

IMPROVING THE PALATABILITY OF MEDICATION TO HELP CHILDREN BE MORE COMPLIANT

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Abstract. The objective was to determine which pediatric liquid medications are commonly flavored and re-flavored in the U.S. pharmacy setting and which flavors are preferred by consumer. We also evaluated the use of the FLAVORx system to see if it increases compliance. When flavoring was used, non-compliance was reduced from 76% to 20%². Our approach was a practical examination of commonly flavored pediatric liquid medications and most popular flavor choices. The top most commonly re-flavored medications are Augmentin, Amoxicillin, Azithromycin, Cefdinir and Clindamycin. The top most used flavors are grape, bubblegum, strawberry, watermelon and cherry. The stability of each medication was tested in the presence of flavoring using HPLC. It was shown that the stability of all medications were unaffected by the presence of flavoring.

Introduction

One common barrier to higher medication compliance in pediatrics is the taste of liquid medicine. The palatability of a medication is an important factor in medication compliance among children. Nine out of ten pediatricians inquire about the patients preferred medication form or flavor, before prescribing¹. 85% of pediatricians report encouraging parents to use sweeteners or mix medications with other foods¹. It has also been found that among the barriers that impact compliance in acute and chronic illness, 90.8% and 83.9% of the barriers respectively are due to the unpleasant taste of medications¹. Our approach was a practical examination of commonly re-flavored pediatric liquid medications and most popular flavor choices. Because safety is a top priority, the flavored medications are tested for stability prior to a flavoring recipe being released to pharmacies. In the U.S., prescription flavoring is a popular method used by pharmacists to promote higher medication compliance. The effect of flavoring on medication compliance was examined with children admitted to the Robert Wood Johnson University hospital in New Brunswick, NJ.

FLAVORx, a U.S. based company, provides medication flavoring systems to more than 35,000 pharmacies across North America. To date, over 47 million prescriptions have been flavored using the FLAVORx system. At the pharmacy, patients

choose from a variety of flavors to customize the taste of their prescription medication regardless of palatability. Customizing the taste not only addresses the poor palatability issues of some commercially available products, but also the single flavor availability of most commercially available products. Consumers often opt to flavor simply for the ability to choose a flavor better suited to their individual taste. FLAVORx recognizes taste choice as yet another compliance tool in promoting medication adherence.

Methods

The FLAVORx Online Formulary provides detailed re-flavoring instructions for commercially prepared pediatric medications and over-the-counter drugs. This guide is one of several references a pharmacist can consult when a patient requests flavoring or when a physician or pharmacist recommends flavoring to improve compliance. By analyzing 2011 usage data from the FLAVORx Online Formulary, medications were ranked according to how often they were re-flavored in the pharmacy. The data also identifies the most commonly chosen flavors for improving the palatability of pediatric liquid medications. Over 2 million flavorings were analyzed. Brand and generic versions of medications were included in our study.

The medications were tested for stability in the presence of FLAVORx flavors using High

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Performance Liquid Chromatography chemical analysis (HPLC) by the University of Maryland Baltimore County. The assays were done on a Hitachi L-7000 system with UV-detector (220nm). The column used was a Zorbax Rx-C18, 4.6mm X 15cm. The mobile phase was monobasic sodium phosphate buffer :methanol (95:5) to pH 4.4 with phosphoric acid.

