



IntelliFill® i.v. IV Automation and Nursing



INTRODUCTION

IV automation is often considered a “pharmacy issue” but cannot be considered without looking at the larger audience of affected healthcare stakeholders.

Nursing represents a significant stakeholder in the medication use process and the last line of defense against medication errors. IV automation affects Nursing activity to the extent that:

- It produces doses administered by nurses
- It produces labeling intended to be read by nurses

The output of IV automation must, at a minimum, produce no noticeable change to the medication administration process from a Nursing perspective, or must change that process for the better. This paper discusses the Nursing issues that should be addressed when considering the addition of the IntelliFill i.v. automation system to a health-system pharmacy.

SYRINGE INFUSION

One salutary change in medication administration for Nursing from IV automation with IntelliFill i.v. is the re-introduction of syringes as a primary injection container for the administration of intermittent doses.

With the current Joint Commission emphasis on providing ready-to-administer doses,¹ nurses now contend with a wide variety of containers for intermittent doses. This requires that they look in a unit-based cabinet for some doses and in the refrigerator for others. It requires that they locate, mate and activate container units in some cases (these products are associated with a 2-3% failure rate²).

Current ready-to-use dose packaging, generally called convenience packaging, is not only expensive, but involves the gratuitous administration of additional, unnecessary fluid in many cases. This results in an exceptional administration scheme for patients under fluid restriction.

While the use of these containers cannot be avoided in all cases, a large number of drugs administered intermittently can be administered in a syringe either by direct push or by infusion, using a device such as the Baxa InFuse™ Syringe InFuser or the Baxa MicroFuse™ syringe infuser. Because both the syringes and the InFuse are inexpensive and small, they generally can be stored in one location to provide a consistent and clinically appropriate system not subject to activation failures or the gratuitous administration of unnecessary fluid.

Nursing preference for syringes as infusion containers is well documented.^{3,4,5} IntelliFill i.v. therefore supplies doses in syringes, prepared and labeled appropriately for use.

LABELING

IV dose labeling is intended to be read by nurses. For a nurse, the purpose of this labeling is to support verification of the “five rights” of medication administration:

- Right Patient
- Right Drug
- Right Dose
- Right Route
- Right Time

Given the median age of the current provider population, this key information must be printed in a format that provides ready visual verification of these “five rights.” This includes not only consideration of font size, but also formatting that helps the nurse visually verify the five “rights.”

The Institute for Safe Medication Practices (ISMP) has identified a number of contributors to medication errors, including inappropriate dose expressions, look-alike/sound-alike drug names and, most recently, the font type and size used on labels.

One scheme often proposed for visual label verification is color coding. ISMP recommends against color coding because providers become dependent on it and stop reading the information intended for their use. An error that results in the application of the wrong colored label to a dose can result in a medication error, even if the text on the label is correct.

Clearly, color coding is of little value to providers that are color blind. Similarly, color coding must use colors that are readily distinguishable when the colors stand alone. This places severe limits on the number of different colors that can be used, since colors that may be readily distinguishable when compared with each other can be difficult to differentiate when one or the other is viewed alone. Color coding cannot, therefore, serve as an effective adjunct to proper drug identification; there simply are not enough usable colors.

As an alternative, ISMP has recommended the use of tall-man⁶ lettering, where key, distinctive portions of the drug name are printed in capital (or larger) letters to force the reader’s attention to the portion of the name that uniquely identifies one drug from another. For example, while Ceftriaxone and Cefotaxime may look similar when printed normally, CefTRIAxone and CefoTAXIME are more visually different.

IntelliFill i.v., therefore, eschews color coding in favor of the use of tall-man letters, as well as highlighting key information. An exception is made for syringes prepared for use in anesthesia where the use of color to distinguish drug types is governed by a well-established standard. Further, the software permits the use of a variety of different label formats to provide clear visual differentiation between labels for specific drugs or drug classes. Baxa Corporation works with each individual customer to develop labeling schemes that maximize the useful content of the label while ensuring readability.

ISMP also has identified certain practices related to the representation of dose amounts, both in representation of numbers and of units of measure, that lead to medication errors. This has resulted in rules for expressing dose quantities issued by ISMP⁷ that have been incorporated directly into the label printing software of IntelliFill i.v. for the benefit of Nursing.

Barcode medication administration (BCMA) systems further support the “five rights” by providing a mechanized process for verifying that a dose is correct for a specific patient. IntelliFill i.v. places a bar code on the label of every syringe it produces to support BCMA initiatives for this purpose. Recognizing that there are, as yet, no clear standards for the content of such bar codes, IntelliFill i.v. maintains an architecture that permits users to determine what information is needed in the bar code to support their BCMA system of choice. To date, IntelliFill i.v. syringes have been used with Admin-Rx™ (McKesson), MEDITECH and Bridge (Cerner) BCMA systems.

IntelliFill i.v. is manufactured for Baxa Corporation by FHT, Inc.

- 1 Pederson, Craig A et al, ASHP national survey of pharmacy practice in hospital settings: Dispensing and administration—2005, Amer J Health-Sys Pharm 63:327- 345 (Feb 2006)
- 2 Bates DW, Cousins DD, Flynn E et al. Consensus development conference statement on the safety of intravenous drug delivery systems: balancing safety and cost. Hosp Pharm. 2000; 35:150–5
- 3 Gin, Alfred et al, Syringes Versus Minibags as an Intravenous Admixture System: A comparison of cost and nursing preference, The Canadian Journal of Hospital Pharmacy 40(3):81-85
- 4 Baker, K et al, Costing Services: comparing three i.v. medication systems, Nurs Manage 24(3): 55-60
- 5 Reilly, RT et al, Cost comparison of two systems for intermittent intravenous administration of small-volume injections, Am J Hosp Pharm 42(2):323-328
- 6 <http://www.ismp.org/Newsletters/acutecare/articles/20030220.asp>
- 7 <http://www.ismp.org/Newsletters/ambulatory/Issues/Abbreviations.pdf>