

Special REPORT

Vial2Bag Advanced® 20mm Admixture Device: Cost Reduction and Operational Efficiency in IV Medication Distribution

Faculty

William L. Calhoun Jr, BS Pharm

Clinical Affairs Manager
Progressive Medical, Inc
Fenton, Missouri

Overall pharmacy experience: 33 years

Hospital experience: 18 years

Last role/title in hospital setting: Director of Pharmacy

Previous hospital: North Mississippi Medical Center in Tupelo

Hospital type: Level 2 trauma center, teaching

Number of beds: 750

Annual drug volume: More than \$40 million

When was V2B^b adopted at previous center: 2011

Why was V2B adopted: To improve pharmacy workflow and meet nursing needs for timeliness of medication delivery from pharmacy

How did V2B affect your previous center: Improved the time to first dose and improved pharmacy score on nursing satisfaction annual score, and improved pharmacy workflow by allowing the technicians to compound what was necessary and decreased interruptions

Anna Cunningham, PharmD

Clinical Affairs Director
Progressive Medical, Inc
Fenton, Missouri

Overall pharmacy experience: 17 years

Hospital experience: 8 years

Last role/title in hospital setting: Clinical Pharmacist, focused on perioperative medicine

Previous hospital: St. Louis University Hospital in St. Louis, Missouri

Hospital type: Level 1 trauma center; research, academic, and tertiary-care medical center

Number of beds: 365

T.J. Henderson, PharmD

Pharmacy Operations Manager
Piedmont Columbus Regional Midtown
Columbus, Georgia

Overall pharmacy experience: 14 years

Hospital experience: 5 years

Hospital type: Not-for-profit, community teaching hospital; Level 2 trauma center

Number of beds: 583

Annual drug volume: Approximately 68,000 LCSPs

When was V2BA^a adopted at current center: May 2022

Why was V2BA adopted: To assist and improve pharmacy workflow; preserve manufacture dating and decrease waste of medication; standardize admixture processes to maximize efficiency for pharmacy and point-of-care nursing, and reduce delays in medication administration

How has V2BA affected your center: Improved pharmacy workflow by no longer requiring pharmacy technicians to manually assemble "pop-together" variations; decreased waste of medication via preserved manufacture dating of V2BA assembly at bedside; decreased limitations set by specific manufacturer's fluids and adapters; standardized admixture process for facility by converting to one adapter, therefore maximizing efficiency for pharmacy and nursing; decreased delays in medication administration, and improved nursing satisfaction

Brandon McLain, PharmD, MBA, BCPS

System Director of Pharmacy Operations
Baptist Health
Louisville, Kentucky

Overall pharmacy experience: 21 years

Hospital experience: 19 years

Hospital type: Community hospital health system

Number of beds: 2,770

Annual drug volume: More than \$450 million

When was V2BA adopted at current center: 2021

Why was V2BA adopted: To improve pharmacy workflows, capture cost savings, and improve timeliness of medication delivery from pharmacy

How has V2BA affected your center: Contributed to budgeted cost savings initiatives; improved pharmacy workflow; reduced amount manually compounding, and reduced number of missed/late doses secondary to being able to store product on the units

LCSP, locally compounded sterile products (non-chemotherapy); NICU, neonatal intensive care unit; V2B, Vial2Bag Admixture Device; V2BA, Vial2Bag Advanced® 20mm Admixture Device

(For more information, please see Important Product Information on page 4).

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Introduction

In recent years, IV drug distribution has been a dynamic and ever-changing environment. Challenges faced by hospital pharmacy managers and directors have included supply disruptions,¹ staffing shortages,² rising costs,³ safety concerns,⁴ absence of standardization,⁴ and inefficiencies that have resulted in large-scale drug waste.⁵ This special report will review the factors that can affect quality IV drug distribution, and how the use of updated technology, such as the Vial2Bag Advanced® 20mm Admixture Device (West Pharmaceutical Services; Figure), may result in improved outcomes for patients and reduced waste and cost for providers.

