

SUSQI PROJECT REPORT

Project Title: Removal of single use disposable teats

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Background:

George Eliot Hospital NHS Trust (GEH), is a district general hospital located in North Warwickshire. Our services cover a large footprint including North Warwickshire, Southwest Leicestershire, and North Coventry. We provide a range of elective, non-elective, surgical, medical, outpatients, women's, children's, maternity, diagnostic, therapeutic and cancer services to a population of more than 300,000 people with an annual birth rate of approximately 2200 births.

The Neonatal Unit at George Eliot Hospital is an 8 bedded unit that provides specialist support and care to premature and newborn babies with an admission rate of approximately 300 babies per year. Nationally, every year, over 90,000 babies are cared for in neonatal units in the UK because they have either been born prematurely (before 37 weeks of pregnancy), or full term (after 37 weeks) but sick. This means that around 1 in 7 babies born in the UK each year are admitted onto neonatal units (Bliss, 2024). Most of the babies admitted to the Neonatal Unit will require some feeding support,

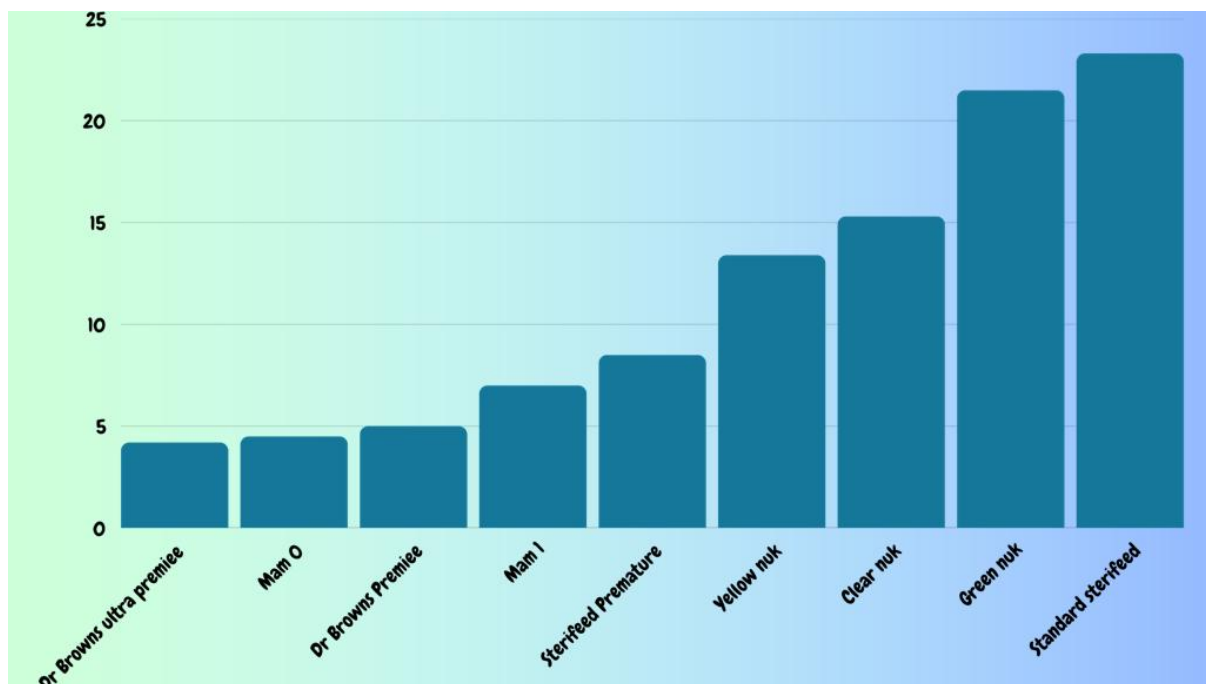
whether this is through supporting mum to express breastmilk to be given via a nasogastric tube (NG tube), or a slow transition to suck feeds from a period being nil by mouth or receiving nutrition via a different route. To facilitate with the safe transition to suck feeds, the Neonatal Unit has the valued support of a Speech and Language Therapist, Dietician, Family Integrated Care lead nurse and a Neonatal Feeding Support Worker, who provide specialist skills, knowledge and education throughout babies feeding journeys. Babies on the unit are fed via a variety of methods. If the parental choice is to bottle feed their baby, families are encouraged to bring in their own bottle and teat for when their baby is ready to transition to suck feeding. Engagement from the families to bring in a bottle has been a challenge the unit has faced for a variety of reasons, such as financial pressures and transport issues. This has led to a risk of parents relying on the disposable teats and acquiring a stock of these after discharge then resterilising them which comes with its own risks.

Prior to this project, a previous piece of work was undertaken to ensure that the disposable teats currently available on the neonatal unit at George Eliot are the slowest possible flow for hospital provision (Sterifed premature latex free). However, the flow of these teats remains faster than many other options and they are often too fast for premature babies or babies with certain medical conditions, which can lead to negative feeding experiences, contribute to a limited oral intake and could cause aspiration.

By removing single use teats and bottles and switching to slow flow reusable bottles and teats, the outcome would be improved bottle-feeding skills, increased positive feeding experiences and a possible reduction in the transition time from tube to oral feeds. Reusable bottles and teats will also save costs for the unit and reduce plastic waste/carbon footprint in comparison to the multiple single use bottles and teats use. (Haynes, A., Godwin, H., Ali-Ahmed, R., Levine-Kotin, D., Wood, E.B., & Gollenberg, A.L. (2026).

A Flow rate audit by Bell and Harding (2019) identified the different flow rates for a wide range of teats. The teats available for use across the unit in George Eliot through NHS supplies are compared below. A wide variation in flow rates can be seen below in figure 1.

