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DIAL THE DOSE: A CLEVER DISPENSER FOR NON-STERILE LIQUIDS

There have been several reports and studies which have highlighted the dangers of accidental overdose from using teaspoon- or tablespoon-based instructions for liquid medications. Paul Wismer, MBA, from Balda explains how their product, Dial-the-Dose, can help improve accuracy with liquid dosing.

“In the US, over 10,000 calls to poison centres occur because the wrong dose of oral liquid medications was given to a child and over 70,000 children visit an ER as a result of medication overdoses..”

Have you ever given a child cough medicine, pain reliever or antibiotics in the middle of the night? Did you measure the dose with a spoon or cup? Besides any difficulties in seeing and/or measuring the dose, how accurate are such dispensing aids, regardless of the time of day? How error-free are users when they dispense the medicines via these dosing aids?

A study of people’s behaviour and perception regarding liquid dosing was conducted in the US a few years ago.¹ Many different kinds of dosing errors can occur and, especially with children, the consequences can be very severe. Using a teaspoon or tablespoon, for example, to administer children’s medications can often lead to medication dosing errors. Teaspoon- or tablespoon-based medicine instructions doubled a parent’s chances of incorrectly measuring the intended dosage, and also doubled the risk they would not accurately follow the doctor’s prescription, the study authors found.

“A move to a millilitre preference for dosing instructions for liquid medications could reduce parent confusion and decrease medication errors, especially for groups at risk for making errors, such as those with low health literacy and non-English

speakers,” said the study’s lead author Dr Shonna Yin, an assistant professor of paediatrics at NYU School of Medicine (New York, NY, US).

More than 10,000 annual calls to poison centres occur because the wrong dose of oral liquid medications was given to a child, according to background information included in the study.

In addition, over 70,000 children visit an Emergency Room annually as a result of unintentional medication overdoses.²

A number of groups have suggested that paediatricians and pharmacists switch to millilitre dosing for young patients, including the American Academy of Pediatrics, the US Centers for Disease Control and Prevention, and the Institute for Safe Medication Practices.

The FDA provided guidance in 2011 on dosing devices for orally administered liquid medications. Prior to that there was no standard – ML, mL or even cc were used, and sometimes the instructions would differ from those which were actually on the delivery/measuring device.³

There have been numerous reports of accidental overdose that were attributed, in part, to liquid measure markings on dosage cups provided with orally ingested OTC



Paul Wismer
Business Development Manager
E: PWismer@balda-group.com
T: +49 5734 513 2584

Balda Healthcare
A StevanatoGroup company
Bergkirchener Strasse 228
32549 Bad Oeynhausen
Germany

www.balda-group.com

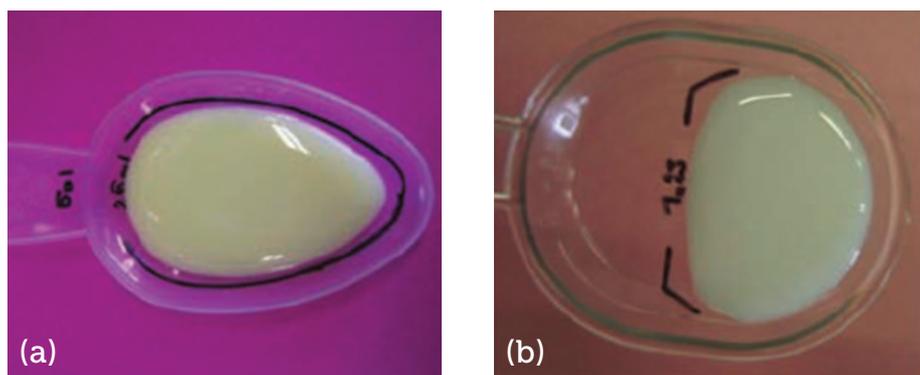


Figure 1: The discrepancy between the nominal and actual volume of different measuring spoons. (a) Difference in volume obtained when measuring a 2.5 ml dose with a pipette compared with the use of the $\frac{1}{2}$ graduation of a measuring spoon supplied with amoxicillin. (b) Difference in volume obtained when measuring a 1.25 ml dose with a pipette compared with the use of the $\frac{1}{4}$ graduation of a measuring spoon supplied with erythromycin.⁴



