

P. J. Bush



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Guide to Developing and Evaluating Medicine Education Programs and Materials for Children and Adolescents

This Guide is based on recommendations of the U.S. Pharmacopeia (USP) Ad Hoc Advisory Panel on Children and Medicines and on information obtained from interviewing children and teachers.

Child Development and Learning Medicine
Education Programs and Materials for Children and Adolescents

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USP/CH

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Rockville, MD 20852

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Guide to Developing and Evaluating Medicine Education Programs and Materials for Children and Adolescents

Acknowledgments	iv
Introduction	1
Part 1	
Guiding Principles for Teaching Children and Adolescents about Medicines	3
Part 2	
Instructions for Evaluating Children's and Adolescents' Medicine Education Programs and Materials	5
Part 3	
Forms for Evaluating Medicine Education Programs and Materials	7
Checklist for Forms Used in Evaluation	9
Form 1 Description of Programs/Materials	10
Form 2 Screening Questions for Materials Review	11
Form 3 Tailoring Materials to People of Different Ages	12
Form 4 Background and Contact Information	14
Part 4	
Content Recommended for Children's and Adolescents' Medicine Education Programs and Materials	15
A. Key Behaviors to be Promoted in Medicine Education, Examples of Messages Addressing Key Behaviors, and Steps in Taking Medicines	17
B. Concepts: What Children Want to Know About Medicines	23
C. Answers to Common Misconceptions and Knowledge Gaps about Medicines	25
D. Pictograms Children Should Recognize	37
Appendices	41
A. Fry Test for Reading Levels	
B. The Medicine Cabinet in Homes with Children	

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Introduction

In keeping with its mission to provide quality information on the use of medicines to all consumers, the United States Pharmacopeia (USP) formed an *Ad Hoc* Advisory Panel on Children and Medicines. The Panel met with more than 100 health professionals, educators, and consumer representatives, and concluded that children and adolescents need, want, and deserve to have information about medicines. The few medicine education programs for young people are inadequately evaluated and have not been based on what children themselves want to know. In part this may be due to a lack of guidelines to assist in creating, evaluating, or refining such programs or materials.

Recognizing the need for guidance in developing, and criteria for evaluating, medicine education programs for children and adolescents, USP's Advisory Panel on Children and Medicines first developed "Ten Guiding Principles for Teaching Children and Adolescents about Medicines" and second, developed this "Guide to Developing and Evaluating Medicine Education Programs and Materials for Children and Adolescents."

This four-part Guide can be used:

- to assess existing children's and adolescents' medicine education programs and materials, or
- to develop or revise such programs and materials.

Also, the Guide can be adapted to focus on medicine use for specific chronic illnesses or on other health topics. The Guide is intended primarily for children and adolescents living in the United States, but may be adapted for other countries.

Part 1 presents a list of principles or

standards that provide the rationale for, and guide activities and programs designed to help children develop into competent medicine users.

Part 2 provides instructions for evaluating existing medicine education programs and materials for children and adolescents.

Part 3 provides a checklist and forms that may be used to perform such an evaluation.

Part 4 contains information that can be used to revise existing materials for children's medicine education or to create new ones. The recommended educational content covers:

- action-oriented messages with recommended minimum ages keyed to 10 Key Behaviors. These also include actions for parents, some of which are appropriate for school personnel.
- information that children (and adults) should have in order to be informed medicine consumers.

10 Guiding Principles for Teaching Children and Adolescents about Medicines

A Position Statement of the United States Pharmacopeia

These principles are intended to encourage activities that will help children, through adolescence, become active participants in the process of using medicines* to the best of their abilities. Recognizing that children of the same age vary in development, experience, and capabilities, these principles do not specify children's ages.

- 1 - Children, as users of medicines, have a right to appropriate information about their medicines that reflects the child's health status, capabilities, and culture.
- 2 - Children want to know. Health care providers and health educators should communicate directly with children about their medicines.
- 3 - Children's interest in medicines should be encouraged, and they should be taught how to ask questions of health care providers, parents, and other caregivers about medicines and other therapies.
- 4 - Children learn by example. The actions of parents and other caregivers should show children appropriate use of medicines.
- 5 - Children, their parents, and their health care providers should negotiate the gradual transfer of responsibility for medicine use in ways that respect parental responsibilities and the health status and capabilities of the child.
- 6 - Children's medicine education should take into account what children want to know about medicines, as well as what health professionals think children should know.
- 7 - Children should receive basic information about medicines and their proper use as a part of school health education.
- 8 - Children's medicine education should include information about the general use and misuse of medicines, as well as about the specific medicines the child is using.
- 9 - Children have a right to information that will enable them to avoid poisoning through the misuse of medicines.
- 10 - Children asked to participate in clinical trials (after parents' consent) have a right to receive appropriate information to promote their understanding before assent and participation.

* Medicines include all types: prescription medicines, non-prescription medicines, herbal remedies, and nutritional supplements such as vitamins and minerals.

Developed by the Division of Information Development, United States Pharmacopeia.

Primary responsibility resided with the USP Pediatrics Advisory Panel and its *Ad Hoc* Advisory Panel on Children and Medicines.

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Instructions for Evaluating Medicine Education Programs and Materials for Children and Adolescents

Complete the Checklist for Forms Used in Evaluation (p. 9) as you follow Steps 1-5 below. When you are finished you will have described the materials under review and determined if they are usable for your target population.

Step 1. Complete Form 1 "Description of Program and Materials (p. 10)."

Step 2. Complete Form 2 "Screening Questions for Materials Review (p. 11)" to make an initial assessment of the overall program/materials. These questions ask you to compare overall content with the list of Key Behaviors in Part 4A and screen for significant problems.

Step 3. Complete Form 3 "Tailoring Materials to People of Different Ages (p. 12)" to review the appropriateness of the program and materials for adults and children of various ages and reading levels. Review content in more detail, referring to the Appendices as directed.

Step 4: If the materials pass Step 3, ask for the opinions of persons in the age group(s) you hope to target. (Examples: you may not find illustrations offensive, but your target audience does. You may think teens will like the materials but teens disagree.) School-related activities, waiting rooms, and public gatherings are good places to quickly interview people and get feedback. A few good questions to ask:

"What do you think is happening in this picture (or sentence)? Or what do you think this is a picture of?"

"Who do you think this is supposed to be in the picture? What age is the person supposed to be?"

"Are the people in these pictures people like you or not like you? Why? Is there anything you like or dislike (about this picture?) or (about what is said?) What? Why? Is there anything that bothers you or is offensive?"

Step 4A: If the materials pass all three Steps 2-4, consider building a program that uses the materials or lessons. Complete Form 4 (p. 14) to gather more background information about the program and materials.

Step 4B: If the materials do not pass all three Steps 2-4 but have some good qualities, determine first if the program materials are designed in a way that allows selection of portions of the materials or deletion of offensive, inaccurate, or unclear components, and then proceed to Form 4 to gather more background information about the program and materials.

Step 4C: If small - but critical - changes are needed in either illustrations or text, contact the authors to express your concern and inquire if changes are already planned. If not, ask the authors if they would be willing to make changes at your request or if they would be willing to let you adapt the materials, giving credit to their program. If not, you should not use the materials.

Part 3

Checklist and Forms for Evaluating Children's and Adolescents' Medicine Education Programs and Materials

Checklist for Forms Used in Evaluation

Form 1: Description of Program and Materials

Form 2: Screening Questions for Materials Review

Form 3: Tailoring Materials to People of Different Ages

Form 4: Background and Contact Information

Checklist for Forms Used in Evaluation

Name of Program / Material: _____

- | | | | |
|-----|---|-----|----|
| 1. | Completed Form 1 "Description of Program / Materials" | YES | NO |
| 2. | Completed Form 2 "Screening Questions for Materials Review" | YES | NO |
| 3. | "Screening Questions" passed | YES | NO |
| | If NO ("Screening Questions..." not passed), DO NOT proceed; Circle 10 D. below. | | |
| 4. | Completed Form 3 "Tailoring Materials to People of Different Ages" | YES | NO |
| 5. | "Tailoring Materials" questions passed | YES | NO |
| | If NO ("Tailoring Materials..." not passed), DO NOT proceed; Circle 10 D. below. | | |
| 6. | Opinions of representatives from target population obtained
(See Step 4, pg. 5) | YES | NO |
| 7. | Opinions test passed | YES | NO |
| 8. | If YES, Form 4 "Background and Contact Information" completed | YES | NO |
| 9. | If NO, but program / material has some good qualities,
some portions can be used | YES | NO |
| | A. If YES, Form 4 "Background and Contact Information" completed | YES | NO |
| | B. If NO, but program / material could be revised, authors contacted | YES | NO |
| 10. | Summary (Circle the choice that best represents the results of the evaluation) | | |
| | A. Entire program / material can be used as is. | | |
| | B. Components of the program / material can be used as is. | | |
| | C. Program / material can be revised and authors are revising or consent to revision. | | |
| | D. Program / material should not be used. | | |

FORM 1. Description of Program and Materials

Instructions: Complete this form for all materials you want to review.

Reviewer: _____ Today's date: _____

Title of program / materials: _____

Author(s): _____

Country of origin: _____ Date published or latest revision: _____

Original language: _____ Also translated into: _____

Special populations, e.g., limited literacy or ethnic groups targeted: _____

Estimated number of persons who received the program / materials: _____

General and specific themes: _____

Part of a Series: Yes No Monitoring / Evaluation component included: Yes No

Based on claims by the authors or promotional materials, indicate the INTENDED audience of each item listed below. Check all that apply indicating whether for children, adolescents, parents, or other adults. (Note: Your further assessment of the materials will tell you if these are correct.)

Items	Under 6 years	6-11 years	12-17 years	Parents	Other Adults
1. Lesson plan(s) or curriculum					
2. Printed Materials					
handout					
pamphlet					
activity book					
comic book					
poster					
flip-chart					
script					
other (specify):					
3. Audiovisual Aids					
Video__ or CD-ROM__ (length in minutes: __)					
audio cassette (length in minutes: __)					
transparencies					
slides					
other (specify):					
4. Other Components (specify):					

FORM 2. Screening Questions for Materials Review

Assess the overall content, presentation, and acceptability of materials. Consider all components.