Figure 1. Bottle flow rates



The Dr Brown's ultra preemie, preemie and the Mam size 0 and 1 are currently the slowest flowing reusable bottles and teats available. These bottles and teats can be ordered via NHS supply chain. Families can also purchase these bottles once discharged home if these are to be their preferred choice of bottle. Sterifeed premature teat flow rate is still faster than the Dr Brown's ultra preemie, preemie and the Mam size 0 and 1 at 9ml per minute, which can be counterproductive when transitioning to sucking feeds.

This project supports the sustainable value equation (figure 2) and CSH principles of sustainable healthcare (figure 3) of:

- Prevention and outcome for patients/population:**
 Introducing evidence-based slow-flow reusable bottles and teats supports safer, developmentally appropriate feeding, reducing the risk of aspiration, improving feeding experiences and supporting smoother transitions to oral feeding.
- Low carbon alternatives/environmental impact:** Replacing multiple single-use bottles and teats with reusable alternatives significantly reduces plastic waste and carbon emissions

whilst maintaining safe, high-quality care. Existing sterilisation processes and reusable sterilisation bags enabled this change without requiring additional infrastructure.

The project also demonstrates the Sustainable Value Equation by delivering improvements across all four domains:

- Patient outcomes – safer, evidence-based bottle feeding, improved feeding experiences and greater parental confidence.
- Environmental impact – reduced single-use plastic waste and lower carbon emissions.
- Financial impact – reduced procurement and waste disposal costs through reusable feeding equipment.
- Social impact – increased staff confidence, improved consistency of practice and greater parental involvement in feeding decisions.

Figure 2. Sustainable value equation.



Figure 3. Principles of sustainable healthcare,

1. PREVENTION

Promoting health and preventing disease by tackling the causes of illnesses and inequalities

3. LEAN SERVICE DELIVERY

Streamlining care systems to minimise wasteful activities

2. PATIENT SELF-CARE

Empowering patients to take a greater role in managing their own health and healthcare

4. LOW CARBON ALTERNATIVES

Prioritising treatments and technologies with a lower environmental impact



Mortimer, F. The Sustainable Physician. Clin Med 10(2). April 1, 2010. D110-111.

Specific Aims:

- Improve infant feeding safety and experience, achieving **100%** adherence to Neonatal SLT best practice guidance (Bell, N. and Harding, C. (2019) and on slow-flow feeding.
- Cut associated bottle-feeding financial costs for George Eliot unit by at least 50%.
- Reduce plastic waste and carbon footprint associated with bottle-feeding by at least 50%.

Methods:

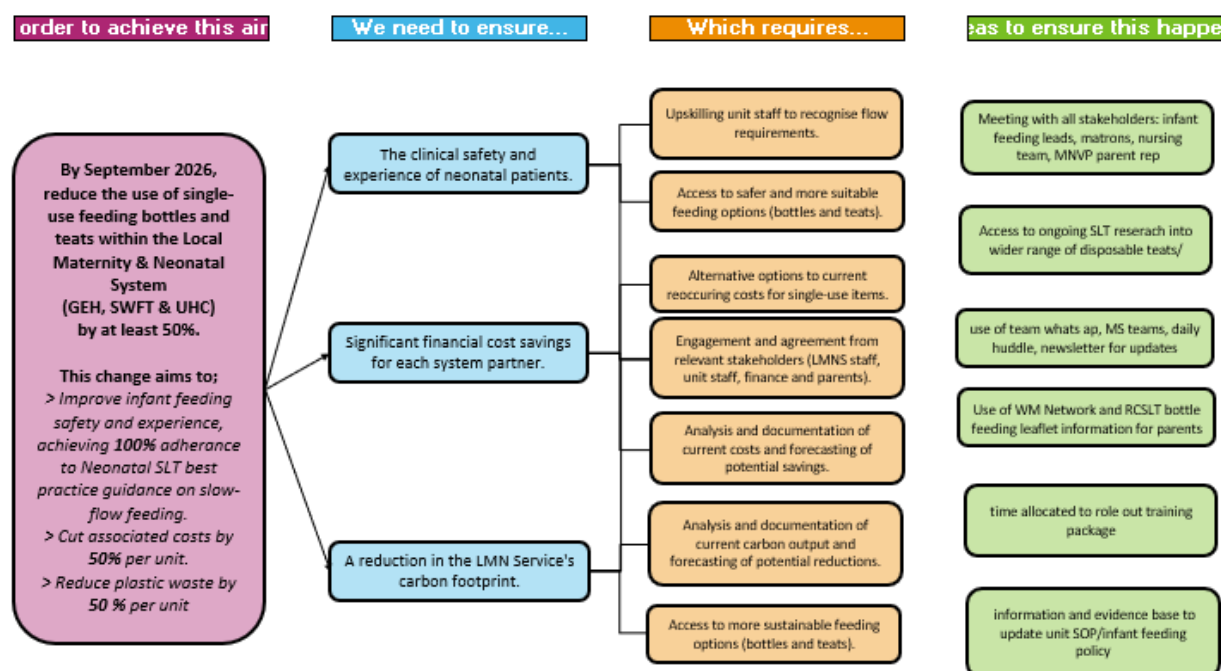
A national Speech and Language Therapy webinar took place where the issue of single use bottles and teats across all neonatal units was discussed. There was an update where other units have implemented similar “go green” campaigns due to the pressure nationally to reduce carbon footprints.

