Children's Safety Network

EDC Education Development Center

March 22, 2022

2:00 p.m.- 3:00p.m. ET

Safe Use and Administration of Medication to Young Children

Moderator

Maureen Perkins

Team Lead, Poison Control Program

Health Resources and
Services Administration (HRSA)

Funding Sponsor

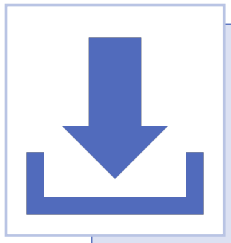
This project is supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) under the Child and Adolescent Injury and Violence Prevention Resource Centers Cooperative Agreement (U49MC28422) for $5,000,000 with 0 percent financed with non-governmental sources. This information or content and conclusions are those of the author and should not be construed as the official position or policy of, nor should any endorsements be inferred by HRSA, HHS or the U.S. Government.

Technical Tips

Audio is broadcast through computer speakers

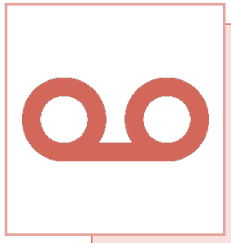
If you experience audio issues, dial **(866) 835-7973** and **mute computer speakers**

You are muted



Download resources in the File Share pod (above the slides)

Use the Q & A (bottom left) to ask questions at any time



This session is being recorded

Speakers

Daniel Budnitz

Director,
Medication Safety Program
U.S. Centers for Disease Control and Prevention (CDC)

Mary Leonard

Managing Director
Consumer Healthcare Products Association (CHPA) Educational Foundation

H. Shonna Yin

Associate Professor of Pediatrics
NYU School of Medicine

Preventing Pediatric Medication Poisonings:

Safe Use and Administration of Medicine for Young Children

8 Facts about the problem of pediatric medication exposures, overdoses, and errors

8 Key messages for parents and caregivers for prevention

The PROTECT Initiative: Advancing Children's Medication Safety

PROTECT

What is PROTECT?

The PROTECT Initiative is an innovative collaboration bringing together public health agencies, private sector companies, professional organizations, consumer/patient advocates, and academic experts to develop strategies to keep children safe from unintentional medication overdoses.

www.cdc.gov/medicationsafety/protect/protect_initiative.html

3–Pronged Prevention Approach

Safer Packaging

New approaches and innovations in child-resistant safety packaging can limit or prevent harm when a young child finds and tries to ingest medication on his or her own (unsupervised ingestions). Learn More about Safer Packaging.

Safer Use

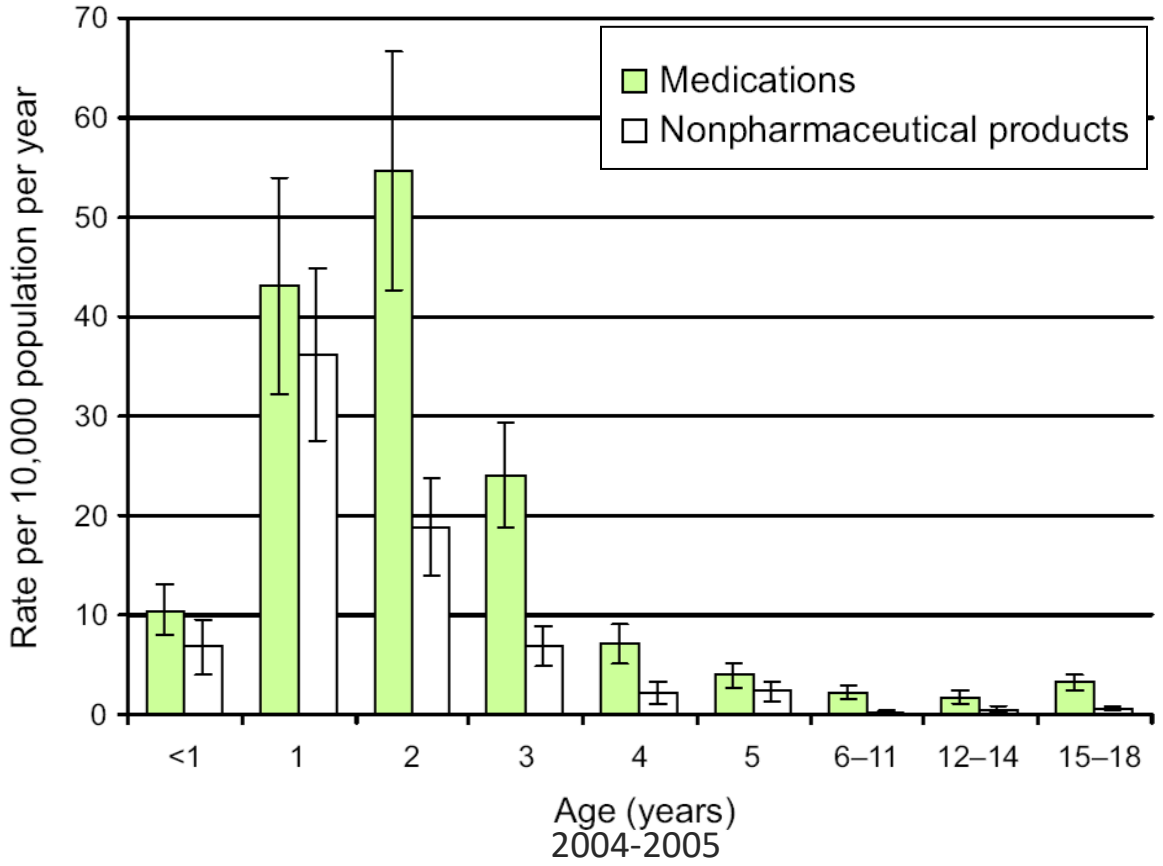
Standardizing and synchronizing the units of measure on dosing directions and on dosing devices can prevent caregiver dosing errors (e.g., milliliters (mL) should be used on both dosing directions and devices). Learn More about Safer Use.

Safer Storage

All medicines should be stored up and away and out of sight of young children. Following a few simple steps every time medicines are used can decrease the chance of young children finding and ingesting medicines on their own. Learn More about Safer Storage.

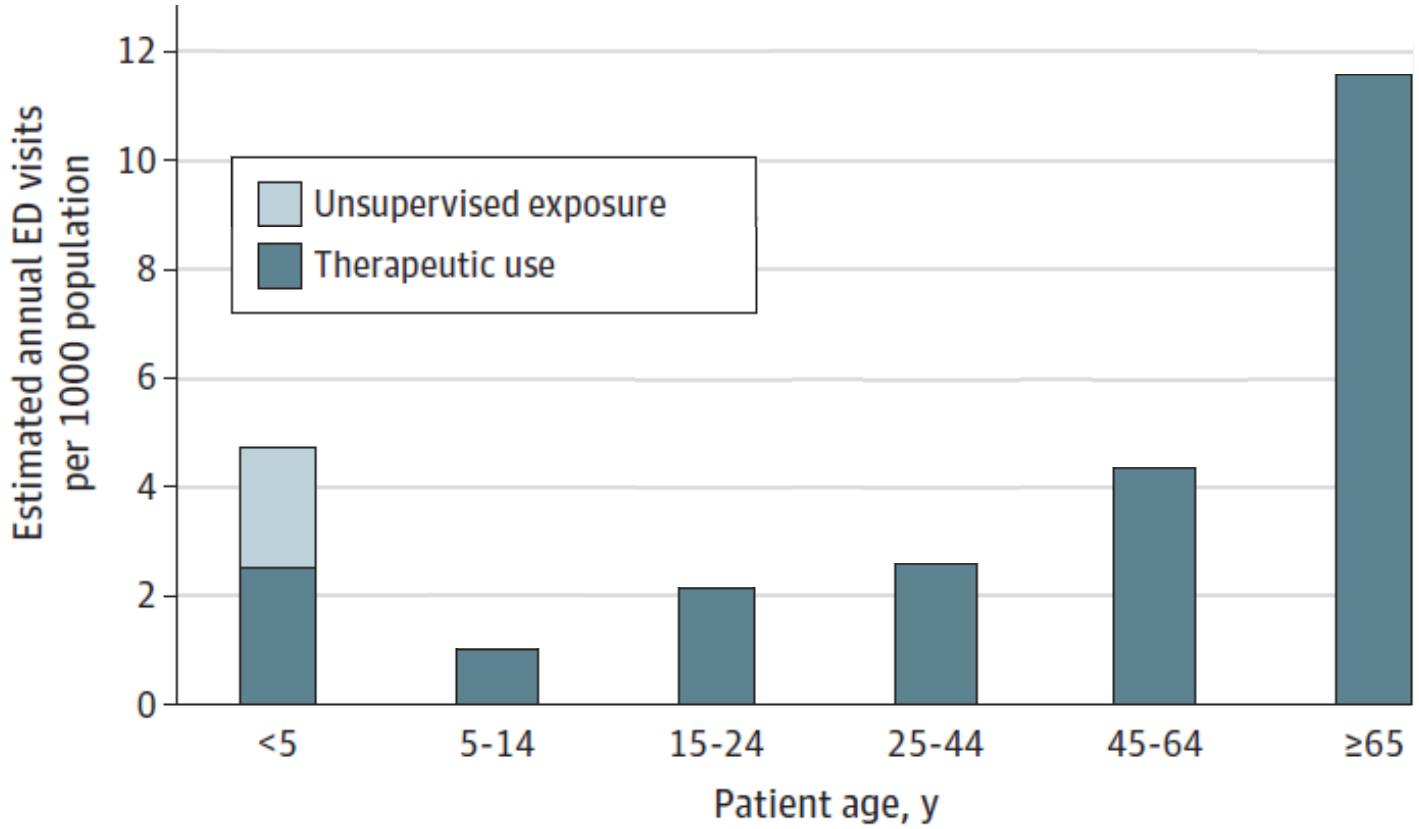
www.cdc.gov/medicationsafety/protect/protect_initiative.html

Fact 1: More children are brought to Emergency Departments (EDs) for unintentional medication exposures and overdoses than exposures to all other consumer products combined



Schillie SF, et al. *Am J Prev Med* 2009;37:181-7

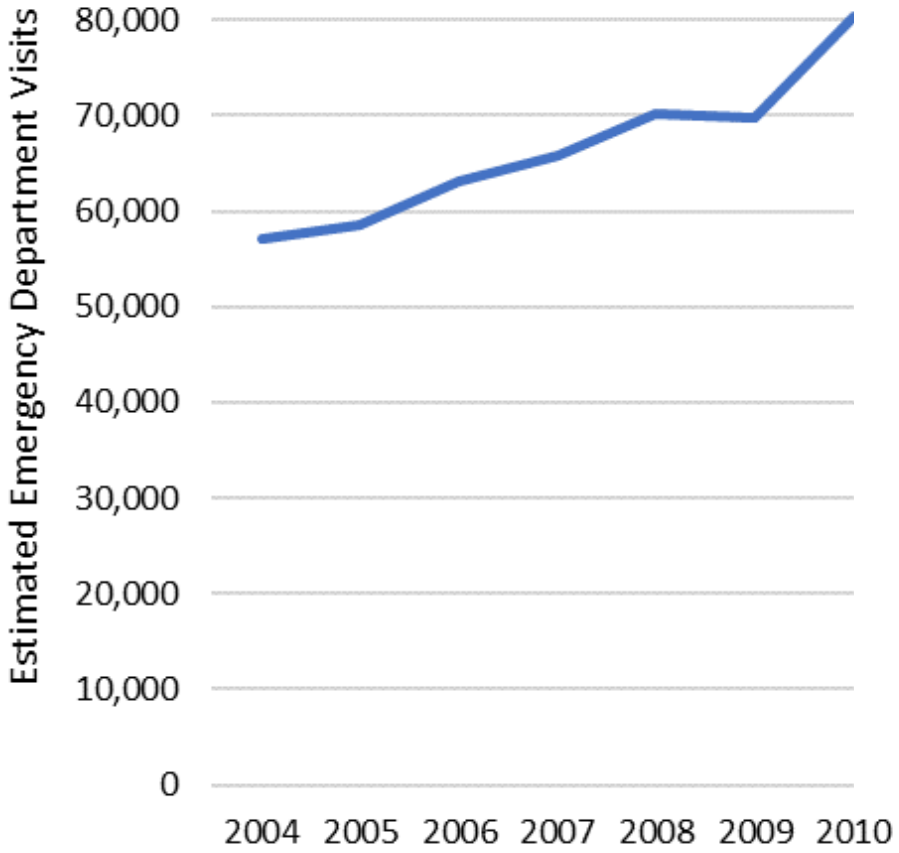
Fact 2: Children <5 years come to EDs for medication-related harms at a higher rate than all others under 65 years old*

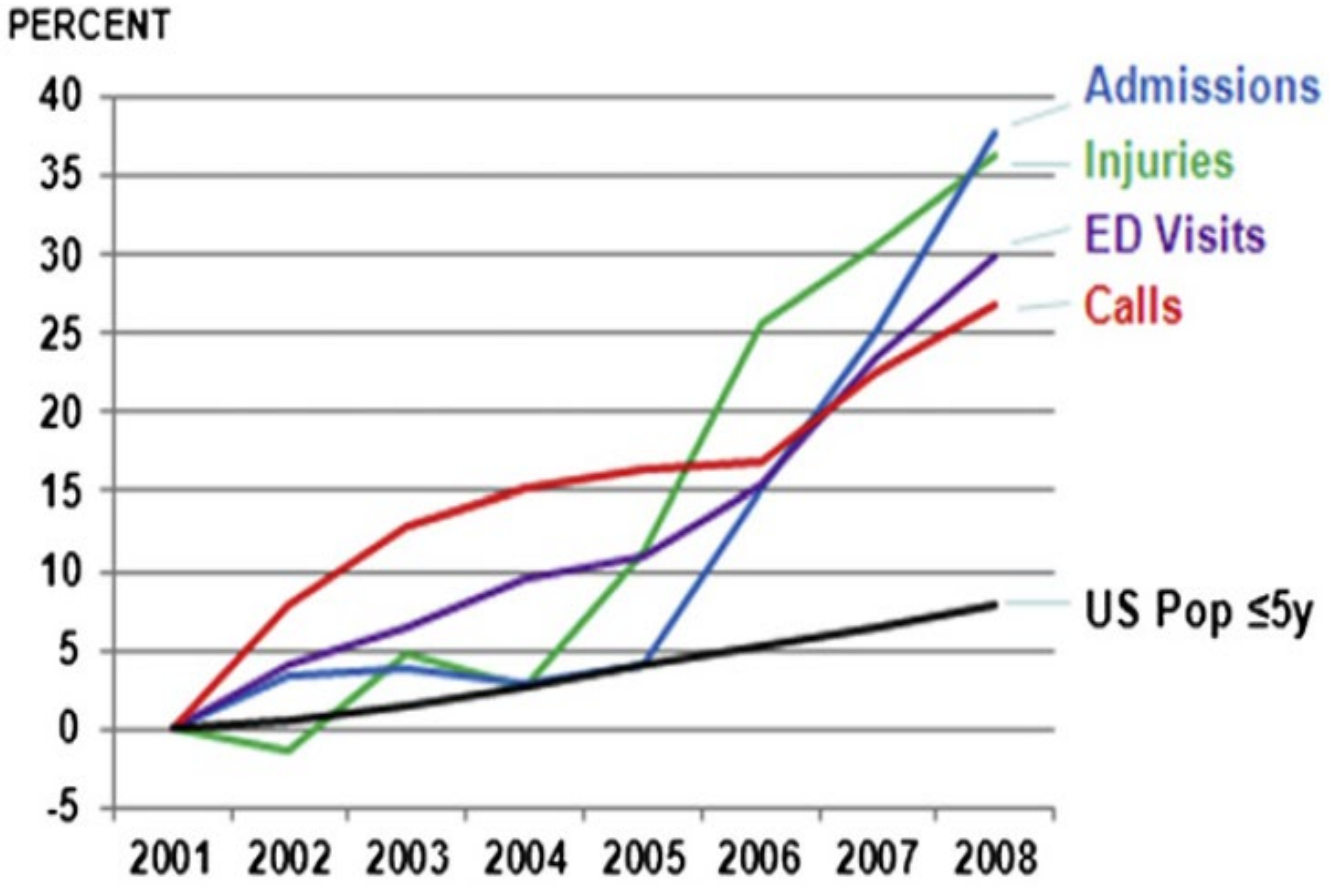


*Excludes self-harm and abuse, 2017-2019

Budnitz DS et al. *JAMA* 2021;326:1299-1309

Fact 3: In 2000s, emergency visits for medication overdoses and exposures in young children increased by approximately 30%

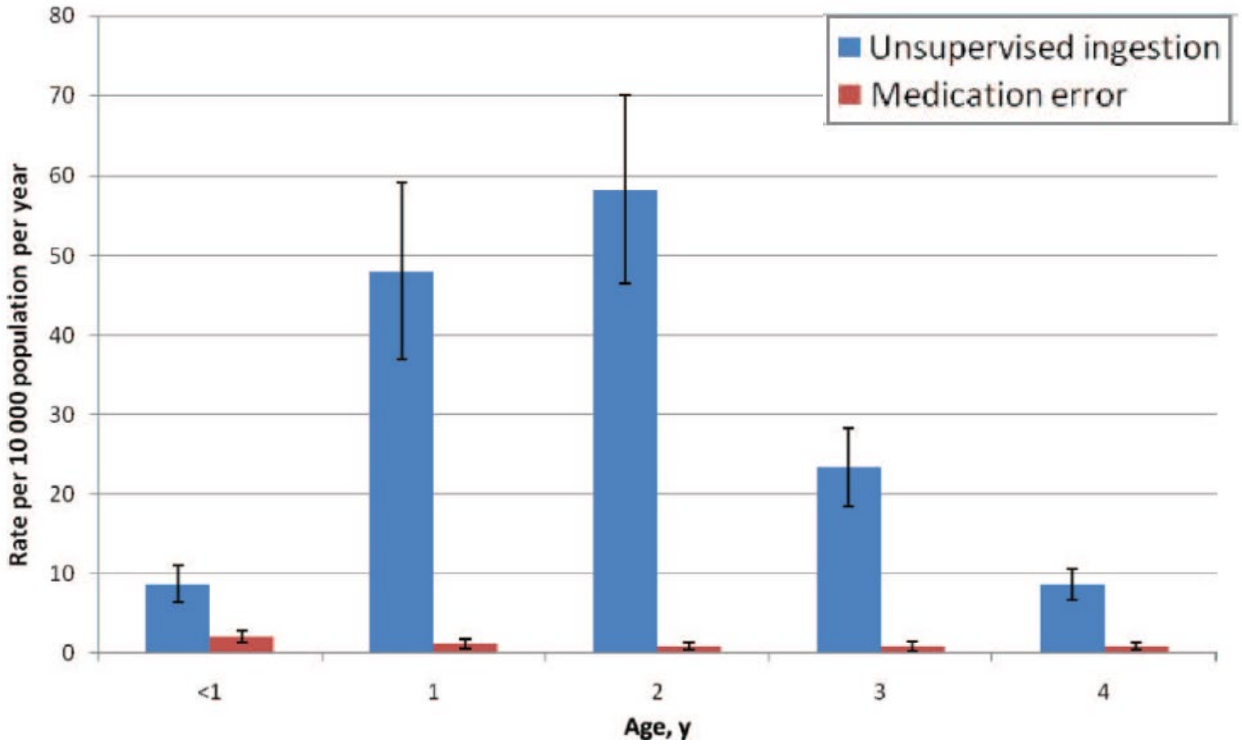




NEISS-CADES, PROTECT Initiative Meeting 2021

Bond et al. *J Peds* 2012;160:265-70

Fact 4: Emergency visits for unsupervised ingestions are more common than administration errors (but when errors do occur, they are most common among children <1 year old)



