

Evaluating the use of Droplet in care homes on the Isle of Wight

Evaluation report created by Wessex AHSN, July 2020

1.0 Creation of this report

This project was designed, implemented and overseen by the Isle of Wight NHS Trust Technology Enabled Care Team. Wessex Academic Health Science Network (AHSN) were approached and agreed to offer support in writing up the project and findings into this evaluation report.

2.0 Project Background and Introduction

2.1 Context

Keeping well hydrated is an essential part of healthy ageing. Care home residents are among the most frail and vulnerable in the population. They are at particular risk of dehydration due to a combination of age-related changes, reliance on others to support them to drink and behavioural and cognitive factors such as the presence of dementia¹. El-Sharkawy et al (2015) found that 37% of acute hospital admissions over the age of 65 were dehydrated². Wolff et al (2015) found that patients admitted from care homes were ten times more likely to be dehydrated than those admitted from their own homes³. The rate was still five times higher after adjustments for age, gender, mode of admission, dementia and other variables. Hooper et al (2016) reported a dehydration incidence of 20% among a sample of care home residents. Increased risk of dehydration was associated with increased severity of dementia⁴.

The Droplet® Intelligent Hydration Kit (produced by Spearmark UK) is a drinking aid, designed to help people who need extra support to drink more, reminding them to stay hydrated. It consists of a smart base (which enables the user to select voice or light reminders at regular intervals). The light or voice reminder will only reset once the person has put the cup to their mouth. The voice option has pre-recorded prompts or the user can record their own message or get a family member to record a message for them. The smart base comes with mug (dark blue) and tumbler (light blue) attachments, which can be used interchangeably to suit the user. There is a clear lid with a sip hole and a hole for a straw.



A trial took place in care homes on the Isle of Wight to evaluate the use of Droplet®. Baseline data was collected by each care home for one week, followed by a six-week period of data collection with Droplet® in use.

2.2 Aim

To evaluate the use of Droplet® in improving hydration among residents in four care homes on the Isle of Wight.

¹ The British Nutrition Foundation (<https://www.nutrition.org.uk/bnfevents/events/83-nutritionscience/life.html>)

² El-Sharkawy et al. (2015). Hydration and outcome in older patients admitted to hospital (The HOOP prospective cohort study). *Age and Ageing*, 44 (6): 942-947.

³ Wolff et al. (2015). Are patients admitted to hospital from care homes dehydrated? A retrospective analysis of hypernatraemia and in-hospital mortality. *Journal of the Royal Society of Medicine*, 108 (7): 259-265.

⁴ Hooper et al. (2016). Which frail older people are dehydrated? The UK DRIE Study. *Journal of Gerontology: Medical Sciences*, 17 (10): 1341-1347.

