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Laidlaw Undergraduate Research and Leadership Programme

Summer 1 Research Report

Developing Orodisperisble Films for Paediatric Antimetric

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Introduction:

During the summer of 2025, I was fortunate to join the research team at the UCL School of Pharmacy as part of the Laidlaw Scholarship Programme. I worked under the mentorship of Dr Karolina Dziemidowicz and Dr Diba Keyhanfar. My project focused on developing orodispersible films (ODFs) for paediatric antiemetics. These are thin films that dissolve in the mouth and could offer a child friendly alternative to tablets and syrups. The work forms part of a broader research effort by my supervisors, who have been exploring better ways to manage chemotherapy induced nausea and vomiting (CINV) in children for many years.

Over the course of the research project, I gained hands on experience in pharmaceutical research, especially in the characterisation of ODF formulations. I worked with several analytical techniques including thermogravimetric analysis (TGA), differential scanning calorimetry (DSC), powder X ray diffraction (PXRD), scanning electron microscopy (SEM), and ultraviolet visible spectroscopy (UV-Vis). Each of these methods gave me a different perspective on the films, from their stability to their structure, and helped me understand how they might behave as real medicines.

Beyond the lab, one of the most impactful parts of this experience was visiting the oncology and haematology department at Great Ormond Street Hospital for Children NHS Foundation Trust (GOSH). I had the chance to speak with nineteen families of paediatric cancer patients about their experiences with current antiemetic treatments. Many of them described how difficult it was for their children to swallow tablets or tolerate unpleasant tasting syrups. These conversations gave me a deeper understanding of the challenges patients face every day and reminded me that drug delivery systems must always be designed with the patient in mind.

This experience has taught me that the best pharmaceutical innovations are those that are grounded in both science and empathy. In the sections that follow, I will introduce the background to this research, explain the techniques I used, share what I learned from patient families, and reflect on the significance of this research project for my own growth.

Background Knowledge

A. Chemotherapy Induced Nausea & Vomiting (CINV)

Chemotherapy is one of the most effective treatments for cancer, but it often comes with difficult side effects. Among the most distressing of these are nausea and vomiting, known together as chemotherapy induced nausea and vomiting (CINV). CINV is very common. Studies have shown that it affects up to 70-80% of patients receiving chemotherapy (Ruggiero A. et al, 2018). It can start within hours of treatment or appear days later, and for many patients it becomes one of the most dreaded parts of therapy.

Nausea and vomiting might sound like minor problems compared to cancer itself, but they can have a huge impact on quality of life. Children may refuse to eat or drink, which can lead to

dehydration and malnutrition. Repeated vomiting can also weaken the body, delay recovery, and in some cases even cause families to consider stopping treatment (Han L. et al, 2025). For young patients who are already coping with the emotional and physical challenges of cancer, CINV adds another layer of suffering.

There are medicines that help reduce CINV, called antiemetics. These are usually given as tablets, syrups, or injections. While they can be effective, they are not always easy for children to take. Many dislike the taste of syrups or find swallowing tablets difficult, especially when they are already feeling sick. Injections are painful and can be frightening. Even when the medicine works, poor compliance often limits its benefit (Jordan, Warr, Jahn, & Roila, 2024).

This is why CINV remains an important problem in paediatric oncology. It is not simply a side effect to be tolerated but a serious barrier to effective treatment. Reducing nausea and vomiting means children are more likely to complete their chemotherapy, recover well, and maintain a better quality of life throughout their treatment. For researchers like my supervisors and their teams, improving the way antiemetics are delivered is therefore a vital part of supporting young patients and their families (The Royal Children's Hospital Melbourne, 2023).

B. Orodispersible Films (ODFs)

One approach to tackling the problem of CINV in children is to rethink how antiemetic medicines are given. Instead of relying on tablets, syrups, or injections, researchers have been exploring new dosage forms that are easier to take and more acceptable for young patients (Great Ormond Street Hospital for Children NHS Foundation Trust, 2023). One of the most promising of these is the oral dissolving film (ODF).

An ODF is a very thin strip made from safe polymers that carries the medicine within it. When placed on the tongue, it quickly breaks down and releases the drug into the mouth (Bender et al., 2002). The whole process takes only a few seconds and does not require any water or swallowing. This makes ODFs especially appealing for children who may be nauseous, reluctant to swallow, or anxious about injections. A simple way to think about them is to compare them to breath freshening strips you can buy in shops, except that instead of mint flavour they carry a real dose of medicine.

ODFs have several advantages over conventional forms of antiemetics. They are small, portable, and easy to administer, which helps parents and healthcare providers (National Center for Biotechnology Information, 2018). They can also improve compliance because children are more willing to take them compared to unpleasant tasting liquids or large tablets. On top of this, the films can be designed to dissolve very quickly, which is important when a child is feeling sick and needs fast relief (MedlinePlus, 2023).

Another important benefit is the potential for taste masking. One of the biggest challenges in paediatric medicine is that many drugs are naturally bitter. By carefully selecting the polymers and

additives used to make the films, researchers can improve the flavour or even hide the bitterness altogether. This makes the medicine far more acceptable to children and increases the likelihood that they will complete their treatment.

For these reasons, ODFs are increasingly seen as a child friendly solution for delivering medicines, including antiemetics. They combine scientific innovation with practical benefits for patients and families. My project at UCL School of Pharmacy was part of this wider effort to test and characterise ODFs, with the aim of one day translating them into real clinical use for children undergoing chemotherapy.

C. Electrospinning

In this project, we used electrospinning to create the orodispersible films. Electrospinning is a technique that uses electricity to spin a polymer solution into very fine fibres. The solution, which contains both the drug and the polymer, is loaded into a syringe with a small needle. When a high voltage is applied, the liquid is drawn out into a thin jet. As it travels through the air, the solvent evaporates, and solid fibres are formed. These fibres are collected on a flat surface, gradually building into a thin film.

