



## **Buffy Coat Quality Initiative Day**

### **Synopsis Report** June 2007

Nova Scotia Provincial Blood Coordinating Program

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## *Core Members*

## *Role*

Cindy Hyson RN BScN.....	Planning
April Lockhart RN.....	Planning/Implementation/Evaluation
Paula Hammond RN BScN.....	Implementation/Evaluation

## *Acknowledgements:*

We would like to acknowledge the contributions of many individuals/organizations that helped make this Quality Initiative day possible. First, we would like to thank Canadian Blood Services (CBS) for supplying fifteen units of red blood cells collected using the buffy coat process for assessment purposes and also for introducing the concept of “buffy coat” to participants with a comprehensive presentation. In particular we would like to acknowledge the contribution of David Howe, Susan Shimla, Cheryl Doncaster, Bev Pearce and Michael Jackman. The British Columbia Provincial Blood Coordinating Office generously provided us with a copy of stage II assessment forms and allowed us to use their buffy coat video, demonstrating the spiking technique. Furthermore we would like to thank the various contributions and generous donation of supplies from industry stakeholders: mainly, Baxter (Blair Johnston, Heidi Hevenor, and Alanna Harrison), MacoPharma (Sandra Chaker), Hospira (Tremaine Brownell) and Alaris (Sherry Blondin). Finally a special thanks to all nurses who participated in the evaluation of IV blood pump infusion set / buffy coat blood bag combinations. The use of your time and expertise was greatly appreciated.

## *Background*

The Buffy Coat method of platelet production has been in widespread use, predominantly in Europe, for over 20 years. One main benefit of the Buffy Coat method is that suppliers are able to provide a pooled, “ready-to-transfuse” platelet concentrate with a five-day shelf life to the health care system. One of the changes to the products delivered by the Buffy Coat method is the use of ISO-compliant blood and blood component storage bags. Canadian Blood Services piloted the Buffy Coat method for the production of platelets in Alberta in 2005. Alberta reported issues with spiking the new bags and despite increased training there appeared to be some consistency with users having difficulty inserting and/or removing an infusion set spike.

As a consequence of Edmonton’s experiences and before the Buffy Coat method arrived in other provinces, British Columbia conducted an extensive study to primarily examine serviceability issues with the new ISO-compliant component storage bags. In October 2006, the British Columbia Provincial Coordinating Office released the results of an extensive study titled “CBS Buffy Coat Blood Bag Evaluation”. At the time of this release the expected roll out date for the Buffy Coat method was fall 2008 for Nova Scotia. Upon review of the report it was noted that mostly gravity fed infusion sets were tested by British Columbia but no specific attention given to IV blood pump infusion sets and pumps. Nova Scotia has been pumping blood/blood products since 1992. The technology employed in the pump system is a silastic membrane within the cassette, this allows for ease of transfusion without the worry of cell damage and/or breakdown. The silastic membrane technology received FDA approval in 1991. The Nova Scotia provincial blood administration policy indicates a pump may be used to administer RBC’s and for the most part, blood infused in Nova Scotia is via a pump. Planning began for the Buffy Coat Quality Initiative day with a core objective, to test IV blood pump infusion sets and pumps currently in use throughout Nova Scotia with the new buffy coat storage bags.

## *Main Objectives*

- 1.** Assess compatibility of IV blood pump infusion sets and pumps currently used in Nova Scotia with buffy coat storage bags filled with blood product.
- 2.** Provide an information session to define “What is buffy coat?”
- 3.** Provide a demonstration of spiking technique to ensure safe and correct spiking during the implementation phase.