2006-2009

Budnitz DS and Salis S. *Pediatrics* 2011;127:1597-9

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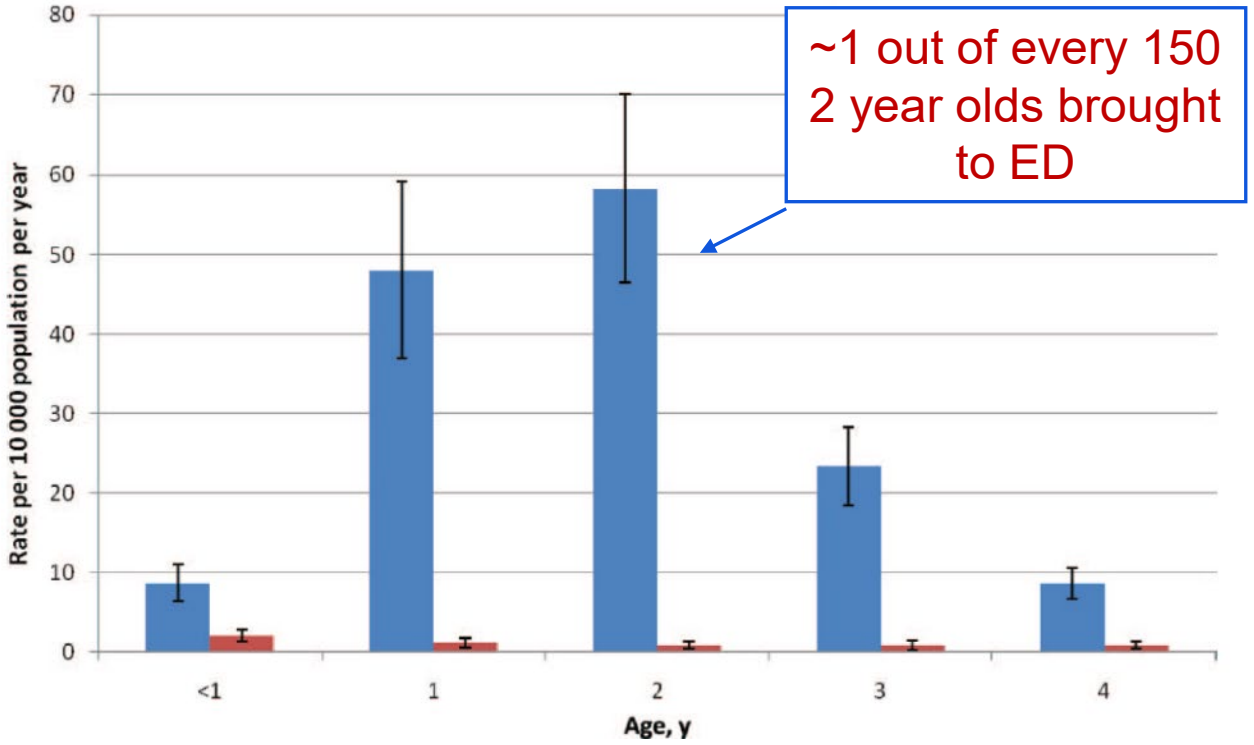
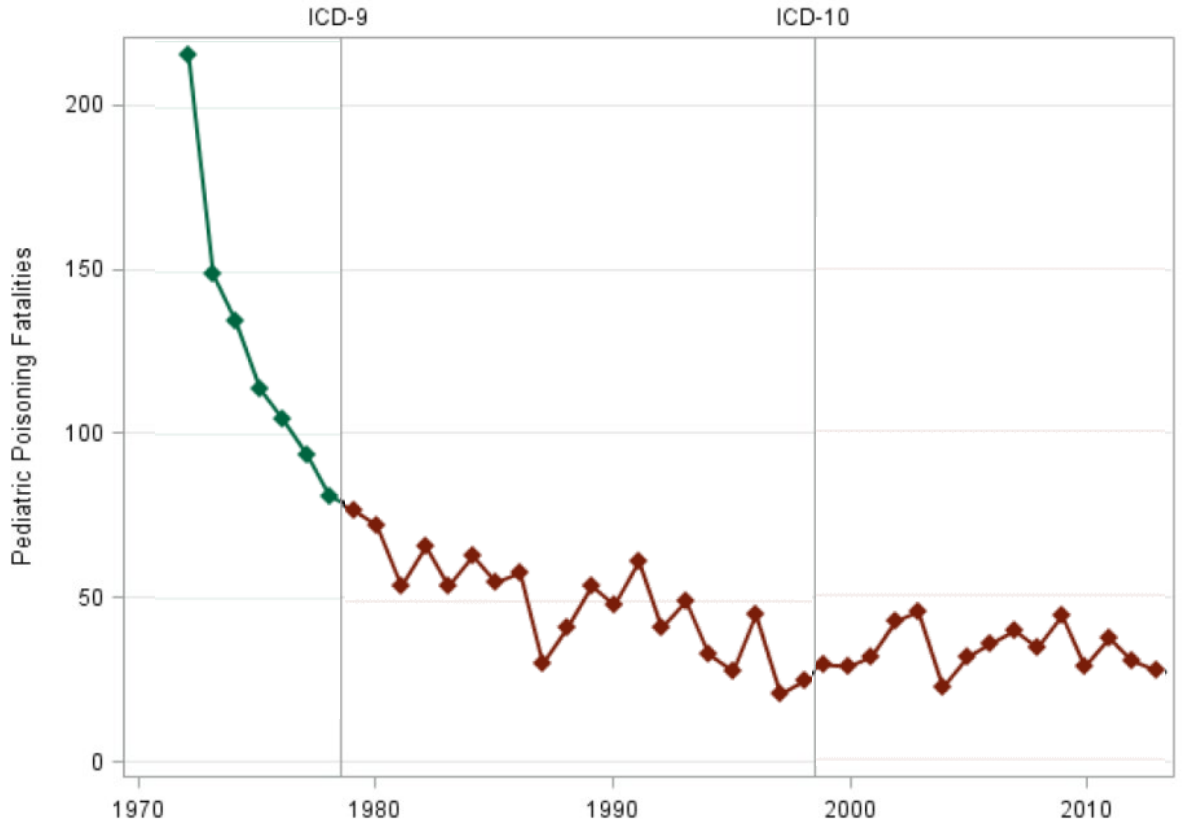


2006-2009

Budnitz DS and Salis S. *Pediatrics* 2011;127:1597-9

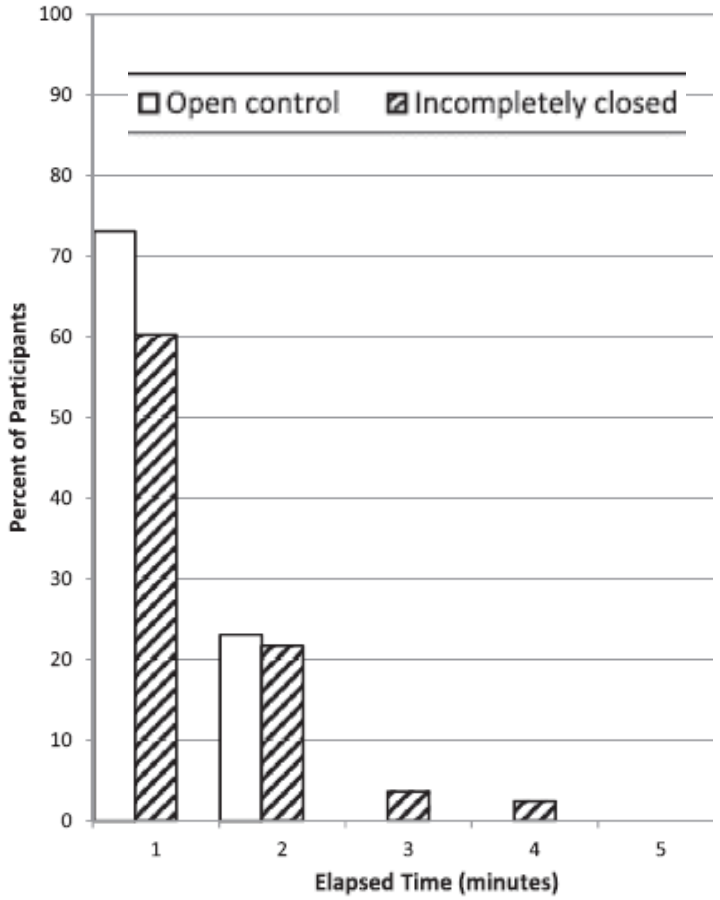
Fact 5: Child-resistant (CR-) closures work well but are ***not*** child-”proof” (Deaths declined dramatically after CR-closures)



www.cpsc.gov/s3fs-public/PPPAMortality2013.pdf

Fact 6: If adults do not put CR-closures back on completely and correctly every time, they hardly work at all

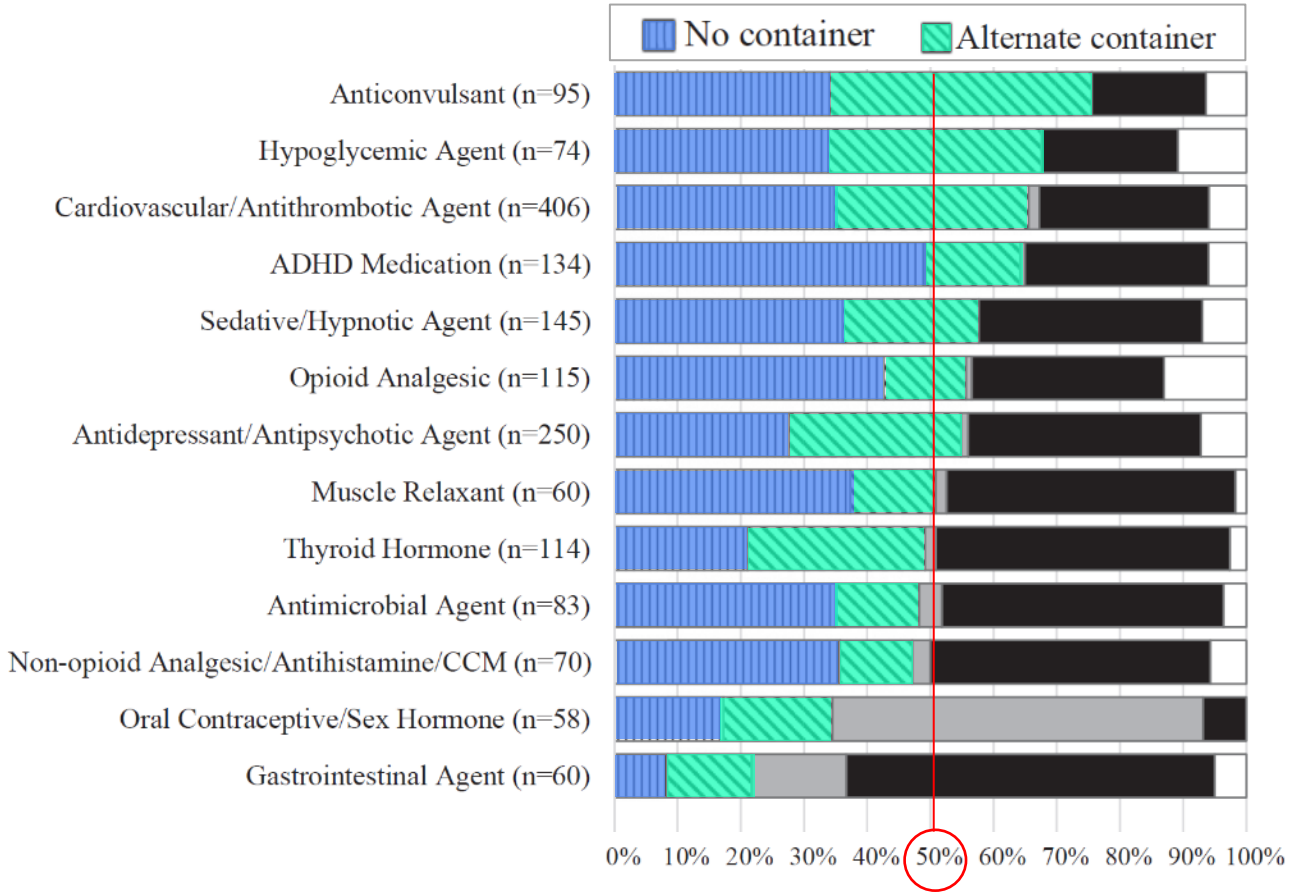
Time required for children to empty open control bottles, incompletely closed bottles



Lovegrove et. al. *J Pediatric 2013;163:1134-9.e1*

Fact 7: Adults intentionally removing pills from original packaging is an underlying cause of many pediatric ingestions

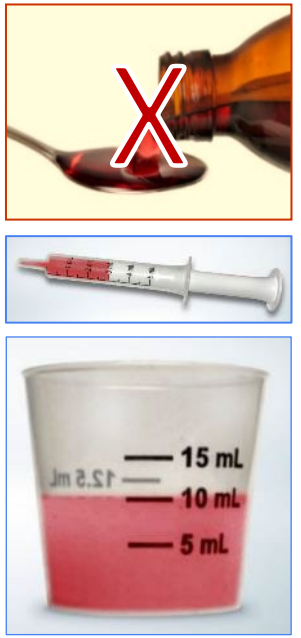
Calls to 5 poison centers for pediatric ingestions of pills by container type, 2017



Agarwal M et al.. *J Pediatr* 2020:188-195

Fact 8: Administration mix ups can lead to multi-fold medication overdoses (and underdosing errors)

Instruction	**Mix-up**	**Outcome**
Give 1 teaspoon	Gave 1 **Table**spoon	3-fold overdose
Give 1/2 teaspoon	Gave **2** teaspoons	4-fold overdose
Give 1 milliliter (mL)	Gave 1 **teaspoon**	5-fold overdose
Give .1 milliliter (mL)	Gave **1** mL	10-fold overdose
Give 1.0 milliliter	Gave **10** mL	10-fold overdose



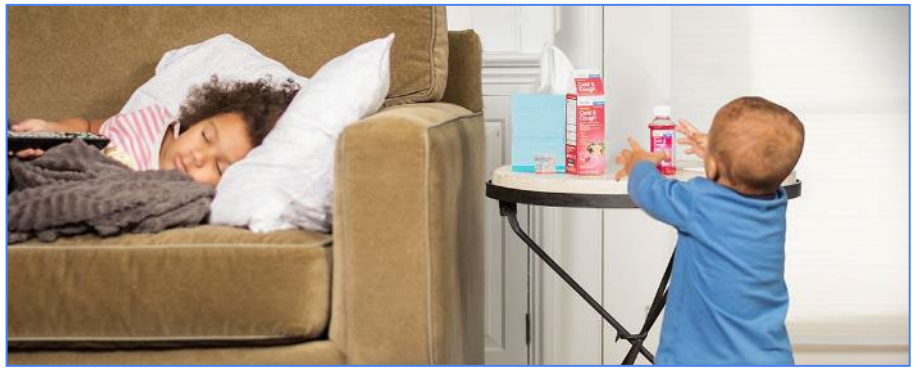
Translating Facts into Focus Group Tested Guidance

1: Pick a place your children cannot reach

- Find a place in your home that is too high for children to reach or see.
- Walk around your home and find the best place to keep your medicines and vitamins up and away, even between doses.

2: Never leave loose pills or liquid medicines out on a counter, table, or bedside

- To a young child, pills can look like candy and liquid medicines can look like sugary drinks, so it’s important to keep them out of children’s reach and sight and in child-resistant containers until right before you take them.



3: At home or away, keep medicines in their original, child resistant containers

- If the medicine has a locking cap that turns, twist it until you can’t twist anymore or hear the “click.”
- If you must put medicines in other containers, such as pill organizers, check to see if they are child-resistant. Many are not and can be easily opened by young children.

4: Teach your children about medicine safety when they are old enough to understand

- It’s important to teach your children what medicine is and why you or another caregiver must be the one to give it to them.
- Never tell children medicine is candy, even if they don’t like to take their medicine.

5: Inside homes with children, discuss keeping medicine in a safe place

- Remind guests to keep purses, bags, or coats that have medicines in them up and away and out of sight when they're in your home.
- If you bring medicines with you to a home with young children, don't be shy about asking for a place to put your medicines that is out of reach and sight.

6: Be prepared in case of an emergency

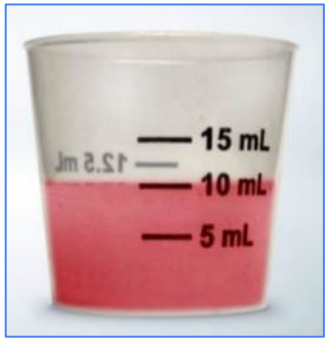
- You can call the Poison Help number (800-222-1222) from any state at any time for expert advice.
- Make sure that babysitters, older children, grandparents, and frequent family visitors have this information too, in case there's an emergency when they're in charge.
- Call Poison Help right away if you think your child might have gotten into a medicine or vitamin, even if you are not completely sure. You can also visit https://poisonhelp.hrsa.gov/.

7: Make sure that medicines carried with you are kept out of sight and reach of young children

- Make sure that medicines those in purses, bags, pockets, or pill organizers are also kept out of sight and reach of young children.

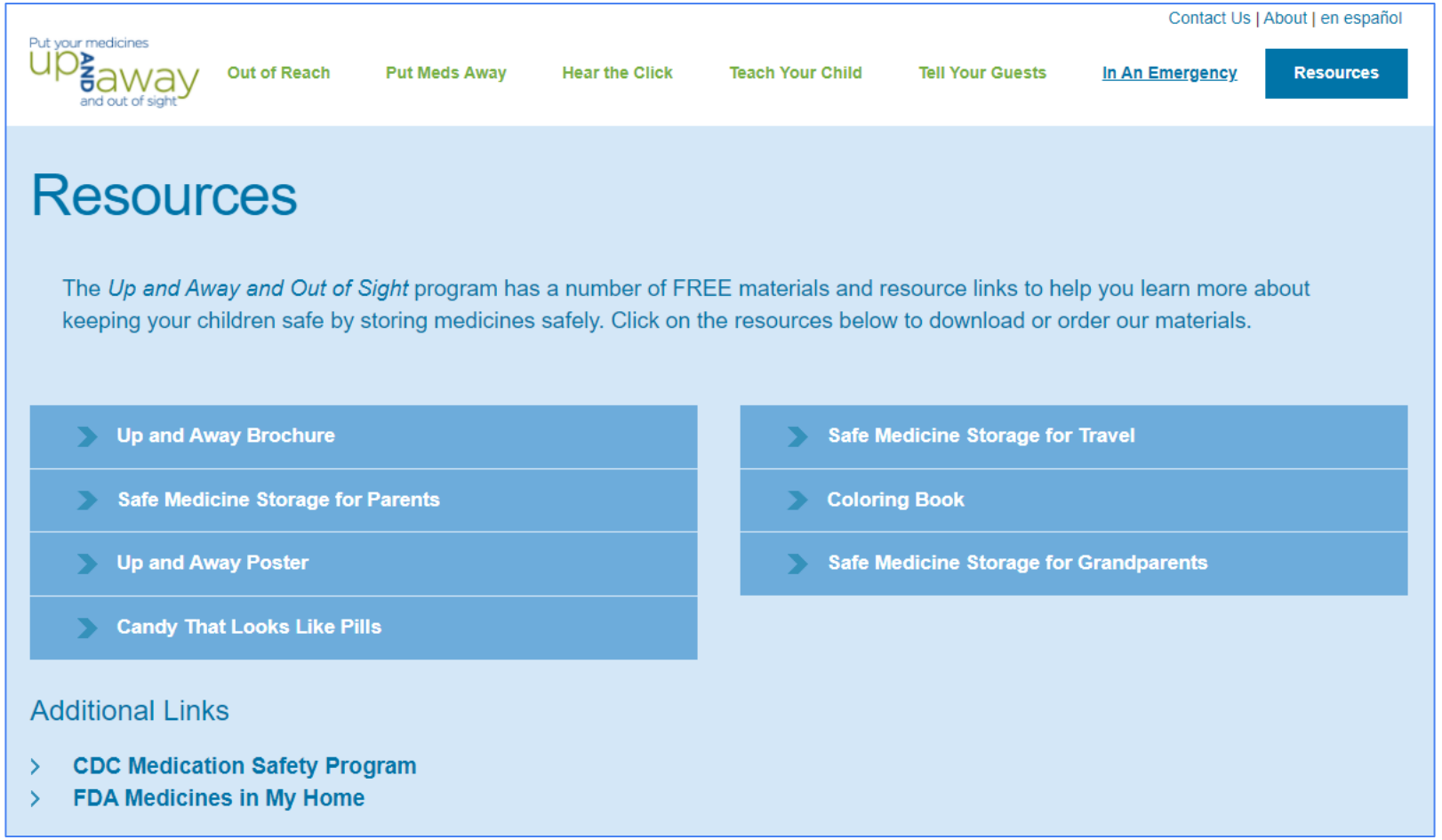
8: Use dosing tools (*not* kitchen spoons) to give oral liquid medicines

- Use the dosing device (oral syringe, dosing cup) that is included with the product.
- If a measuring device is not included with the product or you do not receive one, ask for one from your pharmacist or purchase one at a pharmacy.