A simple way to imagine the process is to think of making candy floss. Instead of sugar being stretched into strands by heat, electrospinning stretches a liquid into fibres using electricity. The result is a web of fibres that are often thinner than a human hair.

This method is particularly useful for oral dissolving films because it produces fibres with a very large surface area. A large surface area allows the drug to dissolve quickly in the mouth, which is important when a child is already feeling sick and needs rapid relief. Electrospinning also allows the drug to be evenly distributed throughout the film, ensuring that each dose is consistent. By adjusting settings such as the voltage or the type of polymer used, researchers can control properties like how strong the film is or how fast it dissolves.

For my project, electrospinning made it possible to design and produce experimental anti-sickness films that could be tested using analytical techniques. It was the foundation of the laboratory work, linking the scientific process directly to the goal of developing a child friendly medicine for chemotherapy induced nausea and vomiting.

Pharmaceutical research

A. Why this research is important

Although cancer treatments have advanced greatly, the way medicines are given to children has not always kept pace. Many formulations are still designed for adults, which means they are too strong,

too large, or too unpleasant in taste for younger patients. Parents and healthcare providers often have to cut or crush tablets, dilute syrups, or find creative ways to convince children to take their medicine. This not only causes stress but can also reduce the effectiveness of treatment if the child refuses or only takes part of the dose.

The World Health Organization has highlighted the lack of child friendly medicines as a global health challenge. Developing formulations that are easier for children to take is not just a matter of convenience. It can make the difference between whether or not a child completes a course of treatment. In the context of chemotherapy, where success depends on both precision and persistence, improving the delivery of supportive drugs such as antiemetics can have a direct impact on survival and quality of life.

For these reasons, pharmaceutical research into new dosage forms like orodispersible films is vital. It bridges the gap between cutting edge science and the everyday experiences of patients and families.

B. Analytical Techniques

Creating a medicine is not only about mixing ingredients together. It is about understanding how those ingredients behave, both on their own and as part of a final product. Medicines must be stable, effective, and safe before they can ever reach a patient. This is where analytical techniques come in.

Analytical techniques act as the eyes and ears of pharmaceutical science. They allow researchers to look deep into the structure of a material, measure its physical and chemical properties, and predict how it will perform in the body. Without these tools, it would be impossible to know whether a formulation is reliable or if it might fail under certain conditions.

In my project, I used several analytical techniques to study orodispersible films. Each one gave me a different piece of the puzzle. Thermogravimetric analysis told me about thermal stability. Differential scanning calorimetry revealed phase changes and compatibility of ingredients. Powder X-ray diffraction showed whether the drug was crystalline or amorphous. Scanning electron microscopy allowed me to see the surface structure at a microscopic level. Ultraviolet visible spectroscopy enabled me to measure drug loading and release. Together, these techniques helped me build a detailed picture of how the films were formed and how they might behave when used as real medicines.

1. **Thermogravimetric analysis (TGA)** is a way of studying how a material changes as it is heated. In simple terms, it measures weight loss as the temperature increases. This can tell us, for example, when water evaporates from a film or when the material begins to break down. In my project, TGA was important because it showed me how stable the

orodispersible films were under heat. Medicines often go through manufacturing processes that involve elevated temperatures, so it is essential to know if the drug or the film will degrade. Watching the curves from TGA felt like seeing a fingerprint of the material's behaviour. A steady line meant stability, while sharp drops in weight revealed points where important changes were happening.

2. **Powder X-ray diffraction (PXRD)** works by shining X-rays onto a powdered sample and recording how they scatter. This produces a diffraction pattern that reveals whether a material is crystalline or amorphous.

   PXRD is commonly used to identify what crystalline material is present and to check for purity. Each compound has a unique pattern, and if unexpected peaks appear, it usually means impurities are present. The technique can also determine different crystal forms, which matter because stability and solubility can change depending on the form.

   In my project, PXRD showed whether the drug in the films stayed crystalline or became amorphous after processing. This was important for predicting how quickly it might dissolve and for confirming that no impurities had been introduced during formulation.

3. **Differential Scanning Calorimetry (DSC)** is an analytical technique used to measure how a material's heat flow changes as it is heated or cooled. It works by comparing the amount of heat required to increase the temperature of a sample to that of a reference. When the sample undergoes a physical or chemical change (such as melting, crystallization, or a glass transition) it absorbs or releases heat, which is detected by the DSC instrument. This makes DSC especially useful for studying thermal properties of materials, including polymers, pharmaceuticals, and foods, providing valuable information about their purity, stability, and phase transitions.

4. **Scanning electron microscopy (SEM)** uses a beam of electrons to create very high resolution images of a material's surface. It can magnify samples thousands of times more than a normal light microscope, revealing details at the microscopic level.

   In my work, SEM was fascinating because it let me see the actual structure of the films I had made. Instead of just knowing the numbers and graphs, I could look directly at the texture and surface. Some films looked smooth, while others showed tiny fibres or pores. These differences can affect how quickly the film dissolves or how evenly the drug is distributed. It felt like zooming in on another world, one that is invisible to the naked eye but critical for how the medicine works.

5. **Ultraviolet visible spectroscopy (UV-Vis)** is a method that uses light to measure how much of a substance is present in a sample. Different molecules absorb light at specific wavelengths, and by measuring this absorption, we can calculate concentrations.

   In this project, UV-Vis was essential for checking how much drug was in the films and how quickly it was released when placed in liquid. To me, it was a bit like testing how strong a cup of tea is by looking at its colour. A darker solution means more tea, just as a higher absorption reading means more drug. UV-Vis provides a reliable way to measure drug content and release, which is crucial in developing films that deliver the correct dose consistently.

