

Medstrom ECO Trial Report, Ward 123, Royal Stoke Hospital

Summary

Introduction: Medstrom ECO is a portable patient shower that provides an alternative solution to a traditional bed bath. This pilot study involving 19 patients examined its effectiveness in saving time and money, and reducing water usage. Ease of use and patient experience were also evaluated.

Method: Health Care Assistants (HCAs) on Ward 123 were shown how to use ECO by members of the Medstrom team. The staff then used the device to wash patients in bed. The time taken to complete the wash was recorded, and an electronic form was then completed with this, and other information included. The data was analysed by Medstrom's clinical research team.

Results & Discussion: The average number of patients requiring a bed bath daily on the ward was eight. In comparison to a traditional bed bath, ECO on average took 53.4% less time to wash the patient (18.9 minutes versus 8.8 minutes respectively). This would save 161.6 minutes per day if all 8 patients were washed by two caregivers with ECO instead of a traditional bed bath. If ECO was used in all 40 medical and surgical wards in the hospital, with an average of 8 patients per ward per day, 45,248 minutes (754 hours) per week would be saved – the equivalent of just over 20 full time staff hours.

The average amount of water used in a traditional bed bath was estimated to be 10 litres, compared to an average of 0.5 litres measured using ECO. In addition, using ECO would save 8 macerator runs per day, saving a further 192 litres of water. Per year, this would save a total of 97,820 litres of water in one ward if 8 patients per day were washed with ECO: the equivalent of 1,304 baths, 2,446 showers or 489,000 mugs of tea. If used this way in 40 wards, water saved would equate to 52,160 baths, 97,840 showers or 19,564,000 mugs of tea.

Cost savings were estimated and offset against rental cost of ECO. For one ward, per year, the saving would be £16,396, and for 40 wards, per year, the saving would be £677,440.

Conclusion: Feedback from both staff and patients was very positive overall. While there are obvious limitations to this study due to the small number of patients, it demonstrates some key benefits of ECO compared to a traditional bed bath. Further research is ongoing to build on these results.



Introduction

Published research has found that traditional bed baths can take, on average, anywhere between 24 and 48 minutes per patient.^{1,2,3,4,5,6} Problems with traditional bed baths include water temperature (too hot or cold), spillages, and excessive water consumption and use of wipes/towels. In addition, a traditional bed bath can increase infection control risks due to cross-contamination in water basins.^{4,7,8}

Alternatives to traditional bed baths have been tried in various healthcare settings, and include disposable bag baths,^{2,4} and disposable wipes or gloves (also referred to as 'washing without water').^{6,9} However, these methods still follow the basic, traditional principles of using wipes and towels to rub the skin clean and then dry. Friction, which occurs as a result of rubbing or strong wiping, can result in decreased skin barrier function and skin tears.^{10,11,12}

Medstrom ECO, in comparison, uses a highly directed, non-aerosol, gentle spray to clean the patient's skin, delivered via a hand-held stylus. Its unique technology breaks the flow of water at the stylus tip, transforming it into 80 micron droplets. This enables precision washing, reaching only the intended parts of the patient without contacting surrounding areas and minimising dispersion in the air. It is able to wash away difficult to remove organic matter by spraying and then dabbing the area, without the need to heavily wipe or rub.

Anecdotally, ECO has been reported to reduce the amount of time taken to wash patients, improve patient experience and significantly reduce the amount of water and wipes/towels needed. This pilot study was designed to start quantifying these observations and obtain feedback from users and patients who were able to provide it.

Method

The trial took place from December 2023 to January 2024. HCAs on the ward were shown how to use ECO by members of the Medstrom team. HCAs and RGNs then used the device to wash patients in bed who they were familiar with, who they would usually wash by a traditional bed bath. An electronic form was then completed. The data was analysed by Medstrom's clinical research team.

The form was anonymous, with no patient identity information captured.

Key information captured on the electronic form included:

- Patient's relevant clinical conditions
- How long the wash took with ECO (minutes)
- How long the wash usually takes for this patient using the traditional bed bath method (minutes)
- Did you think less wipes and towels were used with ECO? (Yes/No)

In addition, scores were captured (1 = poor, to 5 = excellent) for the following:

- ECO ease of use
- ECO portability
- How well the staff felt the patient was washed

Patients who were able were asked for feedback about being washed using ECO in comparison to a traditional bed bath. Any other comments and observations from the HCAs were also recorded.

At the start of each day, the water tank on ECO was filled to its 4 litre capacity with cold water. After the washes were completed, the amount of water left in the tank was measured. This enabled the average amount per patient to be calculated.