Resources for safer use and storage of medications

UpAndAway.org



Resources for safer medication administration

www.cdc.gov/medicationsafety/library.html

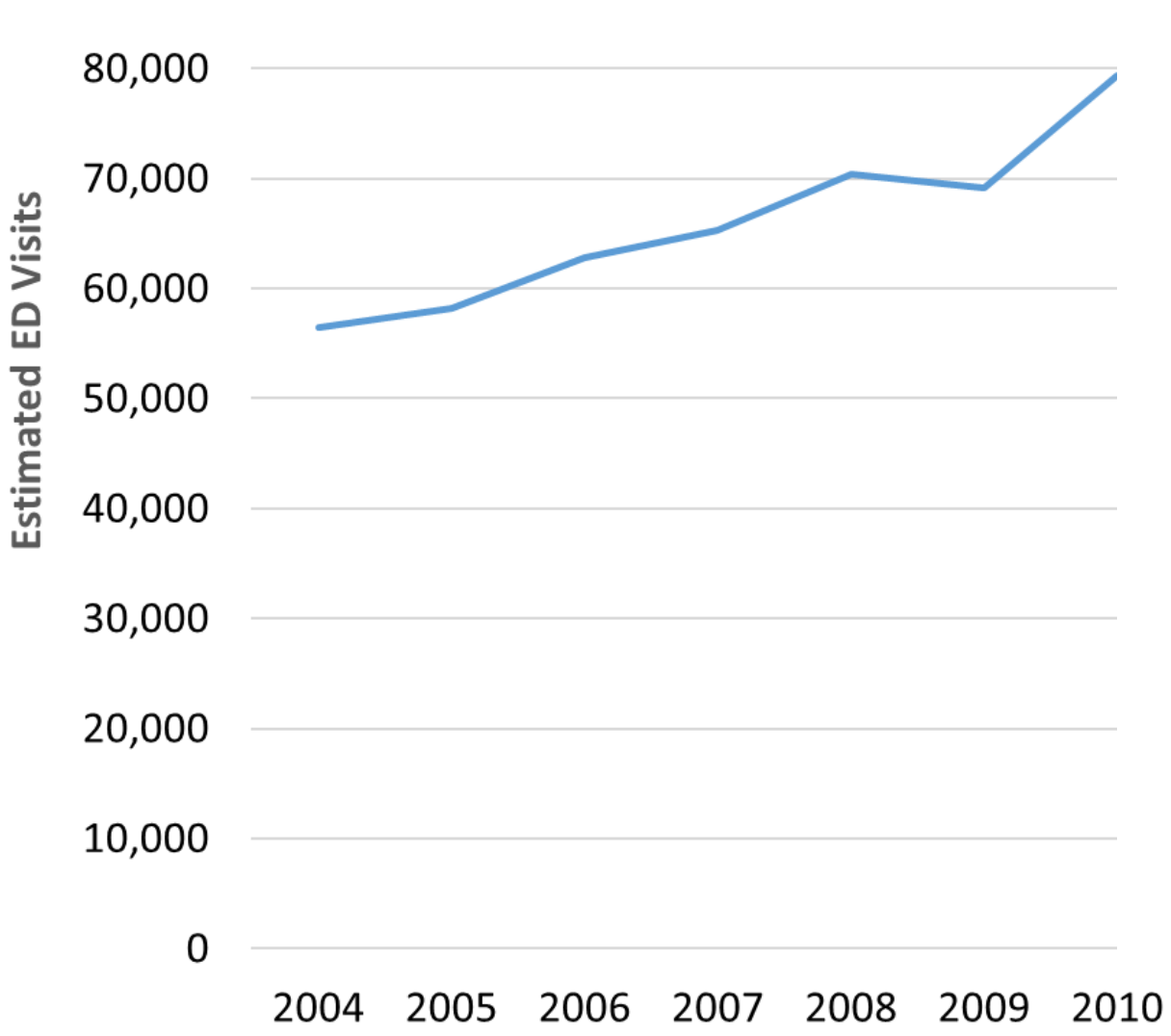
Questions

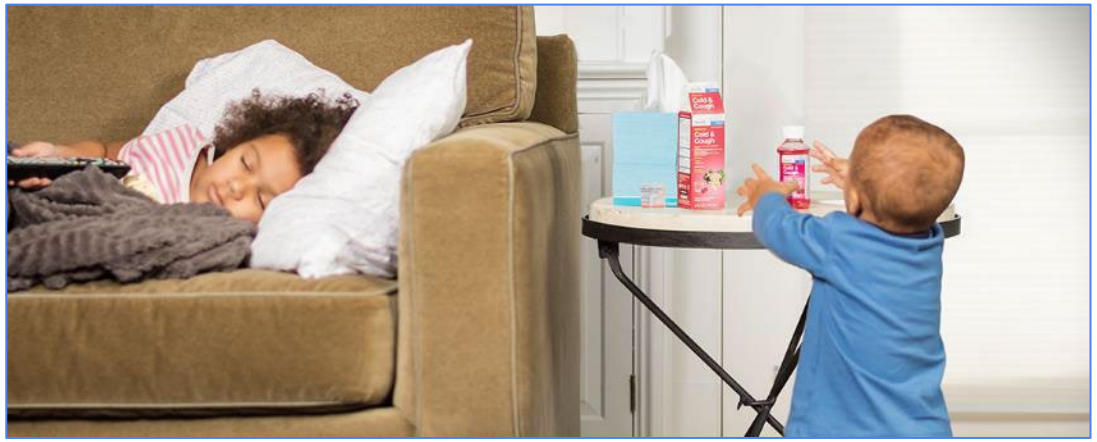
Please enter your questions in the Q & A pod

Up and Away

Preventing Accidental Unsupervised Ingestions in Young Children

An Increasing Public Health Problem in the 2000s





PROTECT

CDC

CENTERS FOR DISEASE CONTROL AND PREVENTION

Put your medicines up AND away and out of sight

Pon tus medicamentos fuera DEL alcance y de la vista de los niños

Put your medicines up and away and out of sight

Educating Families & Amplifying Messaging

Put your medicines up AND away and out of sight

Reach more parents and caregivers with safe medicine storage content

Increase message amplification through partner **relationships**

Core Messages

Put your medicines up AND away and out of sight

1. At home or away, keep medicines in their original, child-resistant containers.
2. Never leave loose pills or liquid medicine out on a counter or table.
3. Keep medicines in child-resistant containers until right before you take them.
4. Make sure that medicines carried with you are kept out of sight and reach of young children.
5. Ask about a safe place to keep your medicines when inside homes with children.
6. Teach your children about medicine safety.
7. Tell guests about medicine safety.
8. Keep the Poison Help info handy: call 1-800-222-1222 or visit poison.org.

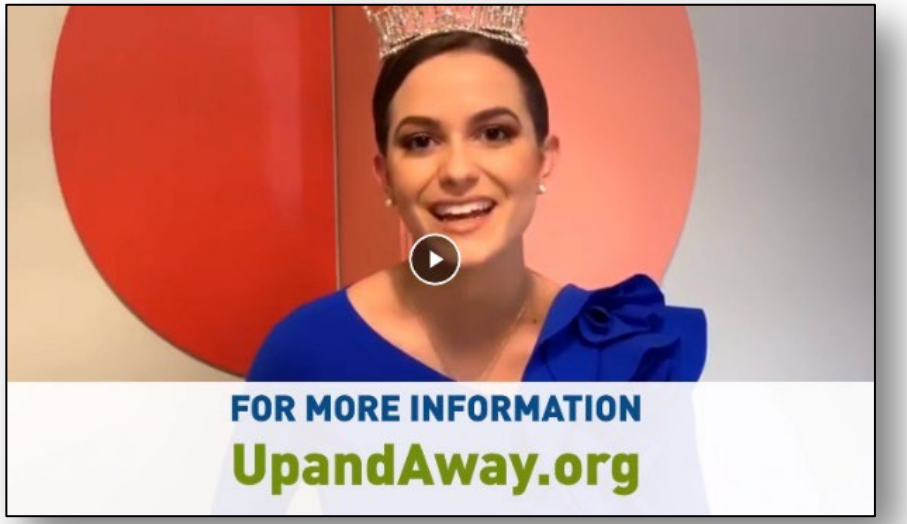
Communication Rallies

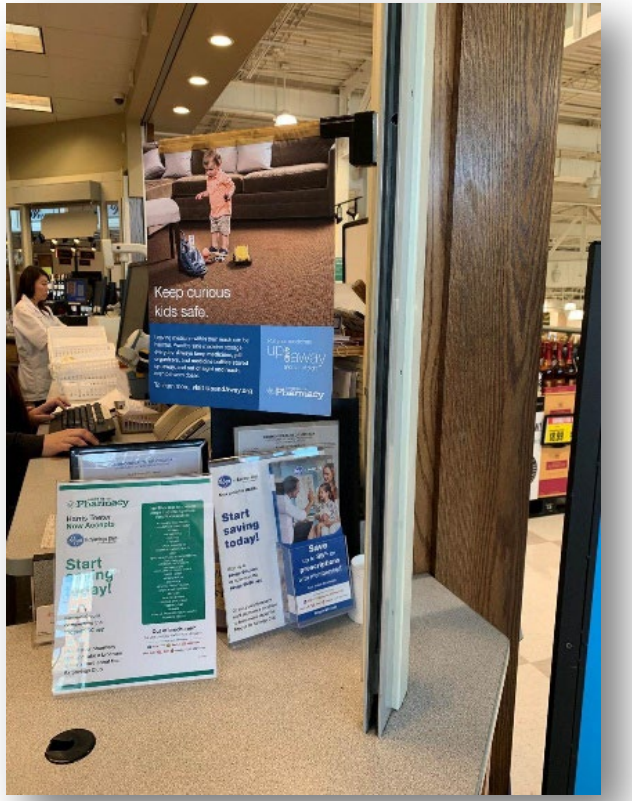
- Seasonal targeting when medicine safety is top of mind
- English and Spanish creative + content
- Integrated mix of communications efforts

Collaborations: Retail, Influencers, Media

Harris Teeter
Your Neighborhood Food Market

CVS Health

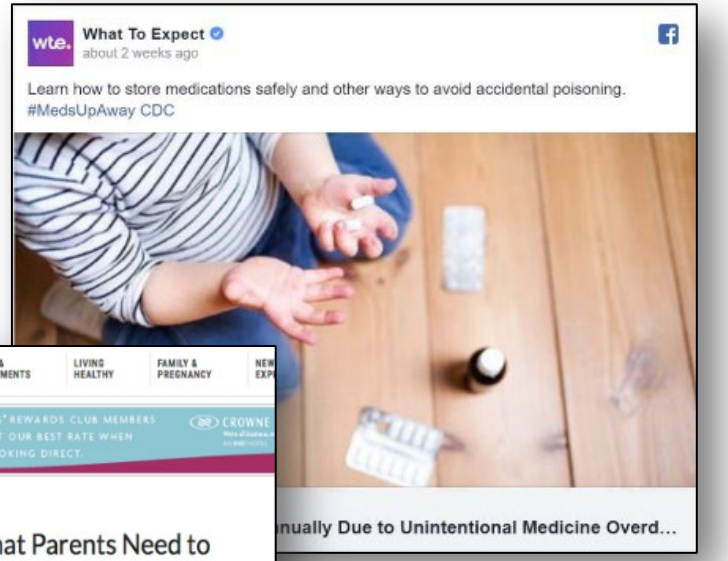




Dr. Jessica Peck interview Fox 26 (Houston, TX)

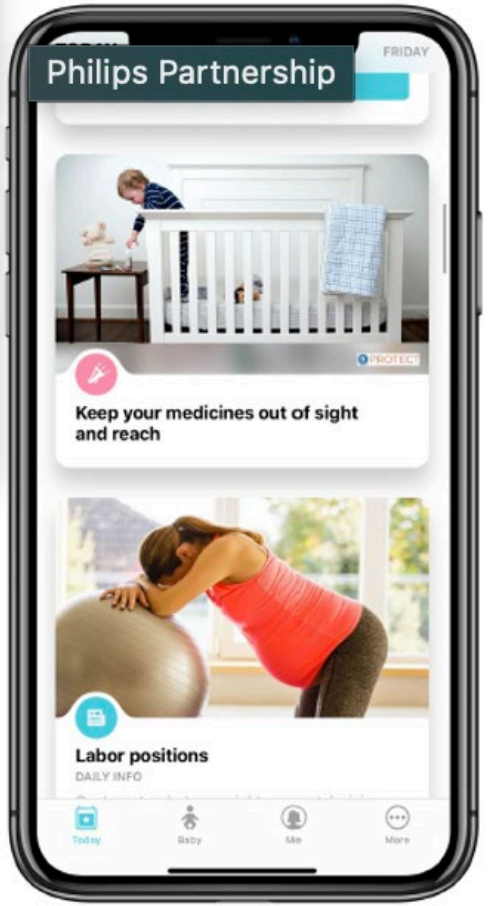
Collaborations: Points of Care, Health/Parenting Sites

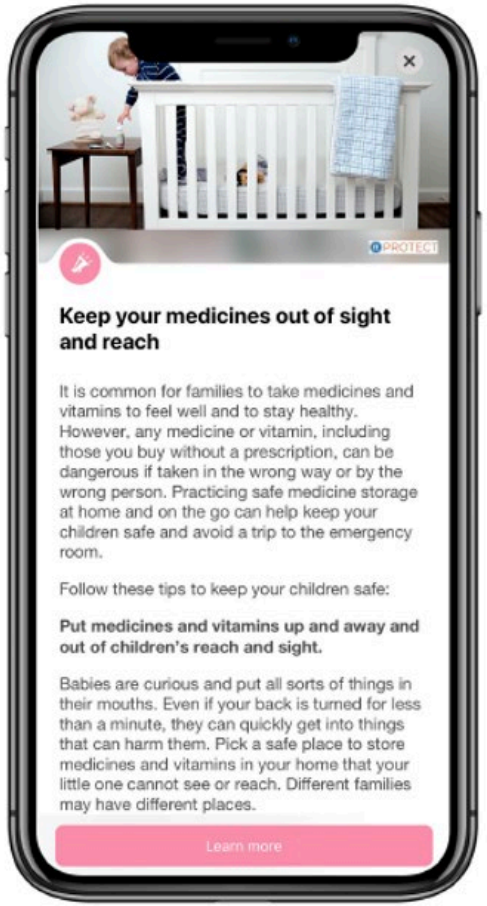
PatientPoint



WHAT TO EXPECT

WebMD





Community Outreach Impact

- 130,000+ materials sent to community health centers, pharmacies, local coalitions, faith-based organizations, HeadStart programs, and medical facilities across the country

Atrium Health

NCA PDA
National Coalition Against Prescription Drug Abuse

BalladHealth

the YMCA
FOR YOUTH DEVELOPMENT®
FOR HEALTHY LIVING
FOR SOCIAL RESPONSIBILITY

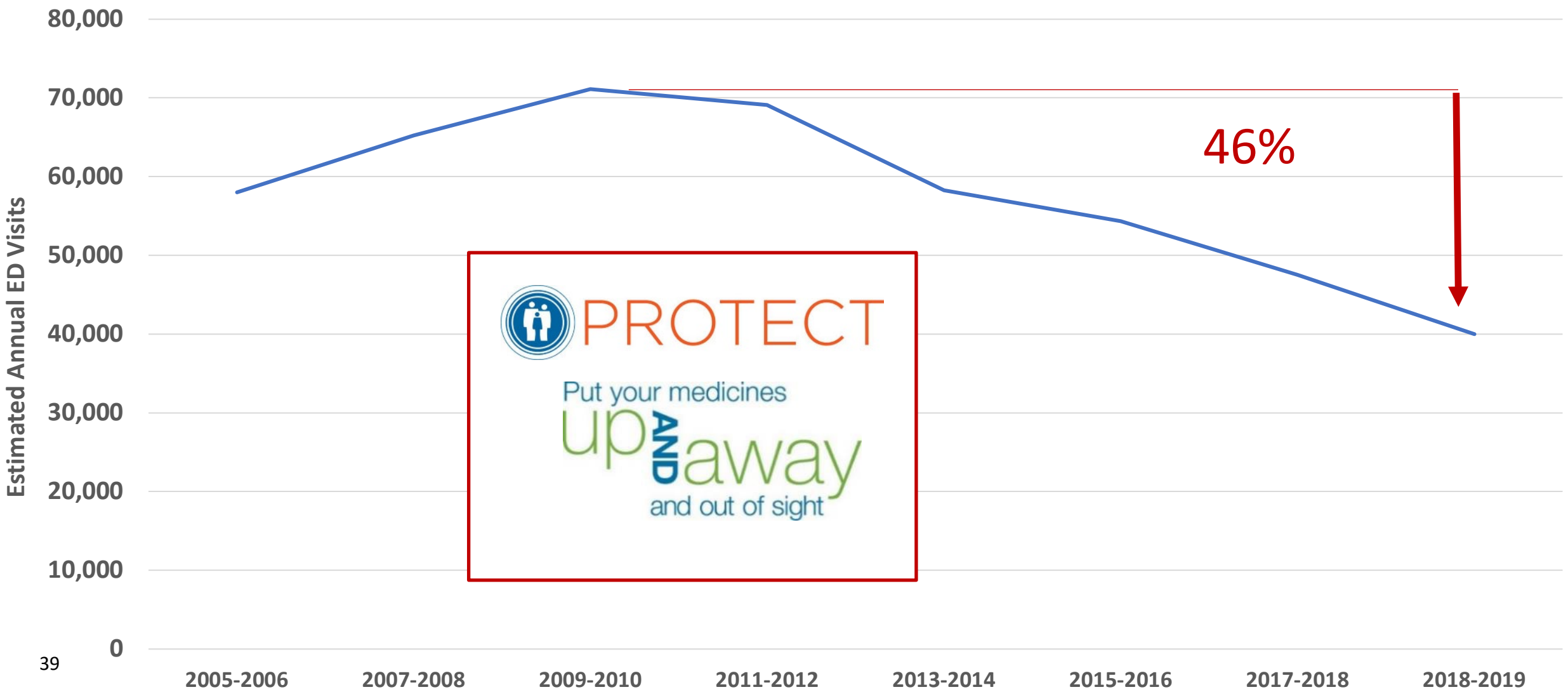
Hasbro Children's Hospital
The Pediatric Division of Rhode Island Hospital
Lifespan. Delivering health with care.®