Following on from this, a meeting was initiated by the Local Maternity and Neonatal System (LMNS) Neonatal Speech and Language Therapist, along with Infant feeding leads and Neonatal Matrons across Coventry and Warwickshire Neonatal Units. The George Eliot Neonatal Matron was particularly interested in this project as she had already been considering ways to reduce plastic waste/carbon footprint for the unit in line with the NHS net zero plan. The Neonatal Matron and the Neonatal Family Integrated Care Nurse had previously worked closely with the Speech and Language Therapist (SLT) to look at improving the bottle-feeding experiences on the unit. A similar piece of work had already been undertaken to ensure that the teat flow on the unit was standardised, and the slowest possible single use teat was used (Sterifeed premature). This was then used as a baseline to build further and meant that staff were already educated on the need for slow-flow teats. The wider team were aware of the need to reduce plastic waste and carbon footprint in line with the NHS net zero plan. The unit was also facing the pressure of needing to “offset” an increase in cost and use of plastic milk warmer liners, therefore the cost and plastic waste savings from the “go green bottle” project had arrived at an ideal time.

The team felt a move towards increasing parents understanding of the need to bring in their own bottle of choice and the unit having reusable bottles would be a suitable next step. This would continue to support the improvement of safe and positive bottle-feeding experiences for babies and families on the unit.

A driver diagram was completed in the initial stages of the project to support with planning and implementation. See figure 4.

Figure 4. Driver diagram for neonatal bottle feeding.



UNICEF reported, that using more than one brand of reusable bottle, would weaken the risk of brand association. The Speech and Language Therapy team continue to await updated research (being carried out by the Royal College of Speech and Language Therapists) on a wider range of bottles and teats which might benefit babies on the neonatal unit (e.g. unbranded/supermarket bottles which if found to be a supportive slow flow, would offer a more affordable option for families).

The director for BFI UK, Sue Ashmore, in 2018 presented at the London Network for infant feeding. The presentation concluded that the disposable teats which are currently used on the neonatal units across the UK are not supporting safe and positive feeding experiences in line with neurodevelopmental practice. Sue stated that she would support the use of commercially available teats in the units as they have been proven to provide a more effective and positive feeding experience.

Time was therefore taken to explore the range of suitable bottles available on NHS supply chain and the bottles were selected in line with the evidence base arounds low flow teats and supportive

bottles for premature babies. These were discussed in detail with each infant feeding lead and care was taken to ensure that more than one bottle/teat would be available.

The impact of sterilisation was taken into consideration but there was no requirement for an increase in sterilisation bags, as these were already in use on the unit (e.g. for sterilisation of dummies, parents who already bring their own bottles in and for sterilisation of breast feeding/expression equipment).

A virtual training package was devised, due to the high number of staff and shift working patterns, it was agreed this would be the most effective and sustainable way to ensure all staff accessed the training. The wider neonatal team were also signposted towards members of the working group if they had any further questions and to ensure that all their views and questions in relation to the project were addressed. A document was provided for infant feeding leads to be able to utilise and signpost within their infant feeding policy/SOP to evidence the background and research for the change in bottles/teats.

Wider parental feedback and viewpoints were sought via the Maternal and Neonatal Voices Partnerships (MNVP) link for GEH, to ensure a co-produced review and improvement plan for future steps. This was particularly important in view of the aim to broaden the range of bottles in the future, particularly in view of range of costs for parents to purchase (i.e. once the Royal College of Speech and Language Therapists has finalised the teat flow test for supermarket bottles, which would offer a broader range of affordability).

The following recommendations were put into place:

- For the units to continue to promote families to bring in their own bottles and teats from home.
- Use the remaining stock of disposable single use teats/bottles prior to transition.
- For the unit to have a supply of reusable slow flow bottle and teats (Dr Brown's and Mam).
For families who do not have bottles and teats at home, one reusable bottle to be provided.
Details to be provided to families on where they can purchase more bottles without promoting specific brands and highlighting the need for a slow flow teat.

- The Dr Brown's preemie and Mam size 0 bottles are good for babies taking expressed breast milk (EBM) as this milk is very thin and requires a very slow flow teat. The Mam size 0 and 1 are good for formula fed babies.
- The Dr Brown's ultra preemie will be used for SLT assessment and advice for specific babies on a case-by-case basis.

Figure 5.

The below image was taken as a clear visual representation of the amount of plastic used, comparing single use bottles and teats to a single reusable bottle system. This was then shared with staff within the virtual training package and was also shared with the parent representative during discussion about the proposed quality improvement project.