An estimate of the average amount of water needed for a traditional bed bath was made by measuring the volume in 2 bowls (which are typically used for each patient), plus estimating the extra that goes down the sink before filling the bowl, when waiting for the tap water to warm up.

Results

Relevant Clinical Conditions

The 19 patients in the study had a wide variety of clinical conditions including neurological, gastrointestinal, respiratory, cardiovascular, and infections. Twelve (63%) had dementia and/or delirium. Eleven (58%) had frail skin and five (26%) had an acute infection.

Wash Times

On average, ECO was 53.4% faster than a bed bath with a bowl of water (8.8 versus 18.9 minutes respectively).

Use of Wipes and Towels

For 17 of the 19 patients (89%), the HCA answered that less wipes and towels were used with ECO compared to a traditional bed bath.

Reduction in the Number of Staff Required to Wash the Patient

For 7 of the 19 patients (37%), the HCA answered that ECO could reduce the number of staff needed to wash the patient. Reasons for not being able to reduce the number of staff included moving and handling risks, non-adherence to care and the patient's clinical condition.

Medstrom ECO Ease of Use, Portability and How Well the Patient was Washed

Table 1 shows the average scores for ECO ease of use, portability and how well the patient was washed. The score range was from 1 (very poor) to 5 (excellent):

Table 1. ECO scores from ward HCAs.

Medstrom ECO	Average Score
Ease of use	4.84 / 5
Portability	4.74 / 5
How well was the patient washed	4.58 / 5

Staff Feedback

- The water saving is good for the planet.
- The patient couldn't communicate verbally but was smiling when she was being washed with ECO and seemed to enjoy it. I felt she was washed very well.
- It was quicker than using a bowl, less water was wasted, and the bed was less wet.
- Preparation time was less, and it's easy to move between patients.
- Although it didn't take much less time than a bed bath, I think that's because I'm not used to it yet. I can see that it could really save time once we are proficient at using it.

Patient Feedback

- My hair wash was nice. (Note: The patient had refused a traditional hair wash for months but agreed to have their hair washed using ECO).
- At first it felt a bit cold, but when the nurse moved it closer to my skin it felt just right.
- I feel great after this.
- The patient kept saying 'ooh lovely' over and over as he was being washed.
- I enjoyed being washed with this, but I enjoy being washed with a bowl of water too. I enjoyed both the same.

Water Used Per Patient

Traditional Bed Bath: It was estimated that **34 litres** of water per patient was used. This consisted of:

- 2 x 4 litre bowls of water (8 litres total),
- Plus 2 litres per patient washed down the sink before the water reached the correct temperature,
- Plus 24 litres of water destroying the pulp bowls in the ward's Haigh Classic+ macerator.¹³

ECO: Measurements indicated that an average of **0.5 litres** of water was used per patient.

Discussion

Time Saved

The average time to wash the patients in the study was 18.9 minutes (traditional bed bath) versus 8.8 minutes (ECO), with two caregivers. Therefore, the average time saving per patient with ECO is 20.2 minutes (18.9 – 8.8 minutes x 2 caregivers).

In the ward during the study, on any given day, an average of 8 patients required washing in bed. Therefore, if all 8 patients were washed with ECO, a time saving of 161.6 minutes per day could be made on the ward (20.2 minutes x 8 patients).

If ECO was used in all 40 medical and surgical wards in the hospital, with an average of 8 patients per ward per day, 45,248 minutes per week would be saved (161.6 minutes x 7 days x 40 wards). This equates to just over 754 hours. A full time member of staff works 37.5 hours per week, so this time saving is the equivalent of just over 20 full time staff hours per week (754 / 37.5).

Water Saved

The average amount of water used for a traditional bed bath was estimated to be 34 litres (wash water plus macerator water), compared to an average of 0.5 litres measured using ECO. Therefore, per patient, 33.5 litres were saved using ECO. Per year, in one ward, if 8 patients per day were washed with ECO this would save a total of 2,920 traditional bed baths and 97,820 litres of water (8 patients x 365 days x 33.5 litres).

On average, a bath uses 75 litres of water, and a 10 minute shower uses 40 litres.¹⁴ A standard mug holds 200ml of fluid (0.2 litres).¹⁵ The water saved **annually** on **one ward** using ECO on 8 patients per day is therefore the equivalent of **1,304 baths** (97,820 / 75), **2,446 showers** (97,820 / 40) or **489,100 mugs of tea** (97,820 / 0.2). If used this way in **40 wards**, water saved **annually** would equate to **52,160 baths** (1,304 x 365 days), **97,840 showers** and **19,564,000 mugs of tea**.