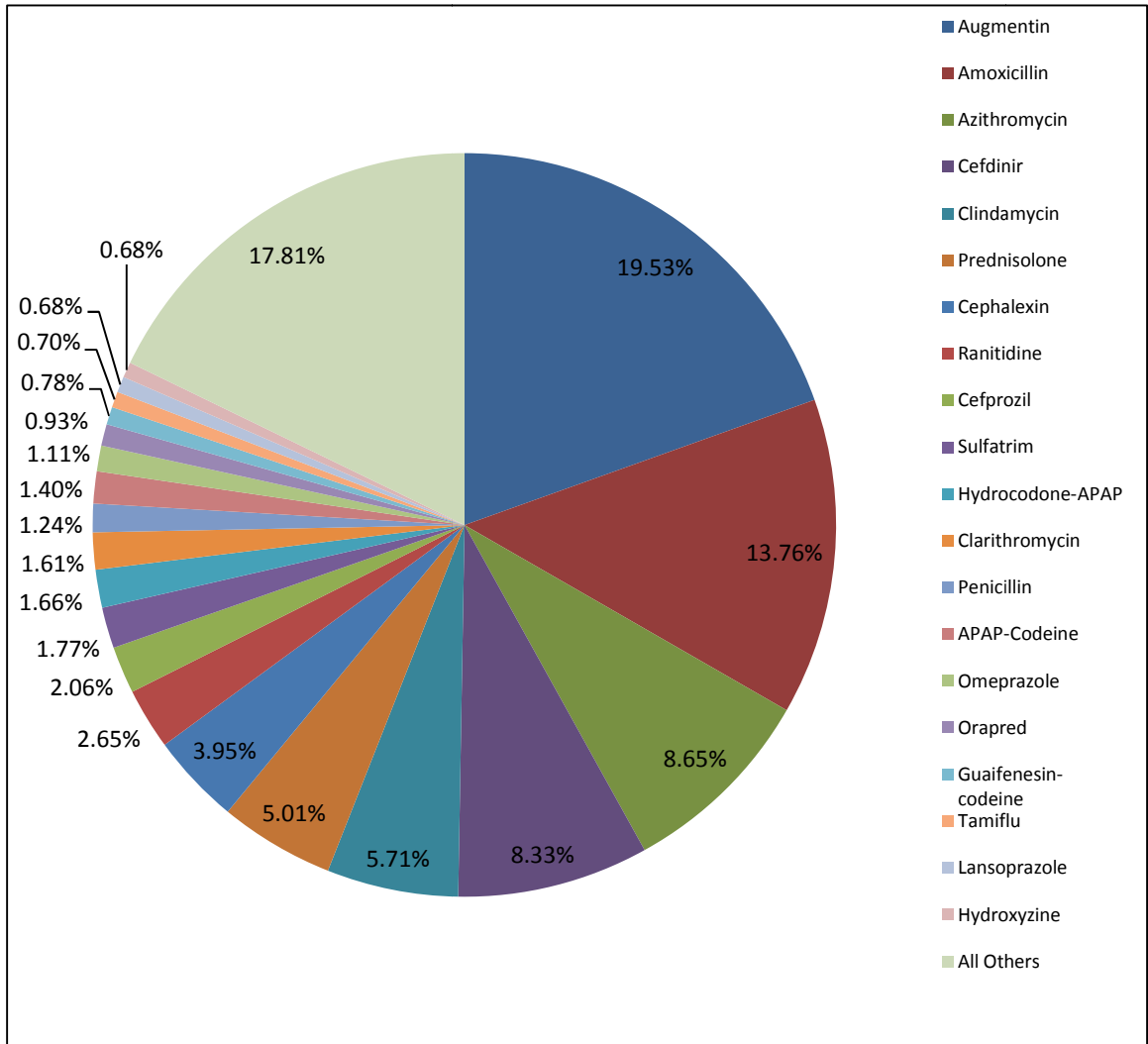
To determine if flavoring increases compliance, questionnaires were used to evaluate patients

admitted to the Robert Wood Johnson hospital with a documented 24 hour history of medication non-compliance due to unpalatable medication ². The doses given on a timely basis were quantified as well as the number of incorrect doses as a result of changed formulation. The control group was given their medication using conventional methods such as mixing meds with ice cream, chocolate or cherry syrup. The test group was given their meds using the FLAVORx flavoring system.