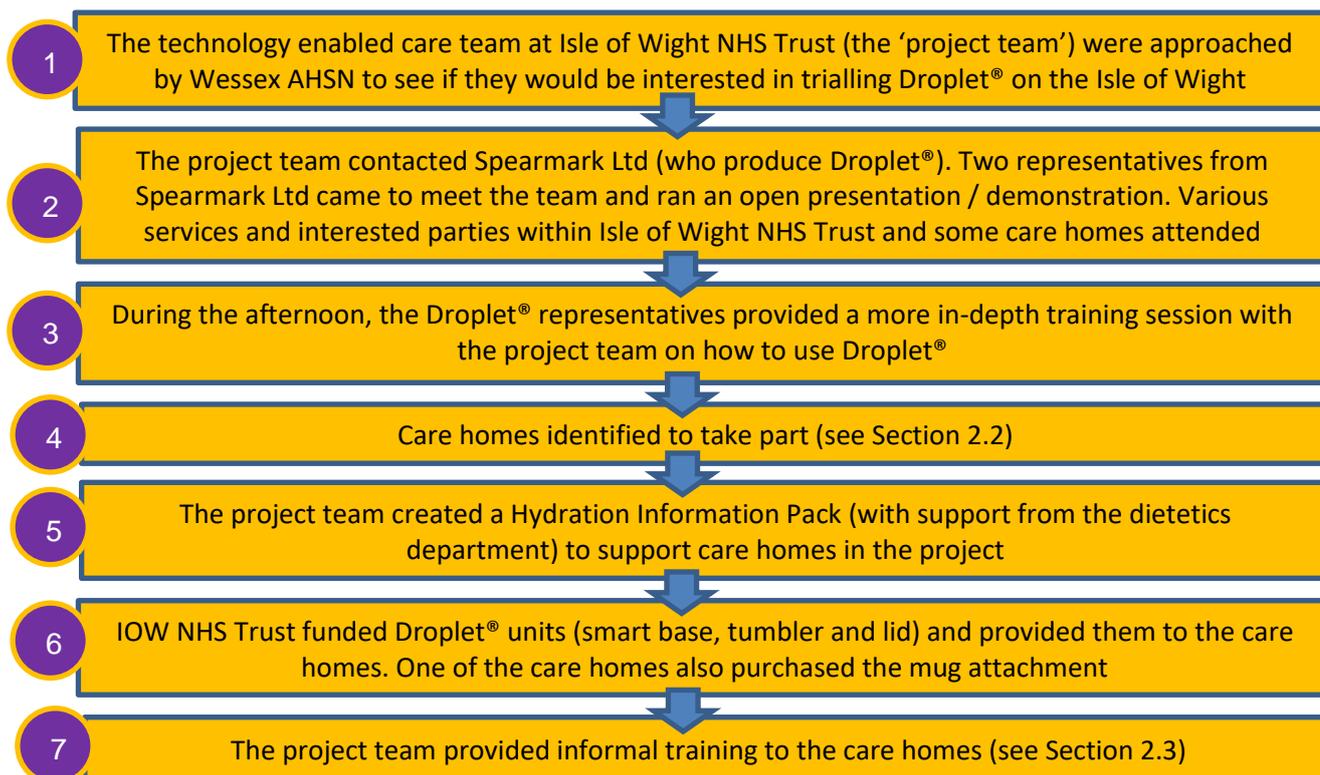
2.3 Objectives

- To evaluate the extent to which the use of Droplet® affected residents' fluid intake
- To evaluate the impact and acceptability of the use of Droplet® on residents, care staff, and the care home
- To complete a structured evaluation

3.0 Methods

3.1 Project development

The following flowchart shows the steps taken in the development of the project prior to starting the trial:



3.2 Recruitment

- Two residential homes were asked by the project team to take part. These homes were open to trying new technology and had previously been part of other projects
- One residential home who had previously been involved in other projects came to the open presentation and asked to be involved
- Each residential home was given 10 Droplet® cups. The homes decided which residents would use Droplet®. If a resident dropped out of the trial, a replacement was not used
- The project team was asked to include a different type of care home. Highfield Nursing Home was approached and agreed to take part. Droplet® was used in the rehabilitation unit only (15 rooms open to patients on a short-term basis (approximately six to eight weeks), whilst they recuperated before returning to their normal place of residence). During the six-week trial period, the rehabilitation beds were occupied by different people. Therefore, the decision was made to allocate the cup to a room instead. This did mean that some rooms had more than one patient using the cup during the six-week period.

3.3 Training for care homes

- The project team developed a Hydration Information Pack to use during the training session, with support from the Isle of Wight Dietetics department. This pack included information on the importance of fluid, signs of dehydration and the effects of dehydration

- The project team provided informal face-to-face training to care staff at each care home in Autumn 2019
- Training lasted one hour
- Training involved going through the Hydration Information Pack and providing a hands-on demonstration of Droplet® for care staff (the Droplet® cups were given out on the same day as training).

3.4 Project structure and data collection

- Data on fluid intake was collected over one week prior to implementing the Droplet® cup (baseline). Data on fluid intake was then collected over a six-week period while residents were using Droplet®
- To be consistent, it was intended that the trial would be run during the same time period. However, due to delays in scheduling the training sessions, dates were slightly different. **Table 1** shows the trial dates
- Residents in three of the four care homes used Droplet® (with tumbler attachment) for cold drinks only. One care home (Tile House) purchased the mugs for hot drinks independently. However, all care homes recorded all fluid intake (not just cold drinks intake whilst using Droplet®)
- All care homes were previously recording fluid intake, and continued doing so during the trial. The project team created a data collection form for the care homes to use to ensure they were recording the same way
- Each cup was marked with a code and the project team received anonymous data relating to each cup.