Example of plastic comparison for ONE baby over ONE week



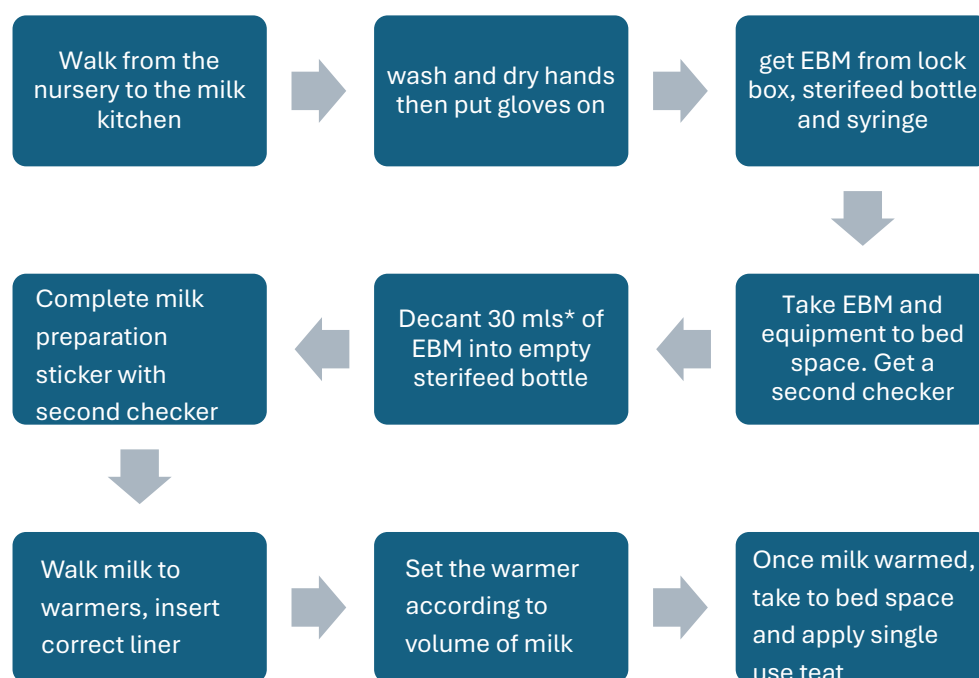
The baseline data for the quantity of single use bottles and teats was identified. Due to single use bottles also being used for the expressing and storage of breastmilk, it was agreed that the most reliable source of bottle feeds would be to quantify the use of single use teats. We could then calculate the cost and carbon emissions of the teats and single use bottles as a complete feeding system. We identified the number of babies who were discharged home over a six-month time frame, either fully bottle feeding or combination feeding with a bottle, again, to identify how many single use bottles and teats we would anticipate replacing with a single use bottle.

The unit already had a sterilisation process in place, meaning staff did not have to learn a new process. The unit uses microwavable sterile bags which can be used up to 20 times.

To understand the impact on the staff from implementing this change, a timed process map was undertaken for both the single use bottle and teat with 30mls of milk to be warmed and a reusable bottle and teat with 30mls of milk to be warmed. There was no impact on the nursery with making up feeds in a Sterifeed or reusable bottle. There is always a staff member in the nursery and both the Sterifeed bottles and the reusable bottles are kept in the same milk kitchen room, therefore, implementing this proposed bottle change does not impact the safety of the nursery. It was also felt that the small increase in time (90 seconds) was not clinically significant.

The two process maps are below:

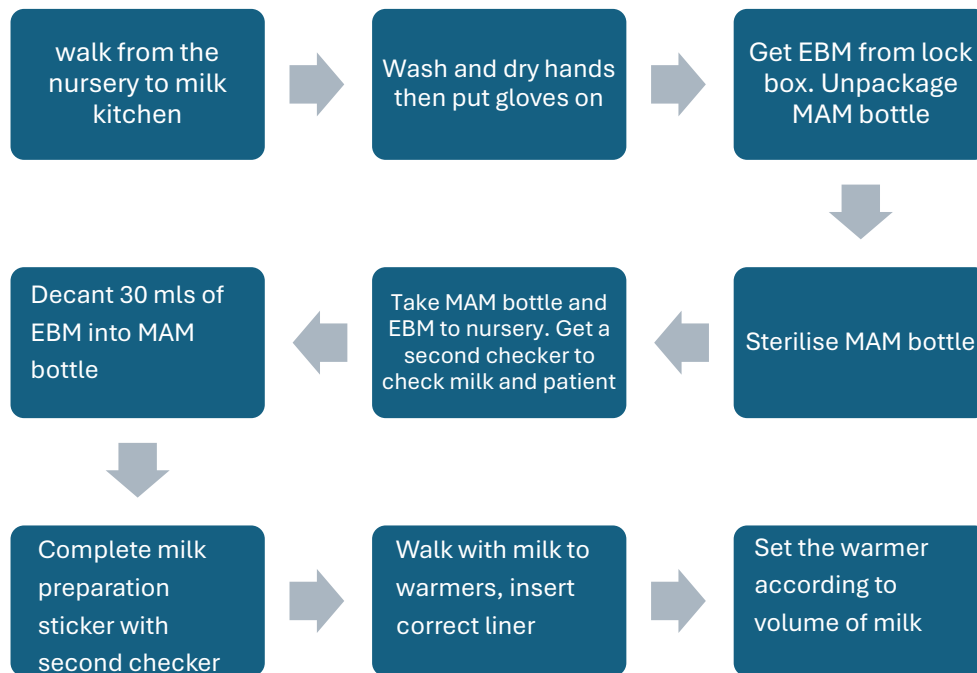
Figure 6. Process map 1- Sterifeed bottle and teat



Time taken to complete this process map was **2 minutes 50 seconds**

*For this experiment, 30mls of milk was used as an example which takes 8 minutes and 16 seconds to warm using the waterless warmers on the unit. It then took an additional 14 seconds to unpackage teat and screw it onto the Sterifeed single use bottle.

Figure 7. Process map 2: Reusable bottle and teat



Time taken to complete this process map was 4 minutes 19 seconds

*For the purpose of this task, 30mls of milk was used as an example. The milk warmer was set to warm 30mls which takes 8 minutes and 16 seconds.

Measurement:

We planned to measure the cost, carbon footprint and waste of single use disposable bottles and teats compared to reusable bottles and teats over a 6 to 12-month period on the unit.

The babies on the neonatal unit have varying lengths of stays and will not all commence bottle feeding at the same point. This posed challenges when aiming to quantify the baseline data. Babies could stay anything from 24 hours to 10 weeks. We therefore looked at averages in relation to the earliest point a baby would be offered a bottle feed (34 weeks age), the longest length of time that could be spent on unit (10 weeks) and the number of times a bottle would be used during a 24-hour periods (eight times).

Patient outcomes:

In line with the aims of this project, it has changed the standard of care for babies and families spending time on the neonatal unit. The removal of single use teats means that the only bottles/teats now available are in line with evidence-based recommendations for slow, safe and developmentally sensitive feeding experiences.