Mercy

Polk County CIA
Community in Action

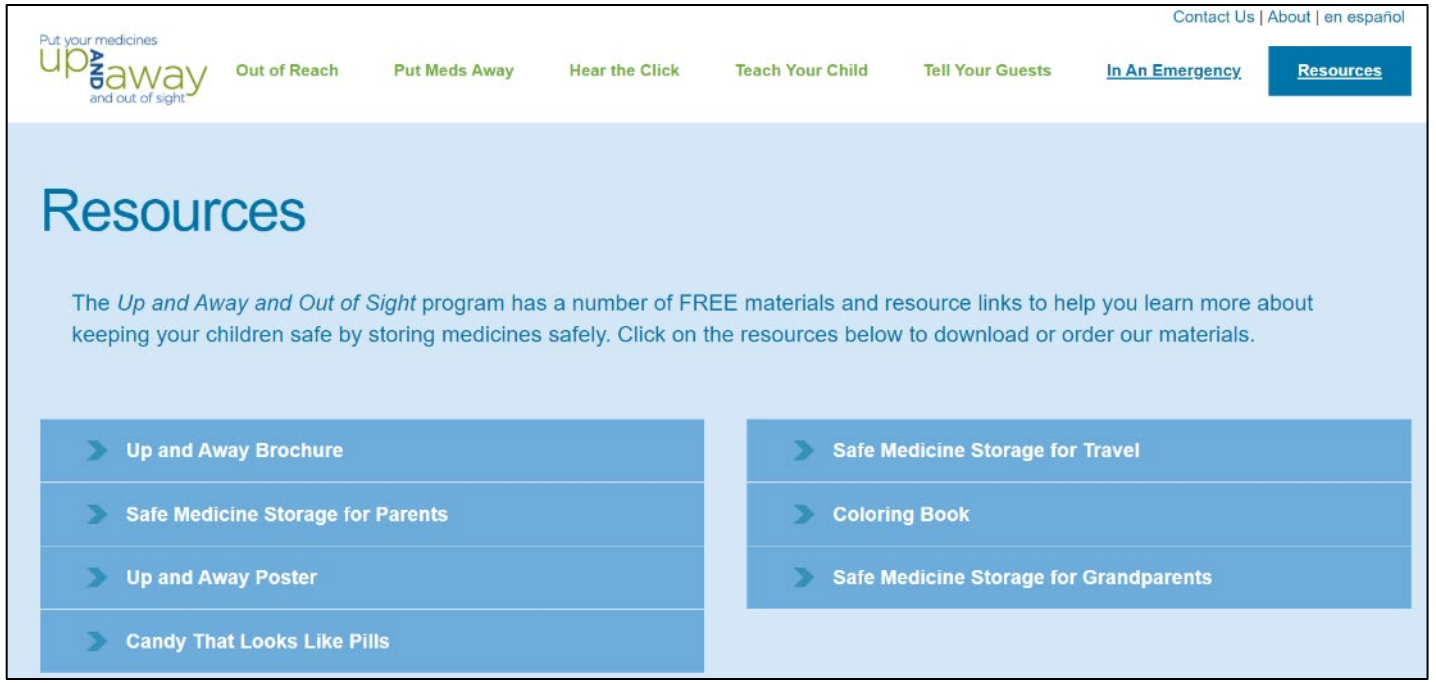
Head Start
COMMUNITY PROGRAM
of MORRIS COUNTY

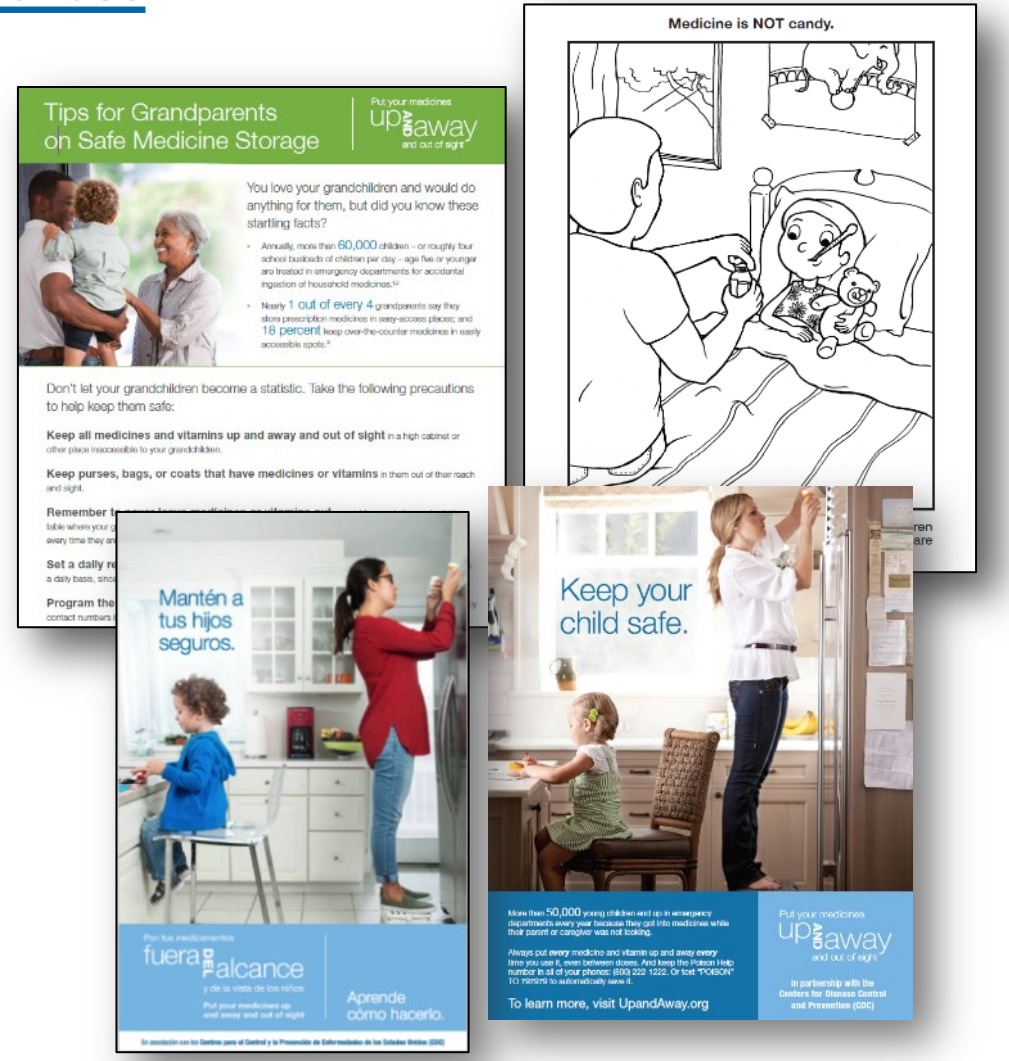
Public Health Impact



Free Resources to Order & Download

www.UpandAway.org/#resources





Available Images + Toolkits

Safe Dosing Photo Gallery

CHPA EDUCATIONAL FOUNDATION

Questions

Please enter your questions in the Q & A pod

HASSENFELD CHILDREN'S HOSPITAL AT NYU LANGONE

NYC HEALTH+ HOSPITALS | Bellevue

Strategies to Encourage Safe Medication Use in Children

H. Shonna Yin, MD, MS
Associate Professor of Pediatrics and Population Health
NYU School of Medicine

March 22, 2022
CSN Webinar: Safe Use and Administration of Medication to Young Children

Outline

- Outpatient medication errors in children
  - Overview
  - Health literacy perspective
- Highlights of recommendations from 2021 AAP Policy Statement
  - “Preventing Home Medication Administration Errors”
- Resources to support safe outpatient medication use

Outpatient Medication Errors in Children

- Outpatient medication use in children frequent
  - **More than half** of US children take 1 or more medication each week
  - Rx and OTC medications, including vitamins & supplements
- Outpatient medication errors in children common
  - **>85,000 Poison Control Center phone calls** each year
  - **>5,500 ED visits** per year for medication errors involving overdoses
  - **>40-50% caregivers** make dosing errors
- Clinical implications → Toxicity/adverse events, therapeutic failure
  - Medication administration errors account for **~70%** of preventable pediatric adverse drug events
- **At risk:** young children (≤5 years old), children with chronic medical conditions

Vernacchio L, et al. 2009; Gummin DD, et al. 2021; Smith MD, et al. 2014; Yin H, et al. 2008; Tzimenatos L & Bond GR. 2009; Zandieh SO, et al. 2008

Outpatient Medication Errors in Children (cont'd)

Scenario	N	<=5 y (Row %)	6-12 y (Row %)	13-19 y (Row %)
Inadvertently took/given medication twice	91,652	11.98	9.52	5.50
Wrong medication taken/given	44,560	12.35	9.60	5.46
Other incorrect dose	41,782	24.41	9.55	6.99
Medication doses given/taken too close together	29,345	11.08	7.30	5.98
Inadvertently took/given someone else's medication	25,247	12.31	16.34	5.97
Other/unknown therapeutic error	18,172	14.25	8.36	6.37
Incorrect dosing route	12,610	6.76	3.16	5.04
Confused units of measure	5,347	52.14	12.66	4.13
Health professional/iatrogenic error (pharmacist/nurse/physician)	5,005	19.60	7.77	6.47
Incorrect formulation or concentration given	4,685	44.61	16.69	4.74
More than 1 product containing same ingredient	4,560	7.21	11.29	9.74
Drug interaction	3,541	2.99	5.20	5.34
Dispensing cup error	2,597	68.04	13.17	2.54
10-fold dosing error	1,693	65.33	6.32	2.24
Incorrect formulation or concentration dispensed	1,273	41.79	13.75	5.89
Exposure through breast milk	176	90.91	0.00	0.00

Data tracked by the American Association of Poison Control Centers (AAPCC) - Gummin DD, et al. 2020

Liquid Formulations & Medication Errors

- Pediatric providers rely on liquid formulations for children
- Liquid formulations involved in **>80%** of pediatric medication errors
  - Sources of parent confusion
    - Dosing instructions
      - Units of measurement
        - » mL / tsp / TBSP
      - Decimal point confusion
        - » Risk of 10-fold errors
    - Dosing tools
      - Avoidance of kitchen spoons
      - Ability to use dosing tools

Yin 2021, 2018, 2017; Smith 2014

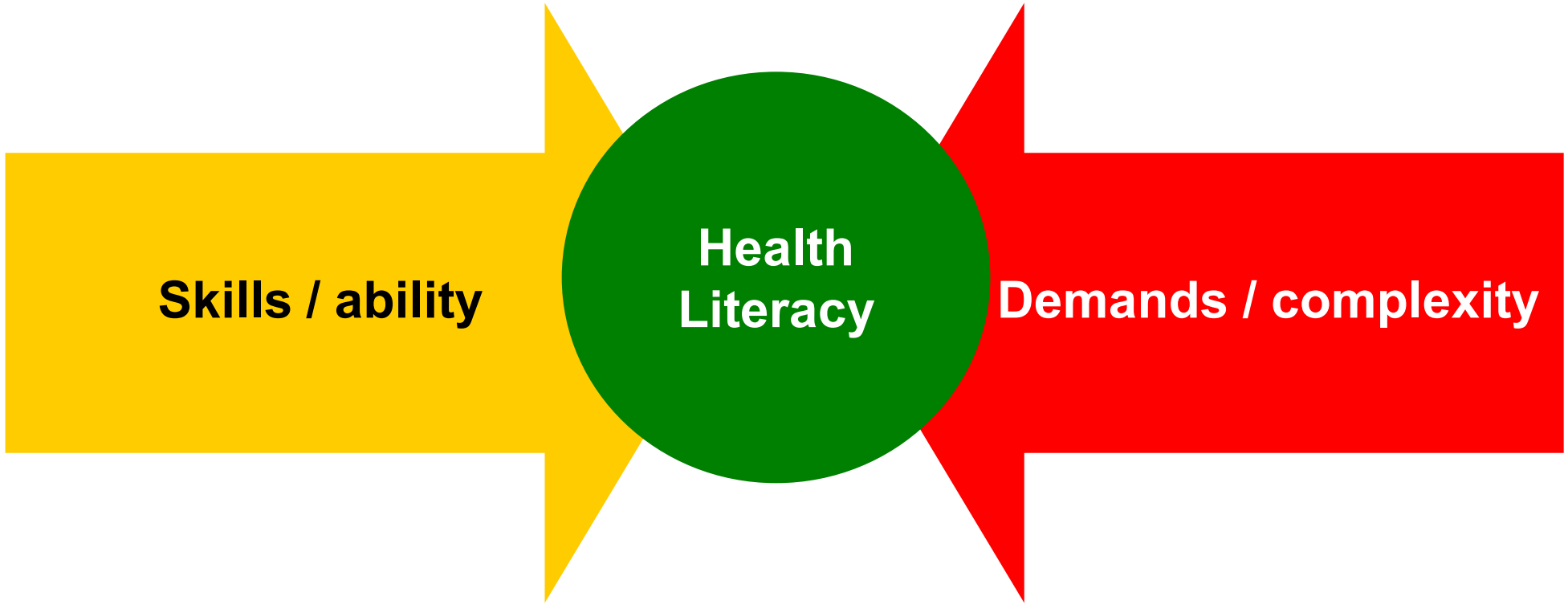
Low Health Literacy & Medication Errors

- Nearly **30% of US parents** have low health literacy
  - Only ~15% have “proficient” health literacy

- Caregivers with low health literacy →
  - greater difficulty understanding **Rx and OTC labels**
    - increased odds of misunderstanding OTC labels (**3.4x**)
  - Increased odds of using **nonstandard kitchen spoons** (**2.4x**)
  - Increased odds of misunderstanding **active ingredient info** (**>10x**)
  - Increased odds of being unaware of **weight-based dosing** (**2.3x**)
  - Increased odds of making medication **dosing error** (**1.5-2.5x**)

Yin 2021, 2017, 2016, 2013, 2010, 2009, 2007; Harris 2017

Risk Factor for Medication Errors: Low Health Literacy



Parker 2009; WHCA Health Literacy Action Guide

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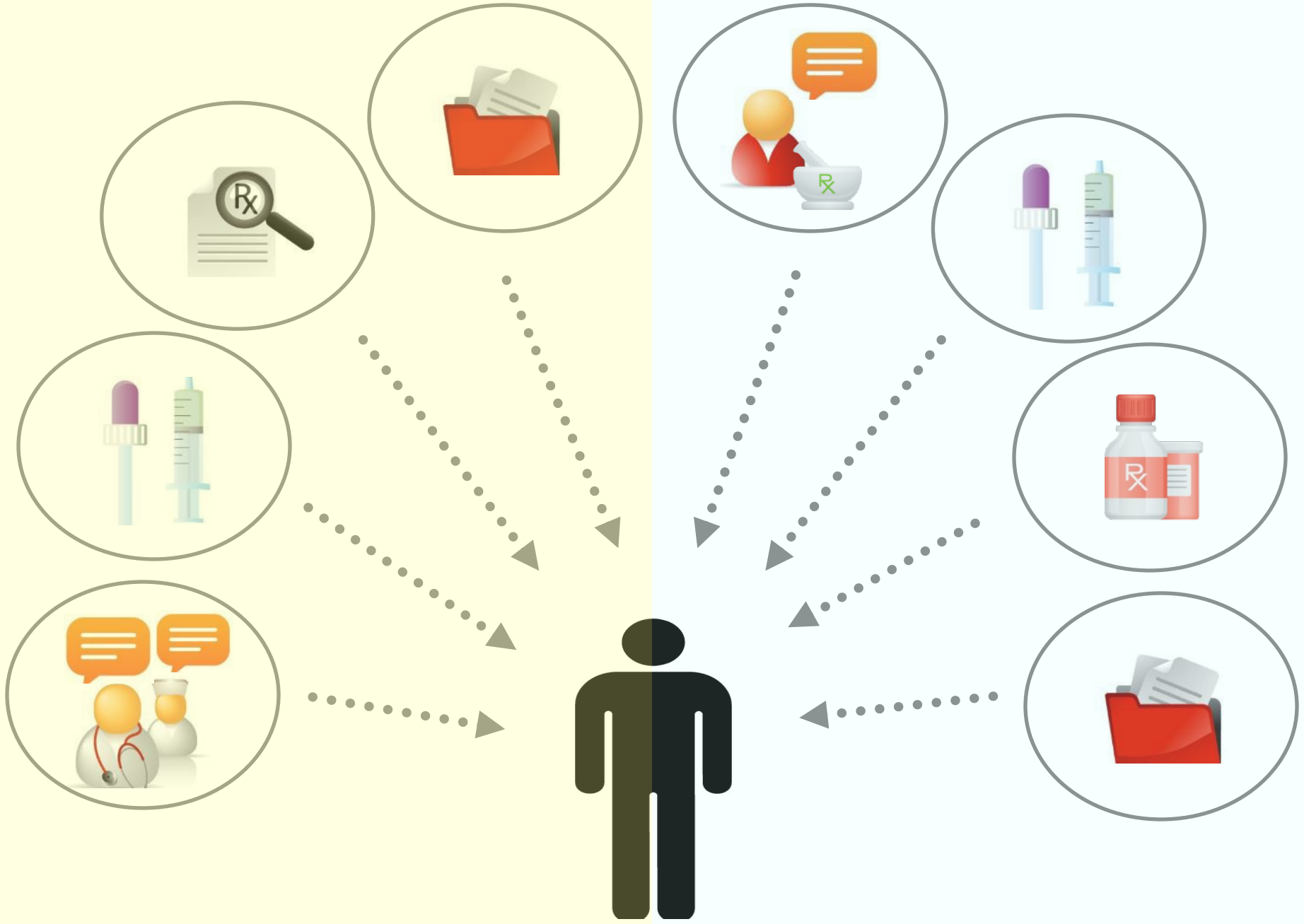
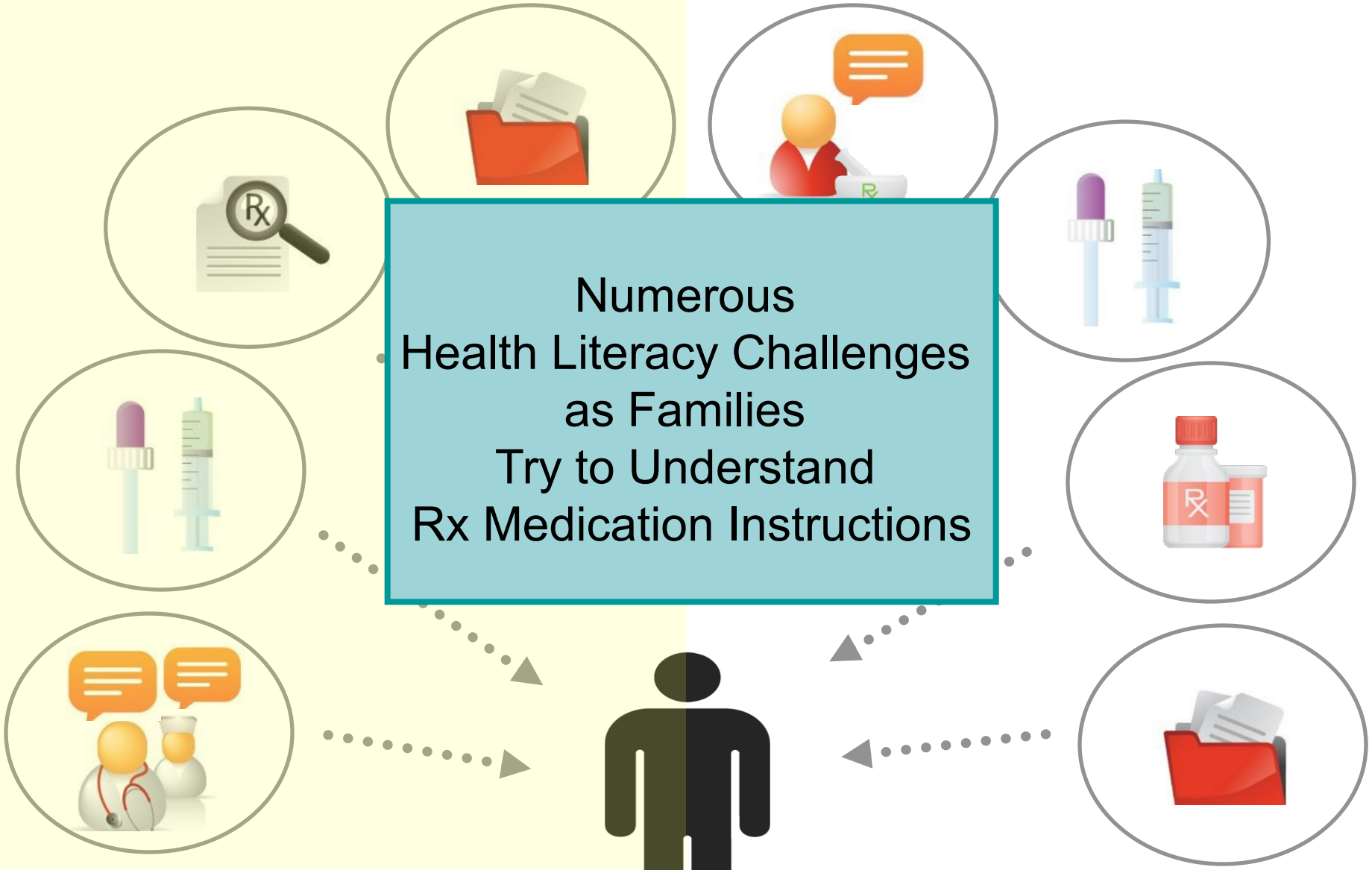
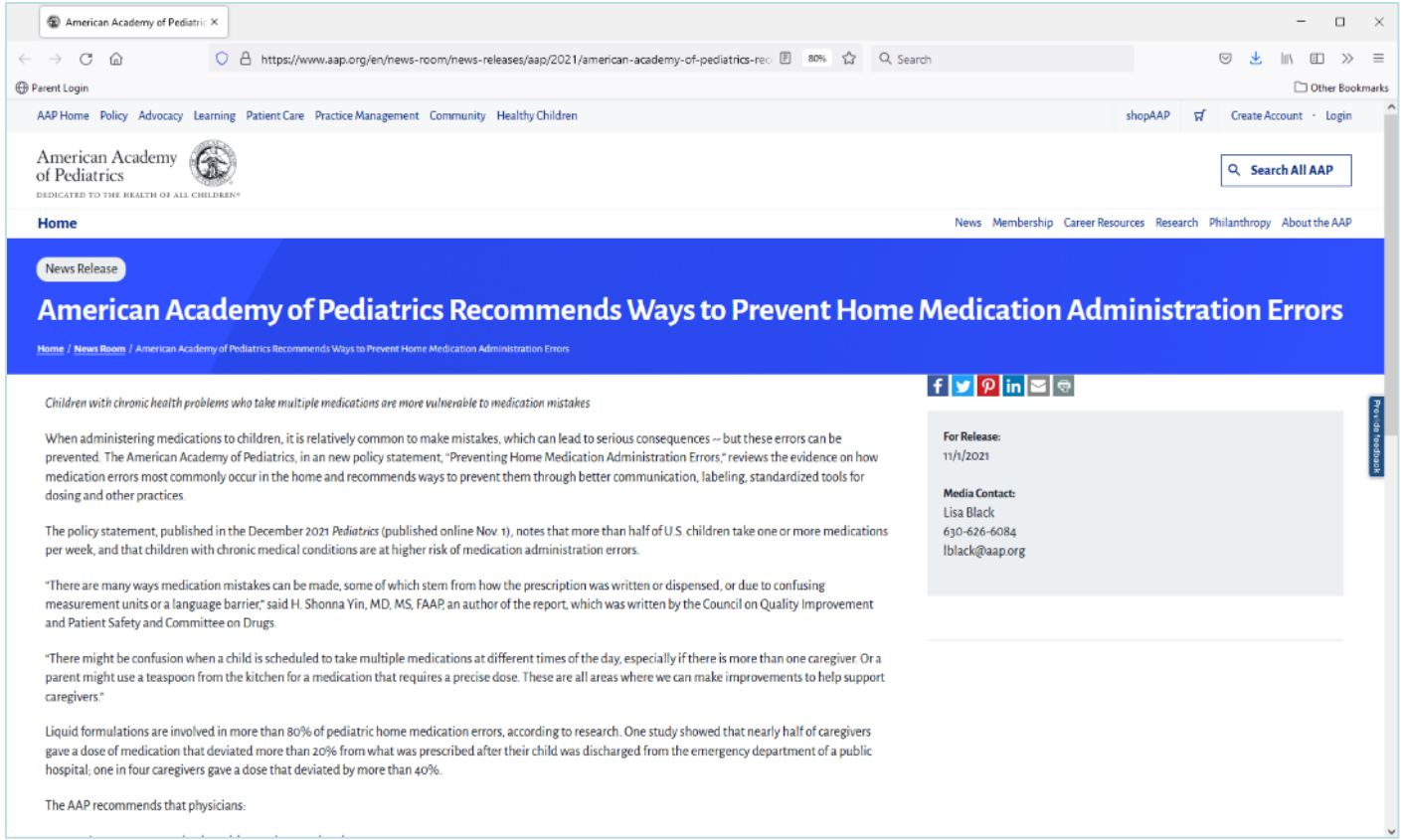