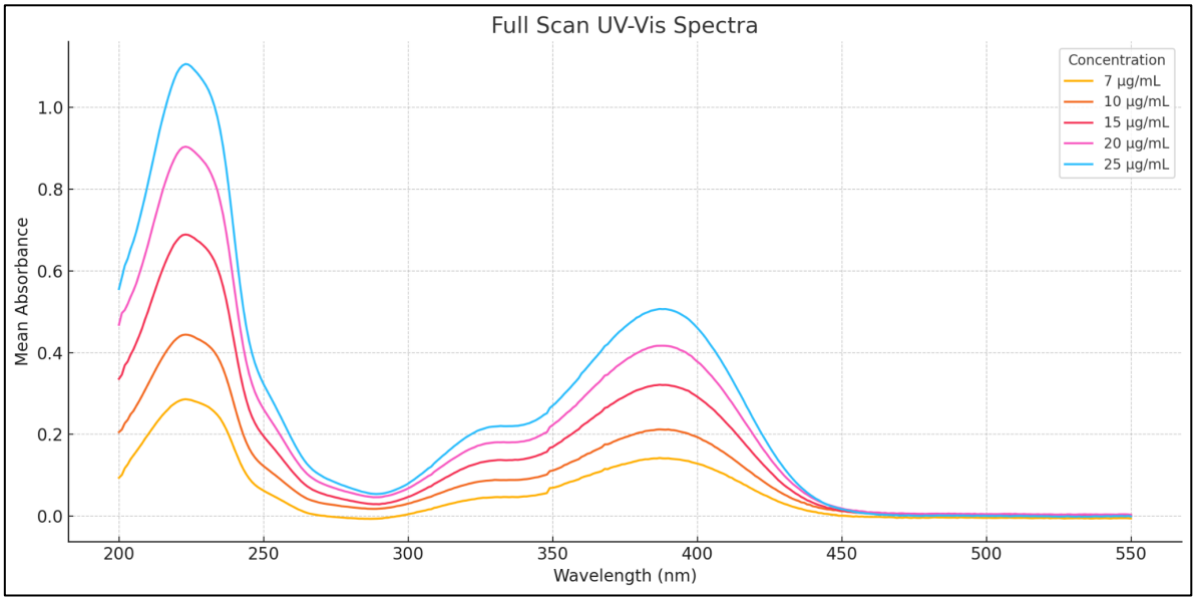


Figure 1. UV-Vis calibration curve for ondansetron.

Questionnaire

A. Methodology

The questionnaire I used was originally created by the previous Laidlaw Scholar, Diya Asawa (2024), who designed a structured survey to explore chemotherapy induced nausea and vomiting (CINV) in paediatric patients. Her work combined Likert scale and open ended questions to assess four key areas: the severity of nausea and vomiting, current coping strategies, treatment experiences and expectations, and dosage form preferences. Her study at Great Ormond Street Hospital (GOSH) provided a valuable foundation for my own project.

Building on her work, I used an edited version of the same questionnaire (see Appendix 1) to collect new data from families in the oncology and haematology department at GOSH during the summer of 2025. A

total of nineteen families of paediatric cancer patients participated. Before starting, families were given an explanation of the study, assured of anonymity, and asked for consent to record responses for accuracy. Participation was voluntary, and families could withdraw at any time.

The survey consisted of three main sections. The first section assessed the severity and frequency of nausea and vomiting, with families asked to rate sickness on a scale from “very mild” to “very severe,” and frequency from “never” to “almost always.” Open questions also invited them to describe when sickness occurred, how long it lasted, and its impact on the child’s physical, emotional, and social wellbeing.

The second section focused on current coping options. Families were asked about non medical advice they had received, such as drinking cold fluids or taking ginger, and whether medicines were prescribed. If medicines were used, they were asked to specify which drugs and what form they were given in (eg liquid, tablet, infusion).

The third section explored treatment experiences and expectations. Families were asked about difficulties with current antiemetics, such as bad taste, swallowing difficulties, or vomiting after administration. They were then presented with images and explanations of different dosage forms (tablets, crushed tablets in water, dispersible tablets, liquids, infusions, and orodispersible films) and asked which forms appealed to their child and which did not. In my adapted version, I also asked families to rank all the dosage forms in order of preference. This addition gave more structured insight into which formulations were most acceptable overall.

The survey design therefore allowed me to collect both quantitative and qualitative data. Scaled responses and rankings provided measurable trends, while open questions captured the lived experiences of patients and families. Together, this created a richer picture of how CINV is managed day to day and how oral dissolving films might meet unmet needs.

B. Findings

Severity of N&V

When asked to rate the usual severity of their child’s sickness on a scale of 1 (very mild) to 5 (very severe), most families selected values in the middle of the scale. The largest group described symptoms as moderate, while several reported them as mild. A smaller but important number rated the sickness as severe, highlighting how disruptive chemotherapy induced nausea and vomiting can be for certain children. Only one family reported that symptoms were very mild, and none selected very severe. This spread shows that while not every child experiences the same intensity, sickness remains a persistent and often significant issue for many families.

