Implementing Virtual Wards: A Case Study on Doccla's Acute Hospital Care Transformation

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This dissertation marks the culmination of an academic and personal journey that has challenged and inspired me in equal measure. I would like to begin by sincerely thanking my supervisor, Dr Joanne Malone, whose insightful feedback, patient guidance, and unwavering encouragement elevated this project beyond what I thought possible. Your critical eye and belief in this research were invaluable.

I am deeply grateful to the five healthcare professionals who generously shared their time and perspectives. Their frontline insights were instrumental in shaping the findings and giving voice to those most affected by digital healthcare transformation. I hope this study does justice to your contributions.

I would also like to acknowledge Doccla for their early engagement. Their model provided the foundation for a focused case study and a timely discussion on how virtual wards can transform acute care delivery in Ireland.

To my family, thank you for your constant support and belief in me. Your patience and understanding, especially during late nights and long weekends and for understanding missed occasions, this allowed me the space to fully commit to this work. With a very special thanks to my loving partner Anne Marie who has been on every step of this journey, always encouraging and supportive through thick and thin.

As I conclude, my thoughts are with every patient who has waited on a hospital trolley in Ireland. May the future of healthcare truly be one where dignity, safety, and innovation are delivered in equal measure.

DEDICATION

Dedicated to the memory of the late Martin Abbott, and all other patients and families who have been affected by hospital overcrowding. Along with all healthcare professionals, who continue to fight the battle, day in, day out.

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LIST OF ABREVIATIONS

Abbreviation	Definition
A&E	Accident and Emergency
AI	Artificial Intelligence
BERA	British Educational Research Association
BYOD	Bring Your Own Device
CADTH	Canadian Agency for Drugs and Technologies in Health
CFIR	Consolidated Framework for Implementation Research
CQC	Care Quality Commission
EHR	Electronic Health Record
FHIR	Fast Healthcare Interoperability Resources
GDPR	General Data Protection Regulation
HAH	Hospital-at-Home
HSE	Health Service Executive
ICF	Informed Consent Form
ICT	Information and Communications Technology
INMO	Irish Nurses and Midwives Organisation
ISO	International Organization for Standardisation
IT	Information Technology
NASSS	Non-adoption, Abandonment, Scale-up, Spread, and Sustainability
NHS	National Health Service
NSW	New South Wales
PIL	Participant Information Letter
TAM	Technology Acceptance Model
UHL	University Hospital Limerick
UK	United Kingdom
US	United States
VW	Virtual Ward

ABSTRACT

Implementing Virtual Wards: A Case Study on Doccla's Acute Hospital Care Transformation

John Mullaney

This research study demonstrated that successful implementation of virtual wards in Ireland requires addressing a combination of factors. These factors span across technical, organisational, individual and process related considerations. Virtual wards were designed to deliver hospital level care to suitable patients in the comfort of their own homes, enabled through remote monitoring and digital technologies. It explored how virtual wards could be introduced effectively into the Irish healthcare system, including what lessons could be drawn from existing models of delivery elsewhere. This was enabled through a comprehensive literature review. Doccla was chosen as the focus of the case study, as they are the current supplier of the virtual ward service being piloted in Ireland.

The research employed a qualitative case study methodology, situated within an interpretivist paradigm. Data collection involved semi-structured interviews with five strategically selected healthcare professionals, representing diverse clinical and technical roles. Two participants had direct experience with virtual wards, while three offered perspectives from adjacent areas. Purposive sampling ensured participants possessed relevant expertise and insight. To identify patterns and relationships across responses, data was systematically analysed using Braun and Clarke's six-phase thematic analysis framework.

Eight key themes were identified, Patient Experience and Access, Resource Allocation, Staffing and Training, Technology and Infrastructure, Communication and Engagement, Clinical Governance, Integration of Care, and Implementation Strategy. Participants highlighted benefits such as high patient satisfaction, earlier discharge, and reduced hospital pressure. However, they also identified key challenges, including digital literacy gaps, poor internet connectivity, limited staff capacity, and the need for clear governance procedures and training for both staff and patients.

Based on these findings, seven recommendations were developed to support healthcare providers and decision makers, in planning and delivering a successful virtual ward implementation in Ireland. The research offered practical guidance for expanding digital models of care, with the aim of improving system capacity while maintaining patient safety and quality of care.

Chapter 1: Introduction and Research Context

1.1 Background

The increasing demand for healthcare services, compounded by ageing populations and rising rates of chronic disease, has amplified the pressure on traditional healthcare delivery models (Wren *et al.*, 2017). According to Greenhalgh *et al.*, (2017), traditional systems often face challenges adapting to emerging technologies, highlighting the need for more flexible care. Digital transformation, particularly through the implementation of virtual wards, has emerged as a vital strategy for healthcare providers seeking to enhance efficiency. Aiming to improve patient outcomes and alleviate capacity constraints (Kosick, 2025). Virtual wards enable hospital level care to be delivered to patients in the comfort of their own homes. This is enabled through advanced digital health technologies, remote monitoring systems and telehealth (Doccla, 2024). While evidence presented by CADTH (2024) and Shi *et al.*, (2024) highlights the potential benefits of virtual wards, Norman, Bennett and Vardy (2023) emphasise that successful implementation depends on addressing technical, clinical and governance complexities.

This transformation became especially pronounced during the COVID-19 pandemic, which underscored the necessity for flexible, technology driven care models (Vindrola-Padros *et al.*, 2021). COVID-19 acted as a catalyst for the accelerated adoption of remote care solutions, exposing critical limitations in traditional hospital based systems (Shi *et al.*,2024).

Doccla emerged as a pioneering provider of virtual ward solutions during this critical period in healthcare transformation. The company's journey began following a personal experience of co-founder Martin Ratz. After suffering a heart attack, Ratz and co-founder Dag Larsson identified the need for better patient monitoring solutions (Leathers, 2021).

> *"One insight I gained at the hospital was that you are monitored in a very outdated way. Once you leave the hospital, you have no protection at all - even though there are great technological tools available. This just needed to be done better to minimise readmissions and better the patient experience, Ratz explained" (Leathers, 2021).*

Initially established in 2019 as a research project, which focused on cardiac patient monitoring. Doccla's plans were undone by the onset of the COVID-19 pandemic. The company swiftly adapted its technology to establish virtual wards for remote patient monitoring, demonstrating both operational efficiency and clinical necessity. This rapid

adaptation compelled Doccla to scale their business and enhance their technological capabilities. Now based in London, they have expanded to become a leading provider of virtual ward solutions across 13 countries. They offer an end-to-end solution that integrates continuous remote monitoring, real-time data analytics, and proactive clinical support (Doccla, 2024). However, McGowan *et al*., (2024) caution that scaling virtual ward models internationally introduces challenges relating to interoperability, regulatory compliance, and care quality, which must be critically evaluated in new healthcare contexts such as Ireland.

1.2 Research Rationale

This examination of Doccla's approach to implementing virtual wards stems from both personal experience and professional interest in healthcare innovation. Having witnessed the Irish healthcare system firsthand for two decades, the researcher has developed a keen awareness of its challenges, particularly regarding hospital capacity, patient flow and care continuity. These experiences have fuelled this interest in innovations, that could potentially improve the experience for patients and their families. All while addressing systemic pressure points. Virtual wards have been recognised internationally as a strategy to alleviate hospital capacity challenges, while improving patient experience and continuity of care (CADTH, 2024; Shi *et al.*, 2024).

The researcher's interest in Doccla predates their entry into the Irish market, having followed their development as an innovative solution to healthcare delivery challenges. Ireland faces significant hospital capacity issues, with the Irish Nurses and Midwives Organisation reporting record levels of emergency department overcrowding (INMO, 2024). The implementation of virtual wards represents a timely opportunity to explore alternative care models. The Health Service Executive's (HSE) recent pilot programmes further highlight the relevance of this research within the current Irish healthcare system (HSE, 2024).

Despite extensive literature on England's National Health Service's (NHS) virtual ward implementations, research examining their transfer to different healthcare contexts remains limited. This study addresses this gap by investigating how virtual ward models developed in one healthcare system (such as the NHS) can be effectively transferred to another context with different structural, regulatory and cultural characteristics. Norman *et al.*, (2023) highlight significant variability in virtual ward delivery models. According to Norman *et al.*, (2023) the absence of standardised implementation frameworks, further emphasise that

success depends heavily on organisational engagement, local adaptation and addressing technical, clinical and governance barriers. Including increased staff coordination burdens, lack of clear governance structures and digital infrastructure challenges (Norman *et al.*, 2023).

Doccla's position as the first virtual ward provider to enter the Irish public healthcare market, offers a unique opportunity to study early-stage implementation in a new healthcare context. Understanding healthcare stakeholder perspectives is essential, as Greenhalgh *et al.*, (2017) found, frontline engagement is a major determinant of successful health technology adoption. Their CQC registration in the UK (Chipman, 2023) and end-to-end solution approach make them particularly relevant as a case study for examining implementation factors across different healthcare systems. As Lasserson and Cooksley (2023) argue, while virtual wards offer considerable potential, their success depends on evidence-based implementation and well-defined clinical standards, areas this research aims to explore.

The Non-adoption, Abandonment, Scale-up, Spread and Sustainability (NASSS) Framework developed by Greenhalgh *et al.*, (2017) will be applied to analyse implementation factors identified by stakeholders, examining how the complexity across domains such as technology features, value propositions, adopter systems and organisational context influences virtual ward adoption. Additionally, Rogers' (2003) Diffusion of Innovation theory will provide a lens for understanding how Doccla's implementation approach addresses key innovation attributes, that influence adoption rates in new healthcare contexts.

This research contributes both to the academic literature on digital healthcare transformation and provides practical guidance for healthcare organisations considering similar implementations. By examining Doccla's approach and stakeholder perspectives within the Irish context, this study aims to generate, transferable insights that can guide the successful adoption of virtual wards across healthcare systems.

1.3 Research Aim and Objectives

The primary aim of this research is to conduct a comprehensive analysis of Doccla's approach to implementing virtual wards, with a particular focus on their development process, technical infrastructure and impact on acute hospital care delivery. This investigation seeks to understand both the technological and operational aspects of successful virtual ward

implementation, while considering the broader implications for healthcare digitalisation. Defining a clear research aim and structured objectives is essential in case study research, to maintain focus and ensure methodological rigour (Yin, 2018).

The research objectives are as follows:

1. To analyse how Doccla has developed its virtual ward service.

This includes tracing the evolution from its initial concept to its current state, with particular attention to how the service has been adapted to meet evolving healthcare needs and market demands.

2. To examine Doccla's implementation methodology and technical infrastructure.

This involves investigating the technical architecture, integration strategies and operational processes that underpin successful deployment, with a focus on interoperability, security, and scalability.

3. To evaluate the potential impact of virtual wards on acute hospital care delivery from the perspectives of key healthcare stakeholders, including an Advanced Nurse Practitioner, a General Practitioner, a Clinical Nurse Manager, a Midwife and a Healthcare ICT Project Manager.

This objective aims to gather insights from healthcare professionals across different care settings, about how virtual wards might enhance or change current care practices. By including diverse viewpoints from various healthcare roles, the research seeks to understand both the opportunities and challenges that virtual wards present in the Irish healthcare system.

Each objective has been designed to build upon the previous one. To create a comprehensive understanding of Doccla's virtual ward implementation and stakeholder perspectives, the analysis will be guided by the NASSS framework developed by Greenhalgh *et al.*, (2017) to identify critical implementation factors.

1.4 Research Limitations

This research has several limitations related to its scope and methodology. The small sample of healthcare professionals, while representing diverse roles within the healthcare system, cannot capture the full spectrum of stakeholder viewpoints. Additionally, the study's focus on a single case study (Doccla's implementation approach within the Irish market) means the

findings are inherently context specific. This requires careful consideration when attempting to apply insights to different healthcare systems or organisational contexts. These factors inevitably constrain the generalisability of findings to broader healthcare environments.

Virtual ward implementation in Ireland is still in its early stages (HSE, 2024). Two interviewees (an Advanced Nurse Practitioner and ICT Project Manager) have direct virtual ward experience, offering complementary clinical and technical perspectives. With the other three participants representing essential stakeholder perspectives for potential widespread implementation. Interview questions were carefully designed to ensure meaningful input regardless of prior implementation experience.

The study uses qualitative interview data rather than measurable outcomes or direct observations. This approach, while useful for exploratory research, may include subjective opinions. As this research was conducted within the limited timeframe of the academic year 2024/2025 and represents a first-time research effort, both the depth and breadth of analysis are restricted. Despite these constraints, the study aims to offer valuable insights into how virtual wards might be effectively implemented in Irish healthcare.

1.5 Dissertation Structure

The dissertation is organised to provide a comprehensive examination of Doccla's virtual ward implementation, addressed through the following five chapters:

Chapter one: Introduces the research context, rationale and objectives, establishing the importance of virtual wards in modernising acute hospital care and the significance of Doccla's role in this transformation. It positions the research within relevant theoretical frameworks and highlights the importance of implementation processes in healthcare digital transformation.

Chapter two: Presents a comprehensive literature review examining virtual ward models, theoretical frameworks for implementation, technical foundations, implementation methodologies, governance frameworks, workforce considerations, and international best practices. It identifies key themes, implementation factors and knowledge gaps that this research aims to address.