1 = none 2 = some 3 = most 4 = all NA = not applicable

Eight Essential Attributes:

1. Information presented is technically accurate.	1	2	3	4	NA
2. Information presented is up-to-date.	1	2	3	4	NA
3. Messages are action-oriented, addressing what to do, not just what to know.	1	2	3	4	NA
4. Writing is clear and simple. Medical jargon is avoided and replaced with lay terms. Inappropriate slang is not used.	1	2	3	4	NA
5. What is happening in each picture is clearly recognizable.	1	2	3	4	NA
6. Graphics reinforce the corresponding message/caption/text/narration.	1	2	3	4	NA
7. Materials are not so busy that the message is lost.	1	2	3	4	NA
8. If lesson plans are provided:					
a) Lesson plans are easy to follow.	1	2	3	4	
b) Lessons are interactive and participatory (e.g. discussions, participatory exercises, games).	1	2	3	4	
c) Messages are reinforced using multiple learning approaches (e.g. interactive exercises, video, print).	1	2	3	4	
d) Adequate background materials for teacher/facilitator are provided.	1	2	3	4	

SCORING: Count separately the responses scored 1, 2, 3, 4.

If there are more 3s and 4s than 1s and 2s, check PASS. If not, check FAIL.

1s & 2s: ____

3s & 4s: ____

Score: PASS ____ FAIL ____

If PASS, score remaining 10 attributes. If FAIL, DO NOT PROCEED; Circle 10D. On FORM 1.

9. The program/materials address the 10 key behaviors in Part 4A.	1	2	3	4	NA
10. Actions promoted are positive, focusing mainly on what to do, not just what not to do.	1	2	3	4	NA
11. Illustrations/photos are well drawn/printed. Video/film is of good quality.	1	2	3	4	NA
12. Graphics are well laid out (appropriate size for detail, not too crowded).	1	2	3	4	NA
13. Materials are generally creative and appealing.	1	2	3	4	NA
14. Hairstyles and clothing are relatively current/attractive: extremes of current fashion or hairstyle (which may soon be outdated) are avoided.	1	2	3	4	NA
15. When included, individuals from various ethnic groups are presented accurately and attractively, and not in a stereotypical or offensive manner.	1	2	3	4	NA
16. Individuals from various ethnic groups are adequately represented for materials for general audiences only; circle NA if targeted to one specific ethnic group.	1	2	3	4	NA
17. Gender bias is avoided (not offensively stereotypical) in narration and text, e.g., “He” is not used repeatedly as a replacement for “your child.”	1	2	3	4	NA
18. Specific brands of medicines are not promoted.	1	2	3	4	NA

SCORING: Count separately the responses scored 1, 2, 3, 4 for questions 1-18.

If there are more 3s and 4s than 1s and 2s, check PASS. If not, check FAIL.

1s & 2s: ____

3s & 4s: ____

Score: PASS ____ FAIL ____

Form 3. Tailoring Materials to People of Different Ages

Instructions: In your opinion how well does this program/materials meet the needs of each age group? Refer to Appendices A & B and Part 4 as needed. For each question, give one rating per age group.

* Note: Ages overlap to reflect the age ranges in various grades in the diverse American school systems.

1 = Never

2 = Less than half the time

3 = About half the time

4 = More than half the time

5 = Almost always

DK = Don't know/can't determine

Questions	PreK-1st grade age 3-6	1st-3rd grade age 5-9	4th-6th grade age 8-12	6th-9th grade age 11-15	9th-12th grade age 13-17	Parents' grade (≥8th)	Limited Literacy Parents (<8th)
1. Do the materials match the age and educational level for the group? (see next pg.)							
2. Is there an appropriate balance between text and visuals for the group? (see next pg.)							
3. Is the length of each session appropriate for the group (see next pg.)							
4. Is the number of different messages/lesson or material appropriate for the group? (see next pg.)							
5. Are reading levels appropriate for the group? (See Appendix A) Note: Consider print materials and any visual aids with captions or text.							
6. Are the ages of the people portrayed consistent with the ages of the group?							
7. Do the messages promote recommended key behaviors (see Part 4A)							
8. Do the messages promote behaviors that are realistic for the group? (see Part 4A)							
9. Do the messages cover issues of interest to the group? (see Part 4B)							
10. Do the messages address common misconceptions about medicines? (see Part 4C)							
Score:							

* **SCORE:** Select the columns matching your target group(s).

Count the number of 1s, 2s, and 3s in each selected column and the number of 4s and 5s.

If the **sum** of 4s and 5s is greater than the **sum** of 1s, 2s and 3s, score **Pass**; if not, score **Fail**.

1s, 2s & 3s ____ ; 4s & 5s ____ . Write **Pass** or **Fail** at the bottom of the appropriate column(s).

Form 3: Tailoring Materials to People of Different Ages (continued)

Target Group	Reading Level ^a and Text-Illustrations Mix	Maximum Length of Session	Different Messages per Session ^b
Preschool and 1st school year: (age 3-6 years)	mainly pictorial	15 mins.	2-3
1st-3rd school year: (age 5-9 years)	mainly pictorial simple text @ grade 2	30 mins.	4-5
4th-6th school year: (age 8-12 years)	heavily pictorial simple text @ grade 5	45 mins.	7-10
Young Adolescents: 6th-9th school year (age 11-15 years)	text @ grade 7 or 8 illustrated	45 mins.	7-12
Adolescents 9th-12th school year (age 13-18 years)	text @ grade 8-10 some illustrations	60 mins.	7-14
Adults (reading level 9th+ school year)	text @ grade 9-12 some illustrations	60 mins. (variable)	7-16
Adults with limited reading skills (< 9th school year)	heavily pictorial	45-60 mins.	7-12

^a – Reading level can be calculated using various standard formulas. Instructions for calculating reading level using the Fry Index are included in Appendix A.

^b – It is difficult to retain more than seven concepts from a session. Several messages, however, may address the same concept, "Protecting young children from accidental poisoning." Such messages might include: "Keep purses and backpacks that might have medicines in them out of the reach of young children;" "Don't take medicines in front of your children under 4 years – they may try to copy your behavior;" "Store medicines safely out of the reach of young children."

FORM 4. Background and Contact Information

Instructions: Complete only if the materials meet the acceptability criteria and you want to use them.

1. Author and affiliation (if available include address, phone, fax, e-mail):
2. Publisher (if available include address, phone, fax, e-mail):
3. Acquisition information (include address, phone, fax, e-mail):
4. Pricing information: ___ per ___
5. Materials still in print and available? **Yes No Don't Know**
6. Copyrighted? **Yes No Don't Know**
7. Could the materials be easily reproduced if permission were granted?
Yes No Don't Know
8. Are the materials part of a program addressing other health issues?
Yes No Don't Know
 - 8a. If **Yes**, are they consistent with other messages in the larger program?
Yes No Don't Know
9. Are the materials consistent with state standards or the National Health Education Standards?
Yes No Don't Know
10. Funding/financial sponsors: _____
11. Endorsements by other organizations (refer to acknowledgments): _____

Background on Development, Use, and Evaluation

(may require discussion with author or review of literature)

12. Were the materials pretested^a or piloted for acceptability with a specific audience?
Yes No Don't Know
 - 12a. If **YES**, describe who conducted the pretest or the pilot _____
 - 12b. On whom was it tested? (*characteristics, number*) _____
13. Have the materials been evaluated for effectiveness (changes in knowledge, attitudes, and behavior)?
Yes No Don't Know
 - 13a. If **YES**, who performed the evaluation (*qualifications*) _____
 - 13b. What were the findings? _____
14. How extensively have the materials been used?
 - ___ don't know
 - ___ limited (one school, one center)
 - ___ some distribution beyond one school/center
 - ___ extensive use (briefly describe) _____
 - ___ internationally (briefly describe) _____
15. Who is the intended program facilitator (e.g., school nurse, classroom teacher)? _____

^a A pretested program or material has received extensive feedback from the target audience about the cultural appropriateness, acceptability, believability, and clarity of presentation.

Content Recommended for Children's Medicine Education Programs and Materials

- 4A. Key Behaviors to be Promoted in Medicine Education and Examples of Messages Addressing Key Behaviors
- 4B. Concepts: What Children Want to Know About Medicines
- 4C. Answers to Common Misconceptions and Knowledge Gaps about Medicines
- 4D. Pictograms Children Should Recognize



Part 4A

Key Behaviors to be Promoted in Medicine Education and Examples of Messages Addressing Key Behaviors

1. Protect young children from accidental poisoning. Know what to do if child is poisoned.

2. Take medicines wisely and safely (Consider if taking a medicine is the best course of action. If yes, ensure the medicine is: the right one, for the right person, at the right time, the right amount, and taken the right way. See Steps in Taking Medicines, pg. 22).

3. Always read labels first. Take medicines as directed. Finish antibiotics (to prevent development of resistance).

4. Look for reactions to medicines. Act fast if serious reactions occur.

5. Learn whom to ask for advice on medicines - and speak up.

6. Store medicines properly. Discard out-of-date medicines. Keep medicines out of the reach of young children.

7. **(Parents Only)** Keep a home medicine cabinet supplied with medicines for emergencies and for common health problems (See Appendix C).

8. **(Parents Only)** Model responsible medicine use for children, especially asking questions of health care providers and decision-making about use of medicines.

9. **(Parents, Teachers, Health Care Providers Only)** Give children information about medicines and their proper use. Teach children how to take responsibility for using medicines as they grow up.

10. **(Parents, Researchers Only)** Give competent children (usually 7+ years), who are asked to participate in a drug study (clinical trial), sufficient information to promote their ability to provide assent after parents or guardians have given consent.