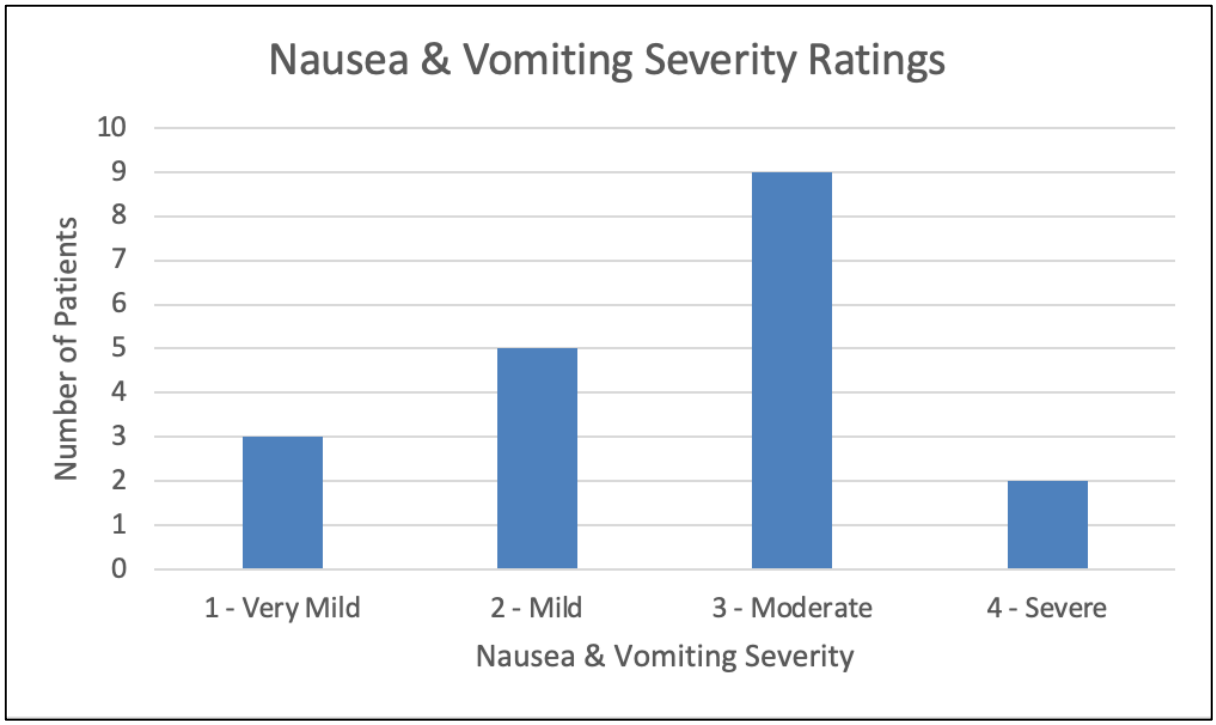


Figure 2. Severity ratings for chemotherapy induced sickness on a 1 to 5 scale. Most families selected mild or moderate, with a notable group reporting severe episodes.

Frequency of N&V

Families were asked how often their child usually experienced sickness, with options ranging from "never" to "almost always." The responses showed a wide spread, but most clustered toward the higher end of the scale. Several families reported that sickness happened frequently (1–3 times per week), and a number described it as occurring very frequently or almost always, often around chemotherapy treatment days. A smaller group reported sickness as occasional, while very few selected "rarely" or "never." These findings suggest that for many children, nausea and vomiting are not isolated events but a regular and expected part of treatment, placing a significant burden on daily life.

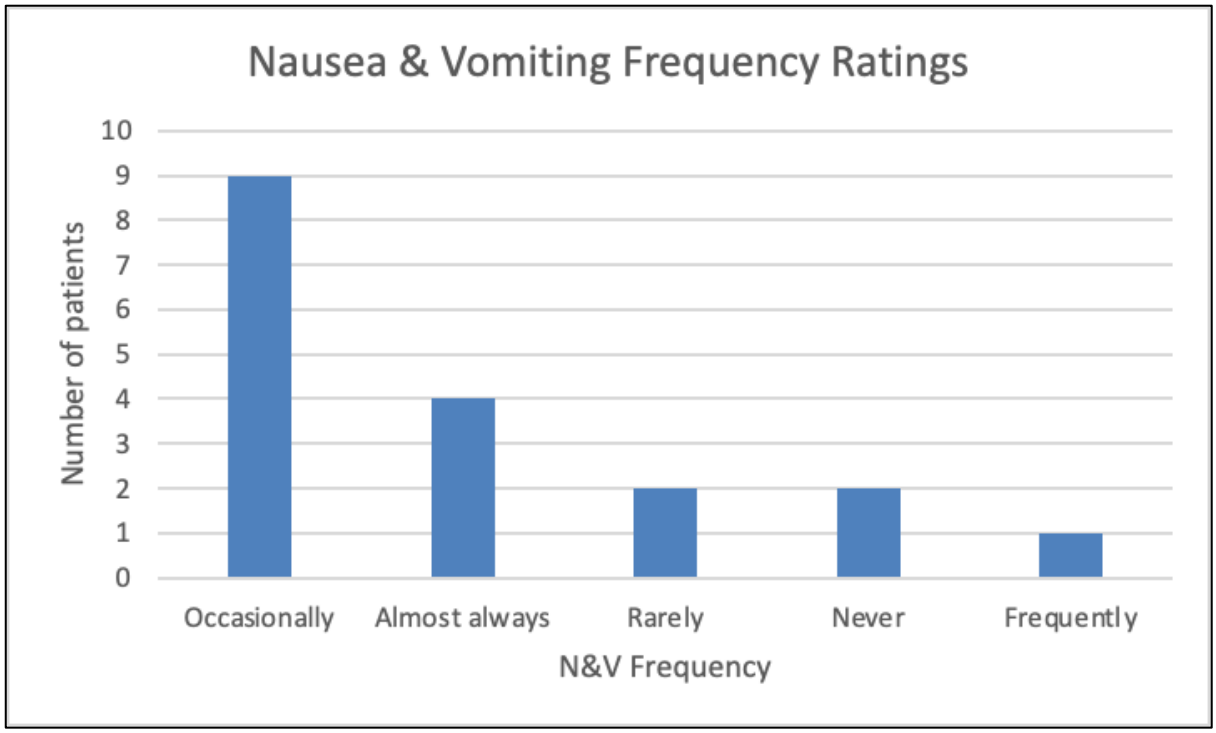


Figure 3. Reported frequency of chemotherapy induced sickness. Most families indicated frequent or very frequent episodes, with some describing symptoms as almost always present during treatment cycles.

