Contents

1. POINTS TO NOTE

a. The preparation used to add additional glucose to an IV fluid in both bags and buretrols is:
Glucose 50% w/v 50mL glass vial - *See Explanatory note below*

b. Explanation for expression of concentration:

> **%w/v = g per 100mL fluid**
> Glucose 50%w/v = 50g glucose/100mL = 25g glucose/50mL
>
> Common Final Glucose Concentrations in IV Fluids include:
> Glucose 2.5%w/v = 2.5g glucose/100mL
> Glucose 5%w/v = 5g glucose/100mL
> Glucose 10%w/v = 10g glucose /100mL

c. IV fluid bags contain an **overage of volume** (see Table 1 below):

Volumes in Baxter 500mL Viaflo Bags including overages[1]

Nominal Volume in Bag	Average Actual Volume in Bag
500mL	**530mL**

[1]*Reference: Baxter Healthcare*

d. To ensure accurate final concentrations in IV fluid bags:
   a. the overage must be removed from the bag
   b. further volume must be removed to account for the increase in bag volume due to the addition of glucose solution. e.g. where 25mL of glucose is to be added to a 500mL bag, 25mL of fluid must first be removed.

e. All IV fluids should be programmed and administered via the CHI smart-pump drug library (where possible).

f. Where the glucose concentration exceeds 12.5%w/v, this must be administered through a central line.

2. ADDING GLUCOSE TO NON-GLUCOSE CONTAINING INFUSION BAGS

a. Calculate quantity of glucose to be added to the 500mL bag:
b. Calculate the equivalent volume of Glucose 50%w/v
c. Calculate the total volume to be withdrawn from the bag to account for overage in bag (30mL) and volume for glucose being added.

Table 2: Adding Glucose to IV fluid bags with no Glucose content (*See Sample Calculation below*)

Target % Glucose (w/v)	Volume to be withdrawn from 500mL bag	Volume of Glucose 50%w/v to be added to 500mL infusion bag	Final Constituents in Bag
2.5%	55mL [25mL (*replaced with glucose*) + 30mL (*overage*)]	25mL	500mL Glucose 5% as: 475mL (diluent) + 25mL (Glucose 50%w/v)
5%	80mL [50mL (*replaced with glucose*) + 30mL (*overage*)]	50mL	500mL Glucose 5% as: 450mL (diluent) + 50mL (Glucose 50%w/v)
10%	130mL [100mL (*replaced with glucose*) + 30mL (*overage*)]	100mL	500mL Glucose 5% as: 400mL (diluent) + 100mL (Glucose 50%w/v)

Sample Calculation:

Required Concentration	Required Stock
Glucose 2.5% w/v = 2.5g glucose per 100mL	1. 500mL bag of fluid 2. Glucose 50% w/v 50mL glass vial (containing 50g of glucose/100mL)

1. Quantity of glucose to be added to 500mL bag:

$$\frac{2.5 \ x \ 500}{100} = 12.5g \text{ glucose}$$

2. Use Glucose 50%w/v (50g glucose in 100mL) to obtain required volume, equivalent to 12.5g glucose:

$$\frac{12.5 \ x \ 100}{50} = 25mL$$

3. Withdraw excess volume from 500mL bag, to account for:
   a. Volume of glucose to be added = 25mL
   b. Overage in the bag = 30mL

   Total to be removed = 25mL + 30mL = 55mL

   This leaves 475mL remaining in the bag.

4. Add 25mL (glucose 50% v/w) to infusion bag (475mL) which gives a final volume of 500mL
   Now have: 12.5g glucose in 500mL
   = 2.5g glucose in 100mL = 2.5%w/v glucose

3. INCREASING THE PERCENTAGE OF GLUCOSE IN A GLUCOSE-CONTAINING INFUSION BAG

a.   When IV fluid bag solution already contains glucose, some of this glucose will be removed from the bag when excess solution is withdrawn i.e. to account for overage and volume of glucose to be added.

b.   To ensure accurate final glucose concentrations, additional glucose must be added to correct for that lost during the withdrawal process.

c.   The following tables provide the volumes of Glucose 50% w/v to be added to IV fluid bags which already contain glucose - these volume to be added to 500mL bags have been adjusted to correct for the glucose content in the withdrawn volume.

Increasing from 2.5%w/v Glucose

% w/v Glucose already in 500mL infusion bag	Target %w/v Glucose	Volume to be **withdrawn** from infusion bag **(including overage)**	Volume of Glucose 50% to be **added to 500mL bag**
2.5%	3%	35.3mL	5.3mL
	3.5%	40.5mL	10.5mL
	4%	45.8mL	15.8mL
	4.5%	51mL	21mL
Final volume of bag = 500mL			

Increasing from 5%w/v Glucose

% w/v Glucose already in 500mL infusion bag	Target %w/v Glucose	Volume to be **withdrawn** from infusion bag **(including overage)**	Volume of Glucose 50% to be **added to 500mL bag**
5%	5.5%	35.5mL	5.5mL
	6%	41mL	11mL
	6.5%	46.5mL	16.5mL
	7%	52mL	22mL
	7.5%	58mL	28mL
	8%	63mL	33mL
	8.5%	69mL	39mL
	9%	74mL	44mL
	9.5%	80mL	50mL
	10%	85mL	55mL
	12.5%	113mL	83mL
	15%	140mL	110mL
Final volume of bag = 500mL			

Increasing from 10%w/v Glucose

This should be prepared using a buretrol. See Section 4 below.

4. INCREASING THE PERCENTAGE OF GLUCOSE IN A BURETROL

%w/v Glucose already in IV fluid	Target %w/v Glucose	Volume of Glucose 50% to be added to buretrol	Volume of fluid containing Glucose 2.5%w/v required in buretrol to give final volume 100mL
2.5%	3%	1mL	99mL
	3.5%	2mL	98mL
	4%	3mL	97mL
	4.5%	4mL	96mL
	5%	5mL	95mL
	5.5%	6mL	94mL
	6%	7mL	93mL
	6.5%	8mL	92mL
	7%	9mL	91mL
	7.5%	10mL	90mL
	8%	11.5mL	88.5mL
	8.5%	13mL	87mL
	9%	13.5mL	86.5mL
	9.5%	15mL	85mL
	10%	16mL	84mL
	12.5%	21mL	79mL
	15%	26mL	74mL
Final volume in buretrol = 100mL			

%w/v Glucose already in IV fluid	Target %w/v Glucose	Volume of Glucose 50% to be added to buretrol	Volume of fluid containing Glucose 5%w/v required in buretrol to give final volume of 100mL
5%	5.5%	1mL	99mL
	6%	2mL	98mL
	6.5%	3mL	97mL
	7%	4mL	96mL
	7.5%	5mL	95mL
	8%	6mL	94mL
	8.5%	8mL	92mL
	9%	9mL	91mL
	9.5%	10mL	90mL
	10%	11mL	89mL
	12.5%	16mL	84mL
	15%	22mL	78mL
Final volume in buretrol = 100mL			

%w/v Glucose already in IV fluid	% w/v Glucose required	Volume of Glucose 50% to be added to buretrol	Volume of fluid containing Glucose 10% w/v required in buretrol to give final volume of 100mL
10%	12%	4mL	96mL
	12.5%	6mL	94mL
	15%	12mL	88mL
Final volume in buretrol = 100mL			