Table 1: Dates for the six-week trial of using Droplet®

Care Home	Dates for the trial of using Droplet®
Tile House	30.09.19 – 10.11.19
Eden House and Seven Gables	21.10.19 – 01.12.19
Highfield Nursing Home	28.10.19 – 08.12.19

3.5 Evaluation methods

- **Evaluation of fluid intake** using data collection sheets
- **Evaluation of care home staff views** through an end of the project questionnaire
- **Evaluation of care home manager views** through end of the project interviews. The interviews were attended by two members of the project team (one asked the questions, whilst the other wrote notes), and questions were agreed in advance
- **Evaluation of resident / family member experiences** through an end of project questionnaire.

4.0 Results

Results have been presented on recruitment of residents, training of care staff, the impact of Droplet® on residents' hydration and feedback from care staff, managers and residents. *Data on the impact of Droplet® on patients on the rehabilitation unit residing at Highfield Nursing Home have been separated from the data from the residents at the three residential homes. This is because there were different patients in the rooms at Highfield Nursing Home, meaning the data at baseline vs implementation cannot be compared in the same way.*

4.1 Recruitment

- Data was collected from 45 residents (27 from the three residential homes; 18 rehabilitation patients from Highfield Nursing Home). **Table 2** shows the care home name, type and number of beds in each home
- At Highfield Nursing Home, some patients were residents for the duration of the trial, whilst others changed. 20 patients occupied these 15 beds across the trial period; data from 18 patients (occupying 14 beds) was collected during the trial period
- No 'exclusion criteria' were set. However, at Highfield Nursing Home, one patient refused to use Droplet® and one patient was on dialysis three times a week, so was excluded due to difficulty in monitoring intake and introduction of fluid restrictions

- A small number of residents from the residential homes refused to use Droplet® or started using it and then declined to continue.

Table 2: Details on the care homes involved and numbers of residents recruited

Care Home	Type of home	Maximum number of service users registered for	Number of residents recruited
Tile House	Residential	20	9
Eden House	Residential	21	10
Seven Gables	Residential	25	8
Highfield Nursing Home	Nursing (rehab beds included only)	15 rehab beds	18 patients occupying 14 beds

4.2 Training

A total of 30 staff (from a range of different roles) received training (see **Table 3** below). Care staff were asked about the training session in the end of project questionnaire. 17 care staff provided feedback (n=9 at Tile House; n=4 at Eden House; n=4 at Highfield) plus a group at a staff meeting at Seven Gables.

83% of staff said they agreed or strongly agreed that the training session covered all the information they needed to use Droplet® effectively.

Table 3: Numbers of staff trained at each care home

Care Home	Number of staff trained
Tile House	10
Eden House	5
Seven Gables	5
Highfield Nursing Home	10

4.3 Impact of Droplet® on hydration

- **Table 4** below shows the average daily fluid intake per resident and the percentage daily increase completed to baseline. The data from rehabilitation patients residing at Highfield Nursing Home has been separated from the residential homes, as there were different patients in the rooms at Highfield Nursing Home
- Data has also been presented for the average fluid intake for each week (along with percentage increase), shown in tabular format (**Table 5**) and line graph format (**Figure 1**)
- **Fluid intake on the weeks with Droplet® were consistently higher than baseline**
- **Fluid intake increased by an average of 12.7% above baseline** for the three residential homes, and 15.4% above baseline for the rehabilitation unit, corresponding to an **average increase of almost 170mls per day**
- Statistical analysis was attempted but the sample size was too small to carry out the analysis
- There was a **12% increase in fluid intake on week 2, and this stayed fairly consistent throughout** the rest of the intervention phase
- Data suggests that residents in the three residential homes were **more likely to achieve the recommended fluid intake** (1500 – 2000 ml per day) with Droplet®
- Rehabilitation beds at Highfield Nursing Home were not achieving the recommended fluid intake with or without Droplet® (however there are several reasons for this, as highlighted in the notes under Table 4)
- Fluid intake among residents at **Seven Gables was consistently higher** than the other care homes (70% higher at baseline, and an average of 64% higher across the six weeks of intervention)
- Fluid intake at Tile House (who also used the mug attachment for hot drinks) was actually the lowest of the three residential homes - average fluid intake on weeks 2-7 increased by 112ml (9%) above baseline.

