

# Use of Flush Bags for Home Infusion Patients

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## OBJECTIVE

To provide IV catheter flush solutions to home infusion patients that are:

- Safe
- Easy for Patient use
- Cost Effective
- Efficient for Pharmacy Dispensing

## SYSTEMS

### System A (Interlink® / MDV)

Cannulas  
Syringes  
Vial Adapter  
Threaded Cannulas  
Injection Port  
NS 30mL Vials  
Heparin 30mL Vials

### System B (CLAVE® Connector / MDV)

CLAVE Connector  
Syringes  
Vial Adapter  
NS 30mL Vials  
Heparin 30mL Vials

### System A (Interlink / PFS)

Cannulas  
Threaded Cannulas  
Injection Port  
NS Syringes  
Heparin Syringes

### System B (CLAVE Connector / PFS)

CLAVE Connector  
NS Syringes  
Heparin Syringes

### System B ( CLAVE / Bag)

NS 100mL bag  
NS 500ml Bag  
Heparin 10,000 Units  
CLAVE Connector  
CLAVE Bag Spike  
Syringes

### Legend

System A = Baxter  
System B = ICU Medical, Inc.  
Bags = Baxter  
Heparin = ESI  
Syringes = Becton Dickinson  
PFS = Rocap

## METHODS

**SAFETY:** Compounded heparin bags were tested for sterility and stability. PVC bags containing 100mL NS were used in compounding. 90mLs of NS were left in the bag by withdrawing 20mLs. 10mLs of heparin (porcine) 1,000 units per mL were added to the bag. All air was withdrawn and a needle-less spike with back check valve was attached.

**Sterility:** Tested bags were compounded, sent to patient's home for use (7 to 10 days), returned to pharmacy, and stored up to 12 weeks. Ten solutions were filtered through a cellulosic membrane filtration system and incubated in a tryptic soy broth for 14 days. At 20-25 degrees Celsius. No turbidity was observed.

**Stability:** Three samples were sent to a special coagulation testing lab for quantitative analysis. One sample was 14 days old when mailed; one sample was freshly prepared the day of mailing; and a control sample containing the concentrated heparin was mailed. Samples were analyzed the on the second day after mailing.

**EASE OF USE:** Nurses evaluated the ease of use in three ways: ease of patient teaching and patient's ability to manipulate and correctly use various flush systems; patient's reference; and the amount of time spent in teaching. The following items were considered due to observations of patient manipulations:

1. Number of pieces
2. Size of pieces
3. Patient's dexterity
4. Patient's comprehension
5. Patient's visual ability
6. Patient's self-confidence
7. Patient's age

**COST:** Costs for all component items in each system were compiled. Quantities of each item were tabulated for 1 to 4 times a day flushing. The cost of each system for 1 and 2 weeks of therapy were compared. For this analysis, it was assumed that patients used flush flushes around IV drug doses, not for maintenance of catheter flushing. These costs are based on our contract prices; other contract prices may vary.

**EFFICIENCY:** The evaluation of pharmacy staff's time included: time to compound heparin and saline bags; label multidose vials, prefilled syringes, and bags; and dispense each system. The time to order, stock, and inventory the various component pieces was also included in evaluation process.

### SYSTEMS TESTED:

Prefilled syringes (NS 5mL, Heparin 100u / mL, 3mL) with attached plunger.

- With needle-less system A (PFS + A)
- With needle-less system B (PFS + B)

Multidose vials

- With needle-less system A (MDV + A)
- With needle-less system B (MDV + B)

IV bags with needle-less spike system and back check valve (Bag + B)

## RESULTS

### SAFETY:

Sterility: No growth after 14 days in incubator.

Stability: 89% of Heparin solution after 16 days, 92% after 2 days, 99.5% in control after 2 days.

### EASE OF USE:

Rating of each system from easiest (1) to hardest (2).

#### Patient Teaching and Manipulation:

1. Prefilled syringes + System B
2. Bag + System B
3. Prefilled syringes + System A
4. Multidose vials + System B
5. Multidose vials + System A

#### Patient Preference:

1. Prefilled syringes + System B
2. Bag + System B
3. Prefilled syringes + System A
4. Multidose vials + System B
5. Multidose vials + System A

#### Time Spent in Education:

1. Prefilled syringes + System B
2. Bag + System B
3. Prefilled syringes + System A
4. Multidose vials + System B
5. Multidose vials + System A

### COST:

System	QDx7d	BIDx7d	TIDx7d	QIDx7d
MDV + A	\$14.20	23.29	32.02	43.08
<b>MDV + B</b>	<b>12.37</b>	<b>14.52</b>	<b>16.32</b>	<b>22.20</b>
PFS + A	20.59	39.77	58.95	78.13
<b>PFS + B</b>	<b>15.25</b>	<b>27.50</b>	<b>38.70</b>	<b>52.00</b>
Bag + B	15.87	17.22	18.56	19.91

System	QDx14	BIDx14	TIDx14	QIDx14
MDV + A	\$28.40	46.58	64.04	86.16
<b>MDV + B</b>	<b>24.74</b>	<b>29.04</b>	<b>32.64</b>	<b>44.40</b>
PFS + A	41.18	79.54	117.90	156.26
<b>PFS + B</b>	<b>30.50</b>	<b>55.00</b>	<b>77.40</b>	<b>104.00</b>
Bag + B	20.21	22.91	25.59	28.29

## **EFFICIENCY:**

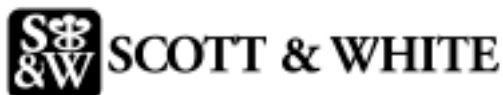
The time to compound, label, order / stock was rated from more time (1) to least time (5):

1. Bag + System B
2. Prefilled syringes + System A
3. Prefilled syringes + System B
4. Multidose vials + System A
5. Multidose vials + System B

## **CONCLUSION**

Dispensing Guidelines for Providing Value – Added Service:

- Patient flushes 1-2 times daily = **MDV + B**
- Patient flushes > 3 times daily = **Bag + B**
- Patient has visual, dexterity, or comprehension handicaps = **PFS +B**



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## **LIST OF RESOURCES**

CLAVE® Connector System, **ICU Medical, Inc.**

[www.icumed.com](http://www.icumed.com)

951 Calle Amanecer, San Clemente, CA, 92718 949-366-2183 Fax: 949-366-8368

Special Coagulation Laboratory: **Colorado Coagulation Consultants**

[www.colorado-coag.com](http://www.colorado-coag.com)

3177 South Parker Road, Suite 300, Aurora, CO, 80014 800-288-6222 Fax: 303-399-3338

Cellulosic Membrane Filtration System: Addi-Chek Quality Control System

**Millipore Corporation**

Bedford, Massachusetts, 01730, 800-645-5476

M000100TS = 100ML Medium

IVQC S47 10=10 test kit with Universal Spike

(May be available through wholesaler)