Chapter three: Outlines the research methodology, including the qualitative case study approach, data collection through semi-structured interviews and ethical considerations. It

details the rationale for the interpretivist paradigm and thematic analysis approach used to explore implementation factors, stakeholder perspectives and discusses limitations.

Chapter four: Presents the findings from the thematic analysis of interview data, organised around eight key themes including Patient Experience and Access, Resource Allocation, Staffing and Training and Clinical Governance. This chapter analyses healthcare professionals' perspectives on implementation challenges and opportunities.

Chapter five: Provides conclusion and recommendations, synthesising key findings related to Doccla's implementation approach and HSE adoption considerations. It links these findings to theoretical frameworks, offers seven evidence-based recommendations for implementation and suggests directions for future research.

This structured approach ensures a logical progression. From understanding the context and theoretical foundations of virtual ward implementation, to practical insights and recommendations for effective deployment in healthcare settings.

Chapter 2: Literature Review

2.1 Introduction

As discussed in chapter one, virtual wards have emerged as a transformative model in modern healthcare (Denecke *et al.*, 2023). The virtual ward model prioritises patient-centred care, while addressing operational efficiency (Lasserson and Cooksley, 2023; Denecke *et al.*, 2023). This innovation has gained traction as healthcare organisations seek more resilient care models in response to evolving system pressures (CADTH, 2024).

The acceleration of virtual ward adoption post the COVID-19 pandemic, has been documented by multiple researchers including Vindrola-Padros *et al.*, (2021) and Schultz *et al.*, (2021). Despite this, critical examination of implementation factors, spanning technical, organisational and clinical dimensions is warranted. In the UK, virtual ward expansion represents a key NHS strategic priority, focusing on frailty pathways, chronic disease management and post-acute care (Norman *et al.*, 2023; NHS England, 2024). Similarly, Australia has developed centralised models initially designed for COVID-19 patients (Schultz *et al.*, 2021), while Ireland has commenced Doccla supported pilots as part of the HSE's digital transformation initiatives (HSE, 2024).

This literature review critically analyses both academic research and industry evidence, to develop a comprehensive understanding of virtual ward implementation. Furthermore, with it's focus on Doccla's model as the central case study. The review is structured thematically, to examine the interrelated factors influencing successful implementation across healthcare contexts (Greenhalgh *et al.*, 2017). It begins by exploring theoretical frameworks that guide implementation analysis, before examining the evolution of virtual wards. The review then investigates technical foundations and implementation methodologies, with particular emphasis on Doccla's approach, before assessing governance frameworks, workforce considerations, clinical impacts and international best practices. The chapter concludes by identifying key implementation challenges and critical research gaps, that this study aims to address. By systematically examining these themes, this review provides a robust foundation for investigating the three research objectives, as outlined in chapter one.

2.2 Theoretical Frameworks for Digital Health Implementation

There are several complementary theoretical frameworks that provide analytical lenses, to understand the complex interchange of factors involved in virtual ward implementation. This section examines four key frameworks, critically evaluating their strengths, limitations and relevance to this research.

2.2.1 NASSS Framework

The NASSS Framework, developed by Greenhalgh *et al.*, (2017), represents a comprehensive approach for analysing implementation complexity, as illustrated below in Figure 2.1. It identifies seven interdependent domains, the condition, technology, value proposition, adopter system, organisation, wider context and domain interactions over time. A key strength of this framework is the recognition that implementation challenges often arise from domain interactions, rather than isolated factors (Greenhalgh *et al.*, 2017). As Greenhalgh *et al.*, (2017) note, the most problematic implementations are those characterised by high complexity across multiple NASSS domains, highlighting why an integrated holistic approach to virtual ward implementation is essential.

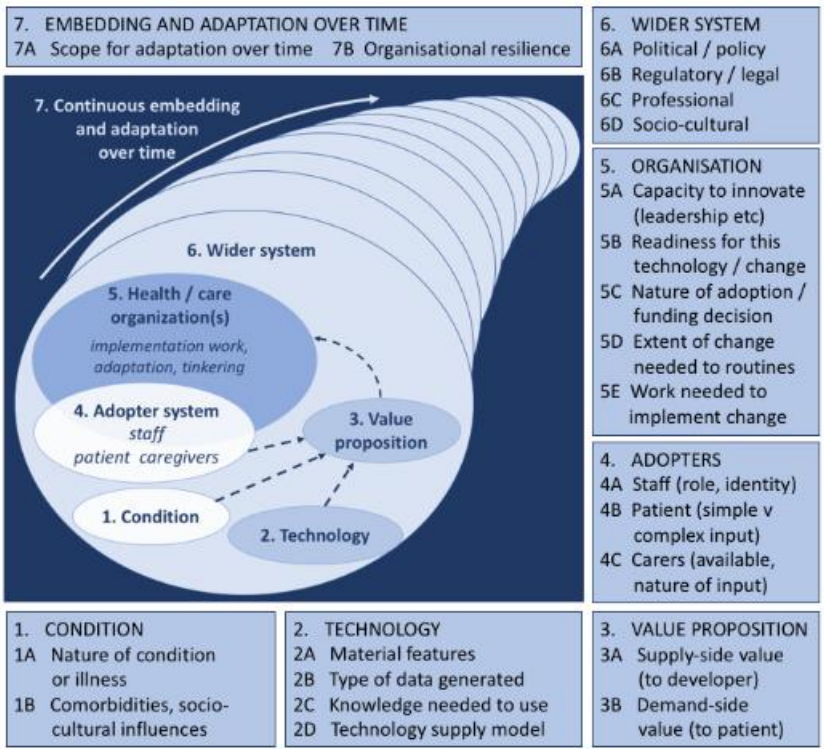

Figure 2.1 Greenhalgh et al., 2017 NASSS

Source: https://www.researchgate.net/publication/320789720/figure/fig2/AS:557605883396096@1509955010377/The-NASSS-framework-for-considering-influences-on-the-adoption-nonadoption-abandonment.png

This multi-domain perspective is particularly relevant for analysing Doccla's implementation strategy, which spans technical, clinical and organisational dimensions. However, as identified by Nilsen, (2015), a primarily descriptive framework may overemphasise complexity without providing concrete guidance on practical implementation steps. This limitation highlights a tension between descriptive and prescriptive approaches in implementation design, a gap that this research seeks to address by focusing on specific implementation factors in the Irish healthcare context.

2.2.2 Diffusion of Innovation Theory

In contrast to the NASSS framework, Rogers' (2003) Diffusion of Innovation theory (Figure 2.2 below) provides a process oriented perspective on how innovations spread through social systems. Rogers identifies five key innovation attributes that influence adoption rates, relative advantage, compatibility, complexity, trialability and observability.

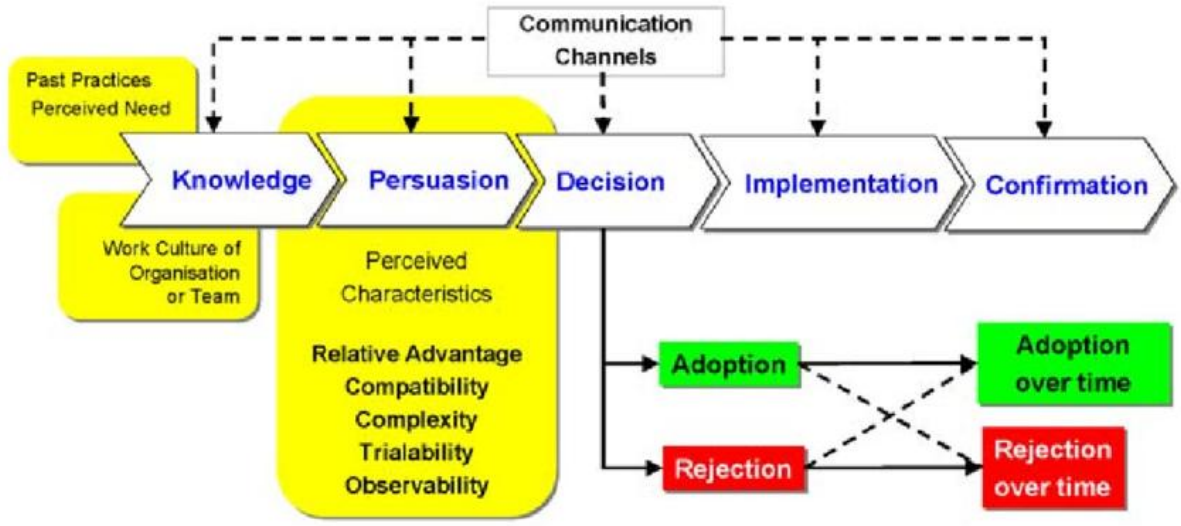

Figure 2.2 Rogers Diffusion of Innovation Theory.

While Rogers' theory offers valuable insights into adoption processes, Greenhalgh *et al.*, (2004) critique its relatively linear conception of innovation diffusion. They argue that it fails to fully capture the iterative and context dependent nature of healthcare innovation. This limitation is particularly relevant for virtual wards, where implementation often involves continuous monitoring and adaptation, rather than straightforward adoption (Doccla, 2024). Nevertheless, the theory's emphasis on opinion leadership and innovation attributes remains valuable for understanding virtual ward adoption patterns. For example, McGowan *et al.*,

(2024) observed that NHS sites led by motivated clinical champions demonstrated stronger engagement, highlighting the importance of these influencers in diffusion processes, a finding that directly informs this study's examination of stakeholder perspectives.

2.2.3 Technology Acceptance Model

While NASSS and Diffusion theories address system level factors, Davis's (1989) Technology Acceptance Model (TAM) visualised below (Figure 2.3) focuses on individual level factors of technology adoption, particularly perceived usefulness and perceived ease of use. These perceptions directly influence attitudes toward technology and usage intentions, making TAM particularly relevant for understanding clinician acceptance of virtual ward technologies (Davis, 1989).

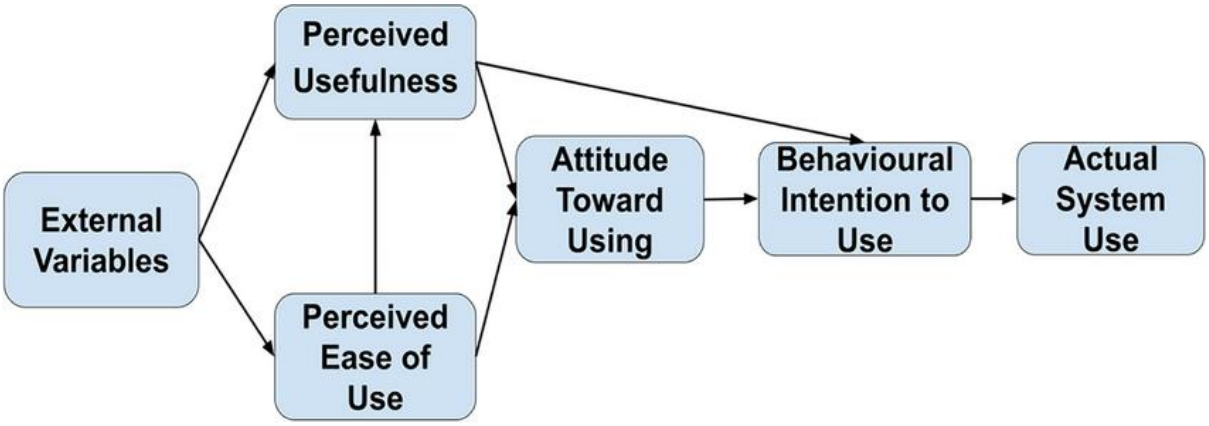

Figure 2.3 Davis's Technology Acceptance Model.

However, Lee *et al.*, (2025) argue that TAM's emphasis on rational decision making underestimates emotional and contextual factors, that influence technology acceptance in healthcare settings. Their extended model incorporates social influence, facilitating conditions and trust as additional determinants more reflective of healthcare's complex environment. This critique highlights the importance of considering both rational and non-rational factors in virtual ward implementation, a perspective that informs this study's holistic approach to understanding stakeholder acceptance (Lee *et al.*, 2025).

2.2.4 Socio-technical Systems Theory

Moving beyond adoption decisions, socio-technical systems theory (Figure 2.4 below) emphasises the bidirectional relationship between technical and social elements in healthcare

settings (Sony and Naik, 2020). Berg (1999) argues that healthcare technologies and clinical practices mutually shape each other, creating complex interdependencies that must be addressed during implementation. This perspective is particularly relevant for virtual wards, which fundamentally reconfigure traditional care relationships.

Figure 2.4 Berg's Socio-technical Systems Theory.

While socio-technical theory offers valuable insights into implementation complexity, Sittig and Singh (2010) note its limited guidance on practical implementation steps. Their eight-dimensional socio-technical model attempts to address this gap, by providing more specific guidance on hardware, software, content, workflow, people, organisation, regulations and measurement dimensions. This expanded framework helps explain why technically sound virtual ward systems may still fail, when not aligned with clinical workflows or organisational priorities (Sittig and Singh, 2010).

2.2.5 Synthesis and Conceptual Framework

The four key theoretical frameworks discussed above offer complementary perspectives on virtual ward implementation. To guide this research a conceptual framework synthesising these perspectives was created (Figure 2.5 below). The framework illustrates how successful implementation depends on addressing both technical functionality and social acceptance, while managing complexity across multiple organisational levels.