**Planning Stage:**

- Arrange collectively with CBS arrival of Baxter and MacoPharma buffy coat storage bags containing blood product.
- Determine which IV blood pump infusion sets and corresponding pumps are in use in each district within Nova Scotia.
- Arrange for IV blood pump infusion sets and pumps to be available on the Buffy Coat Quality Initiative day.
- Obtain a copy and seek permission to use spiking demonstration video developed by British Columbia Provincial Blood Coordinating Office.
- Request a presentation from CBS to define the buffy coat process.
- Request a demonstration of spiking technique by Baxter Product Specialist.
- Seek representation from each District Health Authority (DHA) and from the Isaac Walton Killam Health Center (IWK).
- Provide a teleconference option to DHA’s unable to travel to Halifax for the Buffy Coat Quality Initiative day.
- Arrange for videotaping of session, to be used as a future resource.
- Arrange biohazard garbage bags, gowns and gloves for proper disposal of the buffy coat red blood cells.
- Develop evaluation forms.

Baxter and MacoPharma are the manufacturers and suppliers of red blood cell storage bags for the buffy coat process at CBS. CBS-Halifax will utilize the Baxter red blood cell storage bag for its donations. Since CBS maintains a national blood inventory, it is anticipated facilities in Nova Scotia could receive both Baxter and MacoPharma blood storage bags as part of their red blood cell inventories. With clinical approval from CBS, a request for outdated red blood cells, produced using the buffy coat process was accepted. It was arranged through CBS to have ten Baxter bags and five MacoPharma bags sent to the Nova Scotia Provincial Blood Coordinating Program (NSPBCP) for testing purposes only. It was arranged to have the units of RBC’s stored as per AABB storage guidelines.

Through investigation, it was determined that there are four different IV blood pump infusion sets currently in use in Nova Scotia. See table below for summary of current IV blood pump infusion sets. As some areas are amid changing type of IV blood pump infusion sets, the table also displays the new pump infusion set tubing to be introduced in the future.

Sites	Current IV blood pump infusion set	Expected change of type of IV blood pump infusion set
DHA 1-7	Hospira 12259-02	No changes expected
DHA 8	Baxter JC6392	Baxter JC7751
DHA 9	Baxter JC6392 & Hospira 12259-02	All Hospira 12259-02
IWK	Alaris 72980E	Alaris 71980

Arrangements were made with each manufacturer and IV blood pump infusion sets were provided to the NSPBCP for use at the Buffy Coat Quality Initiative Day. Samples of the new Alaris IV blood pump infusion set were unable to be obtained as it was awaiting FDA approval. A closer look at the IV blood pump infusion sets is shown in the table below.

Manufacturer	Set tested	Description	* Spike length (mm)	*Spike Base Diameter (mm)	*Spike Proximal Diameter (mm)
Hospira	12259-02	Y-Type Blood Plumset	25.13-25.38	5.5-5.6	5.2-5.3
Baxter	JC6392	Y-Type Blood/Solution Set	41.2	5.6	5.15
Baxter	JC7751	Y-Type Blood/Solution Set	52.5	5.6	5.05
Alaris	72980E	SmartSite Blood Set. SE Pump	**	**	**

\*measurements provided by manufacturer representatives

\*\*Manufacturer representative unable to get measurement information in time for report release.

The date for the Quality Initiative day was set for April 26, 2007. An invitation was sent to each district/IWK, inviting nurses and physicians with expertise in the use of blood products to attend the session (Appendix A). Teleconference sites were established and arrangements were made for videotaping.

It was determined which pumps were compatible for each type of IV blood pump infusion set. The number of pumps needed for our Quality Initiative Day was dependent on number of participants. Early enrolment indicated twenty six nurses would be able to participate. The chart below displays the pump and the corresponding type of infusion set, the number of expected attendees that currently use the pump and the number of pumps available for demonstrating.

IV infusion Set	Infusion Pump	Expected Number of Attendees	Number of Pumps needed	Pumps supplied by
Hospira 12259-02	Abbott Plum	20	3	Hospira & DHA9
Baxter JC6392 & JC7751	Baxter Flo-guard	1	1	DHA8
Alaris 72980E	Alaris Signature Gold	5	1	IWK

An evaluation form was developed for participants to complete after a spiking combination (Appendix B). A spiking combination is defined as an IV blood pump infusion set and a buffy coat RBC bag. The outline was adapted from British Columbia's questionnaire used in Phase II of their study "CBS Buffy Coat Blood Bag Evaluation". Participants would only spike with IV blood pump infusion sets they currently use in their facility; presuming familiarity would increase success with spiking. The evaluation form asked participants to compare the combination they tested with the combination in place at their institution.