Results

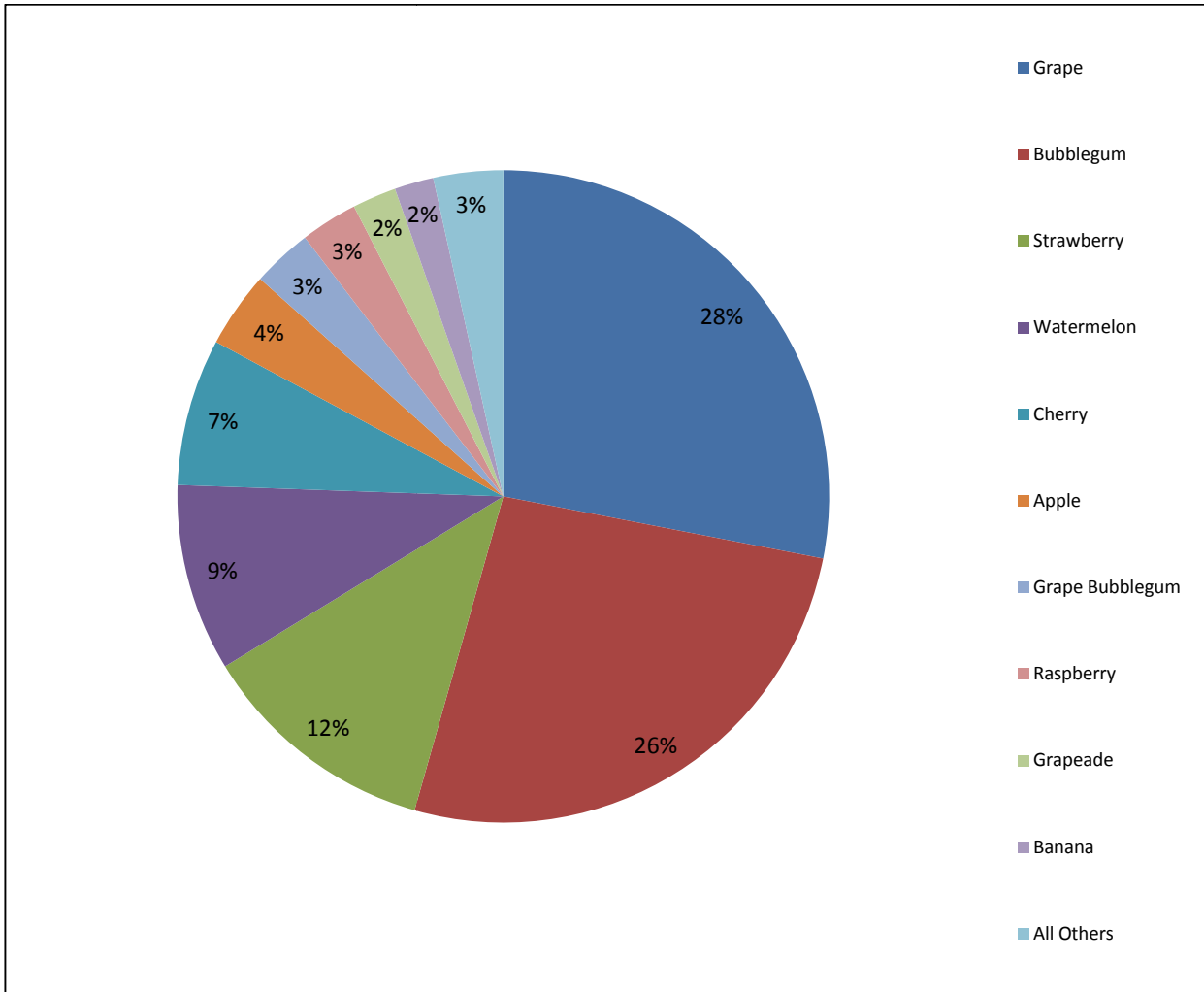
MOST FLAVORED MEDICATIONS AND MOST POPULAR FLAVORS

Figure 1: Commonly Re-Flavored Liquid Medications.