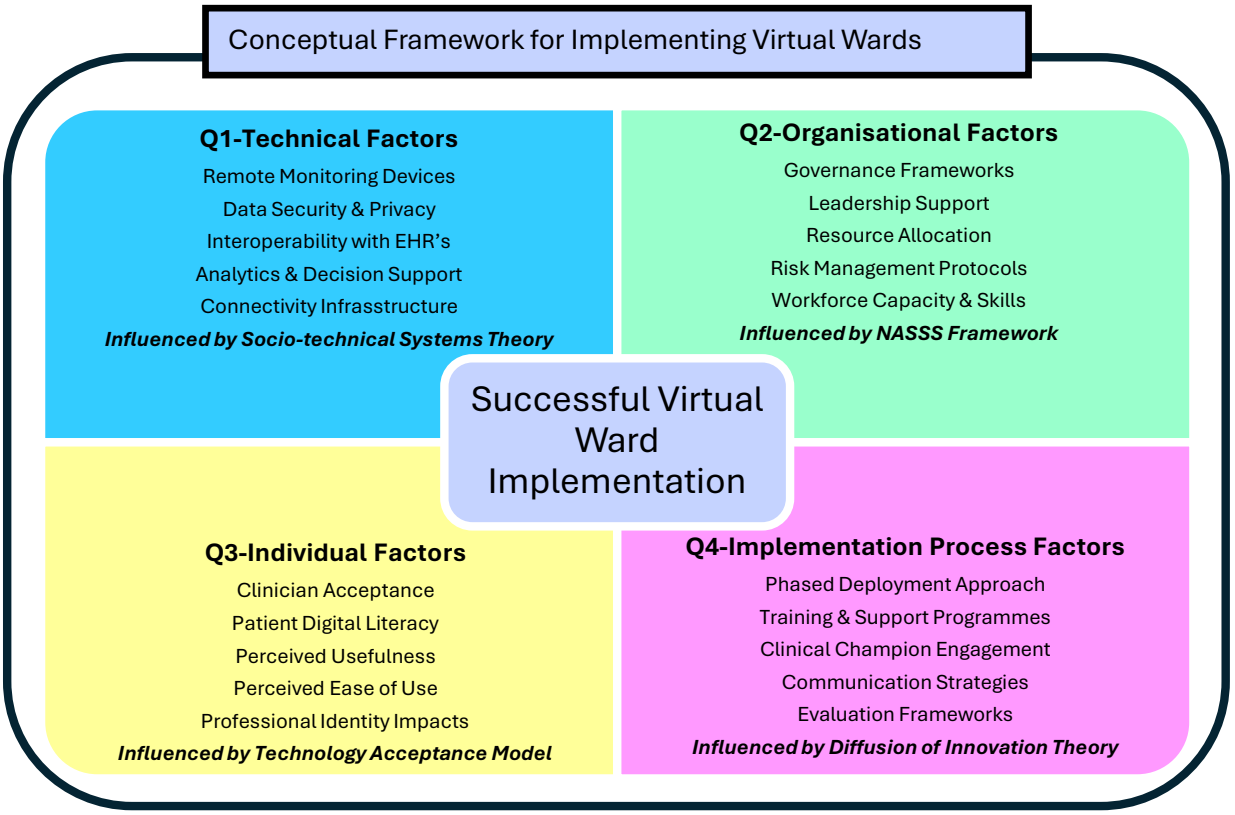

Figure 2.5 Conceptual Framework for Virtual Ward Implementation

The conceptual framework integrates key elements from the four theoretical frameworks discussed. Complexity domains from the NASSS framework (Greenhalgh *et al.*, 2017), diffusion characteristics from Rogers' theory (2003), individual acceptance factors from TAM (Davis, 1989), and socio-technical integration principles from Berg's (1999) work. By synthesising these perspectives, the framework illustrates how implementation success, depends on addressing multiple dimensions simultaneously rather than focusing on isolated factors.

This conceptual framework directly informs the three research objectives by, providing analytical lenses to examine Doccla's service development (Objective One), identifying key dimensions of implementation methodology and technical infrastructure (Objective Two), and structuring the analysis of stakeholder perspectives on potential impacts (Objective three). The framework suggests that implementation success depends on complex interactions between technological capabilities, organisational contexts, individual perceptions and implementation processes. This multifaceted perspective guides this study's approach to understanding virtual ward implementation in Ireland.

2.3 Evolution of Virtual Ward Models

This section critically examines how virtual ward models have evolved from initial concepts to modern implementations. Paying particular attention to Doccla's development journey and implementation framework.

2.3.1 From Early Concepts to Modern Systems

Virtual wards have undergone substantial transformation since their introduction in the early 2000s in the United Kingdom (Norman *et al.*, 2023). Initially conceived as extensions of hospital-at-home (HAH) services in the UK, early implementations focused narrowly on managing chronic conditions, through basic remote monitoring and telephone support (Lewis, 2010). Lewis (2010) demonstrated that even these basic systems improved patient satisfaction and reduced costs. This served the purpose of establishing foundations for future development. However, Lasserson and Cooksley (2023) argue, that many early models lacked robust evaluation frameworks and governance structures, creating implementation inconsistencies across healthcare settings.

The subsequent decade saw virtual wards evolve through progressive integration with electronic health records, mobile platforms and analytics capabilities (Lewis, 2010). Lewis *et al.*, (2012) documented variations in implementation across the UK, US, and Canada, noting how each healthcare system adapted the core concept according to local funding models and regulatory frameworks. This comparative perspective reveals that while the fundamental principle of hospital-level care at home remained consistent, implementation approaches diverged significantly based on healthcare system characteristics. This finding appears to have direct relevance for understanding transferability to the Irish context.

According to Vindrola-Padros *et al.*, (2021), the COVID-19 pandemic catalysed rapid virtual ward expansion, as healthcare systems quickly deployed them to address capacity constraints and infection control challenges. Schultz *et al.*, (2021) documented how pandemic pressures compressed innovation timelines, that might otherwise have taken years. This acceleration created natural experiments in implementation approaches, revealing both successful strategies and implementation pitfalls. They found that systems with pre-existing digital infrastructure and clinical governance frameworks, adapted more successfully than those implementing virtual wards without these foundations (Schultz *et al.*, 2021).

According to Denecke *et al.*, (2023) contemporary models feature greater system integration, multidisciplinary approaches and expanded clinical pathways, beyond the initial focus on chronic disease management (Norman *et al.*, 2023; NHS England, 2024). This evolution reflects a broader transformation from isolated interventions, towards integrated care models spanning traditional boundaries between hospital and community settings. However, Shi *et al.*, (2024) note, persistent variability in implementation quality, with some virtual wards achieving significant improvements in patient outcomes, while others struggle with technology integration and clinician acceptance.

2.3.2 Doccla's Development Journey

Doccla's development trajectory offers insights into how commercial providers can respond to healthcare system challenges (Doccla, 2024). Founded in 2019 as a cardiac monitoring start-up, the company rapidly pivoted during the COVID-19 pandemic, to establish virtual wards for monitoring COVID-19 patients. This was a strategic turning point that accelerated its growth (Doccla, 2024). This adaptability exemplifies the kind of organisational agility that Greenhalgh *et al.*, (2017) identify as essential for successful innovation, in complex healthcare environments.

This patient-centred origin story contrasts with technology driven approaches that may prioritise technical capabilities, over usability and care experience. Berg (1999) argues that such grounding in lived healthcare experiences can enhance innovation relevance, potentially increasing acceptability among both patients and clinicians. However, Lasserson and Cooksley (2023) caution, that personal experience, while valuable for identifying needs, may not provide a sufficient basis for developing clinically robust monitoring systems, without corresponding clinical expertise.

Doccla has addressed this potential limitation through iterative development, incorporating advanced monitoring devices, real-time analytics and telehealth support informed by clinical partnerships and stakeholder feedback (Doccla, 2024). This evolutionary process reflects Rogers' (2003) diffusion concepts, whereby innovations are progressively refined based on implementation experiences. The company's expansion across 13 countries, suggests successful adaptation to diverse healthcare contexts. Though questions remain about transferability to Ireland's healthcare environment, a gap this research aims to address.

2.3.3 Doccla's Implementation Framework

Doccla employs a comprehensive end-to-end service model, encompassing initial deployment, ongoing monitoring and continuous support (Doccla, 2024). McGowan *et al.*, (2024) found that such comprehensive models typically achieve higher adoption rates than fragmented approaches requiring healthcare organisations to assemble multiple components themselves.

This approach directly addresses a critical implementation barrier identified by Norman *et al.*, (2023), ensuring consistent patient engagement with remote monitoring systems. However, Bamgboje-Ayodele *et al.*, (2024) question whether standardised onboarding processes can adequately accommodate diverse patient needs across different clinical contexts.

Central to Doccla's strategy is a collaborative partnership model, with dedicated project managers overseeing implementation from initial deployment through full operation. This ensures robust data management protocols and regulatory compliance (Doccla, 2024). Greenhalgh *et al.*, (2017) found that implementation champions spanning boundaries between technology providers and healthcare organisations enhance adoption success. However, McGowan *et al*., (2024) note that reliance on external implementation specialists may create sustainability challenges after the initial deployment support ends. This potentially highlights the importance of knowledge transfer to local staff during implementation, an aspect this research will explore through stakeholder interviews.

2.4 Technical Foundations of Virtual Wards

This section critically examines the technical components underpinning virtual ward operations, with particular attention to Doccla's technical integration approach.

2.4.1 Digital Infrastructure and Remote Monitoring

McGowan *et al.*, (2024) highlight how effective virtual wards depend on robust digital infrastructure, integrating monitoring devices with clinical information systems. In contrast to traditional HAH models, contemporary virtual wards leverage digital systems enabling continuous remote care (Denecke *et al.*, 2023). Modern implementations incorporate three core technical elements, monitoring devices which capture patient data, connectivity

solutions which securely transmit information, and clinical platforms that organise data for healthcare providers (McGowan *et al.*, 2024).

The monitoring technology landscape has evolved significantly, with devices becoming increasingly sophisticated and user-friendly (Uddin and Koo, 2024). Early virtual wards relied on basic vital-signs monitoring, while contemporary systems incorporate a wider range of parameters including activity levels, medication adherence and even passive monitoring (Doccla, 2025). Schultz *et al.*, (2021) found that ease of use and accessibility significantly influence implementation success, particularly for older patients or those with limited digital literacy. This finding highlights the importance of user-centred design principles in selecting monitoring technologies (Davis, 1989).

Mehta, Pandit and Shukla (2019) advocate for comprehensive multi-parameter monitoring to enable sophisticated analytics, while Norman *et al.*, (2023) argue that simpler, focused monitoring may enhance patient compliance and reduce data overload for clinicians. This tension between comprehensive monitoring and usability represents an important consideration for implementation planning. According to Doccla's public materials, they address this through configurable monitoring packages tailored to specific clinical pathways (Doccla, 2024). Although the effectiveness of this approach in diverse patient populations requires further investigation.

Connectivity infrastructure represents another critical consideration. McGowan *et al.*, (2024) note that NHS virtual wards increasingly employ interoperable systems, that connect patients with multidisciplinary teams via centralised dashboards. While this interoperability marks a significant advancement over isolated early models, Max-Onakpoya *et al.*, (2019) highlight persistent connectivity challenges in rural areas. Their research on opportunistic networks for bridging connectivity gaps offers potential solutions, though implementation complexity increases with such hybrid approaches. This may prove to be particularly relevant in the Irish context (Dempsey and Hoy, 2024).

2.4.2 Advanced Analytics and Artificial Intelligence

Beyond basic monitoring, contemporary virtual wards increasingly incorporate artificial intelligence (AI) and machine learning algorithms for analysing large monitoring datasets (Uddin and Koo, 2024). These technologies enable early detection of patient deterioration through pattern recognition. Mehta *et al.*, (2019) demonstrate that well designed predictive

analytics can identify subtle trends preceding clinical deterioration, potentially enabling proactive interventions.

However, critical perspectives on AI in healthcare highlight important limitations. While Uddin and Koo (2024) emphasise AI's potential for enhancing virtual ward efficiency, Williams *et al.*, (2019) caution that many algorithms lack sufficient validation in diverse patient populations. This tension between technological promise and clinical validation arguably represents another important consideration for implementation planning.

While Uddin and Koo (2024) claim these tools can enhance clinical decision-making, they introduce questions about algorithmic transparency, accountability and unintended biases. Greenhalgh *et al.*, (2017) note that complex analytics may increase rather than decrease implementation complexity if not carefully aligned with clinical workflows.

2.4.3 Security, Interoperability and Compliance

Transmission of sensitive patient data between homes and clinical systems creates potential vulnerabilities requiring robust security protocols. Doccla has addressed these concerns through ISO 27001 certification and Cyber Essentials Plus accreditation. This demonstrates a commitment to data protection (Doccla, 2024). While these certifications establish baseline security standards, Wani, Mendoza and Gray (2020) argue that rapidly evolving threat landscapes require continuous security adaptation, rather than point-in-time certification. Arguably, this highlights the importance of ongoing security governance throughout virtual ward operations.

Interoperability presents another significant challenge with potentially important implementation consequences. Virtual ward systems must integrate with existing clinical information systems, including electronic health records (EHR), laboratory systems and pharmacy platforms (Castanheira, Peixoto and Machado, 2021). This integration enables comprehensive care management but requires navigating complex legacy systems and variable data standards. Castanheira *et al.*, (2021) identify interoperability as a persistent challenge in digital health implementation, requiring both technical solutions and collaborative governance approaches.