A general evaluation form was developed to generate feedback about the day in its entirety and provide demographics of the participants (Appendix C).

### *Implementation Stage*

- Blood storage bags with buffy coat prepared red blood cells were received from CBS on April 25<sup>th</sup> and the morning of April 26<sup>th</sup>. A total of 15 bags received: 10 Baxter and 5 MacoPharma. The buffy coat RBC bags were stored in a monitored fridge and in standard transport containers until used for testing.
- The day's agenda and objectives were explained to participants.
- CBS presented on the buffy coat process.
- Video presentation of spiking technique with Baxter and MacoPharma bags.(video compliments of the British Columbia Provincial Blood Coordinating Office)
- Demonstration by Baxter Product Specialist of spiking a Baxter storage bag.
- Instructions given for completing evaluation forms of bag/spike combination.
- Participants divided into one of three spiking stations coordinating with tubing in use at their facility. Gowns and gloves provided and spiking occurred with staff and product specialists available for resource and assistance. Evaluation forms were given at the end of each spike combination and reinforcement of instructions provided.
- Discussion session ended the four hour day and final evaluation forms were collected (Appendix C).
- Documentation on shipping slip by two organizers validated all units received were discarded. Full traceability of all buffy coat red blood cell units used in the quality initiative day has been maintained according to AABB standards.

## Evaluation

Twenty nurses and one anesthesia assistant attended the “Buffy Coat Quality Initiative Day” (Appendix D). Twenty-two combinations of IV blood pump infusion sets and blood bags were evaluated. (Some blood bags were spiked twice using both ports). All evaluation forms indicated there was **no** evidence of splatter or leakage with either combination of IV blood pump tubing and the blood bags.

Hospira 12259-02 represents the majority of IV blood pump infusion sets used in Nova Scotia. The largest group of participants tested combinations with this infusion set. Twelve evaluations were completed on the combination of Hospira 12259-02 and the Baxter blood bag. Three evaluations were completed on the combination of Hospira 12259-02 and the MacoPharma blood bag (refer to table 1 and 2 below).

**Table 1:** Hospira 12259-02 and Baxter blood bag (12 evaluation forms completed). Pump used was Abbott Plum

Evaluation form questions	% that indicated (much) easier insertion or removal or (much) lower risk	% that indicated (much) more difficult insertion or removal or (much) higher risk	% that indicated no difference from current
1. The degree of effort required to open port cover.	50	25	25
2. The degree of effort required to insert the set into the bag.	75	0	25
3. The risk of contamination when inserting the set into bag	16.5	16.5	67
4. The degree of effort needed to achieve solution flow.	42	0	59
5. The degree of effort required to achieve pump flow.	0	0	100
6. The degree of effort required to remove set from bag.	67	8	25
7. The overall risk of contamination.	33	8	59

**Table 2:** Hospira 12259-02 and MacoPharma blood bag (3 evaluation forms completed). Pump used was Abbott Plum

Evaluation form questions	% that indicated (much) easier insertion or removal or (much) lower risk	% that indicated (much) more difficult insertion or removal or (much) higher risk	% that indicated no difference from current
1. The degree of effort required to open port cover.	0	100	0
2. The degree of effort required to insert the set into the bag.	0	33	67
3. The risk of contamination when inserting the set into bag	0	67	33
4. The degree of effort needed to achieve solution flow.	0	0	100
5. The degree of effort required to achieve pump flow.	0	0	100
6. The degree of effort required to remove set from bag.	0	0	100
7. The overall risk of contamination.	0	0	100

Alaris infusion set (72980E) is only used at the IWK. Time limitations allowed for only one test of Alaris infusion set with the blood bags, therefore only Alaris 72980E and a Baxter blood bag was evaluated. The evaluator found the degree of effort to open the port cover and the degree of effort to achieve pump flow showed no difference from current process. The degree of effort to insert set, achieve solution flow and to remove the set was found to be more difficult (The evaluator indicated this may be due to improper priming technique). The risk of contamination upon set insertion and the overall risk of contamination were indicated on the evaluation as being lower risk than current processes.