Another consideration is that prior to this project there were families who were taking home the single use teats. This was a safety concern, as they are not widely commercially available to purchase, parents had been found to be sterilising and reusing these single use teats/bottles once home (this had been reported by their community follow up teams). This was therefore placing babies at risk as these bottles and teats are not intended for multiple use. Parents were also facing challenges transitioning their babies to their bottle of choice as they had already become established with feeding from these specific, single use teats/bottles for an extended period.

Population outcomes:

The project considered the possibility of low-income families feeling pressured to purchase the more expensive brand of reusable bottle supplied while on unit. However, as outlined previously, one of the key recommendations of the project is to ensure that parents are educated to bring in their own bottle of choice and so the hospital supplied bottles should be a “last resort” or based on clinical recommendation (i.e. following SLT recommendations). It was also felt that the benefits of the slower teat flow and removing the risk of families incorrectly reusing single use teats once home, outweighed this challenge. This was also the reason for discussion with the MNVP link and plans to extend the bottle choices once supermarket/wider affordability ranges have been tested.

Environmental sustainability:

Data was collected from the neonatal team at George Eliot hospital over a six-month period between April 2025-September 2025, on the number and type of feeding regime. This showed the number of babies requiring bottle feeds was 123 in 6 months, calculations were extrapolated to 246 babies per year.

The project aim was to transition away from single-use disposable bottles and teats to reusable bottles and teats. The carbon footprints of the current single use Sterifeed and the proposed MAM reusable approaches were calculated. The assumption was made that each baby would on average,

be offered 56 feeds during their neonatal stay (eight feeds per day for seven days). We acknowledge that, in practice, there is wide variation in the number of bottle feeds individual babies may be offered over the course of their stay.

Emissions factors:

Table 1 shows the emissions factors for the relevant components of the disposable and reusable pathways.

Table 1. Inventory of component parts

Single use pathway	Emissions per aspect (kgCO ₂ e)	Reusable pathway	Emissions per aspect (kgCO ₂ e)
SteriFeed bottle and teat	0.14	MAM bottle, teat, lid, base and other components	0.31
Packaging plastic bag		Packaging plastic bag	
Cardboard box		Cardboard box	
Disposal at end of life		Disposal at end of life	
		Ardo sterilising bags	0.05
		Microwave use	0.07
Delivery/ transport	0.01	Delivery/ transport	0.06

The MAM bottle weighs a total of 88g. When broken down the component parts are:

- (1) lid 8g
- (2) teat 10g
- (3) rim 11g
- (4) and (5) bottle main body 26g
- (6) insert for base 11g
- (7) base 22g



All parts are made from polypropylene except the teat (2) which is silicon.

A 100ml Sterifeed bottle weighs 14g and is 100% polypropylene. The bottle cap is 4g and made of polyethylene, with the bottle bag being low density standard grade commercial polyethylene. The teat weighs 3.6g, is latex free and made of silicon.

The component parts in Table 1 for each pathway were analysed through a detailed process-based approach. It converted each part of the pathway into greenhouse gas (GHG) emissions using carbon conversion factors from the 2025 UK Government Greenhouse Gas Conversion Factors database UK DESNZ Database. The data for these emissions comes from previous work by CSH and BEIS (<https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2025>).

For end-of-life treatment, bottles and teats was assumed to be disposed of as clinical waste, while the packaging waste was assumed to be dry mixed recyclable with the corresponding emission factors taken from [Rizan et al., 2020](#).

The emissions savings were translated into equivalent miles driven in an average car with unknown fuel using a factor of 0.3399 kgCO₂e per mile, as published by the UK Government [Greenhouse gas reporting: conversion factors 2025](#). This factor is inclusive of fuel and well-to-tank emissions.

Assumptions

The size and weight of the cardboard box used to transport MAM bottles were unavailable, therefore the weight-per-bottle for cardboard from the Sterifeed bottles was used for both calculations.

Average UK electricity grid emissions were used for the microwave sterilisation. End of life disposal pathways were assumed as above.

Economic sustainability:

Information was identified relating to the procurement of single-use bottles and teats over a 12-month period for the 246 bottle-fed babies at GEH. This data was then modelled to estimate the procurement requirements for reusable bottles and teats for an equivalent number of babies using reusable products.

Social sustainability:

Qualitative social data was collected through verbal feedback during routine conversations with parents by the Neonatal Feeding Support Worker, alongside separate discussions with nurses and Healthcare Support Workers. These conversations provided real-time feedback on the acceptability of the intervention, confidence in the change and perceived benefits or challenges.

Results:

Admission data was reviewed from April 2025-September 2025 and for this timeframe 171 babies were admitted to the neonatal unit, of which 123 babies would have been offered a bottle and teat for their feeds (a combination of bottle/breast and bottle/NGT were included in this data). This information was obtained from electronic patient records. Assumed number of feeds per baby per day:

- A fully bottle-fed baby would be offered 8 feeds in a 24-hour time frame.
- A mixed bottle-fed baby (with breast or NGT) would be offered 4 feeds in 24-hour time frame.

The assumption has been made that each baby would on average, be offered up to 56 feeds during each week of their neonatal stay (eight feeds per day for seven days). We acknowledge that, in practice, there is wide variation in the number of bottle feeds individual babies may be offered over the course of their stay. However, a crucial element of supporting transition to oral feeding is to respond to all babies feeding cues. Therefore, a baby could be offered even a very minimal amount from a bottle prior to needing to utilise their NGT to complete their feed. This would mean that previously when using disposable bottles and teats, babies would frequently use up to 56 bottles and teats per week.

From the time that the reusable bottles were ordered for the project, no further disposable teats have been bought.