Bahga and Madisetti (2013) advocate for cloud-based integration platforms that can bridge disparate systems. Stead *et al.*, (2011) emphasise the importance of standardised data

exchange protocols like FHIR (Fast Healthcare Interoperability Resources). These differing approaches may reflect broader tensions between centralised and distributed integration models. The most appropriate approach likely depends on specific healthcare contexts.

2.4.4 Doccla's Technical Integration

Doccla has developed a secure, cloud-based infrastructure enabling real-time data transmission from wearable sensors to clinical dashboards (Doccla, 2024). Their approach incorporates a proprietary mobile application typically delivered through dedicated devices provided in their "Doccla Box" but also available to download from the app store to personal devices (Doccla, 2024). While Doccla's approach potentially enhances reliability and standardisation, Wani *et al.*, (2020) argue that supplying managed devices may increase upfront costs and create device management challenges. This suggests trade-offs between standardisation and flexibility that must be navigated during implementation planning.

Doccla has specifically designed its system to ensure interoperability with legacy EHR's, addressing a major challenge identified by Lasserson and Cooksley (2023). This integration enables hospitals to incorporate remote monitoring data into standard clinical workflows, ensuring clinicians receive comprehensive information (Doccla, 2024). While this interoperability focus aligns with Davis's (1989) emphasis on perceived usefulness as a driver of adoption, Greenhalgh *et al.*, (2010) caution that technical integration alone is insufficient without corresponding workflow adaptation.

By providing an integrated solution, Doccla's comprehensive infrastructure potentially reduces implementation complexity for healthcare organisations (McGowan *et al.*, 2024). However, the proprietary nature of the platform may create dependencies that could challenge a transition to alternative providers if needed (Wani *et al.*, 2020). Additionally, successful integration remains contingent on the technical readiness of host organisations, potentially leading to variable implementation experiences across different settings (Castanheira *et al.*, 2021).

2.5 Implementation Methodologies

This section critically examines approaches to implementing virtual wards, with particular attention to Doccla's implementation methodology.

2.5.1 Implementation Approaches

Lasserson and Cooksley (2023) advocate for a structured approach in which virtual ward operations are clearly delineated from traditional hospital services. In contrast, Best (2022) argues for an integrated approach, embedding virtual wards within existing hospital infrastructures.

Greenhalgh *et al.*, (2017) suggest that implementation approaches must be responsive to local contexts, proposing that hybrid models may be most effective in practice. Their research indicates successful implementation often requires balancing standardisation with local adaptation. This hybrid approach aligns with Rogers' (2003) emphasis on trialability as a factor enhancing innovation adoption, though Kotter (1996) cautions that extended pilot phases without clear transition to mainstream operations may create "pilot fatigue" and stall momentum.

The role of clinical champions emerges as another critical implementation factor across organisational models. McGowan *et al.*, (2024) highlight how pilots create opportunities for champions to emerge. These so-called champions are healthcare professionals who experience virtual ward benefits firsthand and subsequently advocate for their wider adoption. Playing a pivotal role in addressing clinical scepticism and building organisational buy-in (McGowan *et al.*, 2024). However, Thomas *et al.*, (2022) note the vulnerability of champion dependent implementations when key individuals depart, suggesting the importance of institutionalising support through formal governance structures and implementation teams.

2.5.2 Doccla's Implementation Methodology

Doccla employs a unified framework addressing multiple implementation dimensions simultaneously (Doccla, 2024). Their process typically begins with small scale pilots, testing and refining the system in controlled environments before expanding to full deployment. Doccla claim implementation timeframes are measured in weeks rather than months, with comprehensive education and training programs delivered both face to face and online, for patients and staff (Doccla, 2024). This approach aligns with established change management principles of creating early wins through limited deployment before broader rollout (Kotter, 1996).

Doccla's approach incorporates elements of both structured and integrated models. While their platform operates as a distinct service with dedicated clinical support, it also integrates with existing hospital systems and workflows to ensure continuity (Doccla, 2024). This hybrid approach potentially addresses limitations of purely structured or purely integrated models, by offering flexibility. However, Greene *et al.*, (2024) note that hybrid models may create coordination challenges without clear delineation of responsibilities between virtual ward teams and traditional hospital services.

Training and support form a central component of Doccla's strategy, directly addressing key implementation barriers. Their approach includes continuous helpdesk access through multiple communication channels, ensuring consistent support throughout implementation (Doccla, 2024). Norman *et al.*, (2023) identified inadequate training and technical assistance as primary implementation barriers, suggesting Doccla's comprehensive support infrastructure may enhance adoption. In contrast, Preet and Chahal (2024) argue that training alone is insufficient without addressing deeper issues of professional identity and organisational culture. This indicates the importance of accompanying technical training with broader change management efforts (Kotter, 1996).

The organisational readiness and change management capabilities of host healthcare providers represent external variables that can significantly impact outcomes (Kotter, 1996). This suggests it is important to carefully assess the organisational context when planning virtual ward implementations, rather than applying standardised approaches without adaptation. The NASSS framework's emphasis on organisational context as a key implementation domain provides a valuable lens for understanding these relationships (Greenhalgh *et al.*, 2017).

2.6 Governance, Safety, and Risk

Virtual ward governance encompasses the policies, protocols and oversight structures that define roles, responsibilities and standards of care (Doccla, 2024). In the UK, virtual ward governance has been formalised through structured care pathways and clinical standard operating procedures, outlining triage rules, escalation triggers and communication protocols (NHS England, 2024). Saleh *et al.*, (2024) observe that these governance structures are typically developed at the NHS trust level, creating potential variability across implementation sites. While local adaptation may enhance responsiveness to specific

contextual needs, NHS England (2024) argues for greater standardisation to ensure consistent safety standards across implementations. This tension between standardisation and local adaptation is arguably an important governance consideration for implementation planning.

Clinical decision support systems represent another governance dimension with significant implementation implications. Early warning systems increasingly support clinical decision making, by alerting clinicians to signs of patient deterioration (Doccla, 2024). However, Zahradka *et al.*, (2023) caution that over reliance on automated alerts may create "alarm fatigue", with clinicians becoming desensitised to frequent warnings. Ensuring accurate alert configuration, real-time data transmission and comprehensive staff training appears essential to mitigate these risks, which could benefit from being addressed through robust governance frameworks.

Risk management is a further critical governance concern. McGowan *et al.*, (2024) found that NHS commissioners viewed clear accountability frameworks as essential prerequisites for safely scaling virtual care. Their study identified key risk factors including patient deterioration, missed alerts, data breaches and handover failures. They also suggest that risks are potentially amplified when services rely on external technology partners, raising complex questions about liability distribution, data ownership and governance transparency. Such considerations are particularly relevant for public–private partnerships like those involving Doccla, where governance responsibilities may span organisational boundaries.

For healthcare systems like the HSE, that are beginning to pilot virtual ward services, governance structures are still evolving. Norman *et al.*, (2023) suggests successful implementation depends not only on technology and clinical design, but also on robust leadership, accountability and risk management systems, which are adapted to local service pressures and capacity constraints (HSE, 2024). Drawing on established frameworks like NHS Digital's (2022) Clinical Safety Standards (DCB0129/DCB0160) may provide valuable guidance while allowing appropriate adaptation to the Irish regulatory environment.

2.7 Workforce, Culture, and Clinical Acceptance

If virtual wards are perceived as adding workload without adequate support, they may encounter resistance regardless of technical merits or governance frameworks (Thomas *et al.*, 2022). McGowan *et al.*, (2024) report that frontline staff in England frequently expressed

concerns about ambiguity in virtual ward models, including uncertainty around role delineation, platform interoperability and the use of hospital-centric terminology in community settings. Additionally, they reported that staff morale was negatively affected by unrealistic implementation timescales and vague targets. Although, they did find that sites led by motivated clinical champions demonstrated stronger engagement, suggesting that leadership visibility and thorough implementation planning are key enablers. This finding aligns with Rogers' (2003) emphasis on opinion leadership in diffusion processes, highlighting the importance of identifying and supporting clinical champions during implementation.

Thomas *et al.*, (2022) note that resistance often stems from embedded professional identities and practice models prioritising in-person assessment. Their analysis suggests that successful implementation requires addressing not only technical skills but also professional values and identities that are challenged by new care models

Competing perspectives emerge on optimal approaches to overcoming cultural barriers. As Preet and Chahal (2024) advocate for comprehensive change management programmes, which address both the rational and emotional aspects of staff resistance. They emphasise the importance of co-design approaches, involving clinicians throughout implementation planning, hoping to build ownership and trust. In contrast, Drew and Pandit (2020) argue that demonstrating tangible benefits through limited deployments may be more effective than prolonged preparatory engagement in securing staff support. The most appropriate strategy likely depends on specific organisational cultures and leadership styles.

Doccla's model addresses many workforce concerns through its managed-service approach, providing clinical triage, patient onboarding and continuous remote monitoring by a multidisciplinary team. This support structure alleviates pressure on hospital-based staff by ensuring routine patient monitoring is carried out by trained remote teams (Doccla, 2024). NHS trust partnerships cited by Doccla, report reductions in readmissions and improved care coordination following implementation. While these self-reported outcomes would benefit from independent verification. The model's emphasis on staffing support and service integration may hold particular relevance for Irish contexts, where capacity remains a persistent constraint (Doccla, 2024; INMO, 2024).

These workforce and cultural considerations directly inform this study's examination of stakeholder perspectives on virtual ward implementation.

2.8 Clinical Impact and Patient Outcomes

Patient outcomes data reveal both consistent and variable impacts across different clinical populations (Shi *et al.*, 2024). Shi *et al.*, (2024) identified a significant length of stay reduction, when comparing home based virtual ward care to equivalent inpatient treatment. Norman *et al*., (2023) also found that virtual wards for older adults resulted in reduced hospital readmissions and increased patient satisfaction compared to traditional care models.

However, critical perspectives highlight important limitations in the current evidence. While Vindrola-Padros *et al*., (2021) documented impressive results from COVID-19 virtual wards, with 97% of patients completing monitoring without requiring hospital return. Lasserson and Cooksley (2023) question whether pandemic driven implementations with heightened resource allocation reflect sustainable long-term performance. Rigorous evaluation frameworks incorporating both short-term effectiveness and long-term sustainability metrics may help address this evidence gap.

According to Doccla, their virtual ward service has demonstrated several clinical and operational benefits across NHS deployments (Doccla, 2024). Their model has achieved reduced readmission rates for virtual ward patients compared to traditional care models. Patient compliance with monitoring protocols has been reported as high across implementation sites.

While outcomes data support virtual ward effectiveness, critical analysis reveals important nuances. Patient selection criteria significantly influence outcomes, with most studies focusing on lower-acuity patients meeting specific stability thresholds (Shi *et al.*, 2024). Outcomes also appear contingent on implementation quality, with considerable variability observed across sites implementing technically similar models (Norman *et al.*, 2023). Although, most evaluations focus on relatively short-term outcomes, with fewer studies examining long-term impacts or health economic analyses (Lasserson and Cooksley, 2023). These limitations suggest that while evidence for virtual ward effectiveness is growing, context-specific evaluation remains important when implementing new models.

2.9 International Best Practices

NHS England's Virtual Wards Operational Framework (2024) outlines virtual wards as a key policy priority to reduce hospital pressures and enhance clinical capacity (NHS, 2024).

Norman *et al*., (2023) emphasise that the adoption of virtual wards across the NHS is rapidly accelerating, particularly within frailty care, though they highlight wide variation in implementation across NHS trusts. They put this down to differences in digital maturity, workforce training, and governance structures.

Saleh *et al.*,(2024), in a recent NHS pilot study focused on atrial fibrillation, found that virtual wards reduced emergency department re-attendance and shortened hospital stays, describing them as aligned with NHS digital transformation goals. While the UK experience demonstrates strong national direction and investment, challenges remain in maintaining consistency, ensuring data interoperability, and addressing digital exclusion among vulnerable populations (Norman *et al.*, 2023; Saleh *et al.*, 2024).

Australia offers another well documented example of virtual ward deployment. Schultz *et al.*, (2021) evaluated a centralised virtual ward, established during the COVID-19 pandemic to manage low-acuity patients at home. The model, led by nurses and supported by structured telephone triage, was found to be an effective, low cost hospital avoidance strategy. They emphasise the critical importance of clear governance frameworks that define accountability, quality standards and escalation protocols (Schultz *et al.*, 2021). Their analysis suggests governance structures should be established before implementation rather than developed retrospectively. Bamgboje-Ayodele *et al*., (2024) identified cultural readiness, leadership support, and continuous learning as key enablers of virtual ward implementation, suggesting the importance of clear communication in fostering clinical acceptance.

A 2024 horizon scan by the Canadian Agency for Drugs and Technologies in Health (CADTH) concluded that, virtual wards deliver outcomes comparable to or better than traditional inpatient care. They assessed key indicators such as mortality, readmission rates, length of stay and overall cost. The review also noted strong satisfaction among patients, caregivers and providers, although it highlighted ongoing challenges such as caregiver burden, the need for staff training, digital exclusion and technology integration (CADTH, 2024).