Table 4: Summary of the key results on change in fluid intake with Droplet®

	Residential homes (Tile House, Eden House & Seven Gables)	Highfield Nursing Home*
Average resident daily fluid intake without Droplet® during baseline (ml / day)	1322 ml	1081 ml (per room / day)
Average resident daily fluid intake for weeks 2-7 with Droplet® (ml / day)	1491 ml	1246 ml (per room / day)
Average increase in fluid intake with Droplet® (ml / day) in weeks 2-7 compared to baseline	169 ml (12.7%)	166 ml (per room / day)
Average percentage increase in fluid intake on weeks 2-7 compared to baseline	12.7%	15.4%

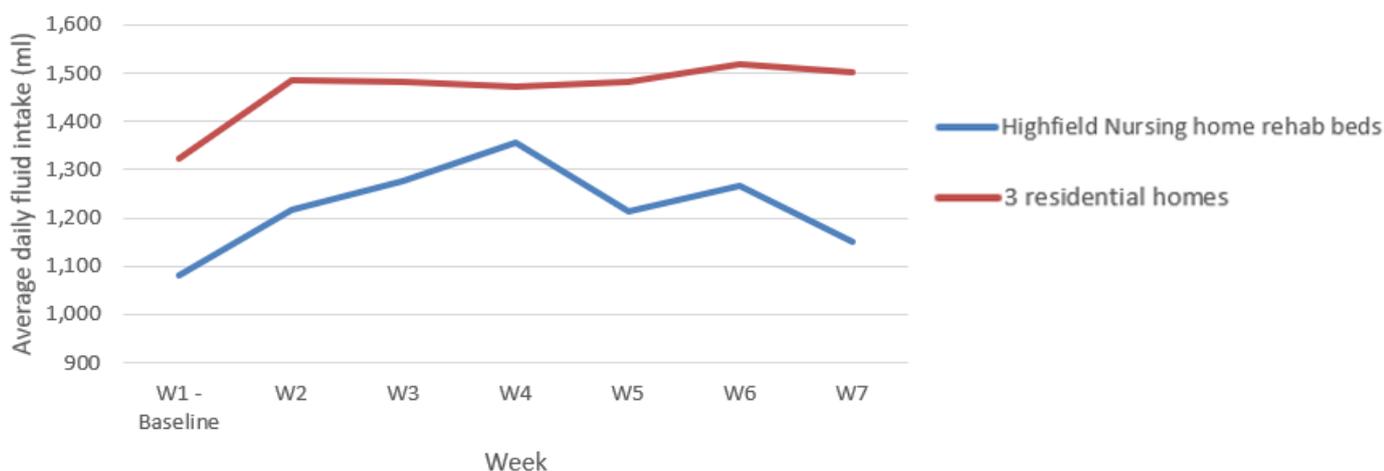
* Note: Across the 14 beds that this data relates to, there were several weeks (7 weeks in total) where one room was empty. In addition, these patients were generally more mobile, making it more of a challenge to record all fluid consumed. Both these factors reduced the total / average fluid intake that was recorded.