Environmental sustainability:

Carbon emissions associated with both single use and reusable baby bottles are shown in Table 2. Results were calculated for a single feed (minimum), eight feeds (akin to a single day), 20 feeds

(based on average number of feeds per baby per stay), 56 feeds (akin to one week) and maximum (if a baby remained on the units from (corrected) week 34 to 44 and had 8 feeds per day).

Table 2. Total emissions (kgCO₂e) per baby based on number of feeds

	Number of feeds					
	Single feed	8 (1 day)	20	40	56	Max number of feeds 560 (10 week stay)
Bottle						
Single use Sterifeed	0.15	1.16	2.91	5.82	8.14	81.41
Reusable MAM	0.49	1.00	1.88	3.40	4.63	42.91

The results in Table 2 and Figure 8 show that the carbon impact of infant feeding bottles depends strongly on the number of feeds. When only one feed is required, single-use bottles produce lower total emissions than reusable bottles. This is because reusable bottles have higher upfront manufacturing emissions, which are not offset when they are used only once. At one feed, emissions are 0.15 kgCO₂e for a single-use bottle compared with 0.49 kgCO₂e for a reusable bottle.

As the number of feeds increases, emissions from single-use bottles rise rapidly because a new bottle is required for each feed. In contrast, emissions from reusable bottles increase more slowly, as the initial production impact is spread over multiple uses. By around eight feeds, the emissions from reusable bottles are lower than those from single-use alternatives, as illustrated in Figure 8.

Beyond this crossover point, the benefits of reusable bottles become more pronounced. At 20 feeds, reusable bottles result in 1.88 kgCO₂e compared with 2.91 kgCO₂e for single-use bottles (35.4% reduction), and at 56 feeds the difference increases to 4.63 kgCO₂e versus 8.14 kgCO₂e (43.1% reduction).

Overall, while disposable bottles may be the lower-emission option for very short-term use, reusable bottles offer substantial carbon savings when used repeatedly. This highlights the importance of considering number of uses when assessing the environmental performance of infant feeding products.

Figure 8. Graph representing emissions based on number of feeds.

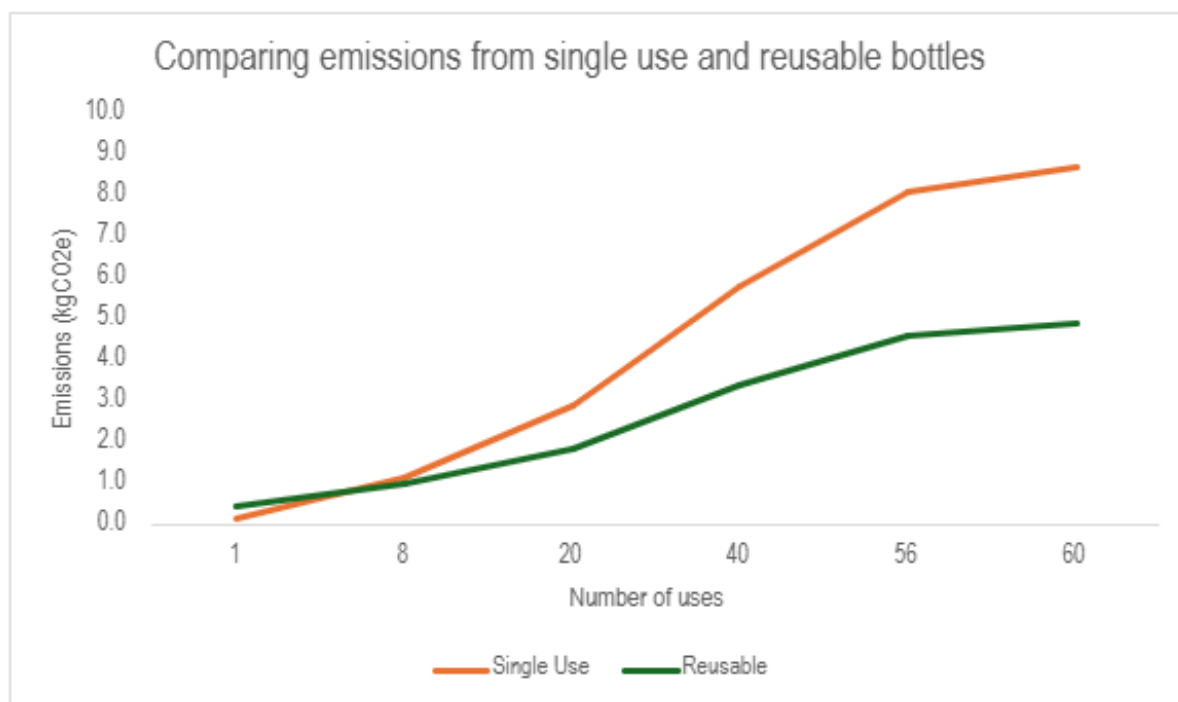


Table 3 shows that when 246 babies are each fed 56 times (one week of eight feeds offered per day), using single-use bottles produces approximately 2,003 kgCO₂e per year, while reusable bottles generate 1,139 kgCO₂e, this equates to a **yearly saving of 864 kgCO₂e or a 43% reduction**.