The CADTH review documented Canadian virtual ward implementations across several provinces, in order to establish implementation guidelines, with collaboration occurring between institutions in Quebec, Ontario and British Columbia. McGill University Health Centre researchers, in partnership with representatives from institutions including Island Health in Victoria and the Ottawa Heart Institute, developed guiding principles for virtual

wards specific to the Canadian context. Their recommendations emphasised using single monitoring platforms that connect with hospital EHR's, selecting appropriate rather than cutting-edge technologies, and establishing robust data security protocols (CADTH, 2024).

2.10 Literature Review Conclusions and Research Gaps

This comprehensive review has examined theoretical frameworks for digital health implementation, virtual ward evolution, technical foundations, implementation methodologies, clinical impacts and governance frameworks, with particular attention to Doccla's approach. The analysis reveals both consistent implementation principles and context-dependent factors that influence virtual ward success. Several significant research gaps emerge from this analysis, providing the foundation for this study's contribution to the field.

First, while the technical specifications and clinical outcomes of virtual wards are increasingly well-documented through systematic reviews (Shi *et al.*, 2024; Norman *et al.*, 2023) and national evaluation reports (NHS England, 2024; CADTH, 2024), detailed analysis of implementation methodologies remains limited. Few studies systematically compare different implementation approaches or identify the specific factors that determine implementation success or failure across diverse healthcare contexts. This gap is particularly evident in research on commercial virtual ward providers like Doccla, whose proprietary implementation methodologies are not fully described in the academic literature. The present study addresses this gap by examining Doccla's implementation approach in detail, providing insights into commercial implementation models that complement existing academic research.

Second, there is insufficient research examining the transferability of implementation models across different healthcare systems. As virtual ward providers expand internationally, critical questions arise about how implementation approaches developed in one context (such as the NHS) must be adapted for different regulatory environments, clinical cultures and technical infrastructures. This research addresses that gap by investigating Doccla's approach as it expands into the Irish healthcare system, yielding potentially valuable insights into cross-context implementation factors.

Third, although theoretical frameworks like NASSS, Diffusion of Innovation, TAM, and socio-technical theory provide valuable conceptual tools, their application to virtual ward implementation remains underdeveloped in current literature. This research helps address that gap by analysing Doccla's implementation approach through these theoretical lenses, contributing to a more robust conceptual understanding of virtual ward implementation dynamics.

Finally, most implementation research focuses on either technical deployment or clinical engagement, with limited integration of these perspectives (McGowan *et al.*, 2024). This study contributes to closing that gap by examining both the technical infrastructure of Doccla's implementation and healthcare professionals' perspectives on implementation factors, providing a more holistic understanding of the implementation process that bridges technical and social dimensions.

By addressing these gaps, this research aims to contribute both theoretical insights and practical guidance for virtual ward implementation. With particular relevance to understanding how commercial providers like Doccla can effectively deploy their solutions across diverse healthcare contexts. The findings will enhance understanding of implementation factors that influence virtual ward adoption and sustainability, potentially informing future implementation approaches both in Ireland and internationally.

Chapter 3: Methodology

3.1 Introduction

This chapter outlines the methodology employed to explore healthcare stakeholder perspectives on virtual ward implementation in Ireland, through a case study of Doccla. A qualitative design was selected to enable in-depth understanding of healthcare professionals' experiences, aligning with interpretivist approaches that value subjective perspectives and contextual factors (Pope and Mays, 2020). The chapter details the research design, data collection methods, sampling strategy and analysis approach, followed by ethical considerations and trustworthiness strategies. Data was analysed using Braun and Clarke's (2023) thematic analysis framework. This was selected over alternatives such as grounded theory, as it permits both inductive and deductive approaches to pattern identification, making it well-suited to implementation research (Nowell *et al*., 2017).

3.2 Research Aim and Questions

This study aimed to explore virtual ward implementation in an Irish healthcare context. Which focused on healthcare professionals' perspectives on benefits, challenges, and potential system impacts. This approach aligns with established implementation science frameworks, emphasising that successful technology adoption depends on stakeholder experiences and context-specific factors (Greenhalgh *et al*., 2017; Damschroder *et al*., 2009).

The research was guided by three questions:

1. How has Doccla developed its virtual ward service?
2. What implementation methodology and technical infrastructure underpin Doccla's virtual ward model?
3. What are healthcare professionals' perceptions of the potential impact of virtual wards on acute hospital care delivery in Ireland?

These research questions directly align with the research objectives outlined in Chapter One. Building progressively from understanding Doccla's development journey (Objective One), to examining their implementation methodology (Objective Two), and finally to evaluating potential impacts through healthcare stakeholder perspectives (Objective Three). This logical sequence reflects Yin's (2018) approach to exploratory case study design, which values

moving from case understanding to broader impact assessment. As Tracy (2020) notes, well-formulated research questions are essential in qualitative research, as they provide direction while allowing for the flexibility needed to explore complex social phenomena.

3.3 Research Overview

Table 3.1 Research Overview

Research Question	**Assessed (How this was addressed)**
1. How has Doccla developed its virtual ward service?	Through a narrative review of public documentation (e.g. Doccla publications, NHS digital health reports) and relevant literature outlining the company's model and expansion strategy. Supplemented by participant references to Doccla's model.
2. What implementation methodology and technical infrastructure underpin Doccla's virtual ward model?	Explored via semi-structured interviews, with specific questions relating to technology, workflow, and system integration. Key questions included those addressing infrastructure, staffing, and training.
3. What are healthcare professionals' perceptions of the potential impact of virtual wards on acute hospital care delivery in Ireland?	Explored through interview questions targeting perceived benefits, challenges and system-level implications. These included questions on patient experience, governance and operational pressure points. Thematic analysis was used to identify patterns in responses.

This integrated approach combined documentary analysis with primary qualitative data. In doing so, this provided methodological triangulation, which strengthens research design by using multiple data sources to address the same phenomenon (Flick, 2018; Farquhar, 2012).

3.4 Research Design

A qualitative case study approach was adopted to examine Doccla's virtual ward implementation. According to Yin (2018), case studies are ideal for investigating a contemporary phenomenon within its real-life context. Particularly, when boundaries between phenomenon and context are blurred. Alternative methodologies were considered but ultimately rejected, as seen as less suitable for the research objectives. A purely quantitative approach would have been inappropriate given the exploratory nature of the study and the relatively limited implementation of virtual wards in Ireland to date. Case study designs are more suitable when the research context is not yet mature enough for variable measurement and statistical analysis (Yin, 2018; Creswell and Poth, 2018). Similarly, a phenomenological study would have focused too narrowly on the subjective lived experience of individuals, rather than the practical and contextual implementation factors this research sought to understand (Tracy, 2020; Merriam and Tisdell, 2016). Action research was another possibility, but without direct involvement in an implementation project, this approach was not feasible. The case study design was therefore selected as the most appropriate for investigating the complex, context-dependent nature of virtual ward implementation (Merriam and Tisdell, 2016).

According to Creswell and Poth (2018), interpretivist inquiry is grounded in the belief that knowledge is socially constructed and context dependent. This paradigm guided the study, allowing for rich, situated understandings of stakeholder perspectives. Creswell and Poth (2018) further describe interpretivist research as prioritising meaning making and multiple realities, shaped by participants' perspectives. This paradigm values rich, contextual data from stakeholder accounts, acknowledging that perspectives on implementation challenges vary across participants (Braun and Clarke, 2021).

Semi-structured interviews with healthcare professionals were employed, to allow open-ended exploration while maintaining core structure, aligning with the research objectives. The Consolidated Framework for Implementation Research (CFIR) informed both the interview guide and analysis, offering a comprehensive framework for identifying barriers and facilitators to implementation (Damschroder et al., 2009). This approach was particularly appropriate given limited literature on virtual ward deployment in Ireland and the need to try and learn directly from those engaged in early-stage implementation (Greenhalgh et al., 2017). Alternative methods were carefully considered but determined less suitable. Questionnaires would have limited participants' responses to predetermined options, missing

the contextual depth needed to understand implementation dynamics in this exploratory study (Pope and Mays, 2020). Focus groups, while valuable for generating data through interaction, presented practical challenges with healthcare professionals' schedules and potential hierarchical dynamics that might constrain honest discussion of implementation barriers (Kallio *et al.*, 2016). As Pope and Mays (2020) note, qualitative interviews are particularly valuable when exploring complex phenomena about area's where little is known, which precisely describes early-stage virtual ward implementation in Ireland. The case study approach with semi-structured interviews aligned with Yin's (2018) recommendation for investigating contemporary phenomena within real-life contexts. This methodological choice enabled systematic data collection while maintaining the flexibility needed to explore unanticipated yet significant implementation factors.

Figure 3.1 below illustrates the research design framework guiding this study, showing the logical progression from philosophical foundations to findings.

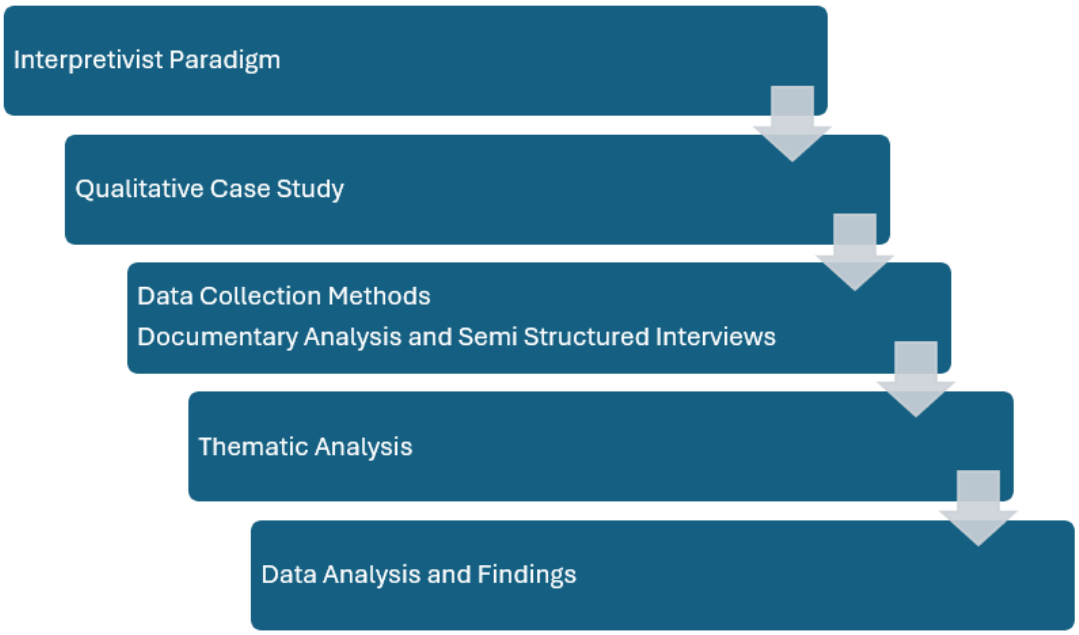

Figure 3.1 Research Design Framework.

Thematic analysis following Braun and Clarke's (2023) framework was employed to systematically identify patterns across the interview data. This analytical approach led to the

identification of eight key themes, that form the foundation of the findings presented in Chapter four.

3.5 Data Collection

Participants were offered multiple interview formats: in-person, online via Zoom, or self-administered via Microsoft Forms. As described by Redlich-Amirav and Higginbottom (2014), participant-centred research design prioritises accessibility and choice in data collection. This informed the flexible interview options offered in this study.

Four participants opted for self-administered formats, while one opted for in-person interview. The mixed-mode approach is supported by Archibald *et al*., (2019), who found that offering choice enhances data quality, particularly among time-constrained professionals.

Interview questions covered topics including current hospital capacity challenges, awareness of virtual wards, perceived benefits and challenges and required implementation supports. Participants were encouraged to elaborate and raise additional points, in line with the recommendation by Kallio *et al.*, (2016) that semi-structured interviews should balance focus with openness to unexpected insights. All responses were collated in Excel, coded manually and uploaded to Microsoft Power BI, to support visualisations after thematic analysis. This approach enhances analytical rigour and transparency (Fielding, 2012).

3.6 Data analysis

The interview data was analysed using Braun and Clarke's six-phase thematic procedure (Braun and Clarke, 2023). First, the four Microsoft Forms transcripts and the manually transcribed fifth interview were combined in an excel worksheet. Next, they were analysed multiple times while brief notes captured initial impressions. In Excel a Responses and Coding sheet was created, each line of text was cleaned and merged where necessary. An additional column was added for short descriptive code. In another sheet named Keywords Data sheet, listed terms (for example connectivity, governance, upskilling) that were used with the filter and search tools to ensure no relevant extracts were missed. Similar codes were then grouped and logged in the Coding Sheet, where theme names and working definitions were refined through repeated comparison with the data. Coherence and separation of these provisional themes were checked in the Theme Frequency Table, using pivot tables that

tallied occurrences by participant and by interview question. Miscoded or duplicate rows were corrected at this stage also. After several cycles eight final themes were confirmed, namely, Technology and Infrastructure, Staffing and Training, Patient Experience and Access, Clinical Governance, Resource Allocation, Communication and Engagement, Integration of Care, and Implementation Strategy. The completed workbook was imported into Power BI to generate the visualisations presented in Chapter four, and both the Excel workbook and Power BI files are available (Appendix four and five) to provide a full audit trail from raw text to reported findings.