The Baxter infusion sets (JC7751 and JC6392) are similar in diameters and only differ by spike length. Since there were no incidents of spatter or leakage and the evaluations are similar, it was decided to consolidate the evaluation form results for review. A total of six combinations with the Baxter infusion sets were evaluated: three with the Baxter blood bags and three with the MacoPharma blood bags. The results are seen in tables 3 and 4 on the following page.

**Table 3:** Baxter JC6392/JC7751 and Baxter blood bags. Pump: Baxter-flogaurd (3 evaluation forms completed)

Evaluation form questions	% that indicated (much) easier insertion or removal or (much)lower risk	% that indicated (much) more difficult insertion or removal or (much) higher risk	% that indicated no difference from current
1. The degree of effort required to open port cover.	33	0	67
2. The degree of effort required to insert the set into the bag.	33.3	33.3	33.3
3.The risk of contamination when inserting the set into bag	33	0	67
4. The degree of effort needed to achieve solution flow.	0	0	100
5. The degree of effort required to achieve pump flow.	0	0	100
6. The degree of effort required to remove set from bag.	33	67	0
7. The overall risk of contamination.	67	0	33

**Table 4:** Baxter JC6392/JC7751 and MacoPharma blood bags. Pump: Baxter-flogaurd (3 evaluation forms completed)

Evaluation form questions	% that indicated (much) easier insertion or removal or (much)lower risk	% that indicated (much) more difficult insertion or removal or (much) higher risk	% that indicated no difference from current
1. The degree of effort required to open port cover.	33	0	67
2. The degree of effort required to insert the set into the bag.	0	0	100
3.The risk of contamination when inserting the set into bag	0	0	100
4. The degree of effort needed to achieve solution flow.	0	33	67
5. The degree of effort required to achieve pump flow.	0	0	100
6. The degree of effort required to remove set from bag.	0	0	100
7. The overall risk of contamination.	33	0	67

## *End of Day Evaluation*

Nineteen evaluation forms were collected from on site participants and three were received from teleconference participants. Teleconference participants stayed on line for only the first half of the day and chose to leave during the interactive phase when participants tested various combinations of tubing and blood bags. The video upon release will be made available to these groups if they wish to view the rest of the day's activities.

In reviewing the general evaluation forms for the whole day it was apparent that the day was a success. 55% rated the day as good, 27% rated the day as very good and 9% rated the day as excellent. Only one respondent gave the day a "fair" rating and another respondent had not circled a rating for that particular question. 86% of respondents indicated the information presented was new to them and 90% of participants felt the technical aspect was beneficial. Of the 10% who did not find the technical/hands on aspect beneficial, all were participants who initiated none or less than five transfusions in a year. These respondents were either operating room nurses or resource nurses and suggested that the presence of anesthetists or anesthesia assistants would have been more appropriate. The respondents who indicated the technical aspect as not being beneficial did recognize the opportunity to pass on what was learned at the session to others in their work areas who deal directly with initiating blood transfusions.

## *Summary*

Nova Scotia's experience with its "Buffy Coat Quality Initiative Day" was both positive and insightful. It was beneficial to note, of all the combinations of blood pump IV tubing and blood bags, there was **no** evidence of splatter or leakage and **no** reported difficulties with achieving pump flow. Only one tubing/bag combination reported difficulty with achieving solution flow (Alaris tubing/ Baxter bag). The comments on this evaluator's form suggested it occurred because the set was not properly primed with saline. Most Hospira tubing evaluators noted easier opening of port and easier insertion/removal of spike with Baxter bags but all three evaluators indicated difficulty with opening port of MacoPharma bags. The remaining three evaluators who examined MacoPharma bag combinations had no difficulty with opening ports. The overall risk of contamination was noted to be mostly unchanged from current practice and a small number of respondents felt the risk of contamination with spike insertion was increased.