Table 3. Total emissions based on 246 babies per year feeding for 56 feeds each

Type of bottle used	Emissions (kgCO ₂ e) per year
Single use	2,003
Reusable	1,139

Economic sustainability:

The economic analysis shows that reusable bottles are substantially more cost-effective than disposable bottles. The cost for disposable bottles per baby for one-week (56 feeds) is £24.64, driven by the need to purchase a new bottle for every feed at £0.44 each. In contrast, the cost per week for reusable bottles would be £5.12, broken down into: £1.74 for one bottle, £2.82 for three sterilising bags and £0.56 for 56 episodes of sterilising. For 246 babies each receiving 56 feeds, the total annual cost of disposable bottles is £6,061.44. In contrast, the total annual cost for reusable bottles is £1270.54, including the bottle and teat, sterilising bags, and microwave energy use. Although

reusable bottles have higher upfront and associated sterilisation costs, these are spread across multiple feeds, resulting in an overall **cost saving of £4,790.09 per year or 79% compared with disposable bottles.**

Table 4. Annual cost comparison of disposable and reusable feeding bottles*

Cost category	Disposable bottle/teat	Reusable bottle teat
	Cost	Cost
1 bottle & teat	£0.44	£1.74
Bottle & teat per year	£ 6,061.44	£428.04
Sterilising bags per use	N/A	£0.047
Sterilising bags per year	N/A	£693.72
Microwave electricity per sterilised bottle	N/A	0.0108p
Microwave electricity per year	N/A	£148.78
Totals for 12 months:	£6,061.44	£1270.54

**Assumptions: 246 babies per year, 56 feeds per baby (13,776 feeds total). Each baby receives one reusable bottle and teat. Sterilising bags reused 20 times.*

Social outcomes:

Qualitative feedback was collected throughout implementation by the Neonatal Feeding Support Worker during routine conversations with families on the neonatal unit and through discussions with nurses and Healthcare Support Workers. This provided real-time feedback on the acceptability of the intervention, parental understanding, staff confidence and the perceived impact on feeding experiences. Additional service user feedback was obtained through discussions with the Maternal and Neonatal Voices Partnership (MNVP) Neonatal Champion to ensure the project reflected the views and priorities of families.

Within this project, the introduction of reusable bottles and teats has contributed positively to staff experience by enhancing knowledge and skills relating to infant feeding, increasing confidence in delivering developmentally appropriate care and promoting a more consistent approach across the

multidisciplinary team. Staff verbally reported greater satisfaction in delivering care that aligns with clinical best practice and the Trust's wider sustainability ambitions.

Furthermore, the alignment between individual staff values and the Trust's commitment to environmental sustainability and social responsibility has reinforced a shared sense of purpose, which is recognised as an important contributor to staff engagement, morale and retention. The knowledge that changes in practice are contributing to reduced carbon emissions and supporting the NHS Net Zero agenda was also identified as a positive influence on staff engagement.

From a parental perspective, the introduction of reusable feeding equipment within a controlled sterilisation pathway has provided additional reassurance regarding safety, particularly in relation to concerns around material degradation, repeated heating of plastics and potential exposure to microplastics (Plastic Free Babies Roadmap, 2026). Families reported that having a choice of bottles, together with guidance from the neonatal team, increased their confidence in feeding their baby and helped them better understand the reasons for selecting slower flow teats. Parents also recognised the environmental benefits of reducing single-use plastic waste and felt reassured that the unit was considering sustainability alongside safe clinical care. Whilst some families expressed concerns that they may need to continue purchasing a specific brand of bottle following discharge, this was mitigated through early conversations encouraging parents to bring in their own bottle and teat from the beginning of their baby's feeding journey. Staff education also reinforced that families should be supported to make an informed choice rather than promoting any brand, with future work planned to widen the range of suitable bottle and teat options as further flow-rate research becomes available.

Nurses and Healthcare Support Workers also reported positive experiences following implementation of the project. Staff valued having a greater understanding of the differences in teat flow rates and found the process mapping helpful in demonstrating that the additional time required for sterilising reusable bottles was minimal and manageable within existing workflows. Some concerns were initially raised regarding the allocation of reusable bottles and obtaining parental agreement when families were not present on the unit. These concerns have been addressed through staff education, the introduction of a bottle allocation audit process and the development of

a standardised flowchart (Appendix 1), ensuring parents continue to be encouraged to provide their own bottle wherever possible and that the process remains consistent across the team.

Positive feedback was also received from community professionals, who reported seeing fewer families taking disposable hospital teats home and reusing them after discharge, a practice recognised as a patient safety risk. The removal of single-use teats therefore has the additional benefit of supporting safer feeding practices beyond the neonatal admission. Overall, whilst there are some challenges associated with the introduction of reusable bottles, including a small increase in sterilisation time and the potential financial implications for some families, these are outweighed by the improvements in staff engagement, parental confidence, patient safety, sustainability and the promotion of longer-term environmentally responsible behaviours.

Patient outcomes:

The disposable teats previously used on the neonatal unit have been shown to demonstrate inconsistent flow rates, meaning that teats of the same type can deliver markedly different flow rates (Bell and Harding, 2019). This variation has the potential to contribute to unsafe or suboptimal feeding experiences for premature and medically vulnerable infants. Published evidence demonstrates that the use of slower-flow teats is associated with improved suck swallow breathe coordination, improved physiological stability, reduced stress during feeding and a lower risk of aspiration (Pados et al., 2017; Chang et al., 2007; Lau et al., 1991).

If a baby becomes established on disposable hospital teats, it is often difficult or impossible for families to source the same teats following discharge, as these products are not widely commercially available. This can create additional challenges when transitioning babies to an alternative bottle and teat system at home, potentially disrupting established feeding patterns. By introducing evidence-based slow-flow reusable bottles and teats, this project has standardised the feeding equipment available within the neonatal unit and supports safer, developmentally appropriate feeding practices, while promoting continuity of care between hospital and home.

The introduction of reusable feeding equipment within a controlled sterilisation pathway may also provide additional reassurance regarding repeated use of feeding equipment and potential exposure to microplastics associated with inappropriate reuse of disposable products (Plastic Free Babies

Roadmap, 2026). Furthermore, positive feedback from community professionals suggests a reduction in families taking disposable teats home and sterilising them for repeated use, representing an additional patient safety benefit beyond the neonatal admission.