When does N&V occur?

Families were asked when they most often observed nausea and vomiting in their children. The majority (8 out of 19) reported that sickness occurred after cancer treatment or chemotherapy sessions, which highlights the close link between anti cancer drugs and these side effects. A smaller group (3 families) said episodes followed food or dietary supplements, while 2 reported that sickness seemed to happen all the time, regardless of triggers. Only one family said it occurred every few weeks, and another reported that it does not occur. These findings show that for most children, nausea and vomiting are strongly tied to the timing of chemotherapy, though other triggers like food can also play a role in worsening symptoms.

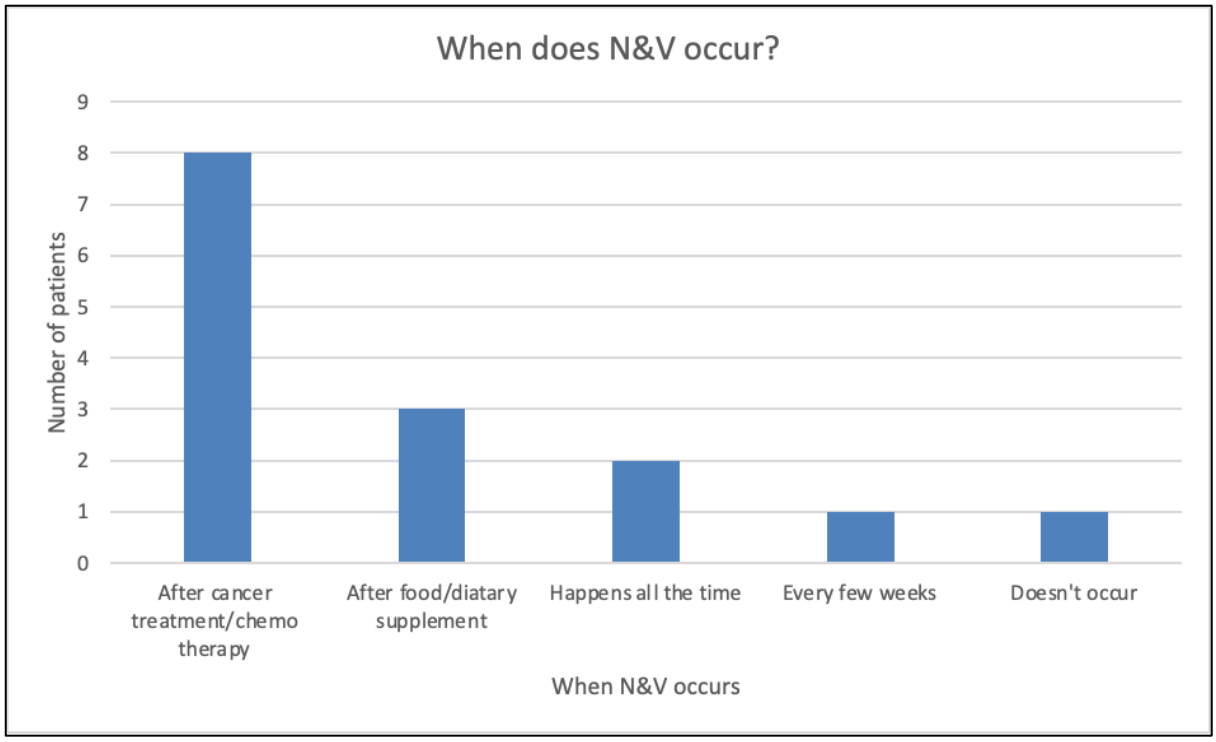


Figure 4. Timing of nausea and vomiting reported by 19 families. The majority of episodes occurred after chemotherapy treatment, with smaller numbers linked to food, persistent sickness, or occasional episodes.

Duration of N&V

Families were asked how long episodes of sickness usually lasted. The responses showed a spread across three main categories. Six families reported that sickness was **very short**, lasting only minutes, while another six described episodes as **short**, lasting for several hours. Five families said that symptoms were **long lasting**, continuing for half a day or more. Only one family reported that their child **never experienced** nausea or vomiting.

These findings suggest that while some children recover quickly, others endure extended periods of discomfort that can disrupt eating, rest, and daily activities. The presence of a substantial group with half day or longer episodes highlights the persistent burden CINV places on families, even when antiemetics are given.