Financial Savings

Staff Costs

The salary for a Band 2 HCA is £11.45 per hour, and £17.69 for a Band 5.¹⁶ On costs of 30% for employer's pension and national insurance contributions¹⁷ take the hourly costs to:

Band 2: £14.89, equivalent to 24.8p per minute.

Band 5: £23.00, equivalent to 38.3p per minute

The calculations in this study assume a Band 2 HCA and Band 5 RGN carried out the bed bath.

The data from this study showed a time saving of 161.6 minutes per day using ECO – with 80.8 minutes of a Band 2 time, and 80.8 minutes of a Band 5 time saved. This is equivalent to £20.04 for the salary and on costs of a Band 2 HCA (24.8p x 80.8 minutes) and £30.95 for the salary and on costs of a Band 5 RGN (38.3p x 80.8 minutes). The total staff cost saving is therefore **£50.99** (£20.04 + £30.95).

Pulp Bowls

On average, two pulp bowls were used per patient for a bed bath. These cost 45p each. Therefore, per day, the cost which would be saved by not using these is £7.20 (8 patients x 2 bowls x 45p).

Dry Shampoo Caps

ECO can wash the patient's hair very effectively with a small amount of shampoo, at very little cost (estimate 5p for the shampoo). A dry shampoo cap costs approximately £1.85. If 4 of the 8 patients per day had their hair washed, the saving with ECO would be £7.20 per day.

Disposable Wipes

Disposable wipes cost approximately 2p each, and ECO has been shown to reduce the amount needed. If a traditional bed bath uses 10 wipes, and ECO 7 wipes, the costs would be £1.60 (10 wipes x 8 patients x 2p) and £1.12 respectively. The saving with ECO is therefore 48p per day.

Water

The cost of water in the hospital in 2021/22 was £2.01 per 1,000 litres.¹⁸ ECO saves 268 litres of water per day for 8 patients (33.5L per patient x 8). This is a cost saving of 53p per day.

Total Savings

Table 2 shows the total daily savings that ECO can provide.

Table 2. Daily cost of a traditional bed bath versus ECO for 8 patients per day, and daily savings using ECO on one ward.

Item	Traditional Bed Bath Cost	Medstrom ECO Cost	Medstrom ECO Saving for Every 8 Patients
Salary + on costs equivalent of saved time	See Staff Costs calculation above	See Staff Costs calculation above	£50.99
Pulp bowls	£7.20	£0.00	£7.20
Hair wash*	£7.40	£0.20	£7.20
Disposable Wipes	£1.60	£1.12	£0.48
Water	£0.54	£0.008	£0.53
		Total	£66.40
		ECO Rental / Day	£20.00
		Net Daily Saving	£46.40

*Assuming 4 patients out of the 8 have their hair washed

Table 3 shows the savings for long term rental of ECO (£20 per day), for 1 ward and 40 wards, assuming 8 patients in each ward were washed using ECO per day.

Table 3. Financial savings using ECO to wash 8 patients per ward, per day, instead of a traditional bed bath.

Time	1 Ward Savings	40 Wards Savings
1 day	£46.40	£1,856
1 week	£324.80	£12,992
1 month	£1,411	£56,453
1 year	£16,936	£677,440

Conclusion

This study has demonstrated considerable savings using Medstrom ECO in comparison to a traditional bed bath. The time saved, whilst not reducing head count, could help to reduce agency staff costs and free up staff who are already stretched to complete other tasks. It could also allow them to spend more quality time with patients.

In terms of sustainability, ECO offers highly substantial water savings (a 98.5% reduction). On one ward, washing 8 patients per day with ECO instead of a traditional bed bath, would save using 5,840 pulp bowls per year. On 40 wards, this would save 233,600 pulp bowls annually.

There are other cost savings which could be significant, but which can't be quantified from this data. For example, if skin damage occurred as a result of strong wiping during a traditional bed bath, which then resulted in a pressure ulcer, the cost of treating that could range from £2,000 to 16,000.¹⁹ If a hospital-acquired infection occurred as a result of cross-contamination in a water bowl, the average cost of treating it is £3,237.²⁰ A prolonged stay in a general ward as a result of complications such as these cost £586.87 per day in 2016/17.²⁰

The overall feedback from both staff and patients was very positive. Some staff, before using ECO, felt it would soak the patient and the bed with water, but were pleasantly surprised that it didn't. It was fed back that ECO was beneficial for patients who had areas on their body which were difficult to reach, as those areas could be cleaned more easily than with a bowl of water and wipes. Hair washing using ECO proved popular with both staff and patients, with staff feeding back it was a better way to wash the patient's hair.

While there are obvious limitations to this study due to the small number of patients, it demonstrates some key benefits of Medstrom ECO compared to a traditional bed bath. Further research is ongoing to build on these results.

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