Whilst there is a strong published evidence base demonstrating the clinical benefits of slow-flow feeding, it was beyond the scope and timeframe of this quality improvement project to directly quantify physiological patient outcomes within our own neonatal population.

Discussion:

This project models a yearly saving of 2,003 kgCO₂e and £4,790.09 for GEH alone. This is now being implemented into two larger units across the ICB and therefore will have even further savings both financially and carbon footprint.

This project demonstrates a scalable and transferable model that can be implemented across a range of neonatal and maternity settings to improve infant feeding experiences while also delivering measurable environmental and financial benefits. The successful rollout within the Local Maternity and Neonatal System (LMNS) provides evidence of its feasibility at a wider system level, highlighting that the approach can be embedded without disruption to existing clinical pathways or standards of care. Importantly, the intervention aligns with, and does not compromise, Baby Friendly Initiative accreditation, as it supports safe, responsive and informed feeding practices. The model is adaptable to local context, requiring relatively low resource investment and utilising existing sterilisation infrastructure, making it suitable for replication across other organisations. Future expansion would involve standardising data collection processes to improve accuracy and consistency, alongside continued evaluation of clinical, environmental and financial outcomes. Consideration will also be given to refining implementation strategies based on learning from initial rollout, including early stakeholder engagement and targeted staff education. Overall, this project presents a sustainable, system-wide opportunity to enhance care quality while contributing to broader organisational and environmental objectives.

Conclusion

This project has demonstrated that the transition from single use to reusable bottles and teats is both practical and beneficial across multiple areas of care. It has supported improved feeding

experiences for babies, increased confidence for parents, and greater consistency in staff practice, while also delivering measurable environmental and financial benefits. The work aligns with national and organisational priorities relating to patient safety, sustainability and quality improvement.

Key factors contributing to the success of the project included early engagement with staff and families, clear education and training, and the use of existing systems such as established sterilisation processes. These elements supported a smooth implementation and helped embed the change into routine practice. Some challenges were identified, including concerns around additional time and correct consenting for bottle feeds from families. However, these were addressed through ongoing communication, staff support and refinement of processes.

The change will be incorporated into local guidance and governance structures to support sustainability and has already been scaled across the LMNS, demonstrating its transferability. The project can be replicated in other settings without compromising Baby Friendly standards, as it supports safe and responsive feeding practices. Future work will focus on strengthening data collection to improve the accuracy of outcome measurement and to better understand longer-term impacts, including staff engagement and parental behaviours.

Overall, this project highlights how a relatively simple change in practice can deliver meaningful improvements in patient care, while also contributing to wider environmental and organisational objectives.

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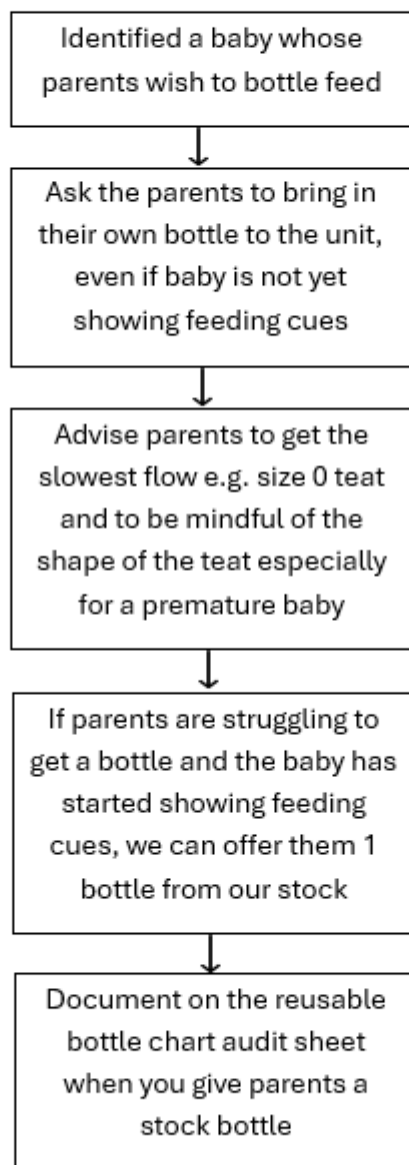
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Appendix 1

Staff guide for giving parents a reusable bottle



Critical success factors

Please select **one or two** of the below factors that you believe were most essential to ensure the success of your project changes.

People	Process	Resources	Context
☐ Patient involvement and/or appropriate information for patients - to raise awareness and understanding of intervention ☐ Staff engagement ☐ MDT / Cross-department communication ☐ Skills and capability of staff ☐ Team/service agreement that there is a problem and changes are suitable to trial (Knowledge and understanding of the issue) ☐ Support from senior organisational or system leaders	☐ clear guidance / evidence / policy to support the intervention. ☐ Incentivisation of the strategy – e.g., QOF in general practice ☐ systematic and coordinated approach ☐ clear, measurable targets ☐ long-term strategy for sustaining and embedding change developed in planning phase ☐ integrating the intervention into the natural workflow, team functions, technology systems, and incentive structures of the team/service/organisation	☐ Dedicated time ☐ QI training / information resources and organisation process / support ☐ Infrastructure capable of providing teams with information, data and equipment needed ☐ Research / evidence of change successfully implemented elsewhere ☐ Financial investment	☐ aims aligned with wider service, organisational or system goals. ☐ Links to patient benefits / clinical outcomes ☐ Links to staff benefits ☐ 'Permission' given through the organisational context, capacity and positive change culture.