The Vial2Bag Advanced® Admixture Device is indicated to serve as a connection between a 50, 100, or 250mL IV bag, vial with 20mm closure, and an external IV administration set. The integrated vial adapter makes it possible to reconstitute and/or admix drugs prior to administration to the patient.⁶ The Vial2Bag Advanced® Admixture Device is designed to make it possible for medications that must be diluted before IV use at the point of care to be reconstituted and/or admixed with optimized efficiency⁷ and less risk for drug waste.⁸ (For more information, please see Important Product Information on page 4).

Improving Drug Delivery Time

Optimizing IV medication distribution for point-of-care admixture can save time, which has the potential to provide direct patient benefits.⁸ For example, drug delivery time is crucial in conditions like severe sepsis and septic shock. A recent study showed that patients experiencing septic shock who received appropriate antibiotics within 1 hour of diagnosis had the greatest benefit in survival.⁹ Other conditions that can benefit from reducing IV medication delivery delays include pneumonia, severe COVID-19 infections during which a hospitalized patient must remain sedated while intubated, and prophylactic antibiotic infusions before and during open heart surgery, according to Anna Cunningham, PharmD, the clinical affairs director at Progressive Medical, Inc, in Fenton, Missouri. “Drug delivery delays are a challenge for nurses and other members of the health care team in busy hospitals,” she said. “One of the complaints from nurses is that they often are waiting on pharmacy to deliver a medication.”

Using the Vial2Bag Advanced® Admixture Device in an automated dispensing cabinet (ADC) gives nurses and other members of the health care team less disruption to their workflow and streamlines their ability to give an IV infusion immediately.⁷ Minimizing delays can help health care professionals take better care of patients by reducing stress for both the patient and the nurse.¹⁰ “If a nurse is waiting for a STAT infusion for their patient, for example, and they do not have it because they are waiting on pharmacy, that is a high-stress situation for the patient and also can be stressful for the nurse,” Dr Cunningham said. “This is compared to being able to walk to their machine when supply is becoming low, get the medication, use the Vial2Bag Advanced® Admixture Device, and hang the infusion. From that standpoint, I think the admixture device definitely can reduce stress as well as give nurses some control and autonomy in the IV infusion delivery.”

Brandon McLain, PharmD, the system director of pharmacy operations at Baptist Health in Louisville, Kentucky, stated how his health care system loads the Vial2Bag Advanced® Admixture Device into their automation with the IV piggyback

bag and vials. Thus, as soon as a nurse enters an order, that order progresses down the verification queue in pharmacy through the electronic medical record (EMR). Depending on how busy the pharmacy is, workers there can verify the order in 30 seconds to 5 minutes. “Once verification occurs, it will transmit up to the automated cabinets on the floor immediately, and nursing can pull it right at the point of care. Within 5 minutes, the nurse could have drug in hand after placing an order,” Dr McLain said.

Dr McLain noted that prior to using the Vial2Bag Advanced® Admixture Device, if the pharmacy would need to compound the requested medication, the process could take 30 minutes. The time delay could be dependent on other workloads in the IV room; other medication orders preceding it; verifying the order; labeling the medication; awaiting a technician who is gathering the components and compounding them; and waiting for the medication to be physically run up to the floor. “We went from about 30 minutes down to 5 minutes of having the drug in hand,” he said.

The difference in drug delivery time when using the Vial2Bag Advanced® Admixture Device is like “night and day,” said T.J. Henderson, PharmD, the pharmacy operations manager at Piedmont Columbus Regional Midtown in Columbus, Georgia. “It means we no longer have to garb up and prepare these medications under the hood; we can just select the components we need and send them up in a kit. Using the Vial2Bag Advanced® Admixture Device has decreased a lot of time spent preparing IV medications.” Dr Henderson added that a highly trained pharmacy technician is not needed to use this admixture device—any technician or pharmacist is able to obtain what they need, and the nursing staff performs the assembly entirely. “Once they’ve got it on hand, they’re ready to go,” he said.