Table 5: Average daily fluid intake for each week for the three residential homes (pink columns) and Highfield Nursing Home rehabilitation beds (blue columns)

Week	Tile House, Eden House and Seven Gables		Highfield Nursing Home (rehab beds)*	
	Average Daily Fluid intake per resident (ml)	Percentage increase compared to baseline	Average Daily Fluid intake per resident (ml)	Percentage increase compared to baseline
Week 1 - Baseline	1322		1081	
Week 2	1486	12%	1218	13%
Week 3	1481	12%	1276	18%
Week 4	1473	11%	1355	25%
Week 5	1483	12%	1214	12%
Week 6	1519	15%	1266	17%
Week 7	1501	14%	1150	6%

* Rooms where baseline data was not available was removed from the analysis

Figure 1: Average daily fluid intake for each week for the three residential homes (pink line) and Highfield Nursing Home rehabilitation beds (blue line)



4.4 Process evaluation: Feedback from care staff, managers and residents

4.4.1 Care staff questionnaires

Questionnaires were completed by around 25 care staff in a range of roles (n=9 at Tile House; n=4 at Eden House, n=4 at Highfield Nursing Home). Staff at Seven Gables completed one questionnaire as a group at a staff meeting (for analysis purposes, it is assumed that eight members of staff provided their views). **Figure 2** shows a summary of the key results and **Figure 3** shows some of the additional comments provided.

Figure 2: Summary of care staff questionnaire responses about using Droplet®

<p>Training</p> <ul style="list-style-type: none"> 88% agreed / strongly agreed that the training session covered all the information they needed to use Droplet® effectively 84% agreed / strongly agreed that the Hydration Information Pack used during the training was useful
<p>Use and effectiveness of Droplet®</p> <ul style="list-style-type: none"> 64% of care staff agreed or strongly agreed that the residents found Droplet® easy to use 76% of care staff had no problems introducing Droplet® with residents 80% of residents used both the light and verbal prompts 80% of care staff agreed that Droplet® helped residents to drink more 80% of care staff noticed positive changes to residents' behaviour / wellbeing through using Droplet®
<p>Support for their care role - 76% of care staff felt using Droplet® helped them in their care role</p>
<p>Future use of Droplet®</p> <ul style="list-style-type: none"> 80% of care staff would recommend Droplet® to other healthcare professionals and plan to continue to use Droplet® after the trial has finished None of the care staff from Highfield Nursing Home plan to continue using Droplet® after the trial

Figure 3: A selection of quotes from care staff on the positive and challenging aspects of using Droplet®

Positives

- “Raised awareness of fluid intake with those who required assistance to ensure it was given frequently and regularly”
- “The prompts were good for carers to keep on top of fluid intake and recording for these clients. The prompts also helped boost our own performance as staff”
- “Helped to make sure non-verbal people were drinking enough”
- “Intake of fluid with some residents improved greatly, with a beneficial effect on overall wellbeing”
- “Easy to set up and operate”
- “Robust and well built”

Challenges

- “Some residents found the cups to heavy and wide to pick up”
- “Many of our clients who have dementia required assistance from staff to keep up fluid intake and were unable to recognise the prompt independently”
- “Introduce a clear glass as some felt the drink was discoloured and declined to drink form it”
- “Verbal prompts could not be heard in communal areas and may have ignored them”
- “Some residents tried to collect all the cups as they felt they all belonged to them”
- “The residents did not like the cup going off every 20 mins”

4.4.2 Manager feedback (interviews)

The feedback from managers has been categorised into seven key themes (some of the feedback and quotes from managers can be seen in **Figure 4**):

1. Droplet® improved fluid intake of residents
2. Droplet® had a positive impact on resident outcomes
3. Droplet® had a positive impact on staff role and fluid intake monitoring processes
4. There were several design issues; notably the needs for a lighter cup with two handles and a spout
5. There was mixed feedback about how the care homes will continue to use Droplet in the future
6. The majority of managers would recommend Droplet® to other care homes
7. There were particular limitations for using Droplet® in the rehabilitation setting

The manager of Highfield Nursing Home summed up this feedback with the following quote:

“The concept is fantastic, but the design and features need to be improved”

Figure 4: Manager feedback (Red text – Seven Gables; Blue text – Tile House; Green text – Eden House; Purple text – Highfield Nursing Home)