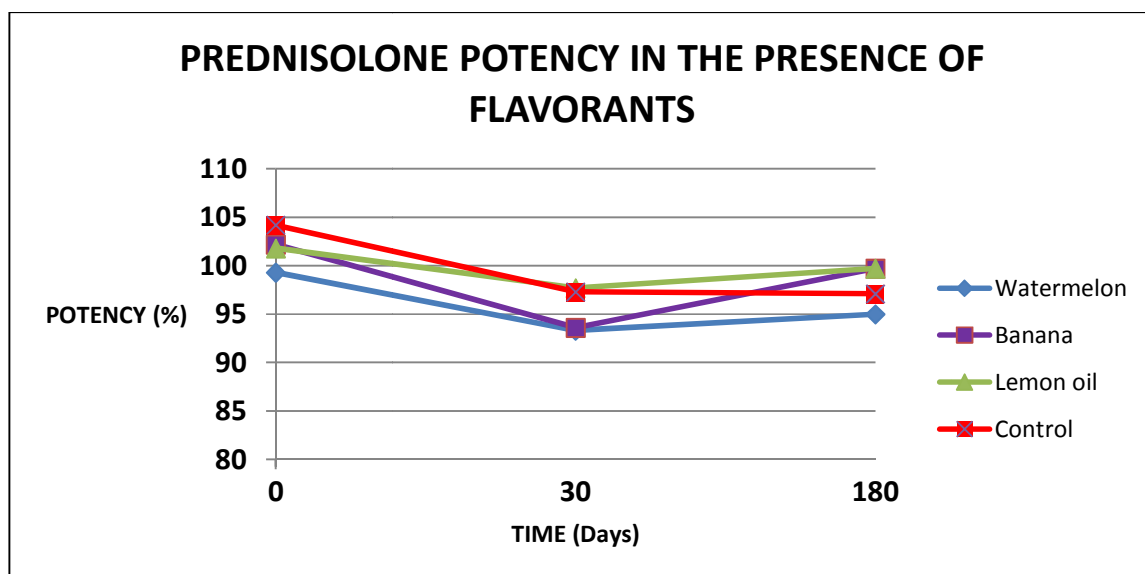
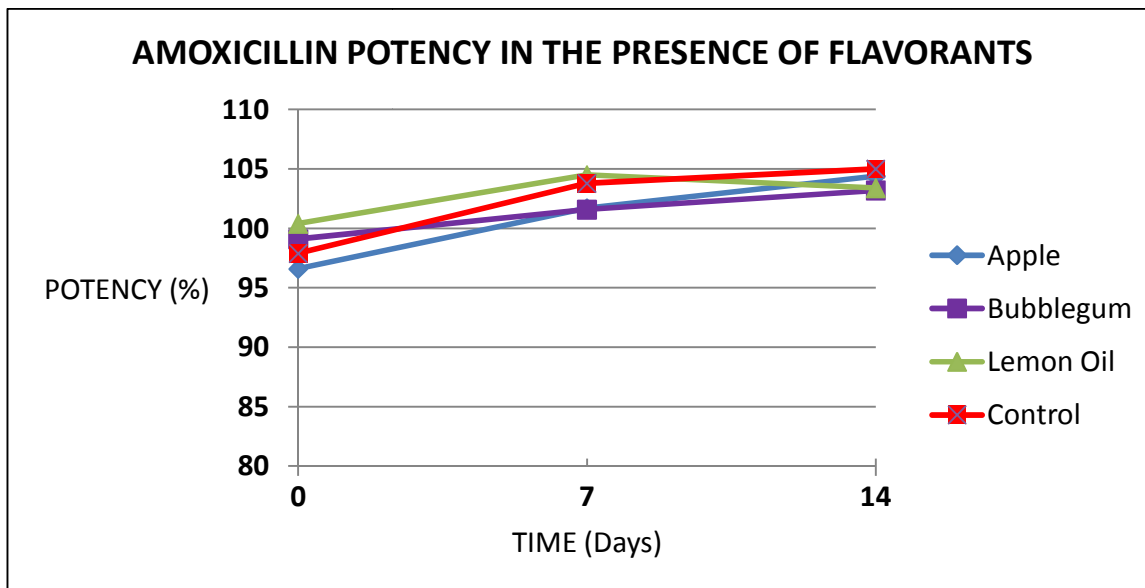
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Figure 2: Popular Flavors for Improving the Palatability of Liquid Medications.



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Figure 3: MEDICATION STABILITY IN THE PRESENCE OF FLAVORx FLAVORS



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MEDICATION COMPLIANCE WITH THE USE OF FLAVORING

	CONTROL, % (n=15)	TEST/FLAVOR, % (n=15)
NON COMPLIANT DOSES	76	20
PATIENTS WITH SUBSEQUENT FORMULATION CHANGE	80	0
PATIENTS WITH DOSES ON TIME	0	100

Conclusion

The FLAVORx system has been shown to improve the palatability of a wide range of pediatric medications. Antibiotics were shown to be the most re-flavored medications regardless of taste. Interestingly enough, while Amoxicillin/Clavulanate is widely known to be a foul-tasting antibiotic and Amoxicillin is widely accepted as one of the best tasting antibiotics, both were shown to be in high demand for post market flavoring. It appears that adding flavoring to palatable as well as unpalatable medications increases compliance, therefore it is our opinion that flavoring is dually beneficial. Not only does flavoring mask the taste of unpleasant medications, but it addresses the issue of individual taste preferences. We believe that allowing children to choose how their medication will taste encourages a child to take charge of their own health and is yet another way to help children be more

compliant. Grape, bubblegum, strawberry, watermelon and cherry dominated as the preferred flavors of U.S. consumers. All the stability tests done by the University of Maryland Baltimore County have all shown that the addition of FLAVORx flavors does not affect the stability of any medication³.

References

1. Division of Health Policy Research. (2001). *Patient compliance with prescription regimens*. Periodic Survey of Fellows, American Academy of Pediatrics, 44
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3. Lacourse, W. (2009). *Flavorant stability testing*. Baltimore, MD: University of Maryland Baltimore County.

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