3.7 Piloting

The interview format was piloted with three individuals, a nurse friend and two family members; one of which is employed in the health service. This approach reflects best practice recommendations that pilot participants should approximate the characteristics of the intended study population (Turner, 2010; Majid *et al.*, 2017). The pilot tested three key areas, question clarity, estimated completion time and logical flow.

These dimensions were prioritised specifically as they directly affect participant comfort, cognitive load and the quality of responses. These elements are crucial in obtaining rich, usable data in qualitative research. Vague or cognitively demanding questions can interfere with participants' ability to engage meaningfully, reducing data richness (Chenail, 2011). Similarly, estimated completion time was assessed as healthcare professionals' time constraints could limit participation or lead to rushed responses, if interviews were too lengthy. Logical flow was examined, as Turner (2010) demonstrates, an incoherent sequence of questions can confuse participants and disrupt their thought processes, resulting in fragmented narratives rather than coherent accounts.

Based on pilot feedback, two questions were reworded for clarity and flow. This piloting process enhanced instrument usability for the formal interviews, to identify and address methodological issues before main data collection. Piloting allows researchers to identify and address potential methodological problems before they impact the main study, enhancing both ethical practice and data quality (Kim, 2011). This methodical approach to piloting directly supports the validity and reliability of the subsequent data collection.

3.8 Sample

Five participants were recruited using purposive sampling, a technique employed when seeking individuals with specific knowledge or perspectives (Palinkas *et al.*, 2015). Purposive sampling was selected over probability sampling due to the research requiring participants with specific expertise rather than statistical representativeness (Etikan, Musa and Alkassim, 2016). Convenience sampling was rejected as it might have yielded less diverse perspectives.

The final sample included an Advanced Nurse Practitioner, a Clinical Nurse Manager, a General Practitioner, a Healthcare ICT Project Manager and a Midwife. Two participants had direct involvement in virtual ward implementations, while three offered perspectives from adjacent areas. Although modest in size, the sample is appropriate for qualitative research which prioritises depth over breadth. Guest, Bunce and Johnson (2006) found that data saturation typically occurs within six to twelve interviews, supporting that a small, focused sample can yield robust insights. Malterud, Siersma and Guassora (2016) further argue that when participants have high "information power" due to their relevant expertise, smaller samples provide adequate data.

3.9 Ethics

This research received formal approval through Griffith College's ethics application process and adhered to the British Educational Research Association's (BERA, 2018) Ethical Guidelines. BERA emphasises that researchers must recognise the right of all participants to privacy, personal dignity and autonomy. Additionally, researchers must obtain informed consent, based on a clear understanding of the research purpose, procedures and implications.

All participants received a Participant Information Letter (PIL) detailing the study's purpose, participation requirements and data handling procedures. Participants were fully informed of their rights, including the right to withdraw without penalty. Varkey (2021) emphasise, respecting participants' autonomy is a fundamental ethical principle that requires giving them complete control over their participation. Suggesting that allowing participants to make reasoned decisions about their participation throughout the research process, is not merely procedural but fundamentally ethical. This approach also aligns with the principle of non-maleficence, ensuring no harm comes to participants by giving them the power to exit the study if they experience any discomfort or concern (Beauchamp and Childress, 2019).

To maintain confidentiality, participants were assigned pseudonymous identifiers (e.g., Participant A, B, C) and any potentially identifying details were removed from transcripts. Saunders, Kitzinger and Kitzinger (2015) note that anonymising interview data requires strategies that preserve the richness of the interview material while also protecting participants. This was achieved through careful redaction of institutional affiliations and unique role descriptors. Member checking was employed, allowing participants to review their interview transcripts, enhancing transparency and credibility (Birt *et al.*, 2016).

All data was stored securely on a password-protected laptop, with recordings to be deleted after examination and transcripts retained for two years for verification purposes. This two-year retention period follows academic best practice as outlined by BERA (2018), which recommends maintaining anonymised data for a limited period to permit independent scrutiny and facilitate accountability, while not extending retention unnecessarily. The study complied with the General Data Protection Regulation (GDPR) (European Union, 2018), particularly regarding data minimisation, secure storage and limited retention.

3.10 Trustworthiness

Trustworthiness in qualitative research encompasses credibility, transferability, dependability, and confirmability (Lincoln and Guba, 1985). Several strategies were employed to enhance these elements:

Credibility was strengthened through member checking, where participants reviewed their transcripts to confirm accuracy (Birt *et al*., 2016). Methodological triangulation between documentary analysis and interviews further enhanced credibility by providing multiple perspectives on the phenomenon (Noble and Heale, 2019). Reflexive thematic analysis acknowledged the interpretive nature of qualitative research, with the researcher maintaining a reflective log to surface potential biases (Braun and Clarke, 2006).

Transferability was supported through rich descriptions of the research context and participant characteristics, enabling readers to assess applicability to other settings (Creswell and Poth, 2018). While not aiming for statistical generalisation, the study provides sufficient contextual detail for analytical generalisation.

Dependability was established through a clear audit trail documenting research decisions and processes (Nowell *et al*., 2017). The interview guide was piloted and refined, enhancing

instrument reliability (Majid *et al*., 2017). This systematic approach to data collection and analysis ensures consistency and traceability. Creswell and Poth (2018) note that documenting the research steps allows others to assess the study's coherence and logic, which supports the reliability of the findings.

Confirmability was reinforced through the audit trail and reflexivity practices mentioned above. A coded transcript repository was maintained, allowing external reviewers to trace connections between raw data and interpretations. Direct participant quotations in the findings demonstrate that themes are grounded in the data rather than researcher bias. Braun and Clarke (2006) stress that qualitative analysis must be coherent and data-grounded, even though it involves interpretation, a principle that guided the analytical process.

Together, these strategies ensured the research maintained methodological rigour in accordance with established qualitative research practices (Birt *et al*., 2016; Creswell and Poth, 2018). By systematically addressing each dimension of trustworthiness, the study establishes its credibility and robustness within the qualitative research tradition.

3.11 Informed Consent

Informed consent is a core principle of ethical qualitative research, ensuring that participants voluntarily agree to take part with full knowledge of the study's purpose, procedures, and implications (BERA, 2018). For this research, interviews were conducted with healthcare professionals regarding the implementation of virtual wards in Ireland. Although the subject matter was not highly sensitive, it still required rigorous ethical handling to safeguard autonomy, privacy and transparency.

All procedures were approved through Griffith College's ethics application process prior to data collection. Participants were provided with a comprehensive PIL, outlining the aims of the study, what their participation would involve, their right to withdraw at any time and how their data would be handled. This aligns with the ethical standards described by Creswell and Poth (2018), who stress the importance of clarity and participant understanding in all stages of the research process.

Informed consent was obtained in two formats depending on the interview method:

For the four participants interviewed online, digital consent was collected via a secure Microsoft Forms link that required participants to read the information sheet and confirm their agreement to participate by submitting their digital signature prior to interview.

For the one participant interviewed in person, written consent was obtained using a signed paper form.

The use of digital tools for obtaining consent is supported in the academic literature. A systematic review by Gesualdo *et al*., (2021) found that interactive and digital methods of consent, when implemented clearly and securely, are ethically appropriate and can even enhance participant understanding. Their study concluded that digital tools may be useful in enabling the development of personalised informed consent that is tailored to an individual's socio-cultural characteristics.

This approach to informed consent follows established procedures in qualitative research as outlined by Varkey (2021), who emphasise that informed consent is a continuous process rather than a one-time event. They argue that ethical consent involves creating an ongoing, transparent relationship between researcher and participant based on mutual respect and clear communication. Aligning with this principle, participants were reminded before and during the interview that participation was entirely voluntary and that they had the right to withdraw their data post-interview. All participants were offered the opportunity to review their transcripts to ensure accuracy and fairness, a process known as member checking, which enhances trustworthiness in qualitative research (Birt *et al*., 2016).

3.12 Methodological Limitations

Several limitations of the methodology must be acknowledged. As mentioned above, the sample consisted of five participants from varied healthcare roles, which brought diverse insights but also limits the breadth of representation within each profession (Mason, 2010).

As interviews formed the sole data collection method, findings reflect participants' perspectives at a single point in time and may not fully capture evolving views or long-term implementation challenges. Additionally, while two participants referenced feedback from patients involved in early virtual ward pilots, no patients were interviewed directly limiting direct insights into patient experience.

Despite these constraints, the consistency of responses and alignment with established literature suggest that the findings offer a credible foundation for understanding early-stage virtual ward implementation in the Irish healthcare context. While these methodological constraints are acknowledged, additional limitations specific to the analysis and findings are discussed in detail in Chapter four.

3.13 Conclusion

This chapter has outlined the methodological framework underpinning the study, justifying the choice of a qualitative case study approach. Along with semi-structured interviews linking it to the interpretivist paradigm which guided the research. The study employed purposive sampling to engage five healthcare professionals with relevant expertise, conducted using a flexible, participant-centred approach. Thematic analysis following Braun and Clarke's (2023) framework was used to identify patterns across the data, with ethical considerations and trustworthiness strategies carefully integrated throughout the research process. This methodology created a robust foundation for exploring healthcare professionals' perspectives on implementing Doccla's virtual ward model in Ireland.

Chapter 4: Data Analysis & Findings

4.1 Introduction

This chapter presents the analysis of qualitative data from the five semi-structured interviews examining virtual ward implementation in Ireland with Doccla as a case study. Participants represented diverse healthcare roles: a healthcare ICT project manager, a clinical nurse manager, an advanced nurse practitioner from a virtual ward, a hospital midwife, and a general practitioner.

4.2 Thematic Analysis Overview

Following thematic analysis of transcribed interviews using Excel coding, eight major themes emerged: Patient Experience & Access, Resource Allocation, Staffing & Training, Technology & Infrastructure, Communication & Engagement, Clinical Governance, Integration of Care, and Implementation Strategy. These themes capture stakeholder perspectives on both the potential benefits and challenges of implementation, directly addressing research objectives regarding Doccla's methodology (Objective two) and impacts on acute care delivery (Objective three).

The interview data was systematically coded using a matrix approach in Excel, where responses were tagged by theme and question. This methodical process allowed for identification of patterns across participants and questions, revealing important insights about implementation priorities. Data cleaning involved consolidating similar concepts (e.g., various terms for training or technology) under relevant theme codes to ensure consistency across the analysis. Power BI visualisations were then created to represent theme prevalence and relationships, presented as figures throughout this chapter.

The identified themes align with the conceptual framework presented in Chapter two (Figure 2.5), with themes distributed across all four dimensions, technical factors (Technology & Infrastructure), organisational factors (Resource Allocation, Clinical Governance), individual factors (Patient Experience & Access, Staffing & Training), and implementation process factors (Communication & Engagement, Implementation Strategy, Integration of Care). This distribution validates the multi-dimensional approach to virtual ward implementation proposed in the theoretical framework.

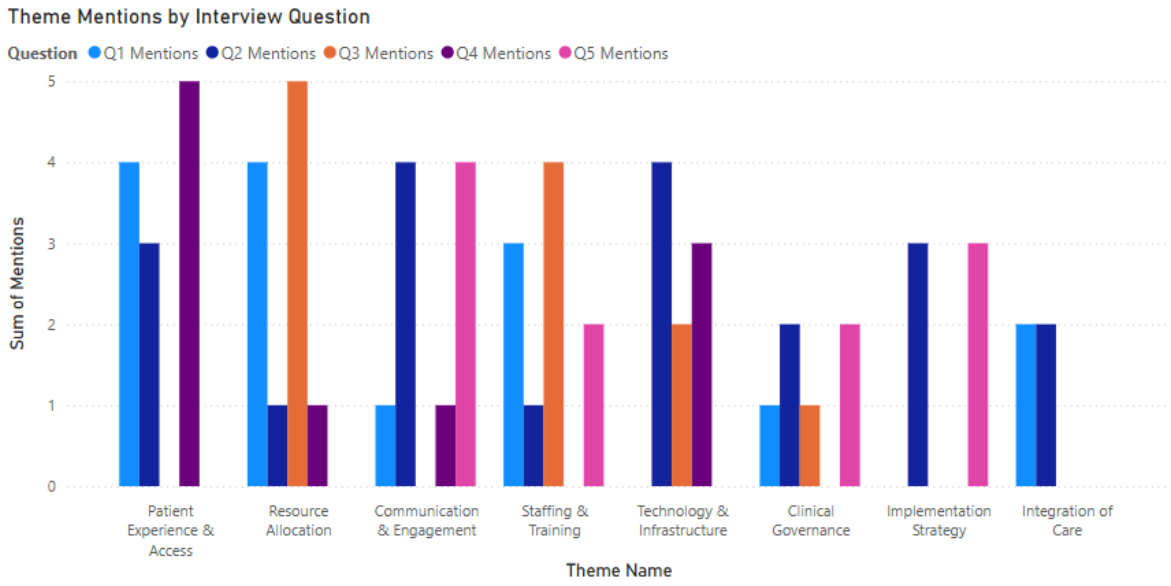

Figure 4.1 Distribution of theme mentions by interview question

Figure 4.1 above illustrates which interview questions were most effective at capturing specific themes, providing methodological transparency about the data collection process. This visualisation shows that Question two concerning Opportunities & Challenges was uniquely valuable as it was the only question that elicited responses across all eight themes, accounting for 29% (n=20) of all 68 theme mentions. The chart also demonstrates which implementation factors were most prominent in participants' responses, helping to validate the significance of these themes in the findings.