Examples of Messages for Children and Parents Related to 10 Key Behaviors

Instructions: Wording may need to be modified to be appropriate for the vocabulary and reading level of each age group targeted with the message. (Definitions of Key Behaviors on pg. 17)

Key Behavior Number	Actions for Children	Minimum Age to Introduce
1	If you find a pill or a piece of candy, give it to a grownup. Don't taste it.	3
1	Take medicines and vitamins only when your parent says you should.	3
1	Tell a grownup right away if other children are getting into medicines.	3
2	Ask your parents to put your name or a sticker on the bottle so everyone knows which medicine is yours.	5
1,6	Keep medicines of all kinds (including herbal medicines) and vitamins out of the reach of young children. Tell guests to do the same.	5
2,5	If you take medicine and feel worse, tell your parent.	5
2,3	Remind the person giving you medicine to read the label and check how much you should take.	6
2	Remind the person giving you medicine when you are supposed to take it next.	6
2,3,5	At the doctor's office, ask the doctor to tell you: what medicine you will be taking, why you need to take it, what it looks like, what it tastes like, when you are supposed to take it, how many days you have to take it, and what to do if you miss a dose. Also, ask if it is an antibiotic.	6
2	Know the steps for taking medicine. Ask your parents which steps they should do alone, which steps you can do with them, and when you will be ready to start doing some of the steps alone.	7
2	Know the rules for taking medicines at school and follow them.	7
3	Learn the meaning of pharmacy pictograms (See Part 4D).	7
2,3,5	Read the label before taking medicine. Is it what the doctor or your parent said? If not, tell them. Check how much medicine to take and how to take it. Take it as directed.	7
1,6	Always remove medicines from pockets and store medicines safely away from young children.	7
1,2,6	Don't take medicines in front of children under age 4; they may try to copy your behavior.	7
5,10	If your parent tells you the doctor wants you to be in a drug study, ask questions until you understand what they want you to do and why. Then you can say if you want to be in the study.	7
2,3	Know how much you weigh. Tell your parents how much you weigh when they check the label of medicine to see how much you should take. If you have bathroom scales, learn how to weigh yourself.	8

Examples of Messages for Children and Parents Related to 10 Key Behaviors (*continued*)

Key Behavior Number	Actions for Children	Minimum Age to Introduce
2,3	If you take medicine every day, write down the day and time you take it. Ask your parents to help you make a chart to fill in when you take your medicines. Tell them you will help fill the chart out.	8
2,5	Ask questions about drug ads. Discuss drug ads you see on TV and what you read on the Internet with your doctor, nurse, pharmacist, or parents.	8
4,5	Ask an adult what side effects could happen, watch for them, and tell if they happen.	8
5	Write down questions to ask a doctor, nurse, or pharmacist about your medicines.	8
1,6	Keep purses and backpacks that might have medicines in them out of the reach of young children at home and when visiting homes or babysitting for small children.	9
2	Talk with your parents about taking more responsibility for taking medicines.	10
3	Tell adults why it is important not to stop taking antibiotics until the prescribed amount is all gone.	10
4,5	Ask which side effects are dangerous and which are likely to go away. Determine with parent what action to take.	10
1,6	Keep medicines in original containers with child-proof caps. Don't use pill boxes that a young child could open.	10
3,9	Know how to read dosage grids on over-the-counter (OTC) medicines.	11
6	Only keep medicines you will use. Discard expired medicines.	12
Key Behavior Number	Additional Actions for Parents	
1	To prevent accidental poisoning, DO NOT use "Mr. Yuck" stickers. Research has found they attract children.	
1,6	Label herbal medicines. Place in child-proof containers. Ask pharmacist for extra child-proof containers.	
1,5	Keep poison control center number on all phones. Know how much your child weighs. Write it down for babysitters. Keep it near the poison control number.	
7	Keep home medicine cabinet stocked with medicines for emergencies and common health problems (Appendix C).	
1,6,7	Keep Syrup of Ipecac in medicine cabinet (or designated place) if 30 minutes or more from a health care provider. Tell all adults and babysitters where it is. Check expiration date of the Syrup of Ipecac and replace if expired.	

Examples of Messages for Children and Parents Related to 10 Key Behaviors (*continued*)

Key Behavior Number	Additional Actions for Parents
1	Tell all babysitters what to do in a poisoning emergency.
2,3,4,5,9	Teach and reinforce messages in the "Actions for Children" section.
1,6	Keep all medicines out of the reach of young children. Be especially careful to store medicines from other countries or herbal medicines out of reach. They may not be well labeled and poison control centers may not be familiar with them if a child takes them by accident.
2	Tell the doctor about all medicines your child takes, including OTC medicines you buy yourself.
3,5	If antibiotics are spilled, tell the pharmacist and get enough to finish the dose.
5,10	If your child is asked to be in a drug study, get enough information to provide informed consent. If your child is competent (usually 7+ years), give your child enough information to understand what will happen and why so that he or she can provide informed assent.
2,8,9	When children are old enough to understand, begin to model good medicine-taking behavior, especially asking questions of health care providers, and explain the steps of buying and taking medicine.* Keep explanations simple and appropriate for the age of the child. Use the Steps in Taking Medicines as a guide when teaching children to take responsibility for medicines.
Key Behavior Number	Additional Actions for Health Care Providers
1,6,7	Talk to parents and children about how to protect young children from accidental poisoning and what to do if it occurs.
2,3,4,5,6,9	When children are old enough to understand, speak directly with them about their medicines. Tell children what you expect them to do and why.
5,9	Encourage children to ask you questions about their illness and treatment.
10	Ensure that children (usually 7+ years) who are being recruited to a clinical trial, and their parents have enough information to provide informed assent (children) and consent (parents).

* See Steps in Taking Medicine on the following page.

Steps in Taking Medicines

Step 1. Decide a medicine is needed (considerations: alternatives to medicine, what's on hand, what doctor or pharmacist recommends, what you have experience with, what other medicines already have been taken, what the label says about purpose, side effects, age of patient, who should not take it);

OR

Remember it's time to take it (if on a schedule).

Step 2. Get the medicine.

Step 3. Read the label.

Step 4. Measure it (pour it, count pills, count drops).

Step 5. Take it the right way (for example, after food or before food? By what technique, for example, by inhaling, by mouth?).

Step 6. Return the medicine to its proper storage place.

Step 7. Record the time the medicine was taken to check later if necessary.

Step 8. Watch to see how the medicine is working and watch for 'adverse reactions' or side effects.

Step 9. Decide when to stop taking the medicine (considerations: antibiotics and some other medicines must be finished, prescription is finished, doctor says to stop, have adverse reaction).

Concepts: What Children Want to Know About Medicines at Different Ages*

Children Grades K-1

1. Why some medicines are only for children.
2. How they can tell the difference between medicines for children and medicines for adults.
3. The therapeutic purposes of medicines, i.e., prevention, cure, symptomatic relief.
4. Dose forms and ways of taking medicines.
5. Importance of complying with the treatment regimen.
6. The side effects of some medicines.
7. That whether a medicine helps is not related to its color, size, or taste.

Children Grades 2-5

1. What the ingredients (active and inactive) are in medicines.
2. How medicines work. Where medicines go in the body.
3. How doctors know that a medicine works.
4. Why there are different medicines for different illnesses.
5. Why the same medicine can be for different illnesses.
6. Why there are different medicines for a single illness.
7. Why you should not take other people's medicines.

8. How to ask questions of health care professionals about medicines.
9. How to read labels.
10. Difference between licit and illicit ("good" and "bad") drugs.

Children Grades 6-8

1. Difference between prescription and OTC medicines.
2. Meaning of dependency and addiction.
3. How medicines are made.
4. Why medicines come in different forms.
5. Why one may have to adhere to a special diet and time schedule when taking a medicine.
6. Potential for drug interactions with other medicines and foods.
7. Lack of a relationship between the efficacy of a medicine and its source or price.
8. Difference between brand and generic medicines.
9. Difference between medicines, botanicals/herbs, and homeopathics.
10. How to select an appropriate over-the-counter (OTC) medicine.
11. *(For children born outside of the United States or whose parents are recent immigrants)* Differences between medicines produced in their country of origin and medicines produced elsewhere.

* Concepts are based on information obtained in 1996 in focus groups of schoolchildren in grades K-8 in Baltimore, Md, New York City, and Worcester, Mass. Medicine education programs should not be based on these concepts alone. The key messages on pages 17-22 should form the core of any program, but a strong program should also address children's concerns and questions.

Answers to Common Misconceptions and Knowledge Gaps About Medicine

The key messages on pages 17-22 should form the core of any program – with emphasis on behavior over knowledge. Addressing children’s concerns (see pg. 23) can strengthen a program. The purpose of this section is to provide background information for those persons who are designing programs or materials, to provide answers to children’s questions, and to help those program facilitators who need answers. Depending on the specific target audience (e.g., adolescents in school), some of this information may be crafted into supplemental lesson plans. **Whenever this information is used, care must be taken to rewrite and present it at a level appropriate to the target audience as indicated in Forms 2 and 3, pg. 11-13.**

A. Children (and many parents) don’t understand that medicines come in many forms and have many names.

A.1 What is a medicine?

Answer: Medicine can mean two things. It usually means everything that’s in a pill or liquid, including both the active and the inactive ingredients. Sometimes the word medicine only means the active ingredient.

Active ingredients are chemicals that can help treat or prevent illness on the inside or the outside of the body. Inactive ingredients are things such as flavor, coloring, sugar, water, and the outside coating on pills. Inactive ingredients are needed to make the medicine, but usually do not affect the body. Some people are allergic to certain inactive ingredients and can’t take medicines that have them.

Medicines are used to diagnose illness, prevent illness, cure illness, control illness, replace something missing, or to make pain or symptoms (such as a cough or runny nose) go away.

A.2 What is the difference between drugs and medicines?

Answer: The word “drug” can mean two things. Sometimes “drug” means “medicine.” Medicines are sometimes called the “good” drugs. The “good drugs” (medicines) are approved by the U.S. Food and Drug Administration. They are made by drug companies. They are sold in drug stores to help people.

The word “drug” can also mean “bad drug” or “street drug.” “Street drugs” are not sold in stores. People who sell them (drug dealers) are breaking the law. “Street” drugs are not sold to help or prevent illness, but only for the feelings they give. They can make you crave them and feel sick. “Bad” drugs or “street” drugs can harm your body instead of help your body. It’s against the law for anyone anywhere in the United States to sell or to have certain street drugs such as heroin and “crack” cocaine. These are never prescribed as medicines.