Optimizing and Maximizing Automated Dispensing Cabinet Utilization

Studies have found point-of-care products in ADCs have the advantages of enhanced safety, increased dispensing efficiency, and cost avoidance.⁸ Also, recent revisions to USP Chapter <797>, which mandate that pharmacies improve and maintain clean medication preparation areas, recommend automation and technology use as much as possible in preparing compounded sterile products.¹¹ The Vial2Bag Advanced® Admixture Device is aimed at reducing the need for compounding.⁷

From a system standpoint, Dr Henderson noted that Piedmont Columbus Regional Health observes key performance indicators on every facility’s ADC, including vend-to-fill ratios. Stock-out ratios have their own list of key performance indicators. One indicator that representatives at Piedmont watch closely is optimizing their inventory. “We perform optimization using BD Pyxis™ on a daily basis,” Dr Henderson said. “We are constantly reviewing usages, which not only is easier for us to manage with Pyxis™, but also is helped by how the Vial2Bag Advanced® Admixture Device is set up. We are managing a vial versus managing a USP sterile IV admixture. The Vial2Bag Advanced® Admixture Device has helped us optimize real estate, as it does not require as much space within the cabinet, which leaves room for more medications. Also, using this admixture device has helped us with scanning compliance because Pyxis™ requires nursing to scan the vial with medication and the fluid.”

William L. Calhoun Jr, BS Pharm, the clinical affairs manager at Progressive Medical, Inc, in Fenton, Missouri, said, “If you look at the data, we know that patient safety is improved if we use automated dispensing machines.⁸ We remove human error by using barcode scanning, so the more medicines you can place into automated dispensing machines and utilize that system, the safer dispensing most likely will be.” Mr Calhoun’s first experience with this product type was using the Vial2Bag admixture device in 2010. West’s Vial2Bag Advanced[®] Admixture Device replaced the Vial2Bag admixture device in commerce, the latter of which is no longer available.⁹ (For more information, please see Important Product Information on page 4).

Mr Calhoun was a director of pharmacy at North Mississippi Medical Center, and the hospital was experiencing problems with drug shortages interrupting the workflow. A large hospital, North Mississippi Medical Center was receiving 250 to 300 orders in its queue that pharmacists had to verify. “The Vial2Bag admixture device^b maximized our automated dispensing machines and used barcode scanning to ensure proper dosing so that the right patient was getting the right medication—not only for the vial, but also for the bag,” he said. “Our team would have it already on the floor, close to the nurse and the patient. Once pharmacy verified the order, it would be sent across the interface automatically from our EMRs to the automated dispensaries, and nursing had access to it. The old way, on the other hand, could take 45 minutes to 2 hours depending on how busy we were.”

Reducing Drug and Labor Waste

A recent study published in the *Journal of Pharmacy Practice* compared the use of the Vial2Bag admixture device^b with ready-to-use and locally compounding infusions.⁸ The authors reported more than \$2 million in extrapolated yearly cost avoidance and over 40,000 fewer IV room compounded products. The study authors also discussed how the flexibility of a universal^c admixture device helped alleviate supply chain disruptions.⁸ (For more information, please see Important Product Information on page 4).

Labor waste also can be a significant cost. Dr Henderson said the reason Piedmont Columbus Regional Health originally considered transitioning to the Vial2Bag Advanced[®] Admixture

Device was the strain on pharmacy technicians who were manually assembling pop-together devices, such as Mini-Bag Plus Container System (Baxter), ADD-Vantage™ System (Pfizer), and Vial-Mate Reconstitution Devices (Baxter). “From a national standpoint, we were facing a technician shortage on top of COVID-19,” Dr Henderson said. “It became even more difficult for technicians to be able to complete all of those assemblies. We would manually compound anywhere between 3,000 and 3,600 per month.” As Piedmont hospitals began using the Vial2Bag Advanced[®] Admixture Device at other facilities, administrators ultimately discovered how much work for which their technicians had been responsible. “It was a pretty simple decision to move forward with this,” he said.

Improving Flexibility to Navigate Shortages

Drug shortages are a global concern caused by regulatory, manufacturing, and logistical issues as well as scarcity of raw materials, increased marketing, and demand.¹² In light of ongoing drug shortages, minimizing waste is particularly important for pharmaceutical stakeholders.¹³ Improving the flexibility of medical devices designed to be universal should be an important method for helping health care decision makers achieve this goal.