Clinic / ED / Hospital
Pharmacy



Yin 2021, 2018, 2017, 2014, 2008; Feifer 2010; Wallace 2010; Kaushal 2010; Lerner 2009; Turner 2009; Shrank 2007; Wolf 2007, 2006; Tarn 2006; Davis 2006


Children's TYLENOL Plus FLU
Children's TYLENOL Plus COUGH & RUNNY NOSE
Children's TYLENOL Plus COUGH & SORE THROAT
Children's TYLENOL Plus COLD
Children's TYLENOL Plus COLD
Children's Motrin COLD
Mucinex COUGH
Mucinex
Mucinex COLD
Delsym
Delsym
Delsym
Claritin
Claritin
Claritin
Claritin
Advil
Robitussin
NyQuil
NyQuil
Pedia Care
Pedia Care
Pedia Care
PediaCare Gentle Vapors
PediaCare Gentle Vapors
Children's Triaminic Syrup Day Time Cold & Cough
Children's Triaminic Syrup Day Time Cold & Cough
Children's Triaminic Syrup Night Time Cold & Cough
Children's Triaminic Syrup Night Time Cold & Cough
Children's Triaminic Syrup Flu Cough & Fever
Children's Triaminic Syrup Flu Cough & Fever
Children's Triaminic Syrup Long Acting Cough
Children's Triaminic Syrup Long Acting Cough
Children's Triaminic Syrup Chest & Nasal Congestion
Children's Triaminic Syrup Chest & Nasal Congestion
Children's Triaminic Syrup Cold & Allergy
Children's Triaminic Syrup Cold & Allergy

2021 AAP Policy Statement



American Academy of Pediatric

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News Release

American Academy of Pediatrics Recommends Ways to Prevent Home Medication Administration Errors

Home / News Room / American Academy of Pediatrics Recommends Ways to Prevent Home Medication Administration Errors

Children with chronic health problems who take multiple medications are more vulnerable to medication mistakes

When administering medications to children, it is relatively common to make mistakes, which can lead to serious consequences -- but these errors can be prevented. The American Academy of Pediatrics, in an new policy statement, "Preventing Home Medication Administration Errors," reviews the evidence on how medication errors most commonly occur in the home and recommends ways to prevent them through better communication, labeling, standardized tools for dosing and other practices.

The policy statement, published in the December 2021 *Pediatrics* (published online Nov 1), notes that more than half of U.S. children take one or more medications per week, and that children with chronic medical conditions are at higher risk of medication administration errors.

"There are many ways medication mistakes can be made, some of which stem from how the prescription was written or dispensed, or due to confusing measurement units or a language barrier," said H. Shonna Yin, MD, MS, FAAP, an author of the report, which was written by the Council on Quality Improvement and Patient Safety and Committee on Drugs.

"There might be confusion when a child is scheduled to take multiple medications at different times of the day, especially if there is more than one caregiver. Or a parent might use a teaspoon from the kitchen for a medication that requires a precise dose. These are all areas where we can make improvements to help support caregivers."

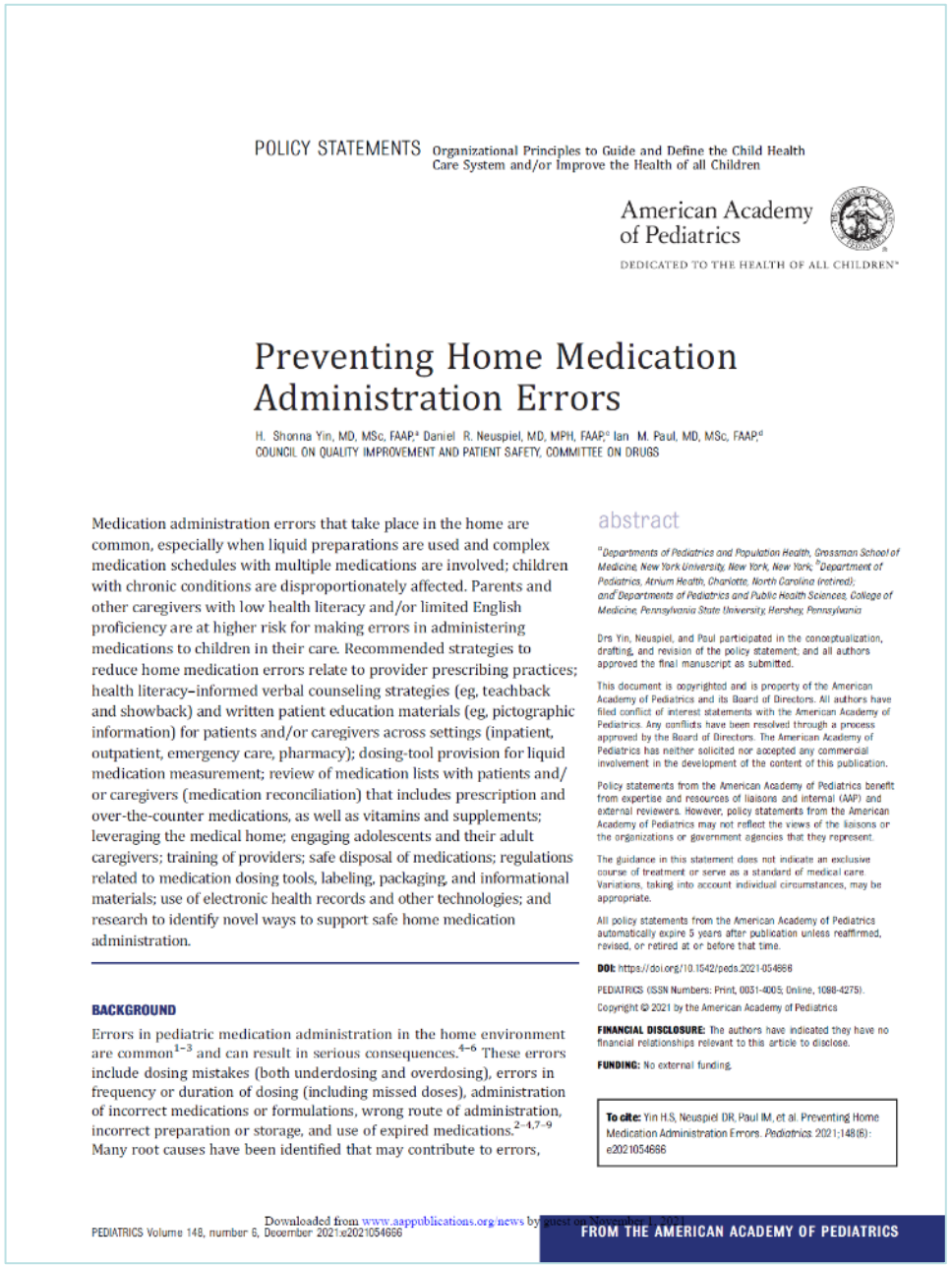
Liquid formulations are involved in more than 80% of pediatric home medication errors, according to research. One study showed that nearly half of caregivers gave a dose of medication that deviated more than 20% from what was prescribed after their child was discharged from the emergency department of a public hospital; one in four caregivers gave a dose that deviated by more than 40%.

The AAP recommends that physicians:

For Release:
11/1/2021

Media Contact:
Lisa Black
630-626-6084
lblack@aap.org

Provide feedback



POLICY STATEMENTS Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of all Children

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN

Preventing Home Medication Administration Errors

H. Shonna Yin, MD, MSc, FAAP,[a] Daniel R. Neuspiel, MD, MPH, FAAP,[b] Ian M. Paul, MD, MSc, FAAP,[c]
COUNCIL ON QUALITY IMPROVEMENT AND PATIENT SAFETY, COMMITTEE ON DRUGS

Medication administration errors that take place in the home are common, especially when liquid preparations are used and complex medication schedules with multiple medications are involved; children with chronic conditions are disproportionately affected. Parents and other caregivers with low health literacy and/or limited English proficiency are at higher risk for making errors in administering medications to children in their care. Recommended strategies to reduce home medication errors relate to provider prescribing practices; health literacy–informed verbal counseling strategies (eg, teachback and showback) and written patient education materials (eg, pictographic information) for patients and/or caregivers across settings (inpatient, outpatient, emergency care, pharmacy); dosing-tool provision for liquid medication measurement; review of medication lists with patients and/or caregivers (medication reconciliation) that includes prescription and over-the-counter medications, as well as vitamins and supplements; leveraging the medical home; engaging adolescents and their adult caregivers; training of providers; safe disposal of medications; regulations related to medication dosing tools, labeling, packaging, and informational materials; use of electronic health records and other technologies; and research to identify novel ways to support safe home medication administration.

BACKGROUND

Errors in pediatric medication administration in the home environment are common[1–3] and can result in serious consequences.[4–6] These errors include dosing mistakes (both underdosing and overdosing), errors in frequency or duration of dosing (including missed doses), administration of incorrect medications or formulations, wrong route of administration, incorrect preparation or storage, and use of expired medications.[2–4,7–9] Many root causes have been identified that may contribute to errors,

[a]Departments of Pediatrics and Population Health, Grossman School of Medicine, New York University, New York, New York, [b]Department of Pediatrics, Atrium Health, Charlotte, North Carolina (retired); and [c]Departments of Pediatrics and Public Health Sciences, College of Medicine, Pennsylvania State University, Hershey, Pennsylvania

Drs Yin, Neuspiel, and Paul participated in the conceptualization, drafting, and revision of the policy statement; and all authors approved the final manuscript as submitted.

DOI: https://doi.org/10.1542/peds.2021-054666

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

FINANCIAL DISCLOSURE: The authors have indicated they have no financial relationships relevant to this article to disclose.

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To cite: Yin H.S, Neuspiel DR, Paul IM, et al. Preventing Home Medication Administration Errors. *Pediatrics*. 2021;148(6):e2021054666

https://publications.aap.org/pediatrics/article/148/6/e2021054666/183379/Preventing-Home-Medication-Administration-Errors

AAP Policy Statement
Preventing Home Medication Administration Errors

RECOMMENDATION #1:
Improving Communication to Caregivers and Patients

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RECOMMENDATION 1

- **Promote use of appropriate dosing units**
  - Use milliliter (mL) only units
  - Avoid spoon-based (e.g. teaspoon [tsp] or tablespoon [TBSP]) or non-metric units

Why?

- Multiple units used in dosing instructions (mL, tsp, TBSP)[1]
  - Risk of multi-fold errors[2]
    - mL vs. tsp→ **5x** error
    - tsp vs. TBSP → **3x** error
  - More errors when Rx labels include teaspoon vs. mL-only[3]
    - **2.5x increased odds** of large 2-fold dosing error

Shah R, et al. 2014; NCPDP, 2014; Yin HS, et al. 2017.

RECOMMENDATION 1

- **Promote use of appropriate dosing units**
  - Use milliliter (mL) only units
  - Avoid spoon-based (e.g. teaspoon [tsp] or tablespoon [TBSP]) or non-metric units

Why? (cont'd)

- Spoon-based terms inadvertently endorse use of nonstandard tools[1]
  - Rx labels with spoon-based units vs. mL-only → **>4x increased odds** of preferring kitchen spoon
- Higher rate of dosing errors with kitchen spoons[2,3]
  - Kitchen spoons highly variable

Yin HS, et al. 2016; Madlon-Kay DJ, & Mosch FS. 2000; Wansink B, & Ittersum, K. 2010.

Recommendation 1

- **Provide dose amounts that are easy to measure**
  - Avoid fractions or decimal amounts when possible (use whole number amounts)
  - Include leading zeroes (e.g. 0.X)
  - Avoid trailing zeroes (e.g. X.0)

Why?

- Fraction and decimal amounts increase the likelihood of error[1]
- Recs re: leading / trailing zeroes align with Joint Commission recs[2]
- Increased risk of **10-fold** error[3,4]
  - When leading zeroes are left out
  - When trailing zeroes are included

Yin HS, et al. 2010; Joint Commission, 2016; NCPDP, 2014; Paul I. 2015.

RECOMMENDATION 1

- **Learn and use health literacy (HL)-informed communication strategies**
  - Plain language
  - Teachback / showback
  - Pictures / drawings

Why?

- Plain language[1,2]
  - Preferred by patients
  - Associated with increased medication knowledge
- Teachback/showback
  - AHRQ best practice[3]
  - Associated with improved outcomes[4-6]
    - e.g. improved glycemic control among diabetic patients

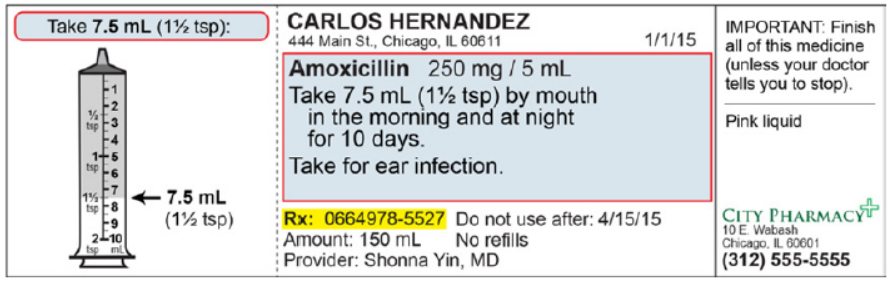
Yin HS, et al. 2008; Yin HS, et al. 2016; AHRQ 2021; Yin HS, et al. 2014; Yin HS, et al. 2017; Schillinger 2003

RECOMMENDATION 1

- **Learn and use health literacy (HL)-informed communication strategies**
  - Plain language
  - Teachback / showback
  - Pictures / drawings

Why? *(cont'd)*

- Pictures/drawings[1,2]
  - Associated with a ~**2-fold reduction** in large (>2x) dosing errors



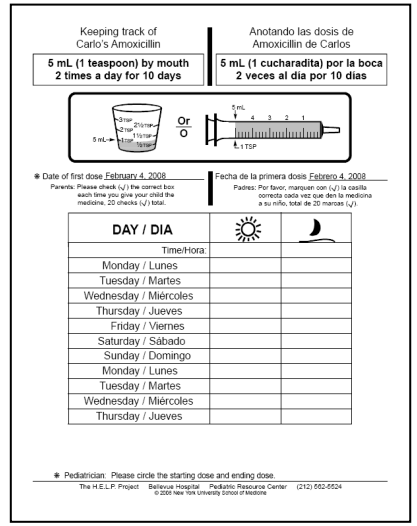
Yin HS, et al. 2017; Yin HS, et al. 2011

RECOMMENDATION 1

- **Learn and use health literacy (HL)-informed communication strategies**
  - Plain language
  - Teachback / showback
  - Pictures / drawings

Why? (cont'd)

- HL-informed counseling (plain language + pictographic medication instruction sheet (dosing diagram + pictographic log) + teachback/ showback) enhances caregiver understanding[1-2]
  - **5x** reduction in dosing errors
  - **4x** increase in adherence


Keeping track of Carlo's Amoxicillin

5 mL (1 teaspoon) by mouth 2 times a day for 10 days

Anotando las dosis de Amoxicillin de Carlos

5 mL (1 cucharadita) por la boca 2 veces al dia por 10 dias

Or / O

* Date of first dose February 4, 2008

Fecha de la primera dosis Febrero 4, 2008

DAY / DIA	☼	☾
Time/Hora:		
Monday / Lunes		
Tuesday / Martes		
Wednesday / Miércoles		
Thursday / Jueves		
Friday / Viernes		
Saturday / Sábado		
Sunday / Domingo		
Monday / Lunes		
Tuesday / Martes		
Wednesday / Miércoles		
Thursday / Jueves		

* Pediatrician: Please circle the starting dose and ending dose.