Many street drugs are made in dirty places such as a garage or basement. They are not tested for how much active ingredient is in them. Sometimes they have a lot and sometimes a little active ingredient, even when they look the same. Other street drugs are medicines that are sold by drug dealers illegally (without a prescription).

A.3 Is there a difference between medicine for grownups and medicine

for children?

Answer: Sometimes the same active ingredient that's in a medicine for grownups also is in a different medicine for children. The amount of active ingredient in the medicine is less when the medicine is for children. Children don't weigh as much as grownups so they don't need as much active ingredient. That's why there's Tylenol® for grownups and Tylenol® for children.

A.4 What is the difference between a pharmacy, a drug store, and other stores where you can buy medicines?

Answer: A pharmacy and a drug store are the same thing. Both are places to get prescriptions filled and to buy medicines you pick out yourself (over-the-counter medicines - OTCs). Both have a licensed pharmacist on duty. A licensed pharmacist went to a special school or college to become an expert on medicines. After graduation, pharmacists must pass a test to get a license to sell prescription medicines. To keep their license, in all states in the United States but one, pharmacists must take courses to keep up-to-date.

Any kind of store, even a grocery store or gas station, can sell OTC medicines that people can choose themselves without a prescription.

A.5 Do the inactive ingredients, or the size, shape, color, or taste, or the place where a medicine came from affect what the medicine does or how well it works?

Answer: Usually no. Only the active ingredient, how much there is of it, and where you put the medicine in (or on) your body should affect how a medicine works. Some people can have problems, such as allergies, with inactive ingredients. These people may need to have a different form of the medicine with the same active ingredient and different inactive ingredients.

The size of the medicine does not affect how it works.

A big pill could have the same amount of medicine in it as a little pill.

The color of the medicine does not affect how it works.

A blue pill could have the same amount of medicine in it as a red pill.

The shape of the medicine does not affect how it works.

Two medicines with the same shape could have different active ingredients in them and treat different things. The same active ingredient could be in a round pill or a square pill and treat the same thing.

The taste of the medicine does not affect how it works.

A good-tasting medicine does not work better than a bad-tasting medicine. A bad-tasting medicine does not work better than a good-tasting medicine.

The place where you got it does not affect how it works.

One medicine is not better than another because you got it from a drug store or a doctor or a grocery store or in another country. Only what is inside - the ingredients - matters.

The source of a medicine (found in nature or made by a chemical process) does not affect how it works.

If a medicine has the same chemical structure, it does not matter if it is made in a lab or is found in nature.

A.7 What are the different ways that medicines can be taken?

Answer: Medicines come in many forms and can be taken many ways. The same active ingredient is sometimes in different medicines that are taken in different ways. That's why there's Tylenol® in a tablet form and Tylenol® in a liquid form. A medicine should only be

taken the way it's supposed to:

- Tablets, capsules, and most liquids can be taken by mouth.
- Some drops and ointments can be put in the nose, eyes, or ears.
- Some medicines are breathed in through the nose or mouth.
- Some are brushed on the teeth, gargled, or used as a mouth rinse.
- Some are spread or sprayed on the skin.
- Some are taken into the body through the skin under a patch.
- Some are injected by a needle into a vein, muscle, or joint.
- Some are put into the rectum through the anus.
- Some are put into the vagina.
- Some are shampooed into the hair or are in soap for the skin.

A.8 What's the difference between prescription medicines and over-the-counter (OTC) medicines; brand names and generic names; medicines bought in the United States and medicines from other countries? What is a counterfeit drug?

Answer:

- In the United States, prescription medicines may only be sold with the OK of a doctor, or dentist (or physician assistant or special nurse in some states). In most cases, the prescription is written on a special prescription form. Most prescriptions can be refilled if the person who wrote it says it's OK and writes the number of times the prescription can be refilled on it. The pharmacist usually writes the number of refills allowed on the label and keeps the original prescription in a file. Some prescription medicines can't be refilled; you have to get a new prescription.
- Over-the-counter (OTC) medicines don't require a prescription. Any kind of store can sell OTC medicines. Some medicines that used to be sold only by prescription can now be sold OTC. OTC

medicines list the active and the inactive ingredients on the package.

- In the United States, a medicine is sold OTC if the U.S. Food and Drug Administration (FDA) decides it can be used safely by a consumer without the advice of a doctor. This means that the consumer is able to decide if the medicine is needed and the label says enough for the consumer to use it safely. If the FDA does not think the consumer can decide alone when the medicine is needed or can use it safely, the FDA says it's a prescription drug. Some medicines are both OTC and prescription. They are OTC if the active ingredient is small in each dose, and prescription if the active ingredient is large in each dose. In other countries, the rules might be different.

- Medicines usually have two names, a generic name and a brand name. The generic name is the scientific name for that medicine no matter who makes it. A brand name is the name given by the company that makes it. No other company can use that name. This means that a medicine has only one generic name but can have several different brand names. For example, ibuprofen is a generic name, but many companies sell it with different brand names such as Motrin®, Advil®, Children's Advil®, Nuprin®, and Ibu-tab®.

- Medicines from other countries should be used with caution. Some other countries don't require medicines to be tested or labeled as carefully as the United States. You can ask your pharmacist to look at a medicine from another country and help you decide if it's OK. A good rule is, "If you don't know what's in it and what it does, don't take it."

- A counterfeit drug is a fake. It may look exactly like the real thing but it is not. It may not have any of the active ingredient in it or the amount may be wrong. A few countries in the world have a problem with counterfeit medicines, but most don't. If you think a medicine is wrong, or is not working the way it

should, check with a pharmacist.

A.9 What is a vaccine?

Answer: A vaccine is most often given to keep people from getting an illness. It is usually given by a shot but some are given by mouth. A flu vaccine may be given by a spray in the nose. Almost every young child gets vaccines to prevent diphtheria, measles, mumps, polio, smallpox, and whooping cough.

A.10 What's the difference between dependence and addiction?

Answer: Some people have to take a medicine to replace something missing in their body or to keep from getting sick. For example, the bodies of people with diabetes don't make enough insulin. People with diabetes need insulin to keep from getting sick. People with asthma need medicines to prevent breathing problems. These people depend on their medicines to stay well, but they do not become addicted to them.

Sometimes, dependence and addiction mean the same thing. If a person is addicted to a legal drug (medicine) or an illegal drug (or to alcohol or cigarettes), he or she is very dependent on it. It means that person has a strong craving for it. Addicted persons can feel sick or nervous if they don't get that drug. Sometimes people depend on a drug, just in their minds, not their bodies. They can feel very strongly that they need the drug even if they don't get sick when they stop. Sometimes that kind of dependence is called "psychological addiction."

A.11 Are things such as vitamins and lotions medicines?

Answer: Sometimes. Vitamins and minerals are medicines even though they are naturally in most foods. If the lotion has an active ingredient in it that changes the body, it's a medicine. Some lotions (and ointments) prevent sunburn, some keep bugs from biting, some stop itching,

some take away corns or warts, some stop dandruff, some stop athlete's foot, and some help take away wrinkles and brown spots on the skin.

A.12 What's the difference between botanicals, herbal medicines, alternative medicines, traditional medicines, Western medicines, and homeopathic medicines?

Answer: Botanicals and herbal medicines are the same thing. They have one or more active ingredients in them taken from plants. They are sold over-the-counter (OTC). The U.S. government does not require them to be tested to see if they work or are safe unless they claim they treat or prevent illness. You often can't tell what the active ingredients are or how much active ingredient there is.

Traditional medicines and alternative medicines are the same thing. They can be made from plants but can also come from animal or fish parts. Use is based on experience, sometimes over hundreds of years. Alternative medicine is sometimes used with Western medicine.

Western medicines are those sold in the United States and other developed countries. These medicines have been studied to see if they work and are safe. They are labeled according to government regulations. The active ingredients are known. Laws say where they can be sold and how they are made.

Homeopathic medicines have a very, very tiny amount of an active ingredient in them. The active ingredient is believed to be able to cause a symptom of the illness, and then to stimulate the body to build up resistance to the illness. For example, if a person has a fever, a homeopathic medicine is chosen whose active ingredient is supposed to cause a fever. The National Institutes of Health (NIH) Office of Alternative Medicine says there's no scientific basis for homeopathic medicines. The U.S. government does not require homeopathic medicines to be tested to prove they work.

Most doctors don't believe homeopathic medicines work.

A.13 Why is it important to take antibiotics for all of the time they are prescribed?

Answer: Even when you feel well, you should take antibiotics for all of the days you're supposed to. If you don't, the bacteria that caused your illness may not be killed and they may become resistant to the antibiotic. Then, in the future when the bacteria make you or other people sick, the antibiotic may not work. Remember too, don't ask your doctor for antibiotics for a cold or the flu. Common illnesses such as colds and flu and chicken pox are caused by viruses not bacteria. Antibiotics can't kill viruses, so they can't cure colds or flu or chicken pox.

B. Children (and many parents) don't understand what happens to medicines in the body.

B.1 What happens to medicines in the body?

Answer: When a medicine is taken into the body, the active ingredient is carried by the blood to most parts of the body. The medicine does not go only to the place in the body where the problem is. That's one of the reasons a medicine can cause side effects. Over time, the medicine is broken down by the liver and/or the kidneys. Usually, some of the medicine (and its breakdown products) are carried out of the body in the urine (pee) or feces (poop). For some medicines this process takes hours, and for others it can take weeks or even months for all of it to get out of the body.

B.2 What's the difference between medicines for prevention, cure, symptoms, and chronic conditions?

Answer: Some medicines cure an illness. Cure means to get rid of the cause of an illness in the body. For example,

antibiotics kill bacteria in the body and cure the infection caused by the bacteria. Examples of illnesses that are cured with antibiotics are ear infections and strep throat.

Some medicines prevent illnesses but can't cure them. Examples of medicines that prevent illnesses are vitamins, minerals, and vaccines. Also, there are medicines called contraceptives that can prevent pregnancy.