One of the disadvantages of pop-together devices is that the adapters are unique to a specific type of fluid bag. “With current IV fluid shortages, the adapter is ultimately rendered useless,” Dr Henderson said. “The functionality of the Vial2Bag Advanced[®] Admixture Device being universal across all manufacturers of fluid^c definitely made managing fluid shortages much easier.” (For more information, please see Important Product Information on page 4). While the April 2021 State of Pharmacy Compounding by *Pharmacy Purchasing & Products* reported that only 64% of facilities have embraced a point-of-care medication distribution model,¹⁴ some believe the current IV fluid shortage will propel this conservation strategy.

Dr McLain said once Baptist Health implemented the use of the Vial2Bag Advanced[®] Admixture Device, they were not finding much waste in the pharmacy anymore. “We essentially eliminated our waste across the board for anything that we were able to use with the Vial2Bag Advanced[®] Admixture Device, which, in today’s day and age with shortages what they are, was significantly beneficial.”



Figure. The Vial2Bag Advanced[®] 20mm Admixture Device.

The Vial2Bag Advanced[®] 20mm Admixture Device enables reconstitution and transfer of a drug between a vial and an IV bag prior to administration to the patient. Device shown (left), attached to vial (center), and attached to IV bag (right).

Images courtesy of West Pharmaceutical Services and Progressive Medical, Inc.

Conclusion

Pharmacy waste reduction, in all of its forms, can help improve profitability and reduce pharmacies' costs,⁸ particularly when point-of-care tools such as the Vial2Bag Advanced[®] Admixture Device are used for drug delivery optimization.⁷ With the industry experiencing a shortage of pharmacy technicians,² using the Vial2Bag Advanced[®] Admixture Device can enable hospital systems to streamline workflow efficiencies



benefiting both patient safety and hospital cost.⁸ Additionally, with fluid and medication shortages a concern for hospital pharmacists overall, the Vial2Bag Advanced[®] Admixture Device can be used with a variety of IV products, and may help reduce health care workers' time spent retooling the ADC and EMR.⁶ Lastly, using the Vial2Bag Advanced[®] Admixture Device, nursing staff may face less stress waiting on pharmacy to provide critical, lifesaving drugs to patients.

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Important Product Information

- ^a The Vial2Bag Advanced[®] 20mm admixture device is 510(k) cleared by the United States Food and Drug Administration (FDA). The use of the Vial2Bag Advanced[®] 20mm admixture device should not be interpreted as modifying, extending, or superseding a drug manufacturer's labeling recommendations for storage and expiration dating, unless otherwise limited by USP <797> compounding standards. Refer to drug manufacturer's labeling and use instructions for recommendations, USP <797>, and applicable institution policy for shelf life and sterility information of reconstituted product and admixture device compatibility. Compatibility of the Vial2Bag Advanced[®] 20mm admixture device with all drug products has not been confirmed. Do not use the Vial2Bag Advanced[®] 20mm admixture device with lipids. Failure to follow the instructions provided may result in inadequate medication reconstitution, dilution, and/or transfer, possibly leading to overdose or underdose and/or delay in therapy. Products shown are for INFORMATION purposes only and may not be approved for marketing in specific regions.
- ^b The Vial2Bag Admixture Device is different from the Vial2Bag Advanced[®] Admixture Device. The Vial2Bag Admixture Device is no longer commercially available and has been replaced with the Vial2Bag Advanced[®] Admixture Device in commerce.
- ^c The Vial2Bag Advanced[®] 20mm admixture device is indicated to serve as a connection between a 50, 100, or 250mL IV bag with an ISO standard IV port compatible with an ISO 8536-4 standard IV spike.
- ^d This article and the Vial2Bag Advanced[®] 20mm admixture device are intended for U.S. healthcare professionals only.

Prescription use only.

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Disclosures: Mr Calhoun is the Clinical Affairs Manager at Progressive Medical, Inc. Dr Cunningham is the Clinical Affairs Director at Progressive Medical, Inc. Dr Henderson reported no relevant financial conflicts of interest. Dr McLain reported that he has received honoraria from Omnicell.

PMI is an authorized distributor of Vial2Bag Advanced[®] admixture devices in the United States.

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