The H.E.L.P. Project Bellevue Hospital Pediatric Resource Center (212) 562-5524

Yin HS, et al. 2017; Yin HS, et al. 2011; Yin HS, et al. 2008; DeWalt DA & Hink A. 2009.

AAP Policy Statement
Preventing Home Medication Administration Errors

RECOMMENDATION #2:
Standardized dosing tools

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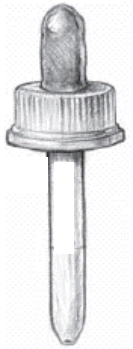
Recommendation 2

- **Encourage use of standardized dosing tools with all liquid medications**
  - Provide oral syringes when dosing accuracy is important


Dosing spoon

Dosing cup


Oral syringe


Dropper

Why?

- Oral syringes preferred for increased dosing accuracy; dosing cups error prone[1-3]
  - **>3x** increased odds of error with cups vs. oral syringes
  - Risk of multifold errors with cups high for small-dose volumes
- Oral syringes especially recommended for[1-4]
  - <5-mL doses of medication
  - Medications for young children
  - Medications with narrow therapeutic windows

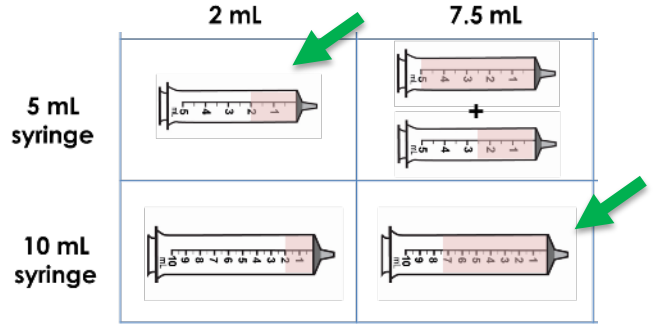
Paul I. 2015; Yin HS, et al. 2016; Yin HS, et al. 2017; Beckett V, et al. 2012; AAP 2009.

RECOMMENDATION 2

- **Provide dosing tools that are the smallest size to fit the dose**
  - Prevent the need for the caregiver / patient to fill an instrument multiple times for a single dose
  - Not too large that there is a lot of room for overdosing

Why?

- Provision of dosing tools that more closely match prescribed dose volume reduces errors



- For 7.5-mL dose, **4x** decreased odds of error with 10-mL syringe vs. 5-mL syringe

Yin HS, et al. 2017

Recommendation 2

- **Encourage caregivers to**
  - Ask for a dosing tool with all prescribed medications
  - Use their medication-specific tool each time medication is administered

Yin HS, et al. 2021

Other Recommendations

- #3 Information on prescriptions – kg only
- #4 Medication reconciliation
- #5 & 6 Provider education
- #7 Medication disposal
- #8 & 9 Policy & Research

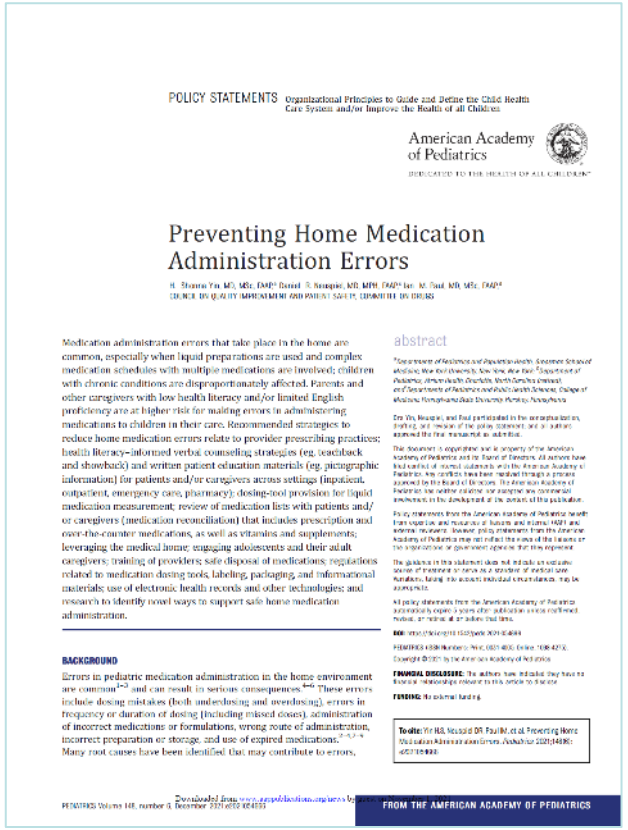
Yin HS, et al. 2021

Resources to Support Safe Outpatient Medication Use

NYC HEALTH+ HOSPITALS | Bellevue

HASSENFELD CHILDREN'S HOSPITAL AT NYU LANGONE

2021 AAP Policy Statement



POLICY STATEMENTS Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of all Children

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Preventing Home Medication Administration Errors

H. Shonna Yin, MD, MSc, FAAP, Daniel S. Kanapicki, MD, MPH, FAAP, Ian M. Paul, MD, MSc, FAAP

COUNCIL ON QUALITY IMPROVEMENT AND PATIENT SAFETY, EXECUTIVE COMMITTEE ON ERRORS

abstract

Medication administration errors that take place in the home are common, especially when liquid preparations are used and complex medication schedules with multiple medications are involved; children with chronic conditions are disproportionately affected. Parents and other caregivers with low health literacy and/or limited English proficiency are at higher risk for making errors in administering medications to children in their care. Recommended strategies to reduce home medication errors relate to provider prescribing practices; health literacy–informed verbal counseling strategies (eg, teachback and showback) and written patient education materials (eg, pictographic information) for patients and/or caregivers across settings (inpatient, outpatient, emergency care, pharmacy); dosing-tool provision for liquid medication measurement; review of medication lists with patients and/or caregivers (medication reconciliation) that includes prescription and over-the-counter medications, as well as vitamins and supplements; leveraging the medical home; engaging adolescents and their adult caregivers; training of providers; safe disposal of medications; regulations related to medication dosing tools, labeling, packaging, and informational materials; use of electronic health records and other technologies; and research to identify novel ways to support safe home medication administration.

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FUNDING: No external funding.

To cite: Yin HS, Kanapicki DS, Paul IM, et al. Preventing Home Medication Administration Errors. Pediatrics. 2021;148(6):e2021054000

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PEDIATRICS Volume 148, number 6, December 2021:e2021054000

FROM THE AMERICAN ACADEMY OF PEDIATRICS

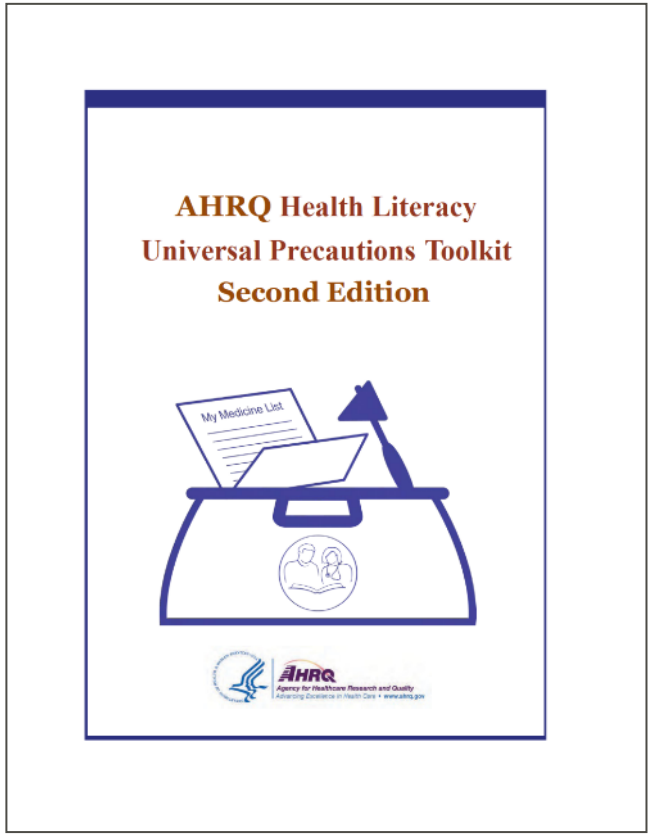
TABLE 3 Helpful Resources

	Resources
Safe prescribing practices	AAP Policy Statement: "Metric Units and the Preferred Dosing of Orally Administered Liquid Medications" (April 2015)[14]: http://pediatrics.aappublications.org/content/135/4/784/
	The Joint Commission "Do not use" list[66]: https://www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/patient-safety/do_not_use_list_9_14_18.pdf
	American Board of Pediatrics Safe Prescribing Performance Improvement Module[212]: https://pim.abp.org/rxwriting/faq/
Health literacy–informed counseling strategies	American Board of Pediatrics Performance Improvement Module on Health Literacy[213]: https://pim.abp.org/health_literacy/faq/
	AHRQ Universal Precautions Toolkit (includes information on verbal and written communication strategies, medication reconciliation)[100,101]: https://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/literacy-toolkit/index.html and https://www.ahrq.gov/sites/default/files/publications/files/healthlittoolkit2_3.pdf
	AHRQ How to Create a Pill Card[214]: https://www.ahrq.gov/sites/default/files/wysiwyg/patients-consumers/diagnosis-treatment/treatments/pillcard/pillcard.pdf
	Plain language pediatrics: Health Literacy Strategies and Communication Resources for Common Pediatric Topics. Abrams MA, Dreyer BP, eds. Elk Grove Village, IL: Elk Grove, IL: American Academy of Pediatrics; 2008[22]: https://ebooks.aappublications.org/content/plain-language-pediatrics
	HELPix Pictographic Medication Instruction Sheets[215]: https://med.nyu.edu/helpix/helpix-intervention/instructions-providers and https://www.helpix-program.org
	Universal Medication Schedule White Paper[104]: https://ncpdp.org/NCPDP/media/pdf/WhitePaper/NCPDP-UMS-WhitePaper201304.pdf
Safe disposal recommendations/ resources	Where and How to Dispose of Unused Medicines (FDA)[209]: https://www.fda.gov/ForConsumers/ConsumerUpdates/ucm101653.htm
	Disposal of Unused Medicines: What You Should Know (FDA)[210]: https://www.fda.gov/drugs/safe-disposal-medicines/disposal-unused-medicines-what-you-should-know
	Drug Disposal Information (US Department of Justice and DEA)[211]: http://www.deadiversion.usdoj.gov/drug_disposal/index.html

AHRQ, Agency for Healthcare Research and Quality.

AHRQ Universal Precautions Toolkit

- Health literacy-informed verbal & written communication strategies
  - Plain language
  - Teachback
  - Written materials



http://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/literacy-toolkit/healthlittoolkit2.html

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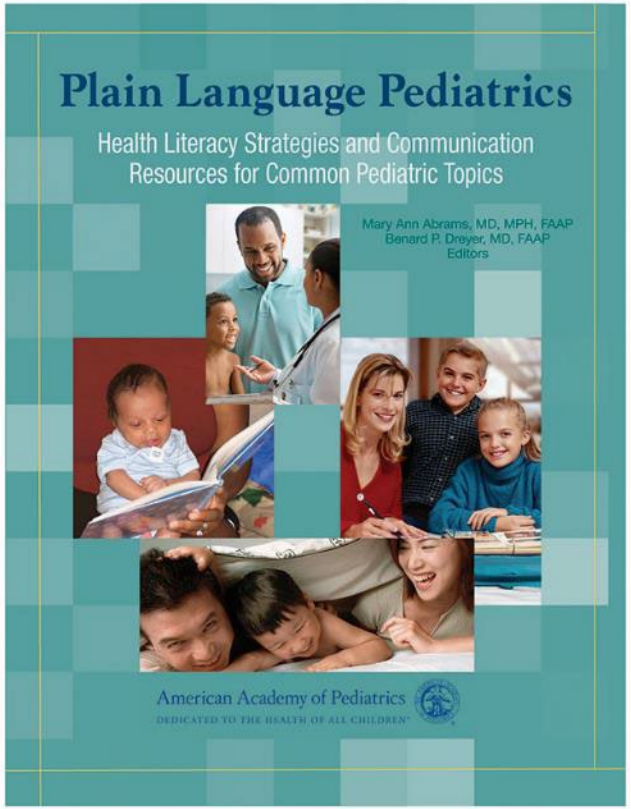
HASSENFELD CHILDREN'S HOSPITAL AT NYU LANGONE

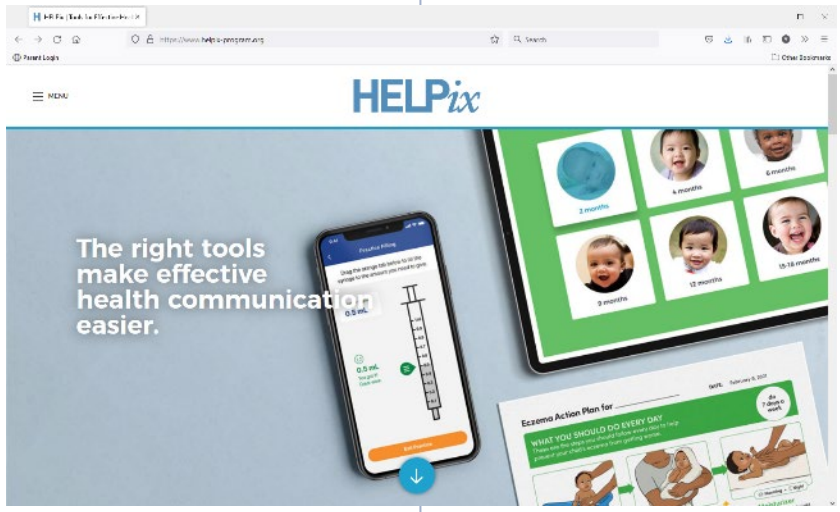
AAP – Plain Language Pediatrics

- Features
  - Reduced Medical Jargon
  - Need-to-Know Information Up Front
  - Pronunciation Guide
  - User-Friendly Layout
  - Lower Reading Level
  - Simple, Purposeful Illustrations

- Medication-related handouts include:
  - How to Use Liquid Medications
  - Choosing and Using OTC Medications



https://www.helpix-program.org/
https://www.helpix-program.org/helpix-intervention/medication-safety/overview/



HELPix Medication Sheet | Tools

https://www.helpix-program.org/helpix-intervention/medication-safety/overview/

Search

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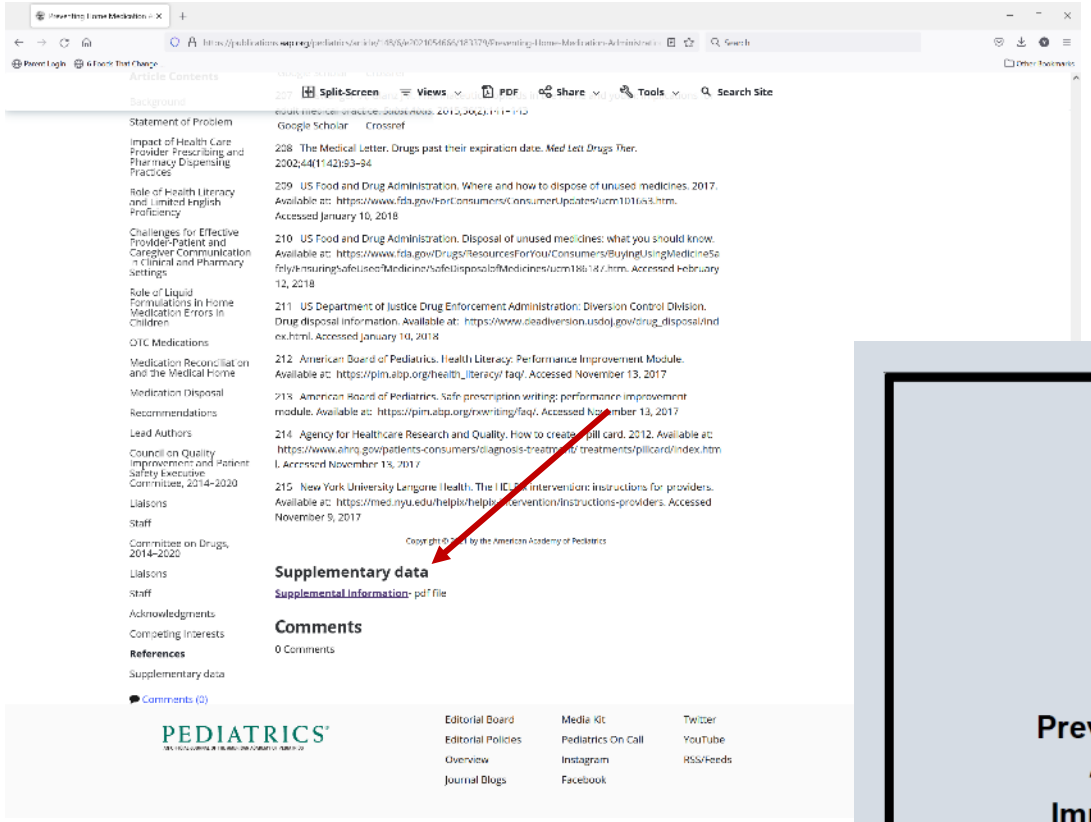
HELPix Intervention

2 x 10 mL oral syringes

1x per day in the morning (English | Spanish)
1x per day in the evening (English | Spanish)
2x per day (English | Spanish)
3x per day (English | Spanish)
4x per day (English | Spanish)

Dosing cup

1x per day in the morning (English | Spanish)
1x per day in the evening (English | Spanish)
2x per day (English | Spanish)
3x per day (English | Spanish)
4x per day (English | Spanish)



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Google Scholar Crossref

228 The Medical Letter. Drugs past their expiration date. *Med Lett Drugs Ther*. 2002;44(1142):93–94

229 US Food and Drug Administration. Where and how to dispose of unused medicines. 2017. Available at: https://www.fda.gov/ForConsumers/ConsumerUpdates/ucm101436.htm. Accessed January 10, 2018

230 US Food and Drug Administration. Disposal of unused medicines: what you should know. Available at: https://www.fda.gov/Drugs/ResourcesForYou/Consumers/BuyingUsingMedicineSafely/EnsuringSafeUse/ucm186187.htm. Accessed February 12, 2018

231 US Department of Justice Drug Enforcement Administration: Diversion Control Division. Drug disposal information. Available at: https://www.deadiversion.usdoj.gov/drug_disposal/index.html. Accessed January 10, 2018

232 American Board of Pediatrics. Health Literacy: Performance Improvement Module. Available at: https://pim.abp.org/health_literacy/faq/. Accessed November 13, 2017

233 American Board of Pediatrics. Safe prescription writing: performance improvement module. Available at: https://pim.abp.org/rxwriting/faq/. Accessed November 13, 2017

234 Agency for Healthcare Research and Quality. How to create a pill card. 2012. Available at: https://www.ahrq.gov/patients-consumers/diagnosis-treatment/t/ treatments/pillcard/index.html. Accessed November 13, 2017

235 New York University Langone Health. The I CAN intervention: instructions for providers. Available at: https://med.nyu.edu/helpbx/helpbx-intervention/instructions-providers. Accessed November 9, 2017

Supplementary data

Supplemental Information- pdf file

Comments

0 Comments

Statement of Problem
Impact of Health Care Provider Prescribing and Pharmacy Dispensing Practices
Role of Health Literacy and Limited English Proficiency
Challenges for Effective Provider-Patient and Caregiver Communication in Clinical and Pharmacy Settings
Role of Liquid Formulations in Home Medication Errors in Children
OTC Medications
Medication Reconciliation and the Medical Home
Medication Disposal
Recommendations
Lead Authors
Council on Quality Improvement and Patient Safety Executive Committee, 2014–2020
Liaisons
Staff
Committee on Drugs, 2014–2020
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Preventing Home Medication Administration Errors

Implementation Resources

Supported by:

AAP Council on Quality Improvement and Patient Safety

November/December 2021

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Table of Contents

Listing of resources does not imply an endorsement by the American Academy of Pediatrics (AAP). The AAP is not responsible for the content of external resources.