Some medicines help control the symptoms of a chronic condition. A chronic condition can be helped but can't be cured. Examples of chronic conditions are diabetes, asthma, and high blood pressure (hypertension).

Some medicines treat symptoms but can't cure the illness that causes the symptoms. For example, aspirin or acetaminophen can help pain go away but they don't cure the problem that caused the pain. If you have a cold, you can take medicines to make your nose less stuffy but the medicines can't cure the cold.

Sometimes you don't need a medicine to get better. A cold usually goes away by itself.

B.3 What should be done if side effects happen?

Answer: It's important to know how serious a side effect (also called adverse reaction) is. Some are very serious and need emergency medical attention. For other side effects, it may be OK just to tell your doctor, nurse, or pharmacist. Also, there are side effects that are likely to go away by themselves or can be helped. For example, a medicine for a headache might upset the stomach, but when taken with food or drink it might not upset the stomach. Medicines that cure illnesses or treat symptoms are powerful. Almost all medicines can cause side effects. A side effect can happen in some people but not others.

Each medicine tested and approved for sale has a list of side effects, how likely they are to happen, and action you should

take if they happen. It's important to know the possible side effects of the medicine you are taking and what to do if you have them. Ask your doctor, nurse, or pharmacist to tell you. Or you can read the drug information leaflet that comes with the medicine. Or you can read a book. Or you can get the information from the Internet. You need to make sure the source of the information you use can be trusted.

B4. Can different medicines treat the same illness? Can the same medicine treat different illnesses?

Answer: Most illnesses can be treated with many different medicines. If one medicine does not work very well or causes side effects, another can be tried. For example, there are dozens of medicines for headache and dozens for asthma. Very few medicines treat only one illness. An exception is insulin. Insulin only treats diabetes. Most medicines can treat more than one illness or health problem. For example, there's a medicine that's used for high blood pressure, but that same medicine can help with stage fright. There's a medicine that's used for allergies and also for trouble sleeping.

C. Children (and many parents) are confused about who decides what medicines are selected, prescribed, and sold.

C.1 What is the role of the doctor, the dentist, the nurse, and the pharmacist in prescription medicines?

Answer: The doctor (physician) and the dentist have the legal authority (a license from the state where he or she works) to order medicines that by law can only be obtained with a prescription. Some kinds of specially trained nurses and physician assistants also are allowed to prescribe medicines in some states. Other nurses prescribe medicines under the supervision of a doctor. Pharmacists are experts about medicines but are not al-

lowed to prescribe medicines. A pharmacist has a license to provide (dispense) a medicine after the doctor or dentist (or a nurse or physician assistant with special permission) has prescribed it for you. Pharmacists, doctors, and nurses all can give you advice about medicines.

C.2 Do medicines prescribed by doctors always work?

Answer: Medicines prescribed by doctors don't always work. Sometimes you need a different medicine. Sometimes bacteria causing the illness have become resistant to the medicine. For some illnesses, there are no medicines that can help.

C.3 If you take more of a medicine, do you get better faster?

Answer: Taking more of a medicine does not make you get better faster. It's dangerous to take more (or less) than you are supposed to. Always read the label and take the right amount at the right time in the right way.

C.4 What is the role of the parent and child (future customer) in selection of OTC medicines?

Answer: Over-the-counter (OTC) drugs can be thought of by groups (also called classes or categories). There aren't many groups of OTC medicines but there are many medicines in each group. It can be hard to pick the best OTC medicine when there are so many to choose from. It's the parent's job to show the child how to do it.

The first step is to ask the doctor or pharmacist what he or she recommends to treat the problem. You can ask the pharmacist if there is another medicine that is the same (that has the same active ingredient) but that costs less. Or, you can find the medicine recommended by the doctor or pharmacist on the shelf. You and your child can then read labels to find others that have the same active ingredient.

When you find them, you can compare the amounts in the bottles and costs. You can also compare flavors if you want to find one the child likes best.

In general, a drug store house brand is the least expensive and is just as good. A good rule to follow is to only get medicines with the active ingredient that is needed. For example, if you want to treat allergy, buy a medicine whose only active ingredient is for allergy. You don't need one that also has ingredients to treat congestion and coughs.

Before you buy the medicine, check the expiration date and check to see that the packaging has not been opened. Find the lot number. If you have a problem with the medicine, you can use the lot number to report it. When the expiration date comes, you should discard the medicine.

At the end of this section, on p. 33, a supplement to C.4 presents an exercise showing the steps taken by a mother and her child to select a cough medicine. The exercise may be used to help design a field or laboratory experience for students. It demonstrates how difficult and time consuming it can be to figure out the best buy in an OTC medicine, and why it's easier to "Ask Your Pharmacist."

C.5 How can you tell if someone has put poison in the medicine you buy?

Answer: Only buy a medicine that has not been opened. Check to see that the original packaging (seal, cap, outer package, inner package) has not been broken or removed. Check to see that the expiration date, lot number, and other information are the same on both the medicine container and its outer wrapping or box.

C.6 Where do medicines come from? What does a drug company do?

Answer: Prescription and OTC medicines are made by drug companies, also called drug manufacturers. Some active ingredients are found in plants and trees.

The drug company takes the active ingredient out of the plant and mixes it with inactive ingredients to make tablets, capsules, liquids, lotions, etc. Some medicines, such as insulin, are taken from animals. Many medicines are synthetic. This means they are made from chemicals. Sometimes a drug is made by a synthetic process even though it occurs naturally. The drug company must test to make sure that each tablet or capsule of a medicine is the same as the other ones in the bottle. The drug company must also test to make sure that what is in the medicine is exactly what the label says.

C.7 Where - and why - are medicines advertised?

Answer: In the United States, drug companies advertise medicines everywhere - on TV, in popular magazines, and newspapers. Medicines also are advertised in magazines (medical journals) read by doctors, pharmacists, and nurses. The U.S. Food and Drug Administration (FDA) has rules about what can be said in prescription medicine advertising. The Federal Trade Commission (FTC) has rules about what can be said in OTC medicine advertising. The purpose of advertising is to tell the people about medicines and to try to get them to buy a certain medicine.

D. Children (and some parents) don't understand that some medicines have been tested carefully; others have not.

D.1 What does the U.S. Food and Drug Administration (FDA) do?

Answer: The FDA sets the rules for drug testing and decides if a drug works and is safe enough to be sold by drug companies. Under the rules, a drug company does the testing and then tells all it learned to the FDA. The FDA decides which medicines are OTC and which are prescription only.

The FDA sets the rules for the information that the drug company must provide

about the drug to doctors. This is a large amount of drug information that's called drug "labeling." All prescription medicines have "official labeling." This is not the label the pharmacist puts on your prescription medicines. You can ask your pharmacist to let you read the "official labeling." It is also called the "package insert." Once the FDA allows a drug to be sold, a doctor can prescribe it for anything, even if it does not say so in the official labeling. This is called "off-label" prescribing.

The FDA also sets the rules for how a prescription drug can be advertised to doctors and to consumers.

D.2 How can you tell which medicines have been tested carefully?

Answer: You can tell a lot about a medicine by knowing where it was purchased and by reading the label. In the United States, all medicines that can be sold by a doctor's prescription have been tested to see that they are safe and that they work for the illness they were tested for.

This does not mean they work better, or even as well, as another medicine for that illness.

Botanicals (herbal medicines) can be sold anywhere. Health food stores sell them. The FDA doesn't require botanicals to be tested. The FDA considers botanicals to be food products that are found naturally. The laws that restrict the manufacture and sale of prescription medicines don't apply to botanicals. Botanicals don't have any official labeling. You usually can't tell what the active ingredients are or how much of them there is in a botanical.

The manufacturers of over-the-counter (OTC) medicines also must show the FDA that the active ingredients work and are safe. If a package of medicine has a lot number printed on it, it has met these FDA rules. If there's a problem with the medicine, it can be reported by its lot number to the manufacturer.

The difference between a prescription

and an OTC medicine is that the FDA thinks consumers can decide if they need an OTC drug, and can take it safely following the instructions on the package. For a prescription drug, the FDA thinks that doctors (or dentists or special nurses) need to decide if the consumer needs it, how it should be taken, and how much should be taken.

Any medicine that says USP on the package meets official standards. If a medicine says USP on it, you can be sure that the label says what's in it. You can be sure it has been tested.

D.3 How are medicines tested? How do they know one medicine works better than another?

Answer: Drug companies use three steps (phases) of research to test medicines in people. The testing in people is only done after research in a laboratory and with animals suggests that the medicine might help or prevent an illness and be safe.

In Phase 1, the medicine is given to a small number of healthy people to determine how the drug affects humans. Such tests are done with people who agree to take the medicine.

In Phase 2, small numbers of sick people are given the drug to see if it helps.

In Phase 3, also known as a clinical trial, more people with the illness take the new drug while others take a fake drug (placebo) or a drug already on the market that's used for the illness. The people in Phase 3 are not told which one they are getting. Sometimes, the doctor doesn't know either. Then the two groups are compared to see if the new drug worked better than the placebo or the old drug. When the patient doesn't know and the doctor doesn't know, it's called a "double-blind" study. If only the patient doesn't know, it's called a "single-blind" study.

The drug company then submits all of its information to the FDA. The FDA reviews it and decides if the new medicine

should be approved for that illness. This whole testing process takes a long time and costs a lot of money.

Parents are asked to agree (consent) for drugs to be tested in their children. When children are old enough to understand (usually 7+ years), they also are asked to agree (assent).

D.4 What is the difference between the FDA and other groups such as USP who provide information about medicines?

Answer: The FDA is part of the U.S. government. It decides if a drug can be on the market and approves its "official labeling" information.

Other groups such as United States Pharmacopeia (USP) or the American Society of Health-Systems Pharmacists (ASHP) are private. They provide drug information for prescribers and consumers. The information from private groups can be based on the most recent research. Unlike the FDA-approved "official labeling," private groups don't have to wait for the drug company to apply to the FDA to approve its use for a certain purpose. Groups such as USP can say that one drug works better than another for a certain purpose. The "official labeling" usually does not tell you if one drug works better, worse, or the same as another.

D.5 Does every country have an FDA?