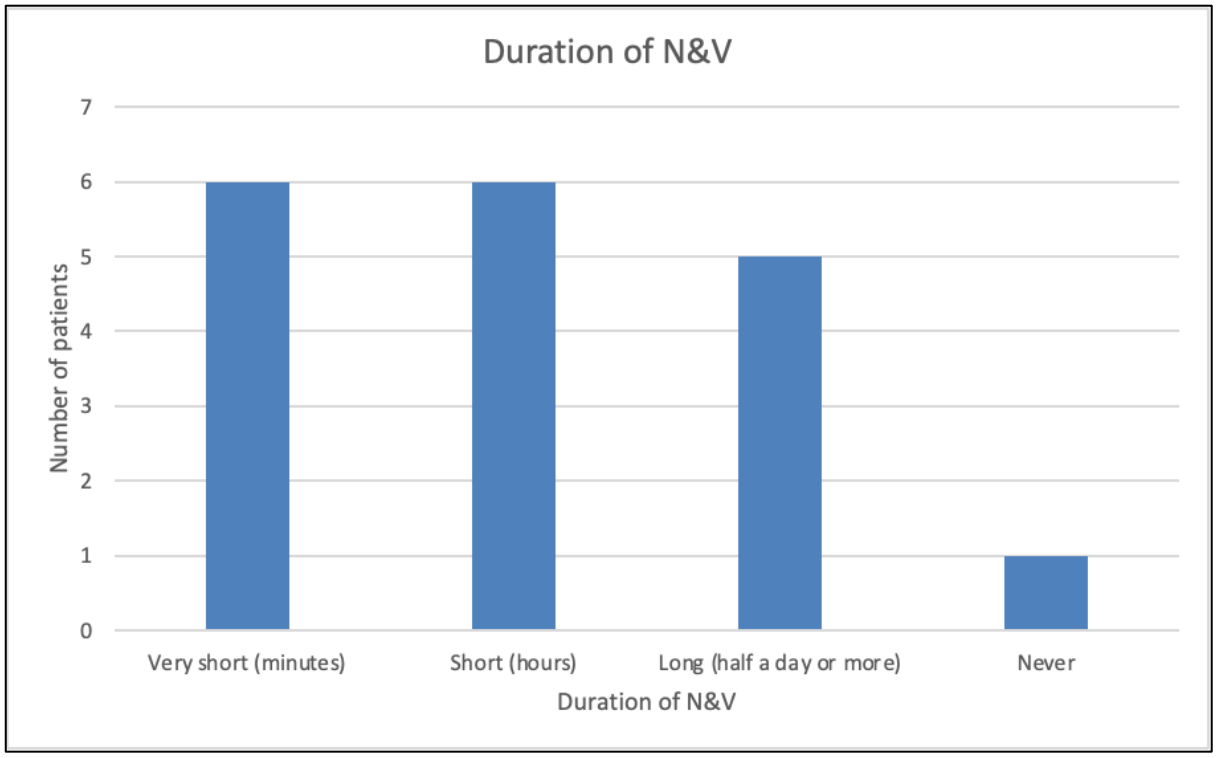


Figure 5. Duration of nausea and vomiting reported by 19 families. Most episodes lasted minutes to hours, though some persisted for half a day or longer.

Types of medicinal form used

Families were asked about the forms in which their child's anti-sickness medicines were usually given. The results are shown in two graphs: one with a detailed breakdown and one with broader grouped categories.

In the detailed chart, oral medicines were split into tablets, liquids, and orodispersible formulations. Oral liquids were the most commonly reported, followed closely by enteral tube administration (via NG or PEG) and infusions. Only a small number of families reported using tablets or orodispersible tablets directly. Several families described mixed or complex regimens, where their child received a combination of forms depending on the setting (eg liquid at home and infusion in hospital).

In the grouped chart, oral administration as a category emerged as the most common route, with eight families reporting it as their child's main form of medicine. Mixed or complex regimens were the next most frequent, followed by enteral tube delivery and infusions.

Together, these findings show that while oral delivery remains common, it is often problematic and frequently supplemented with other forms such as enteral tube or infusion. The reliance on multiple or complex regimens highlights how difficult it can be to find a single formulation that works for children, and it reinforces the need for new, child friendly options such as oral dissolving films.

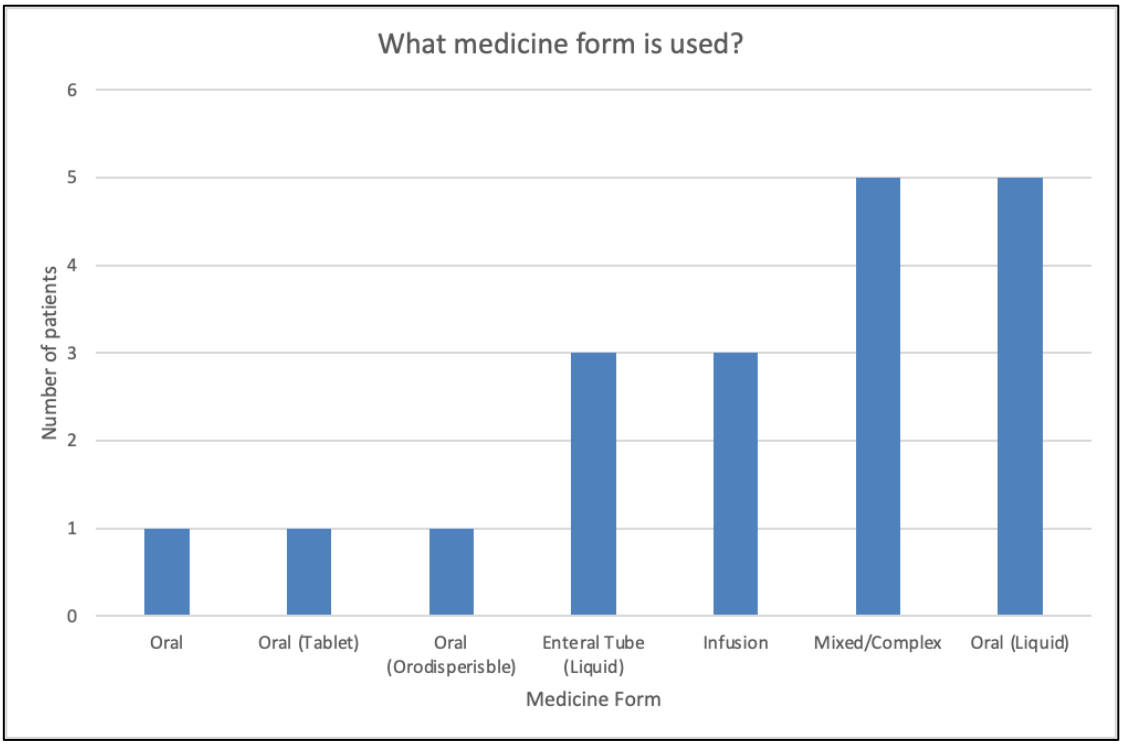


Figure 6. Detailed breakdown of the types of medicinal forms reported by 19 families, including oral liquids, tablets, orodispersible tablets, enteral tube delivery, infusions, and mixed regimens.