Patient and Family Resources

KEY CONCEPT	DESCRIPTION	RESOURCES
How to Use Liquid Medications	Describes how to safely use liquid medicines with children, including how to measure out medicines correctly with tools like oral syringes, dosing spoons, and cups.	How to Use Liquid Medications. American Academy of Pediatrics - HealthyChildren.org https://www.healthychildren.org/English/safety-prevention/at-home/medication-safety/Pages/Using-Liquid-Medicines.aspx
	Gives tips about how to use medicines safely, including storing medicines out of reach, only giving medicine when your child needs it, and getting rid of medicine you no longer need.	Medication Safety Tips. American Academy of Pediatrics - HealthyChildren.org https://www.healthychildren.org/English/safety-prevention/at-home/medication-safety/Pages/Medication-Safety-Tips.aspx
	A **video** that talks about the top 5 safety tips for measuring out and giving liquid medicines.	The Healthy Children Show: Giving Liquid Medicine Safely **(Video)**. American Academy of Pediatrics - HealthyChildren.org https://www.healthychildren.org/English/safety-prevention/at-home/medication-safety/Pages/The-Healthy-Children-Show-Giving-Liquid-Medicine-Safely.aspx
How to Use Over the Counter Medications & Dosing	Talks about how to safely use medicines you can buy without a prescription, including questions to ask your doctor or pharmacist.	Using Over-the-Counter Medicines With Your Child. American Academy of Pediatrics - HealthyChildren.org https://www.healthychildren.org/English/safety-prevention/at-home/medication-safety/Pages/Using-Over-the-Counter-Medicines-With-Your-Child.aspx
	Gives information on the **right amount of acetaminophen** to give your child using your child's weight.	Acetaminophen Dosage Table for Fever and Pain. American Academy of Pediatrics-HealthyChildren.org https://www.healthychildren.org/English/safety-prevention/at-home/medication-safety/Pages/Acetaminophen-for-Fever-and-Pain.aspx
	Gives information on the **right amount of ibuprofen** to give your child using your child's weight.	Ibuprofen Dosage Table for Fever or Pain. American Academy of Pediatrics - HealthyChildren.org https://www.healthychildren.org/English/safety-prevention/at-home/medication-safety/Pages/Ibuprofen-for-Fever-and-Pain.aspx
	Gives information on the **right amount of diphenhydramine** to give your child using your child's weight.	Diphenhydramine Dosage Table (eg, Benadryl) (Antihistamine). American Academy of Pediatrics - HealthyChildren.org https://www.healthychildren.org/English/safety-prevention/at-home/medication-safety/Pages/Diphenhydramine-Benadryl-Antihistamine.aspx
Medication Dosing & Storage	Gives tips about safe dosing, including knowing the right dose, measuring the right amount, using the right tool, and asking questions. Also gives tips about safely storing medicines, including locking the safety cap, putting medicines away, and thinking about safety when there are guests and when traveling.	Protect Your Children: Store & Use Medicines Safety. Centers for Disease Control and Prevention https://www.cdc.gov/patientsafety/features/safe-medicine-children.html
	Information about how to store medicines safely away from children - up and away.	Up and Away and Out of Sight Educational Program https://www.upandaway.org **Coloring book** about safe storage. Up and Away and Out of Sight Educational Program https://www.upandaway.org/resource/coloring-book/
		Safe Medicine Storage for Parents **(Video)**. Up and Away and Out of Sight Educational Program https://youtu.be/zmVMJZL5who
Disposal of Medications	Talks about how to get rid of medicines that you no longer need.	How to Safely Dispose of Unused or Expired Medicine **(Video)** https://www.fda.gov/drugs/safe-disposal-medicines/disposal-unused-medicines-what-you-should-know
	Talks about how to safely get rid of medicines in the trash.	Drug Disposal: Dispose "Non-Flush List" Medicine in Trash https://www.fda.gov/drugs/disposal-unused-medicines-what-you-should-know/drug-disposal-dispose-non-flush-list-medicine-trash

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How to Use Liquid Medicines for Children

Many children's medicines come in liquid form. Liquid medicines are easier for children to swallow than pills. However, make sure to use them the right way so your child gets the amount they need.

Here's what parents need to know.

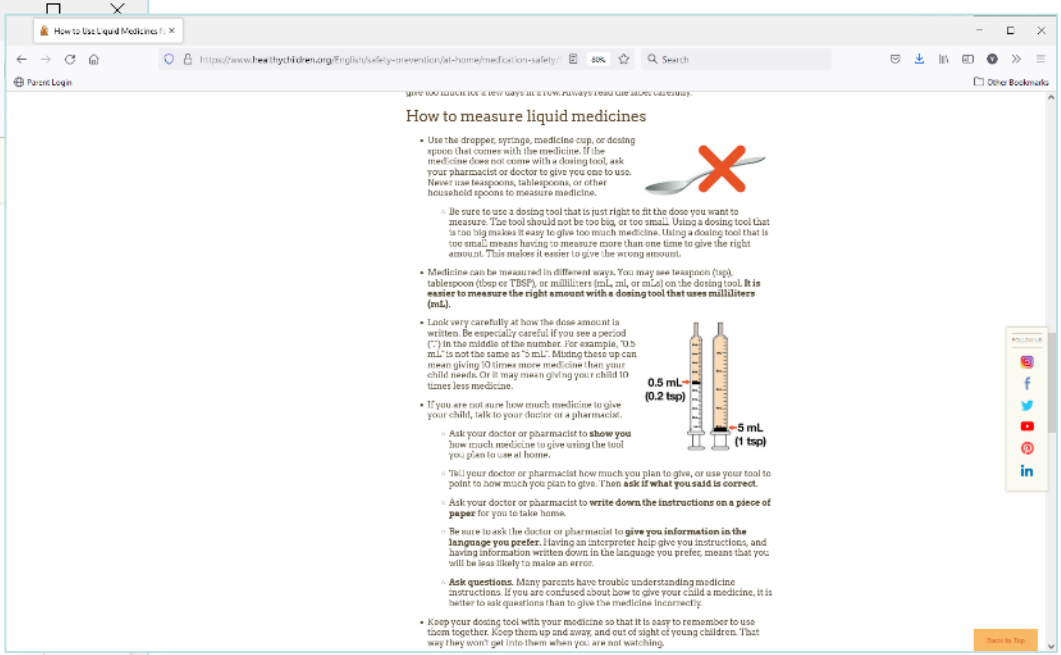
Types of liquid medicines

There are 2 types of liquid medicines:

- Medicines you can buy without a doctor's prescription (called over-the-counter or OTC).
- Medicines a doctor prescribes.

OTC medicines

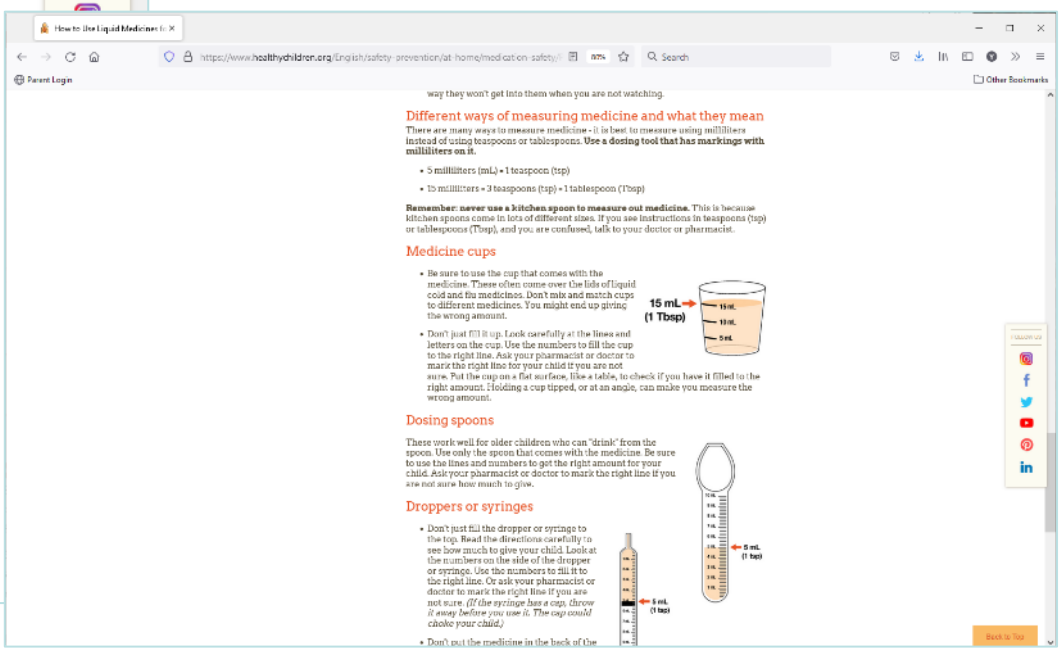
- All OTC medicines have the same kind of label. The label gives important information about the medicine. It says what it is for, how to use it, what is in it, and what to watch out for. Look on the box or bottle, where it says "Drug Facts."
- Check the chart on the label to see how much medicine to give. If you know your



How to measure liquid medicines

- Use the dropper, syringe, medicine cup, or dosing spoon that comes with the medicine. If the medicine does not come with a dosing tool, ask your pharmacist or doctor to give you one to use. Never use teaspoons, tablespoons, or other household spoons to measure medicine.
  - Be sure to use a dosing tool that is just right to fit the dose you want to measure. The tool should not be too big, or too small. Using a dosing tool that is too big makes it easy to give too much medicine. Using a dosing tool that is too small means having to measure more than one time to give the right amount. This makes it easier to give the wrong amount.
- Medicine can be measured in different ways. You may see teaspoon (tsp), tablespoon (tbsp or TBSP), or milliliters (mL, ml, or mL) on the dosing tool. **It is easier to measure the right amount with a dosing tool that uses milliliters (mL).**
- Look very carefully at how the dose amount is written. Be especially careful if you see a period (.) in the middle of the number. For example, "0.5 mL" is not the same as "5 mL". Mixing these up can mean giving 10 times more medicine than your child needs. Or it may mean giving your child 10 times less medicine.
- If you are not sure how much medicine to give your child, talk to your doctor or a pharmacist.
  - Ask your doctor or pharmacist to **show you** how much medicine to give using the tool you plan to use at home.
  - Tell your doctor or pharmacist how much you plan to give, or use your tool to point to how much you plan to give. Then **ask if what you said is correct.**
  - Ask your doctor or pharmacist to **write down the instructions on a piece of paper** for you to take home.
  - Be sure to ask the doctor or pharmacist to **give you information in the language you prefer.** Having an interpreter help give you instructions, and having information written down in the language you prefer, means that you will be less likely to make an error.
  - **Ask questions.** Many parents have trouble understanding medicine instructions. If you are confused about how to give your child a medicine, it is better to ask questions than to give the medicine incorrectly.
- Keep your dosing tool with your medicine so that it is easy to remember to use them together. Keep them up and away, and out of sight of young children. That way they won't get into them when you are not watching.

0.5 mL (0.2 tsp)
5 mL (1 tsp)



Different ways of measuring medicine and what they mean

There are many ways to measure medicine - it is best to measure using milliliters instead of using teaspoons or tablespoons. **Use a dosing tool that has markings with milliliters on it.**

- 5 milliliters (mL) = 1 teaspoon (tsp)
- 15 milliliters = 3 teaspoons (tsp) = 1 tablespoon (Tbsp)

Remember: never use a kitchen spoon to measure out medicine. This is because kitchen spoons come in lots of different sizes. If you see instructions in teaspoons (tsp) or tablespoons (Tbsp), and you are confused, talk to your doctor or pharmacist.

Medicine cups

- Be sure to use the cup that comes with the medicine. These often come over the lids of liquid cold and flu medicines. Don't mix and match cups to different medicines. You might end up giving the wrong amount.
- Don't just fill it up. Look carefully at the lines and letters on the cup. Use the numbers to fill the cup to the right line. Ask your pharmacist or doctor to mark the right line for your child if you are not sure. Put the cup on a flat surface, like a table, to check if you have it filled to the right amount. Holding a cup tipped, or at an angle, can make you measure the wrong amount.

15 mL (1 Tbsp)

Dosing spoons

These work well for older children who can "drink" from the spoon. Use only the spoon that comes with the medicine. Be sure to use the lines and numbers to get the right amount for your child. Ask your pharmacist or doctor to mark the right line if you are not sure how much to give.

Droppers or syringes

- Don't just fill the dropper or syringe to the top. Read the directions carefully to see how much to give your child. Look at the numbers on the side of the dropper or syringe. Use the numbers to fill it to the right line. Or ask your pharmacist or doctor to mark the right line if you are not sure. *(If the syringe has a cap, throw it away before you use it. The cap could choke your child.)*
- Don't put the medicine in the back of the

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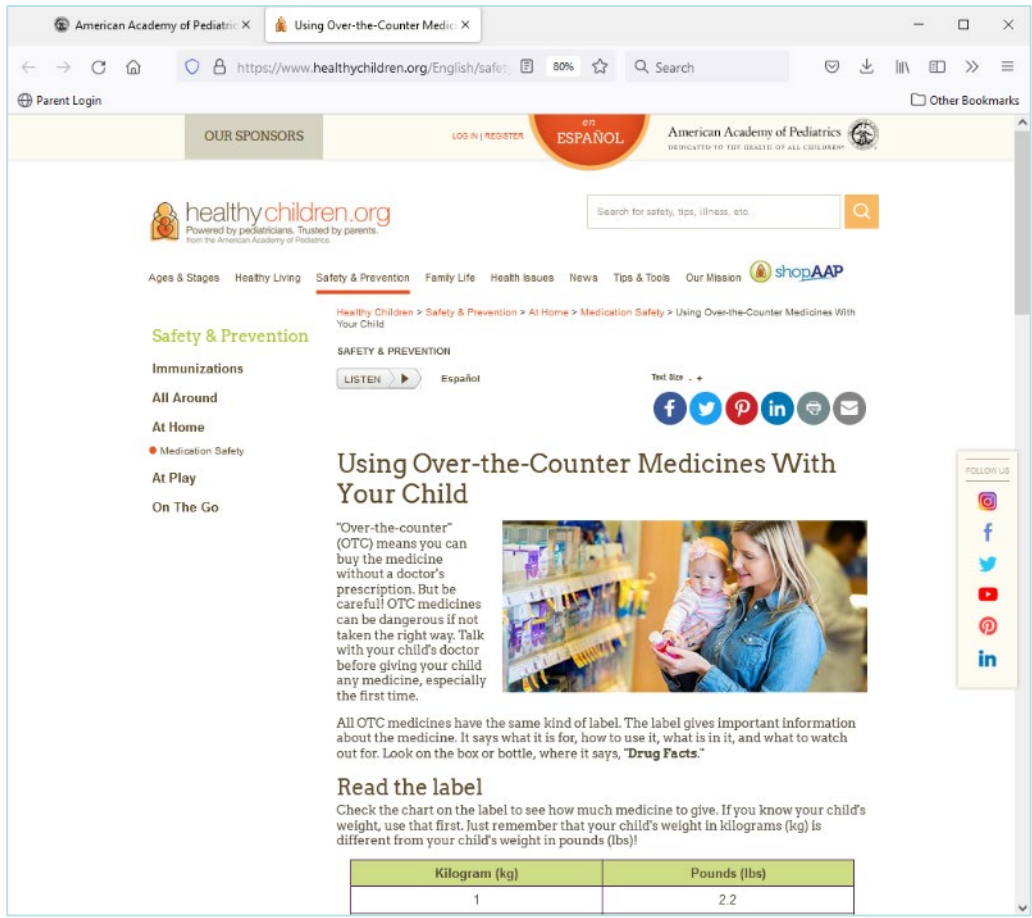
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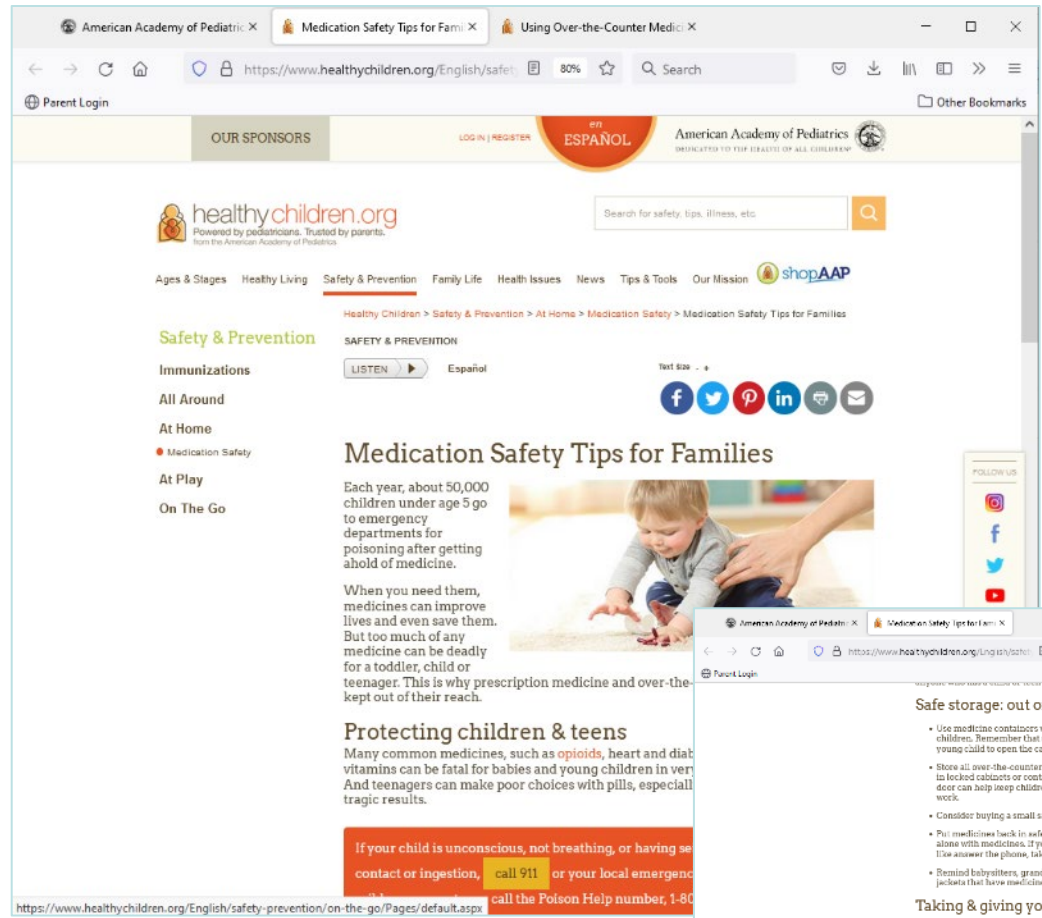
Using Over-the-Counter Medicines With Your Child
"Over-the-counter" (OTC) means you can buy the medicine without a doctor's prescription. But be careful! OTC medicines can be dangerous if not taken the right way. Talk with your child's doctor before giving your child any medicine, especially the first time.
All OTC medicines have the same kind of label. The label gives important information about the medicine. It says what it is for, how to use it, what is in it, and what to watch out for. Look on the box or bottle, where it says, "Drug Facts."
Read the label
Check the chart on the label to see how much medicine to give. If you know your child's weight, use that first. Just remember that your child's weight in kilograms (kg) is different from your child's weight in pounds (lbs)!
Kilogram (kg)
Pounds (lbs)
1
2.2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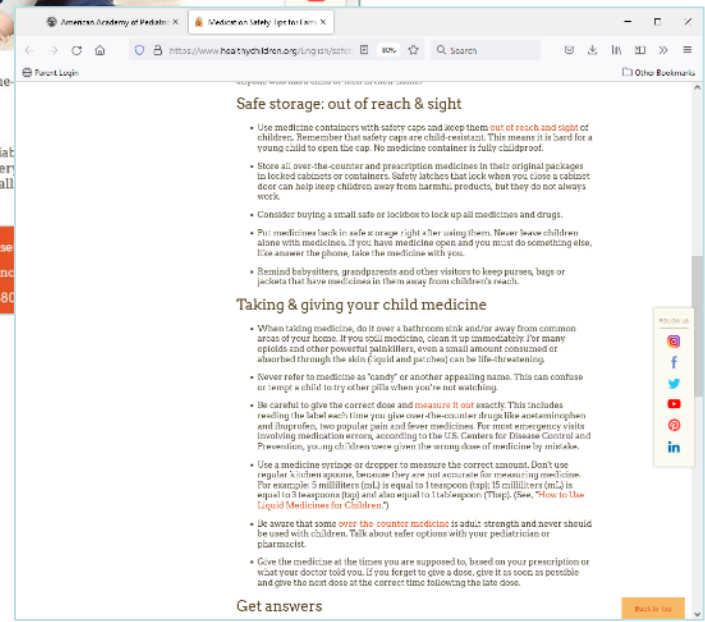
Medication Safety Tips for Families
Each year, about 50,000 children under age 5 go to emergency departments for poisoning after getting ahold of medicine.
When you need them, medicines can improve lives and even save them. But too much of any medicine can be deadly for a toddler, child or teenager. This is why prescription medicine and over-the-
kept out of their reach.
Protecting children & teens
Many common medicines, such as opioids, heart and diab
vitamins can be fatal for babies and young children in ver
And teenagers can make poor choices with pills, especiall
tragic results.
If your child is unconscious, not breathing, or having se
contact or ingestion, call 911 or your local emergenc
call the Poison Help number, 1-80
https://www.healthychildren.org/English/safety-prevention/on-the-go/Pages/default.aspx