<p>Droplet® improved fluid intake</p> <ul style="list-style-type: none"> • Made a big difference to fluid intake • “It did increase fluid intake so we decided to introduce another tea round”
<p>Droplet® had a positive impact on resident outcomes</p> <ul style="list-style-type: none"> • It has made a big improvement in UTIs • Helped improve hydration and reduced number of UTIs
<p>Droplet® had a positive impact on staff role and monitoring processes</p> <ul style="list-style-type: none"> • Staff liked using the cups and had a positive impact on them encouraging residents to drink • “It helped us to see that actually we’re really good at recording fluid intake. And if there were any gaps in the way we monitor the cup helped us to improve the way we do our reviews” • “One of the great things about the cup was its ability to empower the staff” • Some staff felt it really helped them to prompt residents to drink
<p>There were several design issues / challenges – notably the needs for a lighter cup with two handles and a spout</p> <ul style="list-style-type: none"> • The cup was hard to hold, and too heavy for the older residents; having two handles and a spout would be better. Voices reminders was too quiet and flashing lights caused confusion. The night mode could be improved • “The cups stain really easily and you get a build-up in the ml markers which are hard to clean out” • “A spout would be ideal as most clients drink through spouts and the sip hole is too hard to see. Adding a non-spill lid and have a range of different bright colours would be great” • Make the cup a lot lighter, add two handles and make the voice reminder louder • It was too big and heavy to hold for most residents especially the ones with dexterity issues • Two handles would be ideal, especially for residents with Parkinson’s and tremors • You can’t see the sip hole very well, so a spout would be much better • Light prompts worked best • Design of cup caused problems: no handles, too big & bulky, size of cup • A spout would be better and make the spout a different colour so it’s more visible
<p>Mixed feedback in terms of how care homes intend to use Droplet® in the future –</p> <ul style="list-style-type: none"> • All residents who took part are continuing to use them. Not planning to buy for other residents due to cost and the need for the design to be improved. Have recommended family to purchase • “We do not feel Droplet® is for everyone – it all depends on the environment. We don’t feel the cup is suitable for people with dementia or residents with cognitive impairments”

- “We are still giving cups to new and old residents that we feel would benefit from it. We still have at least 5 cups in use”
- “Our rehab patients are no longer using the cups. However, we are going to identify suitable long-term residents to use the cup. We would not purchase cups ourselves until the design has been improved”

The majority of managers would recommend Droplet®

- “We would recommend it. I do feel the potential is massive”
- “They are inexpensive to buy, so we would recommend family to self-purchase”
- “We would recommend it for self-purchase, and have also mentioned it at several manager meetings with other care groups”

There were particular limitations with its use in a rehabilitation unit

- “It’s hard to get a full picture of the amount that has actually been drunk as when relatives visit, they tend to top the cup up so it’s never 100% accurate”
- “The patients in rehab beds don’t really need to be reminded to drink”
- “Generally, rehab patients have more capacity and greater understanding. Most clients did not see the need to be reminded to drink – thought it was like ‘going back to school’”

4.4.3 Resident / family member questionnaires

Obtaining feedback from residents was a challenge, as the majority had dementia. Feedback from 12 residents was received (n=2 at Tile House, n=0 at Eden House, n=1 at Seven Gable, n=9 at Highfield Nursing Home). A summary of the feedback is shown below:

- 33% (n=4) agreed or strongly agreed that Droplet® was easy to use (n=5 were ambivalent and n=3 disagreed)
- 83% agreed or strongly agreed the Droplet® reminded them to drink
- Out of 11 residents, n=2 would recommend Droplet® to family and friends; n=9 (from Highfield Nursing Home) would not recommend it
- 50% experienced problems using Droplet® (these were all rehabilitation patients residing at Highfield Nursing Home) – five of these residents found the cup too difficult to hold (due to size / weight) and two of them found the flashing light annoying
- The main feature residents **liked** was that **Droplet® reminded them to drink**
- The main feature residents would change would be the design, size and weight of the cup (to make it smaller and lighter and add handles).

4.4.4 Resident stories / case studies

Managers were asked if they had any positive outcomes / stories to share from residents using Droplet®. Stories were received back from three of the managers, as seen in **Table 6**.

