GREENCROSS

Maidstone and Tunbridge Wells NHS Trust

Service Evaluation of the AirGlove Patient Warming Device

November 2017

Purpose

The service evaluation aimed to provide evidence as to the efficacy, patient comfort, ease of use and operator preference of the AirGlove warming device.

Methodology

Three production AirGlove warming devices were available for the service evaluation on Charles Dickens ward at Maidstone Hospital between October and November 2017. Charles Dickens is an NHS Oncology ward. Oncology patients who required their arms to be warmed to aid venous access were offered warming using the AirGlove warming device. No patient offered warming with the AirGlove declined.

Patients who had known difficulties in accessing a vein for obtaining blood samples or cannulation were selected by the oncology nurses to test the AirGlove. The device was in use most days and operated by all nurses on the ward.

Study evaluation forms (appendix 1) were completed by chemotherapy nurses for all patients who consented to take part in the evaluation. Patient information was collected in paper form and then entered into a secure Microsoft Excel database for analysis. All patient and staff data is treated in line with Caldicott and Data Protection regulations. Access to the database is limited to Maidstone and Tunbridge Wells NHS Trust Clinical Audit team and stored in a locked office.

Warming of the patient arm to aid venous access.

Patients requiring warming to aid venous access were offered warming via the AirGlove device. On approaching the patient, each nurse attending that patient fully described what the purpose of the service evaluation was and discussed what would happen to the patient, including any potential risks and benefits. Patients were told that they were free to withdraw from the evaluation at any time and withdraw consent for warming. The patients were also asked to provide feedback following warming using the AirGlove and informed that their clinical data will be collected before, during and after the warming.

A total of 80 completed consent forms for the service evaluation were collected.

Results

Use of the Airglove was recorded for a total of 80 episodes. This was made up of women and men. Patients were chosen at random regardless of their sex, age, gender, medical condition etc. The sample size of 80 patients did provide a cohort with a wide range of cancers.

Patient cohort

There was a wide range of ages in the cohort from 33 to 87 years, with a gender split of 26 male (32.5%) and 53 women (66.3%).

Possible patient contraindications
None of the patients were reported to be of any clinical risk or had any conditions that meant they could not participate in the evaluation ie previous arm/skin injury. Seventeen (21.3%) of the patients were taking steroids as part of their treatment but were deemed clinically fit enough to participate in the trial. Seven patients were reported to have peripheral neuropathy and reported to have it in their hands, fingers feet and toes. Again, this did not affect the outcome (both were warmed successfully using AirGlove).

Six patients had dry/sensitive skin but this did not restrict them from using AirGlove Nurses used their clinical judgement as to whether they included patients in the evaluation. None of the six patients were compromised in any way by using AirGlove.

Reasons why warming was required to aid venous access

- Cold hands/arms
- Lack of visible veins to palpate
- Fragile veins
- Veins difficult to locate
- Very fine thread veins
- Arms cold and thin veins
- Multiple lines of chemotherapy
- Veins poor due to long term chemotherapy
- Multiple cycles of chemotherapy treatment
- Hard to find
- Extensive bruising
- Small veins
- Underweight

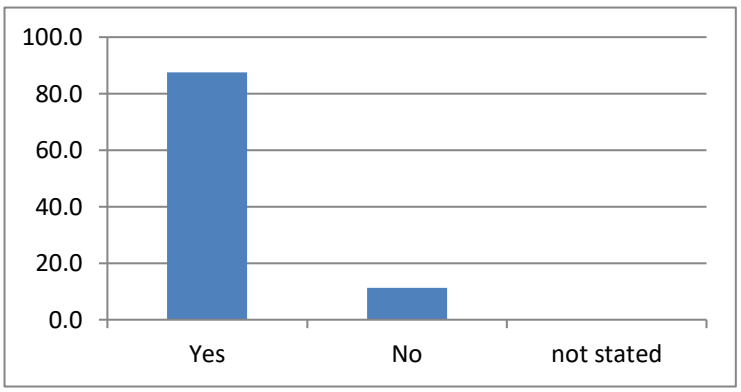
The majority of episodes of use (53 patients n=80) used AirGlove set at temperature setting '2', with a further 24 episodes of use using temperature setting '3'. Many nurses used the temperature setting of 2 as this was widely felt to be within a 'safe' temperature (i.e. not too cool or hot). All 80 episodes of use warmed consistently between 1 and half minutes or three minutes using AirGlove. Nursing staff agreed to warm for either two or three minutes for consistency and to ensure full warming of the patients.