Answer: No. Some countries have drug regulatory agencies that are just as good as the FDA. But most countries (especially small, poor ones) don't have an FDA. These countries have a difficult time making sure that drugs sold there work and are safe. These countries often rely on the work done by the FDA.

D.6 Where can I get more information about medicines?

Answer: A pharmacist is a personal and primary source of information about medicines, but you can also get informa-

tion from the Internet and from books. The Internet changes all the time, so it's best to use a browser to find a good site. Always know where the Internet information came from. Only trust information that came from a source you can trust. You can trust a medical center web site such as The Johns Hopkins University site <www.intelihealth.com>, the FDA's web site <www.fda.gov>, the American Academy of Pediatrics <www.aap.org>, and the web site of the United States Pharmacopeia <www.usp.org>. Be wary of information that comes from persons in chat groups.

Some books you can trust which may be found in your local library are:

- United States Pharmacopeia Drug Information (USP DI) Vol. II, Drug Information in Lay Language, Advice for the Patient, published by Micromedex.
- Understanding Prescription Drugs, published by Consumer Health Information Corporation.
- Complete Drug Reference, published by Consumer Reports Books.
- The PDR Family Guide to Prescription Drugs, published by Medical Economics Data.

Supplement to C.4

Exercise: How To Select The Best Buy For OTC Medicines.

This exercise may be used to help design a field or laboratory experience for adolescents. The example shows how difficult and time consuming it can be to figure out the best buy in an OTC medicine.

Example: Shopping for cough medicine

Tammy Jones, age 10, has a cough so bad it's keeping her awake at night, so she's sleepy in school. Tammy and her mom together decide Tammy should take a medicine to help stop the cough.

Tammy's mom asked the doctor so she knows the name of the active ingredient that helps stop coughing. It's dextromethorphan (dex troe me thor fan), also known as DM.

Tammy and her mom go to the drug store to buy a cough medicine with DM in it. Tammy's mom knows she needs to read labels to learn: 1) the active ingredients, 2) the amount of DM per dose, and 3) the number of doses in the bottle. She also needs to know the cost. Tammy's mom asks Tammy to bring her calculator with them to the store.

At the drug store, Tammy and her mom find the section with the cough and cold medicines. There are so many! Some say they are for children; some say they are for children and adults, and some say they are for adults. Tammy's mom says they will only look at cough and cold medicines that are for children and that have DM in them.

Many of the medicines they find have DM, but most of them also have other active ingredients. Tammy's mom knows that Tammy only needs DM for her cough and shouldn't take medicines she doesn't need. They find 14 different bottles of medicines for children that have DM in them. Some bottles have the same names but are different sizes. Some have different amounts of DM in each teaspoonful. Some say a dose for a child Tammy's age and weight is two teaspoonfuls, and some say one teaspoonful.

Some of the medicines have four active ingredients, some have three, some have two. Tammy and her mom find only **one** medicine that has only DM and no other active ingredients in it. It's Robitussin® Pediatric Cough.

Tammy and her mom also find other kinds of medicines that have DM and one other active ingredient. This other ingredient is guaifenesin (gwy fen e sin). It's supposed to loosen up the mucus and make the mucus easier to cough up.

Tammy and her mom decide to com-

pare the costs of Robitussin® Pediatric Cough medicine with the other bottles of different sizes that also have guaifenesin in them. They make a table to help them find the best medicine at the least cost for Tammy.

On the following page is the table that Tammy and her mom made when they were shopping for Tammy's cough medicine. Tammy sees that it can take time and math to be a smart shopper.

How did Tammy and her mom make the table?

Step 1: Write the names on the bottles in the first column.

Step 2: Write the active ingredients in the second column.

Step 3: Write the total amount of the liquid in the bottle in milliliters (ml) in the third column.

Step 4: Read the dose grid to find the dose for a child Tammy's age and weight and write it in the fourth column.

Step 5: Divide the ml in the third column by the number of ml in a dose in column 4 to find out how many doses there are in a bottle. Put the number of doses in the bottle in column five.

Step 6: Now put the total cost of the bottle in the sixth column.

Step 7: Divide the total cost in the sixth column by the number of doses in the fifth column to find the cost per dose for the last column.

Tammy notices that she would need to take two teaspoonfuls of Robitussin Pediatric Cough and only one teaspoonful of the others for the correct dose.

Tammy and her mom find that tussin DM is the cheapest per dose; it costs six cents per dose and has 47 doses in the bottle. Find it on the table. It has a circle around it. The total cost of the bottle is \$2.99. The next cheapest per dose is the smaller bottle of tussin DM with 24 doses in it. Each dose costs 10 cents. The total cost of the bottle is \$2.49. Tammy and her

Shopping for children's cough medicine with DM in it.*

Brand	Active Ingredients	Fluid Ounces (ml)	Dose	Doses per Bottle	Cost per Bottle	Cost per Dose
Robitussin® Pediatric Cough	DM only (7.5 mg/tsp)	4 (120 ml)	2 tsp (10 ml)	12	\$4.99	\$0.42
Robitussin® DM	guaifenesin and DM (10 mg/tsp)	12 (355 ml)	1 tsp (5 ml)	71	\$8.63	\$0.12
Robitussin® DM	same	8 (237 ml)	1 tsp (5 ml)	47	\$6.88	\$0.15
Robitussin® DM	same	4 (118 ml)	1 tsp (5 ml)	24	\$2.79	\$0.12
Robitussin® Cough/Congestion	same	4 (118 ml)	1 tsp (5 ml)	24	\$2.79	\$0.12
tussin® DM	same	8 (237 ml)	1 tsp (5 ml)	47	\$2.99	\$0.06
tussin® DM	same	4 (118 ml)	1 tsp (5 ml)	24	\$2.49	\$0.10

* All of the medicines listed both the active and the inactive ingredients on the label. The active ingredients listed were guaifenesin (gwy fen e sin) to make mucus easier to cough up; and dextromethorphan (DM) to help stop coughing. Some of the medicines said they were for children. Some said they were for children and adults. All of the medicines said they were for children 6-11 years who weighed from 48 to 95 pounds. All of the medicines said that no more than four doses should be taken in a 24-hour period (one day).

mom decide to buy this one. It costs less per bottle but more per dose. However, Tammy and her mom don't expect Tammy to need it for more than six days. Buying the larger, more expensive bottle would mean that half of it would be wasted.

Tammy's mom shows Tammy what she's doing and why and asks Tammy to use her calculator to divide. She has Tammy read the labels, too. Tammy makes sure the medicine they buy is for a child her age and that she knows how much she should take. Tammy's mom

explains that television advertising does not help her decide what medicine to buy.

Whew! That took so much time, effort, and math. Tammy and her mom decide in the future to ask the pharmacist to help them find the best buy.

You can try it yourself. See if you can find medicines with different brand names that have the same active ingredients in them. See if they have the same amounts of active ingredients, too. Compare costs. Decide what you would buy and why. Then ask the pharmacist if he or she agrees with your decision.

Pictograms Children Should Recognize

Pictograms on labels and drug information leaflets help people take medicines. Children can quickly learn what pictograms mean. All USP pictograms have been pretested with adults and some have been pretested with children. Drug companies often put their own pictograms on OTC medicines.

Teaching children (or adults) what pictograms mean:

Basic USP pictogram shapes

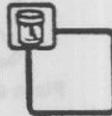
-  an X over a circle means "do not"
-  a triangle means "warning"
-  a rectangle means "how to"

Insets: a smaller picture with a bigger picture showing how (or how not) to take a medicine.

How to take the medicine: inset shows a person with a hand to his/her mouth.



How to handle a medicine: the inset shows a medicine container.



Dose forms: images combined with warnings and instructions. They show inhaler, injection, liquid, nasal drops, nasal spray, eye and ear medicines, rectal, topical, vaginal and oral dose forms. Examples are below.



Take with meals



Take with meals



Take with meals

Combinations: pictures the same size can be sequenced to show the order of taking a medicine, for example, "Wash hands/Place drops in nose/Wash hands again."



Wash hands/Place drops in nose
Wash hands again

Help children find examples of shapes, insets, dose forms, combinations, and do's and don'ts in the pictograms on the following pages.

Pictograms Children Should Recognize (continued)

1.



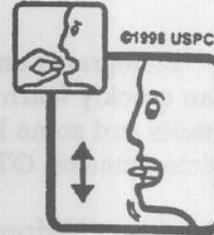
Read the label

2.



Take by mouth

3.



Chew

4.



Do not chew

5.



Liquid

6.



Nasal spray

7.



Wash hands/Place drops in nose
Wash hands again

8.



Place drops in lower eyelid

9.



Place drops in ear

10.



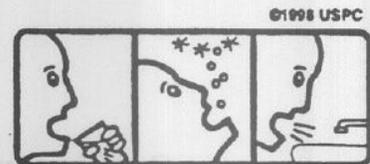
Apply to skin

11.



Use a specially marked spoon

12.



Use this medicine as a gargle

13.



Take in the morning

14.



Take at bedtime

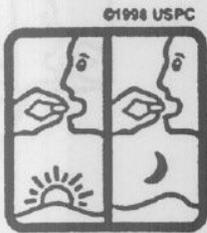
15.



Do not take at bedtime

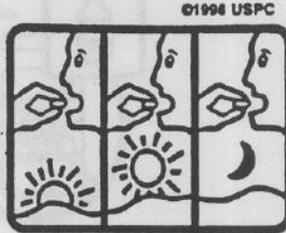
Pictograms Children Should Recognize *(continued)*

16.



Take 2 times a day

17.



Take 3 times a day

18.



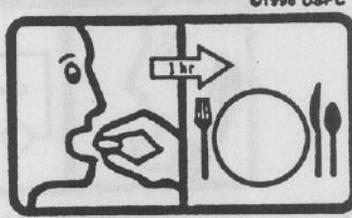
Take with meals

19.



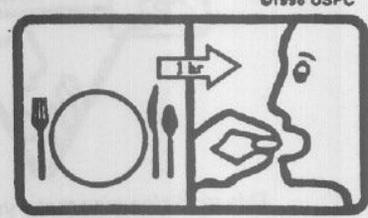
Do not take with meals

20.