The theme **Patient Experience and Access** accounted for 18% (n=12) of total coded references and was most prominently discussed in response to question four (42% of Q4 responses) concerning patient coping with virtual wards, followed by question one about current healthcare challenges (33% of Q1 responses). This distribution suggests, participants were particularly concerned with patient centred issues when considering how different patient groups might adapt to virtual wards. While also recognising these concerns as current system problems.

Resource Allocation represented 16% (n=11) of total theme mentions, appearing most frequently in responses to question three, about support needs (45% of Q3 responses), followed by question one about current healthcare challenges (36% of Q1 responses). This pattern indicates participants identified specific resource requirements for example staff or infrastructure as essential for successful implementation, while also acknowledging these resource constraints as significant existing challenges.

Staffing and Training constituted 15% (n=10) of coded references, featuring most prominently in question three about support needs (40% of Q3 responses) and question one about current healthcare challenges (30% of Q1 responses). This distribution highlights that participants viewed workforce development as both a critical requirement for implementation and an area of current concern within the healthcare system.

Communication and Engagement also represented 15% (n=10) of total mentions, appearing with equal frequency in questions two about opportunities and challenges (40% of this theme's mentions) and question five about additional considerations (40% of this theme's mentions). This equal distribution suggests participants recognised effective stakeholder communication as both an immediate implementation consideration and a long term factor for future sustainability.

Technology and Infrastructure accounted for 13% (n=9) of total coded references, most frequently mentioned in response to question two about opportunities and challenges (44% of this theme's mentions), followed by question four about patient coping (33% of this theme's mentions). This pattern reveals that participants emphasised technological readiness when directly discussing implementation variables and recognised technology's impact on some patients' ability to engage with virtual wards.

Clinical Governance and **Implementation Strategy** each represented 9% (n=6) of total theme mentions, while **Integration of Care** had the fewest references with 6% (n=4). The distinct distribution patterns for each theme across different questions reveal how participants' focus shifted depending on the specific implementation aspect being considered, highlighting the multifaceted nature of virtual ward implementation.

While Figure 4.1 above illustrates how themes were distributed across different interview questions, Table 4.1 below shifts the focus to examine theme coverage across individual participants. This complementary perspective allows us to assess the degree of consensus among healthcare professionals and identify which themes transcended individual roles and experiences.

Table 4.1. Participant Theme Coding Matrix (✓ = theme mentioned in participant's responses)

*Table 4.1 Participant Theme Coding Matrix - *P= Participant*

Theme	P- A	P -B	P - C	P - D	P -E	Mentioned by (# of participants)
Patient Experience & Access	✓	✓	✓	✓	✓	5 (All)
Resource Allocation	✓	✓	✓	✓	✓	5 (All)
Staffing & Training	✓	✓	✓	✓	✓	5 (All)
Technology & Infrastructure	✓	✓	✓	✓	✓	5 (All)
Clinical Governance	✓		✓	✓	✓	4
Communication & Engagement	✓		✓	✓	✓	4
Integration of Care	✓		✓	✓	✓	4
Implementation Strategy	✓		✓	✓	✓	4

As illustrated in Table 4.1 above the matrix demonstrates theme coverage across individual participants. Four themes; Patient Experience and Access, Resource Allocation, Staffing and Training, and Technology and Infrastructure, were mentioned by all participants, indicating strong consensus. The remaining four themes achieved 80% (n=4) coverage, with only Participant B not discussing these more administrative or strategic concerns.

As mentioned above, across all five interviews, a total of 68 coded theme mentions were identified. Figure 4.2 below presents a treemap showing the relative prominence of each theme based on coded references

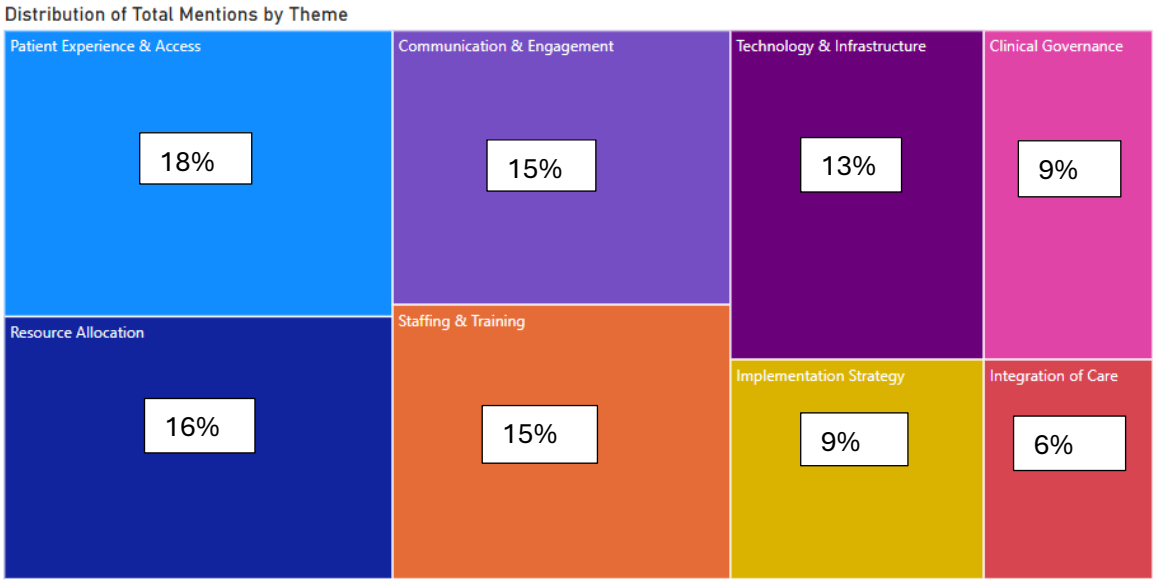

*Figure 4.2 Distribution of Total Mentions by Theme. *Percentages rounded up to nearest whole number.*

Figure 4.2 presents an alternative visualisation of the theme distribution data, using a treemap to highlight the relative prominence of each theme by area. This complementary perspective reinforces the findings shown in Figure 4.1, illustrating how the eight themes were proportionally distributed across all participant responses. The treemap format visually emphasises the relationship between themes, making the priority areas immediately apparent.

Table 4.2 Breakdown of theme mentions by interview question.

Theme	**# and % of Participants Mentioned**	**Total Mentions**	**Q1 Mentions (Current problems)**	**Q2 Mentions (Opportunities & challenges)**	**Q3 Mentions (Support needed)**	**Q4 Mentions (Patient coping)**	**Q5 Mentions (Other considerations)**
Patient Experience & Access	5 (100%)	12	4	3	0	5	0
Resource Allocation	5 (100%)	11	4	1	5	1	0
Staffing & Training	5 (100%)	10	3	1	4	0	2
Communication & Engagement	4 (80%)	10	1	4	0	1	4
Technology & Infrastructure	5 (100%)	9	0	4	2	3	0
Clinical Governance	4 (80%)	6	1	2	1	0	2
Implementation Strategy	4 (80%)	6	0	3	0	0	3
Integration of Care	4 (80%)	4	2	2	0	0	0

Table 4.2 above map's theme mentions across interview questions, which reveals specific patterns, illustrating how different interview questions addressed specific thematic concerns.

In the following section each of the identified themes is now examined in turn, supported by participant insights and related back to frameworks, research objectives and relevant literature.

4.3 Analysis of Key Themes

4.3.1 Patient Experience and Access

Patient experience and access emerged as the most prominent, mentioned by all participants 100% (n = 5) and accounting for 18% (n = 12) of total coded references. Participants strongly agreed that virtual wards can enhance the patient experience by enabling hospital level care in the comfort of their own homes, while maintaining quality of care and patient safety. High patient satisfaction with the virtual ward model was a consistent response across interviewees. Participant C stated:

> *"My patient cohort who have used the virtual ward have been very happy with this model of care, patients love it"* (Participant C).

Participant A also noted:

> *"Patient satisfaction is high, and patients would use the virtual ward again and also recommend it to family and friends"* (Participant A).

These first-hand observations align with the notion that if given the option patients would choose this model of care if they were suitable candidates.

Participant D illustrated this by explaining that many postpartum women prefer fewer hospital visits, stating:

> *"Mothers with other children at home would particularly appreciate fewer hospital visits. First time mothers might value the reassurance of knowing they are being monitored between appointments; it would reduce the anxiety for them"* (Participant D).

This aligns with CADTH (2024), which found that receiving care in a familiar home environment reduced stress and improved comfort for patients and caregivers alike. By enabling earlier discharge or avoiding admission altogether can help avoid disruption to family life or exposure to hospital-acquired infections. Participant D also highlighted:

> *"Anything that keeps you out of hospital is a bonus, provided the care at home is adequately safe and monitored"* (Participant D).

Participants also acknowledged potential challenges that could affect patient experience. Participant D cautioned that while:

> *"Most young mothers would adapt well" due to familiarity with technology, "not all patients would be comfortable with technology and some conditions will still require in person assessment"* (Participant D).

However, Participant B offered a slightly contrasting view, suggesting that younger antenatal patients:

> *"Would embrace virtual wards as they are savvy"* (Participant B).

indicating digital readiness in some patient groups.

Elderly patients with low digital literacy, or complex conditions might struggle without sufficient supports. Participant C observed that older patients who lacked a family caregiver to assist with the devices:

> *"Have not been able to transfer to the virtual ward"* (Participant C).

This is relevant as these patients could be excluded from selection if extra help is not provided.

This highlights a need for robust patient selection criteria and support mechanisms (training patients to use the equipment, providing help) to ensure equitable access. Participant D also noted that language barriers and socioeconomic issues (e.g. among "refugees") along with lack of reliable home internet could impede some patient's ability or willingness to participate in a virtual ward program.

Despite these valid concerns, the overall sentiment was optimistic as regards patient acceptance. The recurrent theme was that the stakeholders feel that patients value the comfort and autonomy of getting hospital level care at home, if they feel safe and well monitored.

These findings address objective three by reflecting stakeholder perspectives on how virtual wards might enhance patient care. This theme primarily aligns with the **Individual Factors quadrant of the conceptual framework (Figure 2.5)**, particularly through TAM (Davis, 1989) elements like perceived usefulness and ease of use, which directly influence patient

engagement with virtual ward technologies. The findings also reveal how technology's material features and complexity, directly influence patient experience, which is identified as a key adoption factor in the NASSS Framework developed by Greenhalgh *et al.*, (2017). Especially for elderly patients with lower digital literacy. While participants report high satisfaction among current virtual ward users, the technology acceptance concerns reflect important barriers identified in the literature (Norman *et al.,* 2023)

This is consistent with literature on virtual ward and previous HAH models. Lewis (2010) noted that even basic virtual ward programs from the early 2000's led to high patient satisfaction, which aligns with participants reports of positive feedback from patients during the pilot of virtual wards in Ireland.

More recent evidence from CADTH, (2024) also supports the notion that suitable patients would generally prefer to receive care at home. The Canadian horizon scan reported that patients, caregivers, and health care providers appear to be generally satisfied with virtual ward programs, as patients' comfort is improved by the familiar home environment (CADTH,2024). Participant A's comments that patients would use the virtual ward again and recommend to family and friends is an endorsement of this, suggesting high acceptance among patients.

In summary, participants feel that virtual wards hold great promise for enhancing patient experience and access to care. Providing that implementation accounts for diverse patient needs and capabilities.

4.3.2 Resource Allocation

Resource Allocation was another highly prominent theme, mentioned by all participants 100% (n = 5) and accounting for 16% of total coded references (n = 11). Participants focussed on how virtual wards could alleviate system pressures. They consistently identified severe resource constraints in acute care and viewed virtual wards as a potential solution.

Bed capacity emerged as a critical concern. As described by Participant E:

> *"At the moment, our biggest challenge is getting patients seen. There are significant bed capacity constraints, discharge delays due to limited step-down care options and frequent re-admissions"* (Participant E).

Similarly, Participant C noted:

> *"Insufficient in-hospital bed capacity, resulting in too many patients having to be nursed on hospital trolleys"* (Participant C).

These frontline observations confirm capacity issues as a severe pain point in the Irish context, this aligns with INMO's 2024 reports of record overcrowding (INMO, 2024).

Participants viewed virtual wards as a potential means to free up hospital beds and resources by enabling earlier discharges and reducing unnecessary admissions. Participant E explicitly stated:

> *"Virtual wards could help mitigate these pressures by enabling earlier discharge, continuous remote monitoring and freeing up hospital beds"* (Participant E).

This reflects optimism that community based care will translate into tangible capacity gains for hospitals. Participant B also noted:

> *"Extra technology and patient compliance training"* (Participant B).

would be essential, reinforcing the need for adequate upfront investment not just in infrastructure, but also in user support and education.

Similarly, Participant E emphasised the need for upfront investment:

> *"Funding would be important, perhaps governmental financing would be required"* (Participant E).

They anticipated long-term efficiency gains. Participant D highlighted that remote monitoring for conditions like pre-eclampsia could:

> *"Potentially reduce readmissions by catching problems earlier"* (Participant D).

In turn benefiting both patients and hospital resource management.