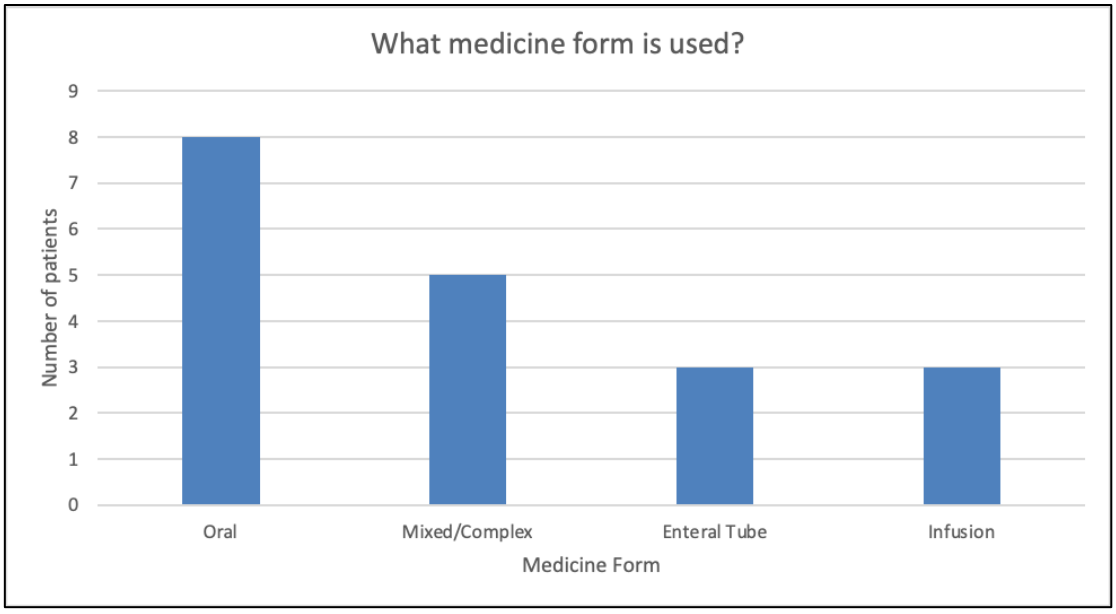


Figure 7. Grouped categories of medicinal forms reported by 19 families. Oral administration was most common, though many families relied on mixed regimens or non oral routes such as enteral tube and infusion.

Impact of sickness

Families were asked to describe the physical, emotional, and social impact of nausea and vomiting on their child. The responses highlighted how far reaching these symptoms can be. Many parents described loss of appetite and dehydration risks, with children refusing food and drink during

episodes. Physical weakness and tiredness were also common, making it difficult for children to play, attend school, or maintain their usual activities.

On an emotional level, families spoke about the distress and frustration their children experienced. Several described the way repeated episodes made their child anxious before chemotherapy, with some children becoming fearful of the treatment environment itself. Socially, sickness often meant children missed time with friends and siblings, and families had to reorganise daily life around episodes of vomiting.

One parent noted that sickness carried the added worry of losing an NG tube during vomiting, which would require replacement and cause further discomfort. Another emphasised that even when the physical symptoms eased, the emotional toll lingered, leaving their child reluctant to eat or drink normally for days afterwards.

These insights show that CINV is not simply an unpleasant side effect but a problem that cuts across physical health, emotional wellbeing, and social life.

Treatment experiences and expectations

When asked about the biggest issues with current anti-sickness treatments, two themes came up consistently: bad taste and difficulty swallowing. Families described syrups as especially unpleasant, with many children refusing to take them or vomiting immediately after administration. Tablets were widely reported as too large or uncomfortable to swallow, particularly for younger children or those already feeling nauseous. Even when medicines were successfully taken, parents said the battles to persuade their child were emotionally draining and often created anxiety around future doses.

Several families also mentioned problems linked to infusions. While effective at controlling symptoms, these were associated with needle anxiety, discomfort from repeated hospital visits, and side effects such as dizziness or fatigue. Overall, parents emphasised that antiemetics were essential, but the form they came in often added to the stress of managing CINV rather than relieving it.

Dosage form preferences and rankings

At the end of the questionnaire, families were shown images and explanations of different dosage forms including tablets, crushed tablets in water, dispersible tablets, liquids, infusions, and orodispersible films (ODFs). They were asked not only which forms appealed most but also to rank all the options in order of preference.

The rankings revealed clear patterns. ODFs were among the most appealing formulations, with many families saying they liked the idea of a medicine that could simply dissolve on the tongue without the need for water or swallowing. Parents emphasised that this would be especially useful

when a child was already feeling sick and reluctant to take anything by mouth. However, they also highlighted that taste masking would be essential for children to accept the films.

Liquids had mixed results. Some families ranked them highly because they were familiar and could be easier for younger children, but many others ranked them low due to bitterness or the need for large volumes. Tablets and crushed or dispersible tablets were consistently ranked lowest, reflecting the swallowing difficulties and taste issues already reported. Infusions were rated in the middle. Families valued their effectiveness but disliked the invasiveness and hospital dependency.

This ranking exercise provided a valuable quantitative picture of preferences that backed up the qualitative feedback from earlier questions. It showed that families are open to new formulations like ODFs, provided they are palatable and easy to use.

Discussion and Reflection

One of the most valuable aspects of this project was being able to connect scientific research in the lab with the real experiences of families at Great Ormond Street Hospital. In the lab, I spent much of my time characterising oral dissolving films using techniques such as TGA, DSC, PXRD, SEM, and UV-Vis. Each method gave me a different piece of information about the stability, structure, and performance of the films. On their own, these results showed me whether the formulations were scientifically promising.