Take 1 hour before meals

21.



Take 1 hour after meals

22.



Take with glass of water

23.



Take with milk

24.



Do not take with milk or other dairy products

25.



Do not break or crush tablets or open capsules

26.



Shake well

27.



Do not shake

28.



Do not take other medicines with this medicine

29.



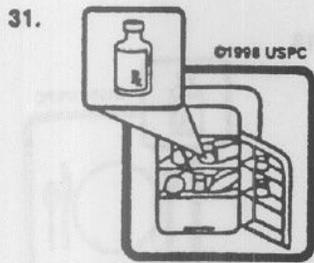
Avoid too much sun or use of sunlamp

30.



Keep out of the reach of young children

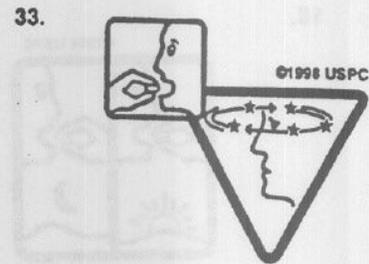
Pictograms Children Should Recognize (continued)



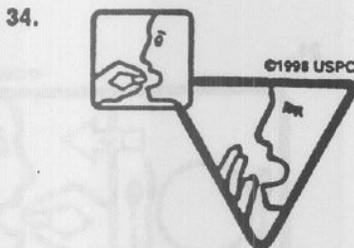
Store in refrigerator



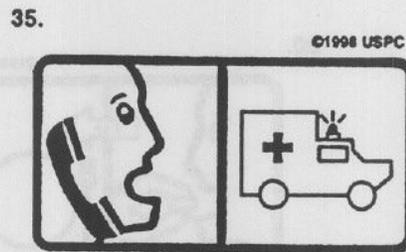
Do not refrigerate



This medicine may make you dizzy



This medicine may make you drowsy



Get emergency help



Wear medical alert



Polson

Appendix A

A. Fry Test for Reading Levels

B. The Medicine Cabinet in Homes with Children



Fry Test of Reading Level of Print Materials

The Fry reading level test¹ was standardized on English and may not be applicable to other languages. A reading level test that has been standardized on the relevant language should be used. If none is available, ask a teacher or persons in the target audience to evaluate the reading level of the material. Reading level tests are available in 12 or more languages.²

Reading level tests for English are available on some computer software, e.g., Word 6.1. Other reading level tests include Flesch Reading Ease, Dale-Chall Formula, Gunning Fog Index, and the SMOG Formula. However, the Fry formula is recommended. It correlates well with the Flesch and Dale-Chall and is easy to use without a computer. The Fry test is based on the number of words in the sentences and the number of syllables in the words. However, use common sense. Short words can be hard to understand.

Fry formula for testing reading level of materials:

1. Select three 100-word passages at random from the material you wish to test starting with the first word of a sentence.
2. Count the number of sentences in each 100 words, estimating the percentage remaining of the last three sentences to the

nearest 10%. Calculate the average number of sentences in the last three samples, i.e., sum the number of sentences in the three samples and divide by 3.

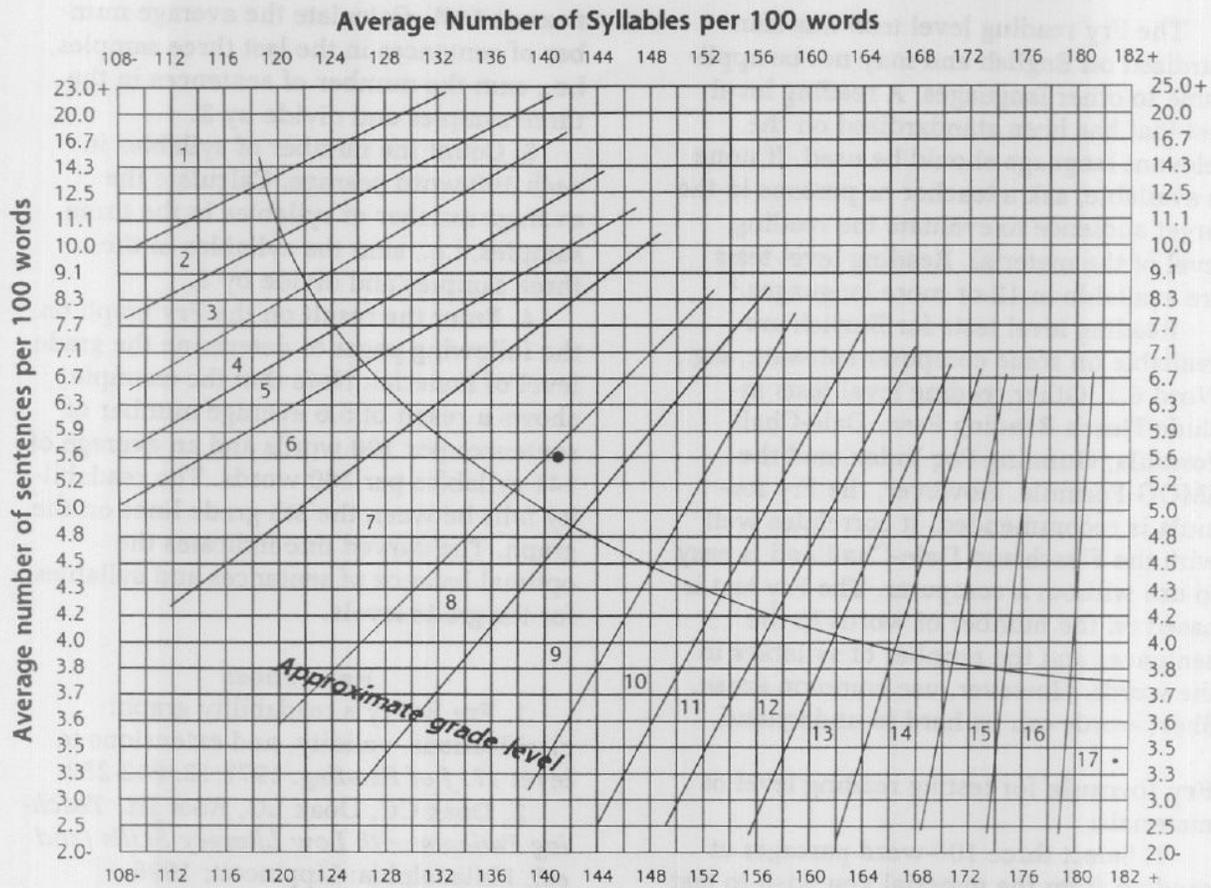
3. Count the number of syllables in each 100-word passage. Calculate the average number of syllables in the three samples, i.e., sum the syllables in the three samples and divide by 3.

4. Enter the result on the Fry graph on the following pages to determine the grade level of material. Note that the example shows a result of 5.6 average number of sentences per 100 words and an average of 141 syllables per 100 words. The readability falls between the 8th grade lines on the graph. The curved line indicates the optimal balance of sentences and syllables for the grade levels.

References

1. Fry E: Fry's readability graph: clarifications, validity, and extensions to level 17. *J of Reading*. 1977;12: 242-252.
2. Doak CC, Doak LG, Root JH. *Teaching Patients with Low Literacy Skills (2nd ed)*. Philadelphia: Lippincott; 1996.

Fry Graph for Testing Reading Level of Print Materials



The Medicine Cabinet in Homes with Children*

Supplies

- adhesive bandages, e.g., Band-aid®
- sterile gauze pads, 3x3 or 4x4 inches
- elastic bandages
- thermometer
- cold-stream vaporizer to relieve croup and stuffy noses
- sunscreen with SPF of not less than 15
- hydrogen peroxide to cleanse wounds (strength must be less than 3%); do not use hydrogen peroxide on fresh wounds; use soap to clean them instead

Always Have These Over-the-Counter (OTC) Medicines On Hand

ask the pharmacist
what brand is the best buy

Medicines

acetaminophen
ibuprofen
syrup of ipecac

Used For

fever, pain
fever, pain
induces vomiting -
keep on hand for
emergency accidental
poisoning only if 30
minutes or more
from a health care
provider

May Have These Medicines If Child Needs Them

for allergies, a kind of antihistamine (chlorpheniramine, brompheniramine, diphenhydramine, tripolidine, carbinoxamine, hydroxyzine)

for itching and bites: calamine lotion and 1% hydrocortisone ointment

for the common cold: nose drops containing a decongestant (phenylephrine, ephedrine, or oxymetazoline)

for severe coughs: a cough syrup - some contain a cough suppressant (dextromethorphan - known as DM) and some also contain an expectorant (guaifenesin). A vaporizer works best.

for repeated ear infections: a decongestant (pseudoephedrine, ephedrine)

for diarrhea: oral rehydration therapy (ORT); ORT is a mixture of sugar, salt, and water that can be made at home. Dissolve 4 level teaspoonfuls of sugar and ½ level teaspoon of salt in 1 quart (4 cups) of clean water (boil if not sure).

* Adapted from Pantell RH, Fries JF, Vickery DM: *Taking Care of Your Child*. 4th ed. Reading, Mass.: Addison-Wesley, 1993.

AMERICAN SCHOOL HEALTH ASSOCIATION

7263 State Route 43 • P.O. Box 708 • Kent, OH 44240

330/678-1601 • 330/678-4526 (fax)

www.ashaweb.org

The American School Health Association unites the many professionals working in schools who are committed to safeguarding the health of school-aged children. The Association, a multidisciplinary organization of administrators, counselors, dentists, health educators, physical educators, school nurses and school physicians, advocates high-quality school health instruction, health services and a healthful school environment.

ASHA has more than 2,000 members in 56 countries. More than one-half the members practice in K-12 schools or advise and oversee health education or health services programs in schools or state agencies charged with managing school health programs.

History

The American School Health Association was founded as the American Association of School Physicians on October 27, 1927, by 325 physicians at the annual meeting of the American Public Health Association in Cincinnati. The charter members represented 29 states and Canada. The first president was William A. Howe, M.D., Buffalo, N.Y.

Interest in the Association grew so rapidly that in 1936, the American Association of School Physicians opened its membership to all professionals interested in promoting school health. The organization officially became the American School Health Association.