Table 6: Resident stories, as provided by care home managers

Care Home	The situation	Change in fluid intake	Other outcomes
Seven Gables	Female resident who used Droplet®	Fluid intake increased so much	Fluid intake increased so much that her family were shocked at how responsive and alert she had become. She was actually able to hold a conversation as a result
Tile House	One lady is very particular but still uses her Droplet® cup. She has grown attached to it	Fluid intake really improved – she has gone from drinking 600ml per day to 200ml every 2-3 hours	Family noticed a difference in her general wellbeing and there was a drop in infections
Highfield Nursing Home		Fluid intake increased (previously dehydrated). The flashing light was key and worked well	Reduced frequency of UTIs

4.4.5 Feedback from project team

The following feedback was provided by Winifred Ratcliffe, TEC Business Support Officer, Isle of Wight NHS Trust (key member of the Project Team):

“The care homes were very engaged, and collected data as requested. The training sessions (including the quiz) were also particularly successful. We didn’t really have any key challenges; the trial went smoothly. Reflecting on the main outcomes, it was clear that Droplet was beneficial for residents; however, it was not suitable for everyone. Staff liked the cup as a good visual reminder to prompt resident to take a drink, but feedback from both staff and residents suggests that the design of cup needs to be changed, i.e. include handles & more obvious spout”

5.0 Discussion

Whilst there are some limitations (as listed below), the data suggests that using Droplet® did increase fluid intake and enabled more residents to achieve their recommended daily fluid intake. Feedback from care staff, managers and residents themselves confirmed that Droplet® helped the residents to drink more. The mechanism by which Droplet® helped residents to drink more seemed to be a combination of reminding residents to drink (through use of the flashing light and/or voice reminder) and prompting care staff to remind residents to drink. In addition to the data on fluid intake, a limited number of resident stories and feedback from care staff and managers provide anecdotal evidence to suggest that Droplet® also helped facilitate an improvement in health and wellbeing, such as increased alertness and reduced UTIs.

Feedback from care staff, managers and residents suggests that Droplet® was not useful for all residents, for example, several staff commented on the confusion caused by the flashing lights and voice reminders for residents with dementia. There was significant feedback from all parties regarding the design of Droplet® - in particular the need for a lighter cup with two handles and a spout.

Strengths

- The project design was simple
- The project was relatively inexpensive to carry out
- The inclusion of training (and the Hydration Information Pack) was a success and should be included in similar interventions.

Limitations

- Use of Droplet® on the rehabilitation unit at Highfield Nursing Home meant this data could not be included with the main data set as they were not the same residents. There are several reasons to explain the lower fluid intake recorded on the rehabilitation unit, compared to the three residential homes. Firstly, within the rehabilitation unit, there were also several rooms which were unoccupied for certain weeks, meaning the average fluid intake was reduced. Secondly, manager feedback suggested that these residents were more independent and mobile, meaning they were getting their own drinks which were not recorded on the data collection sheet
- Too small sample size to evaluate whether there was a statistically significant increase in fluid intake
- The baseline period was too short to account for natural fluctuations in fluid intake
- No exclusion criteria were set – setting exclusion criteria may have enabled the Droplet® cups to be used by those residents most in need
- The Droplet® mug attachment was not used in the trial (except for Tile House who purchased their own). If the mug attachment were to be used in addition to the cup, the potential for an increase in fluid intake would be even greater. Whilst the data from Tile House did not show a higher increase from using both the tumbler and mug attachments, this was just one care home with a small number of residents.

6.0 Conclusion

Dehydration is a well-documented problem, particularly for older people residing in care homes. As such, any new technologies (such as Droplet®) that have the potential to improve fluid intake would be well worth trialling and considering. Droplet® itself is inexpensive to purchase, and has the potential to pay dividends in terms of the increase in fluid intake and related health and wellbeing outcomes. Despite the design issues expressed by care staff and managers in this trial, the majority of managers would recommend its use in the care home setting. If other care homes wished to trial Droplet®, they could consider starting by identifying the residents who they think would most benefit from using Droplet®.