Figure 2: Dial-the-Dose.

liquid drug products that were misleading or incompatible with the labelled dosage directions for use. In addition, these difficulties may lead consumers to use less accurate means (e.g. household spoons) to give children medication, leading to under dosing or overdosing. The FDA is especially concerned because orally ingested OTC liquid drug products are frequently intended to be used in paediatric patients.²

In another study it was shown that dosing of suspensions using the measuring devices provided with the product may constitute a significant source for the lack of dosing accuracy. The overall results reveal that using the $\frac{1}{2}$ and $\frac{1}{4}$ graduation marks on the dosing spoon manifest overdosing can be observed (Figure 1).⁴

DIAL THE DOSE SOLUTION

But the question is: what concrete solutions are available to help consumers? Over the years, a number of “dispensing aids” have been developed. Ideally these should be easy to use, yet very accurate, and measuring in mL would be optimal.

Balda has developed one such solution, called Dial the Dose. This simple yet clever liquid dispensing device allows accurate and easy dosing of non-sterile liquid medicines.

By simply turning the end of the plunger, you can pre-select the volume (Figure 2). In the example here, there is a 3 mL dispensing capacity, divided into six steps of 0.5 mL each. By pulling the plunger until it stops, it is possible to aspirate exactly the amount “dialled-in”. This means there is no need to look at graduation markings on the barrel – it simply needs to be filled and then can be completely dispensed.

The dosing accuracy was measured to be around $\pm 2\%$ with saline. This level of accuracy is more stringent than the FDA requirements.

Dial the Dose is a platform technology. This means other barrel volumes and steps are customisable for the customer’s needs. Balda can produce the dispensing devices, on an original equipment manufacturer (OEM) basis, for pharmaceutical or diagnostic customers around the world, providing regulatory support (CE and FDA, for example) as well, so as to support clients in having their product ready for market.

Balda is an expert in injection moulded plastic, and can therefore also design bottle closures with the customised plug and hole concept (Figure 3). Of course, different colours and designs are also possible, giving your product an easily identifiable link to

your corporate imaging. But the main goal is clear: easy and accurate dosing to help parents give their children the right dose in a simple manner.

REFERENCES

1. Yin HS et al, “Liquid Medication Dosing Errors in Children: Role of Provider Counseling Strategies. *Academic Pediatrics*”, 2014, Vol 14 (3), pp 262–270.
2. Schillie SF, Shehab N, Thomas KE, Budnitz DS, “Medication overdoses leading to emergency department visits among children”. *Am J Prev Med*, 2009, 37(3), pp 181–187.
3. FDA Center for Drug Evaluation and Research, “Guidance for Industry Dosage Delivery Devices for Orally Ingested OTC Liquid Drug Products”, May 2011.
4. Breikreutz J, Abdel-Tawab M et al, “Dosing Accuracy of Measuring Devices Provided with Antibiotic Oral Suspensions. *Paediatric and Perinatal Drug Therapy*”, 2007; Vol 8(2), pp 61-70.



Figure 3: Cap with tailor-made connection to DtD.

Dial the Dose – The Smart Liquid Dispenser

Easy to use yet highly accurate



Standard Features:

(other customized solutions available)

- Dosing dispenser volume 3 mL
- High dosing precision
- 6 dosing settings (0.5 mL steps)
- Low residual volume

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A **Stevanato** Group Brand

Bergkirchener Straße 228
32549 Bad Oeynhausen, GERMANY
Phone: +49 (0) 5734 / 513-0
info@balda-group.com

www.balda-group.com