Mission and Goals

Mission: The mission of the Association is to protect and improve the well-being of children and youth by supporting comprehensive school health programs. These programs significantly affect the health of all students, in preschool through grade 12, and the health of school personnel who serve them. School health programs prevent, detect, address and resolve health problems, increase educational achievement and enhance the quality of life. The Association works to improve school health education, school health services and school health environments. The Association also works to support and integrate school counseling, psychological and social services, food services, physical education programs and the combined efforts of schools, other agencies and families to improve the health of school-aged youth and school personnel.

Goals: To provide national leadership and achieve its mission, ASHA has adopted five goals: 1) promote **INTERDISCIPLINARY COLLABORATION** among all those who work to protect and improve the health, safety and well-being of children, youth, families and communities; 2) offer **PROFESSIONAL DEVELOPMENT** opportunities for all those associated with school health programs; 3) provide **ADVOCACY** support for building and strengthening effective school health programs; 4) encourage **RESEARCH** that affects school health programs; and 5) to fulfill these initiatives, ASHA must acquire human, fiscal and material **RESOURCES**.

Structure and Governance

The Association is divided into Sections and Councils. Sections are defined as subgroups comprised of Association members who are affiliated with a particular discipline within the Association. Councils are issue-focused. These subdivisions of the Association develop policy and facilitate programming, write policy statements and draft position papers.

Structure and Governance (cont.)

ASHA's Executive Committee is composed of the president, president-elect, vice president, immediate past president, chairpersons of the editorial board and finance committee and two at-large Board of Director representatives. The Board consists of the Executive Committee plus 15 members elected at-large from the Association's membership, representatives from constituent and partner organizations and from Sections and Councils of the Association.

Members also elect officers for their constituent organizations. These state or territory chapters have their own constitutions and further the aims of the national organization as well as state-level priorities.

ASHA is a not-for-profit Ohio corporation organized for scientific and educational purposes, exempt from income tax under Section 501 (c) (3) of the U.S. Internal Revenue Code.

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Education

One of the Association's primary goals is to further the professional education of members. For many of the professionals involved in school health, ASHA offers continuing education credits at the ASHA national school health conference and regional conferences.

The Association publishes the *Journal of School Health*, a refereed, professional journal, monthly during the school year, and *The PULSE*, a newsletter for members. The Association also publishes and makes available other publications and web-based resources on topics pertinent to the school health professions.

American School Health Association Membership Application

Dr.
Miss
Mr.
Mrs.
Ms.

Last Name _____ First _____ MI _____ Degree(s) Major _____ Professional Certification (ie, CHES, RD) _____

Title _____ Institution / Organization _____

Preferred Address _____

City / State / Zip _____ Country _____

Telephone _____ FAX _____ e-mail _____

Demographic Information (optional): Female Male Race/ethnicity (optional): _____

Membership Category / Payment

- | | | |
|--|---|---|
| <input type="checkbox"/> Member | <input type="checkbox"/> Institutional (\$165/year) | <input type="checkbox"/> 1st-Year Professional (\$35) |
| <input type="checkbox"/> \$95 one year | <input type="checkbox"/> Emeritus (retired) (\$35/year) | <input type="checkbox"/> Additional Section/Council (\$10 per addition) |
| <input type="checkbox"/> \$175 two years | <input type="checkbox"/> Life (\$1,000) | Canadian / Foreign members add \$20 per year |
| <input type="checkbox"/> \$250 three years | <input type="checkbox"/> Student (\$35) | |

- Enclosed is my check for \$_____ made payable to ASHA Charge my MasterCard / Visa (circle one)
- Please bill me / my institution
- Card#: _____
Exp. Date: _____
Signature: _____

Membership fees are non-refundable and cannot be paid in installments.

- I would like to make a donation to the ASHA Scholarship Fund. \$_____
- Mail preference. We occasionally make our list of members available to carefully screened organizations whose services and activities might be of interest to you. If you prefer not to receive such mailings, please check.

Membership Profile

Worksite:

- | | | |
|---|--|---|
| <input type="checkbox"/> A) Day Care/Preschool/
School System (Public/Private/Parochial) | <input type="checkbox"/> G) College/University | <input type="checkbox"/> K) Industry/Corporation/For Profit |
| <input type="checkbox"/> B) Elementary | <input type="checkbox"/> H) School-Based Health Center | <input type="checkbox"/> L) Non-Profit Organization |
| <input type="checkbox"/> C) Middle/Junior High | <input type="checkbox"/> I) Government Agency
(local, state, federal) | <input type="checkbox"/> M) Self-employed |
| <input type="checkbox"/> D) High School | <input type="checkbox"/> J) Hospital/Managed Care
Organization/Clinic | <input type="checkbox"/> N) Other _____ |
| <input type="checkbox"/> E) Special Education/Ungraded | | |
| <input type="checkbox"/> F) District Level | | |

Major Area of Responsibility Related to School Health:

(If more than one, indicate primary (1), secondary (2), etc.)

- | | | |
|---|--|---|
| <input type="checkbox"/> A) Administration | <input type="checkbox"/> E) Health Promotion for Staff | <input type="checkbox"/> I) School Environment |
| <input type="checkbox"/> B) Counseling, Psychological, or Social Services | <input type="checkbox"/> F) Health Services | <input type="checkbox"/> J) School Food/Nutrition Services, Dietics |
| <input type="checkbox"/> C) Family and Community Involvement | <input type="checkbox"/> G) Professional Preparation | <input type="checkbox"/> K) Other _____ |
| <input type="checkbox"/> D) Health Education | <input type="checkbox"/> H) Physical Education | |

Section and Council Affiliation

Dues include membership in one Section and two Councils. All members are urged to identify their interest. Please check your choices.

Sections: (Select one)

- A) Health Educators
- B) Physicians
- C) School Nurses
- D) Mental and Social Health Professionals

Councils: (Select two)

- A) Alcohol, Tobacco and Other Drugs
- B) Early Childhood Health Education and Health Services
- C) Food and Nutrition
- D) Health Behaviors
- E) Injury and Violence Prevention
- F) International Health

Councils: (continued)

- G) Physical Education & Physical Activity
- H) Program Administration
- I) Research
- J) School Health Instruction
- K) School-Based Primary Health Care
- L) Sexuality Education

Return form and payment to: American School Health Association, 7263 State Route 43, P.O. Box 708, Kent, OH 44240
330/678-1601 / 330/678-4526 (fax) / asha@ashaweb.org

About Your ASHA Membership

ASHA offers the following membership categories:

Member, Institutional, Full-time Student, 1st-year Professional (for ASHA student members entering the workforce), **Emeritus** (retired), **Sustaining**, and **Life**.

All members receive the *Journal of School Health* and *The PULSE* as well as discounts on ASHA publications and annual and regional conference registration fees. Eligibility for group insurance through Mutual of Omaha is an additional membership benefit. Institutional membership includes all membership benefits for four people at one institution's address except only one subscription to the *Journal of School Health* is sent to the institution. ASHA membership is individual rather than organizational and is fully portable should you change employment or address.

ASHA membership provides many opportunities to improve your professional competence.

Membership entitles you to vote and hold office.

Membership entitles you to join one Section and two Councils. Section and Council membership brings specialized information on specific issues in school health. Section and Council involvement provides opportunities to identify, communicate, and work with others who share common skills and goals. Those who wish to join additional sections or councils may do so for an additional \$10 per addition per year.

ASHA's affiliation with national, state, and local school health and education groups provides opportunities to get involved with colleagues at the local, state, and national levels.

For additional information on your ASHA membership benefits or ASHA services, please contact:

Membership Services Department
American School Health Association
7263 State Route 43 / P.O. Box 708
Kent, OH 44240

330/678-1601 (phone)
330/678-4526 (fax)
<asha@ashaweb.org> (email)
www.ashaweb.org

Thank you

American School Health Association

Publication Order Form

School Nurse / Health Services Materials

	ASHA member price	Non- member price
_____ Bright Futures: Guidelines for Health Supervision of Infants, Children and Adolescents	\$21.25	\$24.95
_____ Guidelines for Protecting Confidential Student Health Information	\$12.95	\$18.95
_____ Managing the School-Age Child with a Chronic Health Condition	\$40.00	\$40.00
_____ Roll Up Both Sleeves: Vaccinating Students and Staff at School	\$15.00	\$15.00
_____ Standards of Professional School Nursing Practice	\$10.00	\$15.00
_____ Restructuring Education Support Services: Toward the Concept of an Enabling Component	\$ 9.50	\$10.75
_____ The Role of the Nurse in the School Setting: A Historical Perspective	\$ 9.75	\$11.00
_____ The School Nurse's Source Book of Individualized Healthcare Plans, Volume 1	\$40.00	\$40.00
_____ The School Nurse's Source Book of Individualized Healthcare Plans, Volume 2	\$40.00	\$40.00
_____ "Every Kid Needs A School Nurse" Bumper Sticker	\$ 1.00	\$ 1.00
_____ "School Nurse on Board" Window Sign	\$ 2.00	\$ 3.00

Education / Health Materials

_____ Guide to Developing and Evaluating Medicine Education Programs and Materials for Children and Adolescents	\$ 7.00	\$10.00
_____ Health Counseling	\$12.65	\$14.60
_____ Health Is Academic: A Guide to Coordinated School Health Programs	\$21.20	\$24.95
_____ Healthy Students 2000: Agenda for Continuous Improvement in America's Schools	\$21.25	\$24.95
_____ National Health Education Standards: Achieving Health Literacy	\$ 8.00	\$ 8.00
_____ School Health: Findings From Evaluated Programs, 2nd edition	\$15.50	\$18.00
_____ School Health in America, 6th edition	\$17.50	\$20.00
_____ Sexuality Education Within Comprehensive School Health Education	\$12.65	\$14.60
_____ The Health Promoting School: Focusing on Health and School Improvement	\$21.25	\$24.95

HIV/AIDS Materials

_____ A Comprehensive Approach to Reduce Pregnancy and the Spread of HIV: An Advocacy Kit	\$19.95	\$24.95
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