AIRGLOVE
Two patients reported experiencing some adverse effect but unfortunately the experience was not recorded both patients went on to have a successful cannulation. No patients expressed burning sensation during warming; even those with dry, sensitive skin and no one reported any pain from using the device. None of the patients experienced pain at the time of the evaluation.

Did AirGlove successfully assist with venous access / cannulation?
Nursing staff recorded attempt at cannulation on their patients between 30 seconds to 5 minutes post Airglove warming. Cannulation following one heat treatment using AirGlove was successful in 70 of 80 reported occasions.

Vein access following use of the 'AirGlove'

Was the cannulation successful?



	No.	%
Yes	70	87.5
No	9	11.3
N/S	1	
	80	

Why was it unsuccessful in assisting cannulation in ten cases?
Veins were not visibly enlarged for the nurse to attempt cannulation following warming. 2 of the 10 patients had a further attempt without success and one patient had 3 attempts without success. Nurse's comments post-warming included

- 'veins not visible or palpable'
- 2nd attempt success, veins very fine and thready''
- 'Needle went in Ok but could not advance cannula'
- ''vein visible but? Damage by previous extravasation'

Unfortunately, patient views on the use of the device were not routinely sought by the nursing staff. However, when patients were asked, all reported that it was very comfortable compared to the hot water method'
'The patient liked the device and said it is more comfortable than a bucket of water'
'The patient said it's easy to use'

Review of warm water method
The use of a 'bucket of warm water' to improve venous access was recorded in 10 patients. This is a known heating method and can be successful however; staff reported this method we being cumbersome as the nurse is required to physically carry a large amount of water (enough to submerge the arm of the patient) and the patient at times feel embarrassed to sit with their hand in a bucket. In addition, temperature control cannot be easily adjusted and if additional attempts are required, water temperature is cooling rapidly and thus the requirement of another 'bucket of warm water' which means a delay in accessing the vein and possible treatment (Appendix 3).

Conclusion
Venepuncture to obtain blood or for cannulation is one of the most commonly performed clinical procedures. Local warming is known to facilitate the insertion of peripheral venous cannulas, reducing both the time and number of attempts required; in addition decreasing the time staff spend inserting cannulas, reduction in supply costs, and improved patient satisfaction in the reduction of needle insertions. This evaluation concludes that, the sample size of 80 patients using the AirGlove warming device was successful at assisting venous access for difficult to cannulate oncology patients and with no / minimal discomfort to the patient. Access attempt was employed on both men and women, with a wide range of cancers

with ages spanning five decades. The Airglove device successfully enlarged the veins in 87.5% of patients who had known difficulties, allowing for successful cannulation and progression of their planned treatment in 70 out of 80 cases. Unsuccessful patients included those with more than one cancer, particularly cold limbs, women and those with very small veins. Staff and patient satisfaction with the ease of use and operation of the device was high. Several patients stated that they preferred it to the 'bucket of warm water' method used previously due to comfort and ease of use. There were no adverse events during use of the AirGlove device. Initial evaluation results of the effectiveness of the pre-production AirGlove within a clinical setting are very positive and warrant further clinical research.

Appendix 1 – Study Evaluation Form

ABOUT THE PATIENT

1. Patient Age Years ☐ Months
2. Patient sex M ☐ F ☐
3. Type of Cancer ☐
4. If patient has myeloma, are they at risk of fracture? Y ☐ N ☐
5. Is the patient taking steroids? Y ☐ N ☐
6. Does the patient have myeloma? Y ☐ N ☐
7. Other medical problems ☐
8. Any skin conditions (i.e. psoriasis, dry skin etc.) ☐
9. Medication for cancer ☐
10. Other medications ☐
11. Why (in your opinion) is the patient difficult to cannulate?

☐

12. Does the patient have peripheral neuropathy? Y ☐ N ☐

    If so, where on the body? ☐

EFFECTIVENESS OF AIRGLOVE

1. How long was arm warmed by airglove? ☐ mins
2. What temperature setting was the Airglove set at? 1 ☐ 2 ☐ 3 ☐
3. Did warming by Airglove visibly enlarge the veins of the patient? Y ☐ N ☐
4. Did the patient experience any adverse effects following warming? Y ☐ ☐

    If yes, what are they? ☐
5. How soon after warming did you attempt cannulation? (in mins) ☐
6. Was the cannulation successful? Y ☐ N ☐

    If no, why? ☐

Study Number:

Patient Identification Number for this trial:

CONSENT FORM

Title of Project: **Post Marketing Evaluation of the Air Glove Warming Device in Oncology Patients**

