	.39	3.45	1.05			2.04
Adherent	3.82	.39	3.94	.29			.28
Gender					.20	.65	
Female	3.02	1.24	3.78	.69			.64
Male	2.92	1.33	3.69	.85			.58
Age					1.93	.17	
<64	2.70	1.44	3.66	.93			1.48
65-74	2.83	1.32	3.74	.77			.71
75-84	3.15	1.18	3.83	.61			.60
>84	3.06	1.16	3.71	.76			.57
Mode					2.74	.09	
Flipchart	3.05	1.24	3.73	.77			.56
Powerpoint	2.95	1.30	3.83	.59			.70



	Previous Behavior		Future intentions		Subgroup X change ^a		
	Mean	SD	Mean	SD	Chi-square ^b	p	d ^c
Keep all medications in a place that is up, away, and out of sight of children							
Pre-Program Adherence					99.07	.00	
Non-Adherent	1.14	.35	2.99	1.37			1.36
Adherent	3.89	.31	3.83	.65			-.09
Gender					1.00	.32	
Female	3.21	1.24	3.64	.94			.34
Male	3.09	1.27	3.49	1.06			.34
Age					.44	.51	
<64	3.01	1.29	3.55	.98			.50
65-74	3.12	1.25	3.65	.90			.43
75-84	3.25	1.22	3.60	.99			.27
>84	3.23	1.24	3.60	.97			.30
Mode					.32	.57	
Flipchart	3.14	1.27	3.58	.98			.35
Powerpoint	3.34	1.12	3.70	.87			.32

^a The subgroup X change interaction tests whether the subgroups (based on gender, age, pre-program knowledge, and mode of presentation) showed different amount of benefit in a statistically significant ($p < .05$) way. For behavior, benefit was the difference between previous and intended behavior differed from each other.

^b The df for each item was 1.

^c Interpretation of Cohen's d: .20 = small, .50 = medium, and .80 or larger = large effects.

Appendix: GEE Results – Knowledge - - Differential change by subgroups

	Previous knowledge	Post-program knowledge	Subgroup X change ^a		
	% Correct	% Correct	Chi-square ^b	p	Δ
It is okay for me to measure my medicine with my kitchen spoons and measuring spoons.					
Pre-Program Knowledge			340.41	.00	
Uninformed	0%	69%			+69%
Informed	100%	97%			-3%
Gender			2.21	.14	
Female	75%	89%			+14%
Male	71%	92%			+21%
Age			.10	.75	
<64	75%	89%			+14%
65-74	75%	90%			+15%
75-84	74%	91%			+17%
>84	72%	87%			+15%
Mode			.11	.74	
Flipchart	73%	89%			+16%
Powerpoint	75%	90%			+15%



	Previous knowledge	Post-program knowledge	Subgroup X change ^a		
	% Correct	% Correct	Chi-square ^b	p	Δ
It is okay for me to take someone else's prescription medicine.					
Pre-Program Knowledge					
Uninformed	0%	63%	35.00	.00	+63%
Informed	100%	98%			-2%
Gender					
			.00	.98	
Female	96%	96%			0%
Male	99%	99%			0%
Age					
			1.59	.21	
<64	97%	95%			-2%
65-74	99%	98%			-1%
75-84	97%	96%			-1%
>84	93%	97%			+4%
Mode					
			.78	.38	
Flipchart	97%	97%			0%
Powerpoint	97%	98%			+1%

	Previous knowledge	Post-program knowledge	Subgroup X change ^a		
	% Correct	% Correct	Chi-square ^b	p	Δ
My doctor doesn't need to know about the medications that he/she didn't prescribe for me.					
Pre-Program Knowledge					
Uninformed	0%	68%	131.81	.00	+68%
Informed	100%	93%			-7%
Gender					
			1.06	.30	
Female	91%	91%			0%
Male	89%	92%			+3%
Age					
			.76	.38	
<64	89%	94%			+5%
65-74	89%	90%			+1%
75-84	94%	92%			-2%
>84	86%	86%			0%
Mode					
			1.70	.19	
Flipchart	92%	91%			-1%
Powerpoint	88%	92%			+4%



	Previous knowledge	Post-program knowledge	Subgroup X change ^a		
	% Correct	% Correct	Chi-square ^b	p	Δ
Vitamins and supplements can interact with my medications and cause side effects.					
Pre-Program Knowledge			211.29	0.00	
Uninformed	0%	72%			+72%
Informed	100%	92%			-8%
Gender			1.55	0.21	
Female	88%	91%			+3%
Male	85%	90%			+5%
Age			1.04	0.31	
<64	80%	87%			+7%
65-74	88%	90%			+2%
75-84	87%	91%			+4%
>84	91%	89%			-2%
Mode			.95	0.33	
Flipchart	89%	90%			+1%
Powerpoint	84%	88%			+4%

	Previous knowledge	Post-program knowledge	Subgroup X change ^a		
	% Correct	% Correct	Chi-square ^b	p	Δ
I can call my local poison control center if I have questions about my medications.					
Pre-Program Knowledge			1204.38	.00	
Uninformed	0%	94%			+94%
Informed	100%	96%			-4%
Gender			1.02	.31	
Female	87%	95%			+8%
Male	86%	98%			+12%
Age			.77	.38	
<64	88%	97%			+9%
65-74	85%	97%			+12%
75-84	87%	97%			+10%
>84	88%	93%			+5%
Mode			.23	.63	
Flipchart	87%	97%			+10%
Powerpoint	85%	95%			+10%

^a The Subgroup X Change results test whether the difference between pre-program and post-program knowledge differed due to gender, age, pre-program knowledge, and mode of presentation in a statistically significant (p < .05) way.

^b The df for each item was 1.



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About Evaluation Specialists

Evaluation Specialists is a woman-owned small business that specializes in evaluation of prevention, health promotion, education, and social service programs. Our experienced, highly skilled team provides methodological, substantive and clinical expertise that enables our clients to apply a wide range of cutting edge methods to answer real world questions in community settings. We partner with our clients to design and implement research and evaluation plans that provide timely, accurate, and actionable results that benefit the communities they serve.

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