Safe storage: out of reach & sight
Use medicine containers with safety caps and keep them out of reach and sight of children. Remember that safety caps are child-resistant. This means it is hard for a young child to open the cap. No medicine container is fully childproof.
Store all over-the-counter and prescription medicines in their original packages in locked cabinets or containers. Safety latches that lock when you close a cabinet door can help keep children away from harmful products, but they do not always work.
Consider buying a small safe or lockbox to lock up all medicines and drugs.
Put medicines back in safe storage right after using them. Never leave children alone with medicines. If you have medicine open and you must do something else, like answer the phone, take the medicine with you.
Remind babysitters, grandparents and other visitors to keep purses, bags or jackets that have medicines in them away from children's reach.
Taking & giving your child medicine
When taking medicine, do it over a bathroom sink and/or away from common areas of your home. If you spill medicine, clean it up immediately. For many opioids and other powerful painkillers, even a small amount consumed or absorbed through the skin (liquid and patches) can be life-threatening.
Never refer to medicine as "candy" or another appealing name. This can confuse or tempt a child to try other pills when you're not watching.
Be careful to give the correct dose and measure it out exactly. This includes reading the label each time you give over-the-counter drugs like acetaminophen and ibuprofen, two popular pain and fever medicines. For most emergency visits involving medication errors, according to the U.S. Centers for Disease Control and Prevention, young children were given the wrong dose of medicine by mistake.
Use a medicine syringe or dropper to measure the correct amount. Don't use regular kitchen spoons, because they are not accurate for measuring medicine. For example: 5 milliliters (mL) is equal to 1 teaspoon (tsp); 15 milliliters (mL) is equal to 3 teaspoons (tsp) and also equal to 1 tablespoon (Tbsp). (See, "How to Use Liquid Medicines for Children.")
Be aware that some over the counter medicine is adult strength and never should be used with children. Talk about safer options with your pediatrician or pharmacist.
Give the medicine at the times you are supposed to, based on your prescription or what your doctor told you. If you forget to give a dose, give it as soon as possible and give the next dose at the correct time following the late dose.
Get answers

How to give the right amount of ACETAMINOPHEN (also known as Tylenol) is different depending on which medicine you plan to give.

Dose: Give every 4 to 6 hours as needed for fever or pain. DO NOT GIVE MORE THAN 4 DOSES IN 24 HOURS.
Do **NOT** use with any other medicine containing acetaminophen.

Weight	Age	Infant's Acetaminophen (160 mg / 5 mL)	Children's Acetaminophen (160 mg / 5 mL)	Children's Acetaminophen	Children's Acetaminophen Dissolvable Packets	Adult's Acetaminophen	Adult's Acetaminophen
6 to 11 pounds (3 to 5 kilograms)	0 to 3 months	1.25 mL	———				
12 to 17 pounds (about 5 to 7 kilograms)	4 to 11 months	2.5 mL	———				
18 to 23 pounds (about 8 to 10 kilograms)	12 to 23 months	3.75 mL	———				
24 to 35 pounds (about 11 to 15 kilograms)	2 to 3 years	———	5 mL				
36 to 47 pounds (about 16 to 21 kilograms)	4 to 5 years	———	7.5 mL				
48 to 59 pounds (about 22 to 26 kilograms)	6 to 8 years	———	10 mL				
60 to 71 pounds (about 27 to 32 kilograms)	9 to 10 years	———	12.5 mL				
72 to 95 pounds (about 33 to 43 kilograms)	11 years	———	15 mL				
96 pounds or more (more than 43 kilograms)	12 years or older	———	10 mL and 10 mL 10 mL + 10 mL = 20 mL				

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How to give the right amount of IBUPROFEN (also known as Motrin, Advil) is different depending on which type of ibuprofen you plan to give.

Dose: Give every 6 hours if needed, for fever or pain. DO NOT GIVE MORE THAN 4 DOSES IN 24 HOURS.
Do **NOT** use with any other medicine containing ibuprofen.

Weight	Age	Infant's Ibuprofen Drops (50 mg / 1.25 mL)	Children's Liquid Ibuprofen (100 mg / 5 mL)	Children's Ibuprofen Chewable Tablets (50 mg)	Junior Strength Ibuprofen Tablets (100 mg)	Adult's Ibuprofen Tablets (200 mg)
0 to 11 pounds (up to 5 kilograms)	0 to 5 months	———	———	———	———	———
12 to 17 pounds (about 6 to 7 kilograms)	6 to 11 months	1.25 mL	2.5 mL	———		
18 to 23 pounds (about 8 to 10 kilograms)	12 to 23 months	1.875 mL	4 mL	———		
24 to 35 pounds (about 11 to 15 kilograms)	2 to 3 years	2.5 mL	5 mL	2 tablets		
36 to 47 pounds (about 16 to 21 kilograms)	4 to 5 years	3.75 mL	7.5 mL	3 tablets		
48 to 59 pounds (about 22 to 26 kilograms)	6 to 8 years	5 mL	10 mL	4 tablets		
60 to 71 pounds (about 27 to 32 kilograms)	9 to 10 years	———	12.5 mL	5 tablets		
72 to 95 pounds (about 33 to 43 kilograms)	11 years	———	15 mL	6 tablets		
96 pounds or more (44 kilograms or more)	12 years or older	———	10 mL and 10 mL 10 mL + 10 mL = 20 mL	8 tablets		

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How to give the right amount of DIPHENHYDRAMINE (also known as Benadryl) is different depending on which type of Diphenhydramine you plan to give.

Dose: Give every 6 hours if needed. **DO NOT GIVE MORE THAN 4 DOSES IN 24 HOURS.**
Do **NOT** use with any other medicine with diphenhydramine in it.

Weight →	20 to 24 pounds (about 9 to 10 kilograms)	25 to 37 pounds (about 11 to 16 kilograms)	38 to 49 pounds (about 17 to 22 kilograms)	50 to 99 pounds (about 23 to 45 kilograms)	100 pounds or more (46 kilograms or more)
Children's Liquid Diphenhydramine (12.5 mg / 5 mL)	4 mL	5 mL	7.5 mL	10 mL	———
Children's Diphenhydramine Chewable Tablets (12.5 mg)	———	1 tablet	1 ½ tablets	2 tablets	4 tablets
Diphenhydramine Tablets (25 mg)	———	½ tablet	½ tablet	1 tablet	2 tablets
Diphenhydramine Capsules (25 mg)	———	———	———	1 capsule	2 capsules

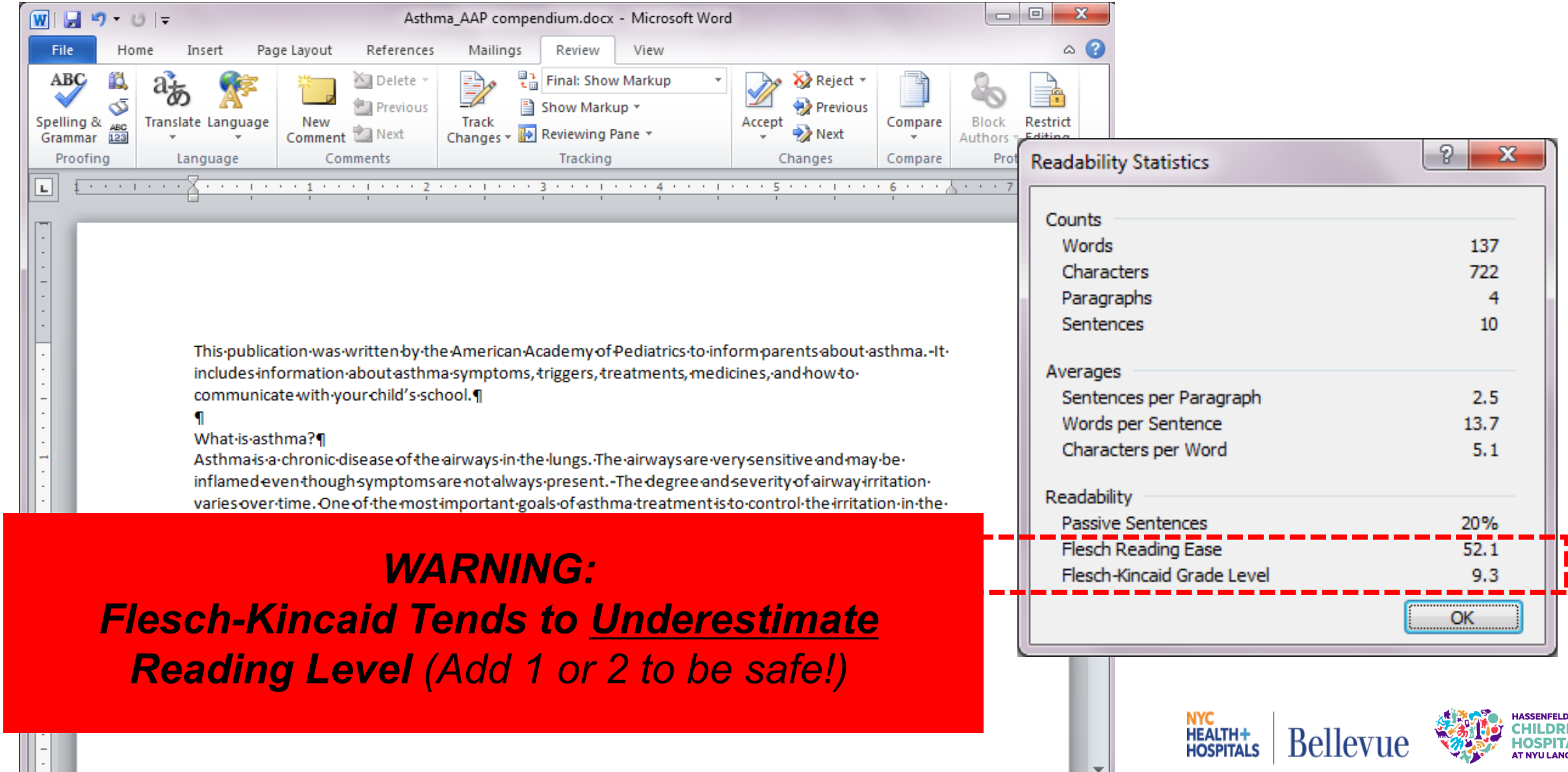
Do not give to children less than 2 years of age.
Do not give to children 2 to 6 years of age unless your doctor tells you to.

Assess Readability of Written Materials

- Free online readability calculators
  - http://www.readabilityformulas.com/free-readability-formula-tests.php

- Microsoft Word as a tool to assess readability
  - FILE > Options > Proofing > “Show readability statistics”
  - To get readability statistics when working on a document, REVIEW > “Spelling and Grammar”

Readability Statistics in Microsoft Word



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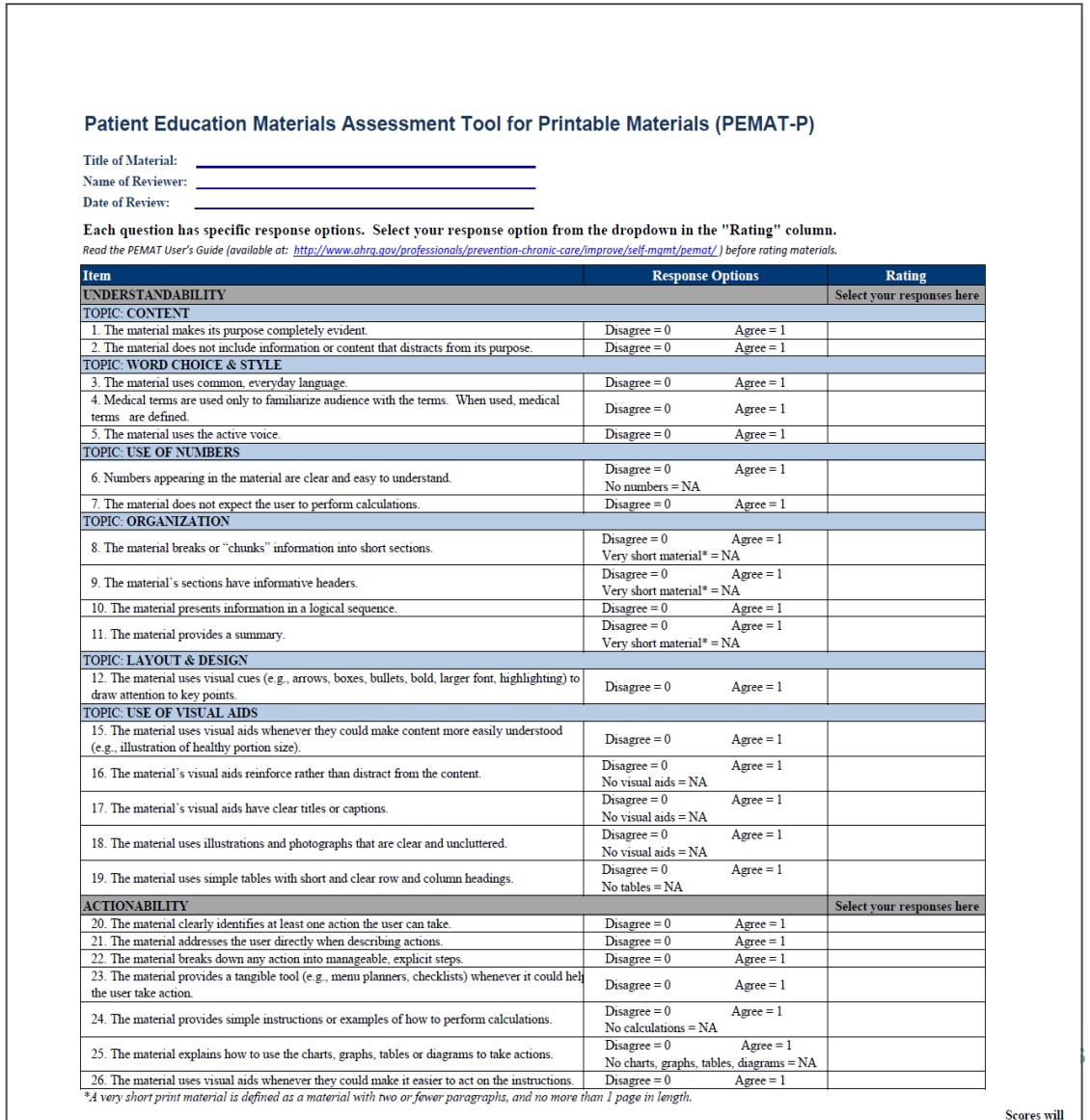
Beyond Readability: Assessing Patient Education Materials

- Patient Education Materials Assessment Tool (PEMAT) - AHRQ
  - Understandability
  - Actionability
- Can be used for print and A/V materials
- Automatic calculation

https://www.ahrq.gov/health-literacy/patient-education/pemat.html



Patient Education Materials Assessment Tool for Printable Materials (PEMAT-P)

Title of Material: _____

Name of Reviewer: _____

Date of Review: _____

Each question has specific response options. Select your response option from the dropdown in the "Rating" column.

Read the PEMAT User's Guide (available at: http://www.ahrq.gov/professionals/prevention-chronic-care/improve/self-mgmt/pemat/) before rating materials.

Item	Response Options	Rating
UNDERSTANDABILITY		**Select your responses here**
TOPIC: **CONTENT**		
1. The material makes its purpose completely evident.	Disagree = 0 Agree = 1	
2. The material does not include information or content that distracts from its purpose.	Disagree = 0 Agree = 1	
TOPIC: **WORD CHOICE & STYLE**		
3. The material uses common, everyday language.	Disagree = 0 Agree = 1	
4. Medical terms are used only to familiarize audience with the terms. When used, medical terms are defined.	Disagree = 0 Agree = 1	
5. The material uses the active voice.	Disagree = 0 Agree = 1	
TOPIC: **USE OF NUMBERS**		
6. Numbers appearing in the material are clear and easy to understand.	Disagree = 0 Agree = 1 No numbers = NA	
7. The material does not expect the user to perform calculations.	Disagree = 0 Agree = 1	
TOPIC: **ORGANIZATION**		
8. The material breaks or "chunks" information into short sections.	Disagree = 0 Agree = 1 Very short material* = NA	
9. The material's sections have informative headers.	Disagree = 0 Agree = 1 Very short material* = NA	
10. The material presents information in a logical sequence.	Disagree = 0 Agree = 1	
11. The material provides a summary.	Disagree = 0 Agree = 1 Very short material* = NA	
TOPIC: **LAYOUT & DESIGN**		
12. The material uses visual cues (e.g., arrows, boxes, bullets, bold, larger font, highlighting) to draw attention to key points.	Disagree = 0 Agree = 1	
TOPIC: **USE OF VISUAL AIDS**		
15. The material uses visual aids whenever they could make content more easily understood (e.g., illustration of healthy portion size).	Disagree = 0 Agree = 1	
16. The material's visual aids reinforce rather than distract from the content.	Disagree = 0 Agree = 1 No visual aids = NA	
17. The material's visual aids have clear titles or captions.	Disagree = 0 Agree = 1 No visual aids = NA	
18. The material uses illustrations and photographs that are clear and uncluttered.	Disagree = 0 Agree = 1 No visual aids = NA	
19. The material uses simple tables with short and clear row and column headings.	Disagree = 0 Agree = 1 No tables = NA	
ACTIONABILITY		**Select your responses here**
20. The material clearly identifies at least one action the user can take.	Disagree = 0 Agree = 1	
21. The material addresses the user directly when describing actions.	Disagree = 0 Agree = 1	
22. The material breaks down any action into manageable, explicit steps.	Disagree = 0 Agree = 1	
23. The material provides a tangible tool (e.g., menu planners, checklists) whenever it could help the user take action.	Disagree = 0 Agree = 1	
24. The material provides simple instructions or examples of how to perform calculations.	Disagree = 0 Agree = 1 No calculations = NA	
25. The material explains how to use the charts, graphs, tables or diagrams to take actions.	Disagree = 0 Agree = 1 No charts, graphs, tables, diagrams = NA	
26. The material uses visual aids whenever they could make it easier to act on the instructions.	Disagree = 0 Agree = 1	

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H. Shonna Yin, MD, MS
YINH02@med.nyu.edu

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NYU School of Medicine / Bellevue Hospital Center
550 First Avenue NBV 8S-4-11
New York, NY 10016

Questions and Answer Session

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