Name of Researcher: **Charlotte Wadey, MTW Lead Chemotherapy Nurse**

Please initial all boxes

1. I confirm that I have read and understand the information sheet dated **[DATE]** (version **[VERSION NUMBER]**). I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected. ☐

3. I agree to participate in the Air Glove Warming Device Service Evaluation to aid in the raising of veins to ease cannulisation whilst on the Charles Dickens Ward. ☐

4. I understand the device is AirGlove Device, version 3 ☐

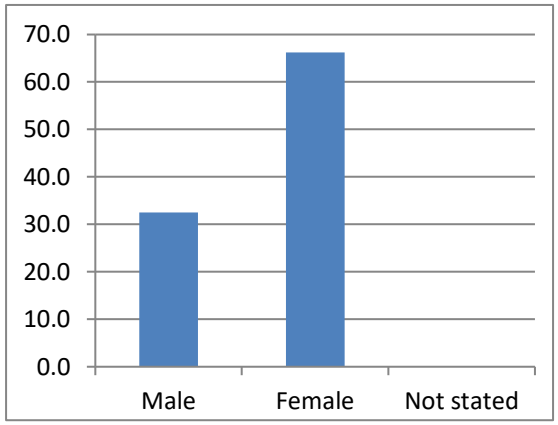
5. I agree to be warmed by AirGlove version 3 ☐

Name of Participant	Date	Signature

Name of Person taking consent.	Date	Signature

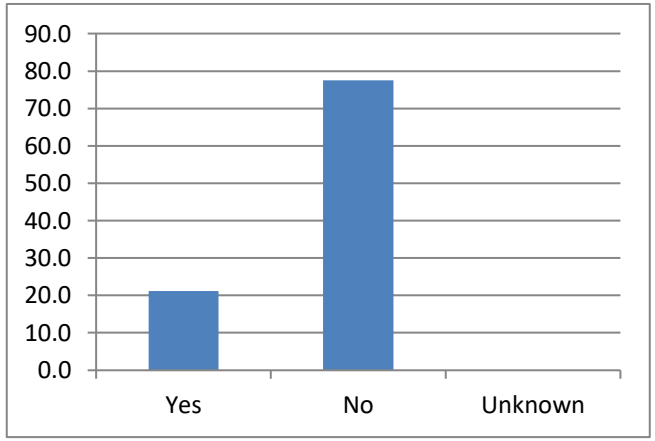
Appendix 2 – Evaluation finding

Patient Gender



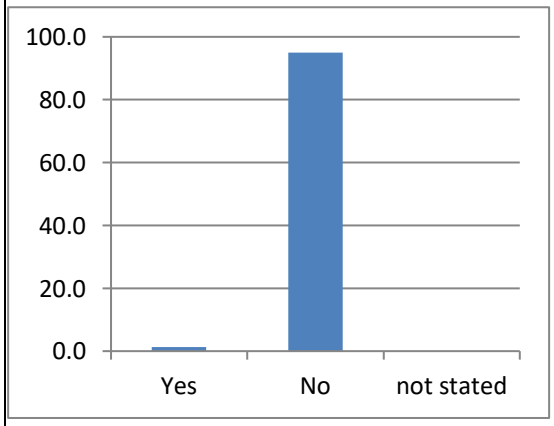
	No	%
Male	26	32.5
Female	53	66.3
Not stated	1	
total	80	

Is the patient taking steroids?



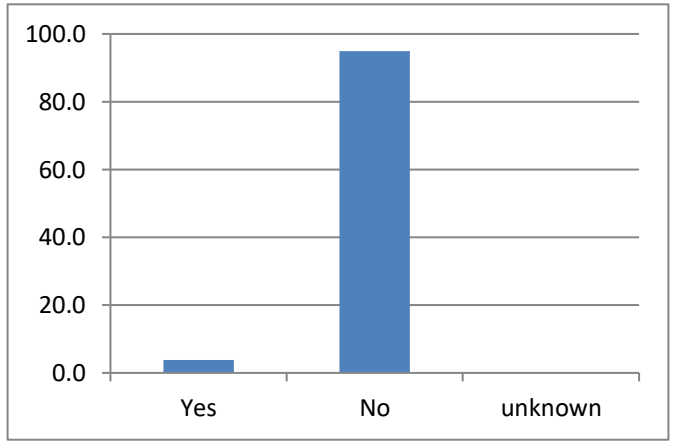
	No	%
Yes	17	21.3
No	62	77.5
Unknown	1	
total	80	

If the patient has myeloma, are they at risk of fracture?