The blood pump IV tubing sets used in Nova Scotia were assessed with the Baxter/MacoPharma blood bags, thus meeting the main objective for organizing the day. Assessment of some combinations were insufficient to draw conclusions but beneficial in providing education and exposure. The participants were provided with adequate knowledge about the buffy coat process and given sufficient demonstrations of the new spiking technique.

## *Future Direction*

Training has already been identified by other provinces as imperative to successful implementation of the new blood bags. NSPBCP agrees that sufficient training should be provided to the highest number of users possible before buffy coat technology arrives. It is essential that there be continued collaboration with NSPBCP, CBS, manufacturers, DHA's/IWK and end users to ensure smooth adoption. It is recommended that Nova Scotia be given a six month notice of buffy coat method arrival to allow for proper training to occur throughout the province.



## ***Appendix A (invitation)***

### **Nova Scotia Provincial Blood Coordinating Program**

Room 7 – 130 Centennial Building  
1278 Tower Road  
Halifax, NS B3H 2Y9  
[www.gov.ns.ca/health/nspbc/](http://www.gov.ns.ca/health/nspbc/)

## ***Buffy Coat Quality Initiative Day***

The Nova Scotia Provincial Blood Coordinating Program is continuously developing educational opportunities to enhance the safety of blood products/transfusions. The NSPBCP is in the early stages of coordinating a quality initiative for the upcoming Buffy Coat roll out by Canadian Blood Services. The focus will be on the technical aspect such as spiking the product to ensure there are no problems with IV tubing and/or product bags. IV tubing and pumps currently in use across the province specific to each DHA/IWK and the Buffy Coat blood product will be trialed. This session is specifically intended for physicians and nurses with expertise in the use of blood products, IV blood tubing and pumps. The education session is booked for April 26<sup>th</sup> at the VG site at the QEII from 10:00-14:00hrs. Telehealth will be available only to a limited number of DHAs\*.

**Date:** April 26, 2007

**Time:** 10:00 – 14:00

**Place:** Room 5110 Dickson, VG Site

**\*Telehealth:** Telehealth services will be available for the following DHAs:

- Amherst - Conf. rm. 1 & 2
- Antigonish - Room 133
- Sydney - Level 3 Telehealth room
- Yarmouth - Room 5C

*\*Lunch, parking and gas (for those who live outside HRRM) will be provided by the NSPBCP*

Please contact April Lockhart @ 473-6287 or via email, [april.lockhart@cdha.nshealth.ca](mailto:april.lockhart@cdha.nshealth.ca), if you have any questions.

# Appendix B

## Blood Bag/Pump Infusion Set Evaluation Form

Blood Bag Identification:

Baxter       MacoPharma

Assessor #: \_\_\_\_\_

Assessment Date: \_\_\_\_\_

Years of Experience: \_\_\_\_\_

Practice Area: \_\_\_\_\_

Infusion Set Identification Number: \_\_\_\_\_

Infusion Pump Identification: \_\_\_\_\_

Current Set Used: (i.e. Hospira) \_\_\_\_\_

Credentials: \_\_\_\_\_

Transfusions initiated/year: \_\_\_\_\_

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**Please circle/tick box:**

1. The **degree of effort** required to **open/remove the port cover** of this bag was:

- 1 Much easier than current
- 2 Somewhat easier than current
- 3 No different than current
- 4 Somewhat more difficult than current
- 5 Much more difficult than current
- 6 Unable to open/remove the port cover

Comments:

2. The **degree of effort** required to **insert** the set into the bag was:

- 1 Much easier than current
- 2 Somewhat easier than current
- 3 No different than current
- 4 Somewhat more difficult than current
- 5 Much more difficult than current
- 6 Unable to insert set into bag