But it was only after listening to families that I fully understood why these details matter. For example, TGA and DSC help ensure that the films are stable and reliable. To a family, that stability means confidence that their child will receive the same effective dose every time. PXRD can distinguish between crystalline and amorphous forms, which influences how quickly a drug dissolves. Families repeatedly said they wanted fast relief during nausea, and an amorphous drug form can make that possible. SEM allowed me to see the surface structure of the films. Finally, UV-Vis confirmed drug loading and release, which is essential for making sure that the medicine is not only present but also available to the patient in the right amount.

The questionnaire highlighted the gap between current treatments and patient needs. Families described how bad taste, swallowing difficulties, and large volumes of liquid often made existing medicines a daily struggle. Many children refused syrups or vomited immediately after taking them, while tablets were too difficult to manage. Infusions, though effective, came with their own burdens of hospital visits and needle anxiety. When parents were introduced to the idea of oral dissolving films, most responded positively. They liked the idea of a small strip that dissolves quickly on the tongue without the need for water. The main concern was whether the films would mask bitterness, reinforcing how central taste is to paediatric compliance.

Reflecting on this, I realised how important it is for research to be patient centred. It is not enough for a medicine to be scientifically sound. It must also be acceptable, easy, and even comforting for the people who will use it. This research project taught me that pharmaceutical innovation sits at

the intersection of science and empathy. I learned that every analytical test has meaning only when connected to the real lives of patients and families.

Conclusion

This research project gave me the opportunity to see how research can move from the laboratory bench to the bedside. In the lab, I worked with oral dissolving films and learned to use analytical techniques that revealed their stability, structure, and performance. At the same time, speaking with families at Great Ormond Street Hospital reminded me why this work matters. The stories I heard about the struggles of giving anti-sickness medicines to children showed me that the form of a medicine can be just as important as the drug itself.

The findings from the questionnaire strongly supported the idea that children need treatments that are easier to swallow, better tasting, and more acceptable in daily life. Oral dissolving films have the potential to meet many of these needs, but they must be carefully designed with the patient in mind. This reinforced for me the importance of connecting technical research with patient voices.

Looking back, the most important lesson I learned is that science and empathy go hand in hand. Developing a medicine is not only about data and graphs but also about understanding the human challenges behind them. This project strengthened my skills as a researcher and deepened my motivation to work on healthcare innovations that make a real difference to patients and families.

Appendices

Appendix 1: Survey to explore chemotherapy induced nausea and vomiting (CINV) in paediatric patients.

N&V HCP SURVEY – V2024 05 05

Nausea & Vomiting (Sickness) Survey

There is a knowledge gap in reporting incidence and experience of nausea & vomiting in paediatric cancer patients that needs addressing. We would therefore like to explore the appropriateness of improving treatment outcomes and patient wellbeing.

In this survey, we want to explore nausea & vomiting severity, current coping options, and treatment experiences & expectations.

Firstly, we would like to inform you that this questionnaire session will be recorded for accuracy of data collection, transcribing, and analysis. All responses are kept anonymous and confidential. You may choose to stop participating at any point during the questionnaire.

Do you give consent for this questionnaire session to be recorded?

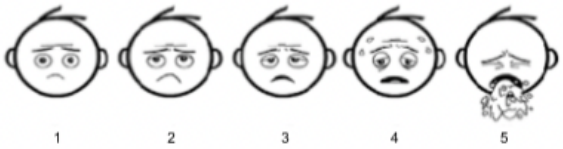
Yes/No

Signature:

1. **Scoping for Nausea & Vomiting (Sickness) Severity and Frequency:**

a) Usually, how bad do you think the sickness is?

- 1 = Very mild
- 2 = Mild
- 3 = Moderate
- 4 = Severe
- 5 = Very severe



b) In your opinion, how often does the sickness usually happen?

- Never
- Rarely (less than once a month)
- Occasionally (1 - 3 times a month)
- Frequently (1 - 3 times a week)
- Very frequently (more than 4 times a week)
- Almost always (nearly every day or daily)

c) Please comment further on when you think the sickness usually happens.

d) In your opinion, how long does the feeling of sickness usually last for?

e) What would you say is the general physical, emotional, and social impact of the sickness? (*e.g. inability to move, emotional distress, inability to carry out daily activities, etc.)?*

2. Current coping options:

a) What non-medical advice is given when the child is feeling sick? *(For example, NHS advice includes: get plenty of fresh air / distract yourself – for example, listen to music or watch a film / take regular sips of a cold drink / drink ginger or peppermint tea / eat foods containing ginger – such as ginger biscuits / eat smaller, more frequent meals.)*

b) Are any medicines offered to treat the sickness?

If yes, then:

c) Which medicine(s) are suggested?

d) What is the usual medicinal form that is given i.e. is it a liquid medicine, pill, suspension, infusion, etc.?

3. **Treatment experiences & expectations:**

a) What do you think is the biggest issue experienced with the current anti-sickness treatments?

b) "What has been your child's experience with their current anti-sickness (antiemetic) treatment?"
Please describe any difficulties such as bad taste, trouble swallowing, or vomiting after taking the medicine.

c) **For patients & families:** *Present the different medicinal forms. (explanations/images provided at the end for patients/families to read).*

Which forms of medicine appeal or don't appeal to your child? Could you comment on the available options and the reasons for your child's choices?

Tablet:	
Crushed tablet in water:	
Dispersible tablet:	
Liquid:	
Orodispersible film:	
Infusion:	

Explanations/images:

Tablet: a solid medicinal form that is swallowed by the patient.	
Crushed tablet in water: the tablet is physically crushed and then mixed with water before being given to the patient.	
Dispersible tablet: the tablet dissolves in water before being given to the patient.	
Liquid - commercial suspension/solution: a liquid medicine where the particles are either suspended or dissolved completely	
Orodispersible film: a thin paper-like film that dissolves on the tongue before being swallowed.	
Infusion: A needle is used to puncture the skin and insert a catheter that delivers medicines/nutrients.	

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