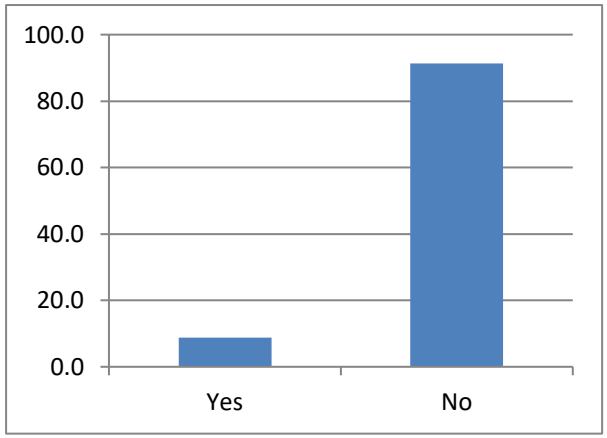
	No	%
Yes	1	1.3
No	76	95.0
not stated	3	
total	80	

Does the patient have myeloma?



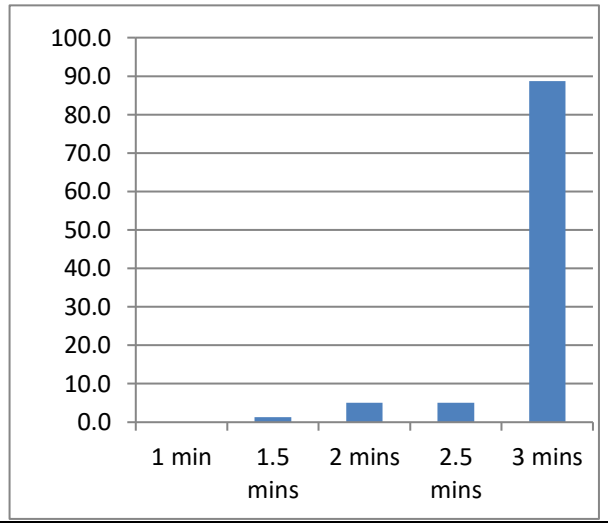
	No	%
Yes	3	3.8
No	76	95.0
unknown	1	
total	80	

Does the patient have peripheral neuropathy?



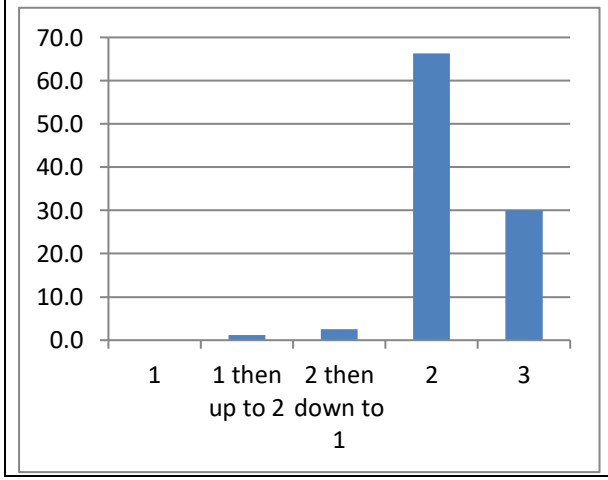
	No	%
Yes	7	8.8
No	73	91.3
total	80	

Time warmed by AirGlove



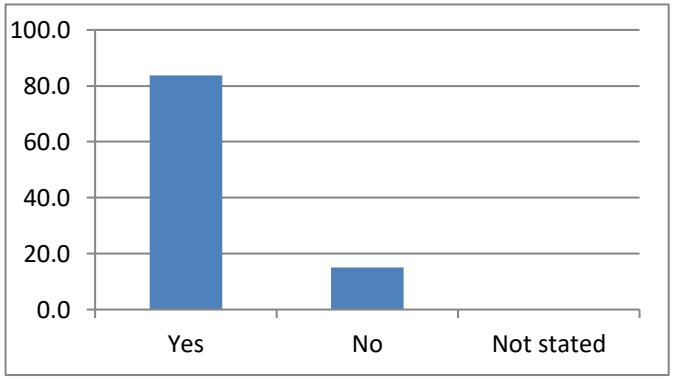
	No	%
1 min	0	0.0
1.5 min	1	1.3
2 mins	4	5.0
2.5 mins	4	5.0
3 mins	71	88.8
total	80	