Comments:

3. The **risk of contamination** when **inserting** the set into the bag compared to the bag/set combination currently in use was:

- 1 Much lower risk than current
- 2 Lower risk than current
- 3 No different than current
- 4 Higher risk than current
- 5 Much higher risk than current

Comments:

4. The **degree of effort** required to **achieve solution flow** was:

- 1 Much easier than current
- 2 Somewhat easier than current
- 3 No different than current
- 4 Somewhat more difficult than current
- 5 Much more difficult than current
- 6 Unable to achieve solution flow

Comments:

5. The **degree of effort** required to **achieve Pump flow** was:

- 1 Much easier than current
- 2 Somewhat easier than current
- 3 No different than current
- 4 Somewhat more difficult
- 5 Unable to achieve solution flow

Comments:

6. The **degree of effort** required to **remove** the set from the bag was:

- 1 Much easier than current
- 2 Somewhat easier than current
- 3 No different than current
- 4 Somewhat more difficult than current
- 5 Much more difficult than current
- 6 Unable to remove set from bag

Comments:

7. The overall **risk of contamination** in the pump infusion environment with this set and bag was:

- 1 Much lower risk than current
- 2 Lower risk than current
- 3 No different than current
- 4 Higher risk than current
- 5 Much higher risk than current

Comments:

8. Did you experience **splatter** with this set and bag?

- Yes
- No

If Yes:

- Upon insertion
- Upon removal
- Both

Comments:

9. Did you experience **leakage** with this set and bag?

- Yes
- No

If Yes:

- Upon insertion
- Upon removal
- Both

Comments:

**Thank you for taking the time to complete this evaluation!**

**Appendix C (End of day evaluation form)**  
Evaluation of “Buffy Coat Quality Initiative Day”

Date: \_\_\_\_\_

DHA/IWK: \_\_\_\_\_

*We appreciate your feedback, so please take the time to fill out this evaluation.*

1. Profession: (circle appropriate)

Nurse

Years of experience: \_\_\_\_\_ years

How often do you transfuse blood and blood components per year? (circle appropriate)

0-5 times      5-10 times      greater than 10 times

Other (specify): \_\_\_\_\_

Years of experience: \_\_\_\_\_ years

How often do you transfuse blood and blood components per year? (circle appropriate)

0-5 times      5-10 times      greater than 10 times

2. Circle one of the following to describe your overall opinion/impression of the presentation:

Poor      Fair      Good      Very Good      Excellent

3. Was the information presented new to you?

Yes      No

4. Did you find the technical aspect beneficial? Please specify.

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5. Given the information presented today, will this change the way you practice or teach? Why or why not?

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6. Is there other information that you require?

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Name: \_\_\_\_\_ Contact number: \_\_\_\_\_

*Please fill in your name and contact information for our draw to be made after the presentation.*

## Appendix D

### Participant Profiles

Participant Number	Credentials	Practice Area	Years Experience	Transfusions Initiated Per Year
1	RN	No data	25	5-10
2	BN3	No data	Student BN3	N/A
3	RN	2	10	1-2
4	RN	Supervisor	18	0 – resource for staff
5	RN	Surgery	24	0-5
6	RN	Day Surgery	23	> 100/year
7	RN	OR	4	0
8	RN	OR HI	18	0
9	BN	MDU	29	300+
10	RN	HI OR	13	0
11	RN	MDU	30	Numerous
12	RN	Emerg	8	50
13	BScN, RN	OR	3	0
14	RN	No data	No data	No data
15	RN, SNP	PBmp	24	83
16	Clinical Development Leader, RN, BN	Pediatric Medical Unit	19	36
17	Anest Assist	IWK Gyne / OR Women's	7	12-20
18	BScN, RN	AC/OPD Emerg	4	5-10
19	BScN, RN	AC/OPD Emerg	4	5-10
20	RN	Medicine	17	20
21	RN	Amb Care	34	100+
22	RN	Amb Care	34	100+