Temperature patient warming is set to

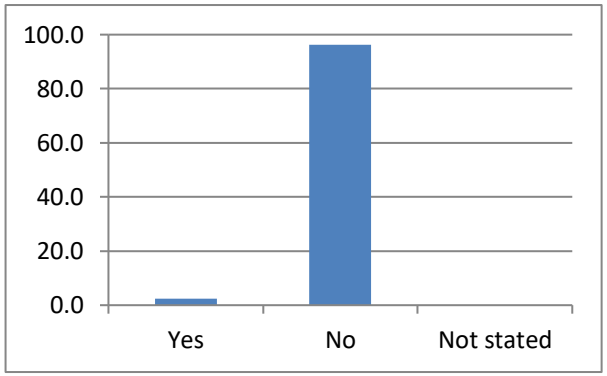
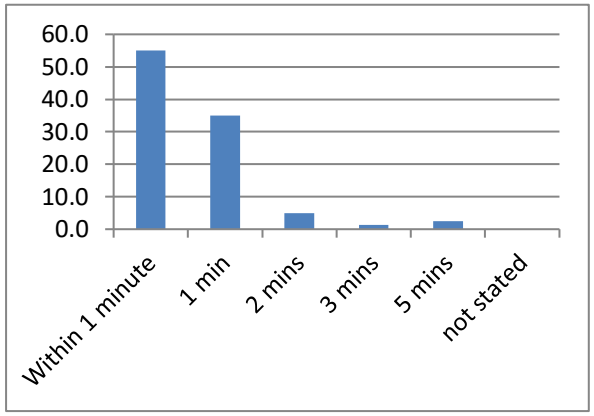
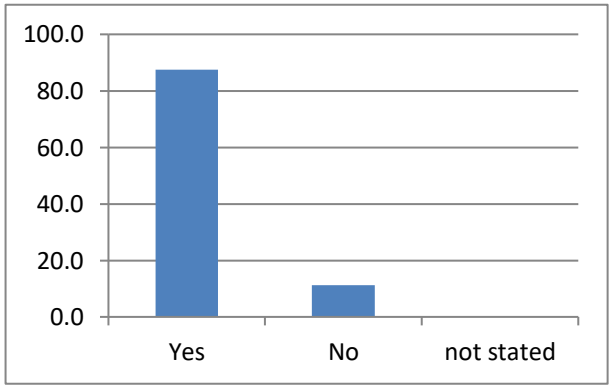


	No
1minute	0
1 then up to 2 minutes	1
2 minutes then down to 1	2
2 minutes	53
3 minutes	24
total	80

Did warming by Airglove visibly enlarge the veins of the patient?



	No	%
Yes	67	83.8
No	12	15.0
Not stated	1	
total	80	

		Did the patient experience any adverse effects following warming? 	<table><tr><th></th><th>No</th><th>%</th></tr><tr><td>Yes</td><td>2</td><td>2.5</td></tr><tr><td>No</td><td>77</td><td>96.3</td></tr><tr><td>Not stated</td><td>1</td><td></td></tr><tr><td>total</td><td>80</td><td></td></tr></table>
How soon after warming did you attempt cannulation? (in mins) 	<table><tr><th></th><th>No</th><th>%</th></tr><tr><td>Within 1 min</td><td>44</td><td>55.0</td></tr><tr><td>1 minutes</td><td>28</td><td>35.0</td></tr><tr><td>2 minutes</td><td>4</td><td>5.0</td></tr><tr><td>3 minutes</td><td>1</td><td>1.3</td></tr><tr><td>5 minutes</td><td>2</td><td>2.5</td></tr><tr><td>not stated</td><td>1</td><td></td></tr><tr><td></td><td>80</td><td></td></tr></table>	Was the cannulation successful? 	<table><tr><th></th><th>No</th><th>%</th></tr><tr><td>Yes</td><td>70</td><td>87.5</td></tr><tr><td>No</td><td>9</td><td>11.3</td></tr><tr><td>not stated</td><td>1</td><td></td></tr><tr><td></td><td>80</td><td></td></tr></table>

Appendix 3.

The use of a ‘bucket of warm water’ to improve venous access was recorded in 10 patients. This is a known heating method and can be successful however; staff note it is very cumbersome as the nurse is required to physical carry a large amount of water (enough to submerge the arm of the patient) and the patient at times feel embarrassed to sit with their hand in a bucket. In addition, temperature control cannot be easily adjusted and if additional attempts are required, water temperature is cooling rapidly and thus the requirement of another ‘bucket of warm water’ which means a delay in accessing the vein and possible treatment.

Water temperature in degree celsius

On emersion	After 5 minutes	Difference
41.6	41.1	0.5
40	39.6	0.4
39.6	39.2	0.4
40.8	40.1	0.7
39.8	39.2	0.4
41.1	39.5	1.3
39.9	39.5	0.4
39.6	39.1	0.5
39.9	39.4	0.5
40.2	39.6	0.6