This theme primarily addresses Research Objective three - the impact on acute hospital care delivery. Resource Allocation sits within the **Organisational Factors quadrant of the conceptual framework (Figure 2.5)**, reflecting how institutional decisions about resource distribution influence implementation success, this is consistent with the NASSS Framework's emphasis on organisational capacity. The interviews suggest stakeholders view virtual wards as a mechanism to potentially improve operational efficiency through better bed allocation and, in turn, reduced healthcare expenditure. This aligns with literature showing

virtual wards were introduced in the UK to address hospital pressures (Lasserson and Cooksley, 2023), and evidence from a systematic review by Shi *et al*., (2024), which found that virtual ward models can achieve similar, or lower readmission rates and reduced hospital stays. Similarly, CADTH (2024) reports that early supported discharge through virtual wards can accelerate bed turnover and maintain quality of care, supporting participants' optimism. However, echoing Participant E's concerns around upfront investment, Sheasby (2025) stresses that implementing virtual wards requires substantial initial funding for staffing, equipment, and integration. He emphasises the importance of robust costing models and sustained financial support to ensure long-term cost-effectiveness and success (Sheasby, 2025). While stakeholders anticipate that virtual wards can ease resource constraints by optimising hospital utilisation, adequate planning and resourcing are essential to realise these benefits.

4.3.3 Staffing and Training

Staffing and Training was a universally acknowledged theme, mentioned by all participants 100% (n = 5) and accounting for 15% (n = 10) of total coded references. Two critical subtopics emerged: ensuring adequate staff capacity and providing comprehensive training.

Participants emphasised that additional staff or a reallocation of duties would be necessary. Participant D pointed out that remote monitoring:

> *"Needs to be staff-specific"* (Participant D).

rather than added to existing responsibilities. Participant D also mentioned the importance of specialised support staff:

> *"More digital IT specialists for local support"* (Participant D).

And Participant C suggested:

> *"Dedicated pharmacist resources for the virtual ward"* (Participant C).

All participants cited training as essential. Participant D emphatically stated:

> *"We definitely require adequate training for all staff involved to feel confident in interpreting remote monitoring data and knowing when to escalate concerns"* (Participant D).

This indicates that remote care requires different skills than traditional hands-on approaches. Participant E noted:

> *"Many staff are not tech-based, but more hands-on"* (Participant E).

Suggesting that portions of the workforce lack familiarity with digital health technology. This reflects Norman *et al*., (2023), who noted that gaps in digital confidence and training are barriers to adopting remote care technologies.

Training needs extend beyond staff to patients and caregivers. Participant D mentioned:

> *"Mothers need to understand how to use the equipment properly" and suggested considering "equity of access, perhaps loaner devices for those without suitable technology"* (Participant D).

This theme relates to both Objective two - implementation methodology and Objective three - stakeholder perspectives. It bridges both the **Organisational Factors quadrant (workforce capacity) and Implementation Process Factors quadrant (training programmes) of the conceptual framework (Figure 2.5)**, demonstrating how staff preparation directly influences implementation outcomes. The findings align with literature identifying insufficient training as a barrier to adopting health technologies (CADTH, 2024; Norman *et al*., 2023). Norman *et al*., (2023) emphasise that adequate digital training and dedicated implementation teams are critical to support staff confidence and minimise errors in virtual ward settings. However, Preet and Chahal (2024) argue that training alone is insufficient if organisational culture and fear of obsolescence are not addressed. Their study identifies that technological resistance often stems from perceived job threats, psychological barriers, and ethical concerns. Therefore, while skills-based training is necessary, it must be paired with leadership engagement, ethical clarity, and change management frameworks to reduce resistance and improve adoption rates in digitally evolving healthcare environments (Preet and Chahal, 2024).

Doccla's approach of suppling devices addresses this concern and embedding its own clinical team also addresses staffing concerns (Chipman, 2023), though local staff still require training on interfacing with the system.

In conclusion, participants view staffing and training as foundational to implementation, reflecting an understanding that virtual wards require both technical deployment and significant changes in work practices.

4.3.4 Technology and Infrastructure

Technology and Infrastructure was a common theme across all participants 100% (n = 5), accounting for 13% of total coded references (n = 9). This theme encompassed both the digital and physical tools required for virtual wards, with two key subtopics emerging: connectivity reliability and digital literacy challenges.

Connectivity emerged as a significant concern, especially in rural areas. Participant A noted:

> *"Connectivity black spots"* (Participant A).

in the Midwest region as a challenge, while Participant D explained that:

> *"Some of our patients have limited internet access, especially in rural areas."* (Participant D).

Such an issue raises safety concerns, as virtual wards depend on real-time data transmission from home to hospital. Socioeconomic factors also influence technology access, as

> *"They may not have the technology at their hands, or the skills and knowledge to use it"* (Participant D).

This reflects Norman *et al*., (2023), who highlight limited internet access as a major barrier to remote care, particularly in rural and low-income settings. Participant D also suggested providing loaner devices to patients, which aligns with Doccla's approach of supplying "tailor-made Doccla box of equipment" including pre-configured smartphones and medical devices.

Digital literacy concerns affected both patients and staff. Participant C observed that:

> *"Older patients who are not digital literate or do not have a family member or carer to assist, have not been able to transfer to the virtual ward"* (Participant C).

Similarly, Participant E noted:

> *"Many staff would not be tech-based but more hands-on"* (Participant E).

indicating widespread training would benefit all. Participant D emphasised the need for:

> *"Good network and infrastructure support for setting up systems and for troubleshooting when issues arise",* (Participant D).

Suggesting dedicated IT personnel are crucial, especially during initial implementation.

This theme addresses Objective two - technical infrastructure requirements and Objective three - stakeholder perspectives, since technology enables functionality. Technology and Infrastructure are at the core of the **Technical Factors quadrant in the conceptual framework (Figure 2.5)**, highlighting how Berg's (1999) socio-technical systems theory explains the interplay between technological capability and implementation success. The findings align with the literature, highlighting connectivity and user interfaces as common challenges in telehealth implementation. Norman *et al.*, (2023) identified issues around access to internet or internet-enabled devices as barriers, particularly in rural or low socioeconomic areas, which directly reflect the participants' concerns. Complementing this, Max-Onakpoya *et al*., (2019) explored rural remote monitoring in Kentucky and proposed using opportunistic networks, such as Bluetooth-based communication to bridge gaps where internet connectivity is intermittent or unavailable. This model of hybrid connectivity addresses the same "connectivity black spots" cited by Participant A and offers a transferable innovation for rural virtual ward settings (Max-Onakpoya *et al*., 2019).

From the Doccla case study perspective, while their platform is designed to integrate with local systems, the participants' feedback highlights that addressing rural broadband gaps is essential for successful implementation in the Irish context.

While technology enables virtual wards, robust infrastructure and digital supports are essential for success. Participants identified potential pitfalls (connectivity issues, digital literacy barriers) and necessary solutions (IT support, device provision, training), reflecting what Norman *et al*., (2023) documented regarding technical reliability and accessibility in telehealth services.

4.3.5 Communication and Engagement

Communication and Engagement was a well-represented theme, mentioned by most participants 80% (n = 4) and accounting for 15% (n = 10) of total coded references. The theme reflects how stakeholders are informed about and involved in supporting the virtual ward initiative. Beyond the technical aspects, participants highlighted that human buy-in and clear communication are central to the successful implementation of virtual wards.

Clinician buy-in emerged as a dominant subtopic. Participant C noted that:

> *"Buy-in of some clinicians is challenging; some cannot yet see the vision of what this model of high-quality acute care can offer to their patients".* (Participant C).

Greenhalgh *et al.*, (2017) similarly argue that engaging clinicians early and involving them in co-design can significantly improve buy-in for technology-driven care models. Participant C also emphasised that consultant support is crucial:

> *"Patients can only transfer to the virtual ward if their consultant consents. Meaning Consultant engagement, cooperation, buy-in, and support are crucial to success"* (Participant C).

This insight is crucial as even with an operational virtual ward service, physicians will not utilise it unless they actively embrace the model and refer patients.

Participants proposed several solutions, including education and transparent communication. Participant D stated:

> *"The biggest thing is communication, both with patients and among the healthcare team. Patients need to understand what virtual wards can and can't do"* (Participant D).

For patients, the process might involve informational materials and pre-enrolment consultations, while staff might benefit from workshops and outcome data to reassure them of patient safety.

Several participants suggested learning from other implementations. Participant D believed seeing successful models would be valuable, stating:

> *"Even sending a number of staff to go and see how these are implemented elsewhere could cut out that fear factor"* (Participant D).

This peer learning approach could build confidence among sceptical staff. Participant E also highlighted the importance of leadership engagement, noting:

> *"Continuous engagement and support from the HSE board is needed to prioritise the initiative"* (Participant E).

This theme relates directly to Research Objective two - implementation methodology and Objective three - stakeholder perspectives. The communication challenges identified align with the **Implementation Process Factors quadrant of the conceptual framework (Figure**

2.5), exemplifying how Rogers' (2003) Diffusion of Innovation theory's emphasis on communication channels directly impacts adoption rates. Participants emphasised that communication, clinician buy-in, and leadership engagement were essential to the successful implementation of virtual wards. These insights align with Greenhalgh *et al*., (2017), who found that sustained clinician engagement, particularly through co-design and addressing concerns around workflow and patient safety, significantly enhances adoption of digital health innovations. This supports Participant C's observation that consultant cooperation is pivotal, as no patient can enter a virtual ward without their approval. Furthermore, Thomas *et al*., (2022) identified that many barriers to remote monitoring adoption occur at the team and organisational levels, emphasising the importance of internal communication, educational support, and visible leadership. Participant E's emphasis on ongoing support from HSE leadership echoes this finding, reinforcing that systemic engagement is just as vital as patient-facing strategies. Together, these studies underscore that successful virtual ward deployment requires not only technical readiness but a concerted, communicative effort across professional hierarchies (Greenhalgh *et al*., 2017; Thomas *et al*., 2022).

The findings about consultant buy-in exemplify how the Implementation Process Factors quadrant in the conceptual framework directly impact success, regardless of technological readiness. Communication & Engagement represents the core aspect of successful implementation. The participants' insights make it clear that successful deployment requires addressing fears, educating all involved parties, and creating feedback mechanisms such as steering committees and advocate roles as mentioned by Participant A.

4.3.6 Clinical Governance

Clinical Governance was a key theme raised by most participants 80% (n = 4), accounting for 9% of total coded references (n = 6). This theme encompasses issues of responsibility, accountability, patient safety, and quality assurance. It addresses who is clinically responsible for patients, how care is coordinated and escalated, and how high standards are maintained in a virtual care setting.

Participants emphasised the need for clear structures and protocols. Participant E summed it up by stating:

> *"Consideration should be given to clinical responsibility and legal accountability. There would need to be clearly defined roles, responsibilities, and escalation procedures to ensure patient safety and clinical governance"* (Participant E).

In traditional hospital care, governance structures are well-established, but virtual wards introduce potential ambiguity, particularly when spanning hospital and community services. Participant D highlighted the need for:

> *"Clear pathways and protocols for patients, for the selection of those patients and monitoring their parameters and escalation pathways"* (Participant D).

One concrete example given was an escalation system for vital signs monitoring. Participant D suggested:

> *"Something very similar to the existing hospital early warning systems would definitely be required for the virtual ward, protocols that trigger appropriate responses if certain thresholds are breached at home"* (Participant D).

Participant E also mentioned:

> *"Legal accountability"* (Participant E).

Highlighting that if a patient deteriorates at home, accountability must be clear, likely requiring formal agreements within the health service.

Quality assurance was another aspect highlighted. Participant E noted:

> *"We would need continuous evaluation to ensure patient safety"* (Participant E).

This theme addresses Research Objective two - implementation methodology, integrating into existing governance structures and Objective three - stakeholder concerns about safety and responsibility. These governance concerns span both the **Organisational Factors quadrant (governance frameworks) and Implementation Process Factors quadrant (evaluation frameworks) of the conceptual framework (Figure 2.5)**, reflecting Berg's (1999) socio-technical perspective that technologies must align with clinical practices. The literature confirms clinical governance as a known challenge in virtual care. Lasserson and Cooksley (2023) noted that ensuring patient safety outside hospital requires robust triage and escalation protocols, while Norman *et al.*, (2023) identified a lack of guidance on team characteristics, data governance and organisational oversight as implementation barriers. NHS England (2022) provides further guidance, recommending that virtual wards be led by a senior

registered clinician and embedded within the provider's existing clinical governance frameworks. This ensures accountability, consistency, and integrated decision-making across care settings (NHS, 2022).

From Doccla's perspective, seeking CQC registration in the UK provided a governance framework. In Ireland, steps would include integration with HSE governance structures to establish clear lines of responsibility. Additionally, the implementation of formal clinical risk management standards, such as DCB 0129 and DCB 0160, have been used by Doccla to systematically identify and mitigate safety risks prior to virtual ward enrolment (Doccla, 2022).

In summary, participants view robust clinical governance as essential to maintain standards and clarity in virtual ward operations, ensuring the same rigour in patient oversight as a physical ward through formal protocols and clearly assigned responsibilities. With these in place, clinician buy-in could be expected to grow, in turn addressing some of the concerns raised by Participant C around clinician engagement.

4.3.7 Integration of Care

Integration of Care was the least frequently mentioned theme, raised by most participants 80% (n = 4) and accounting for 6% (n = 4) of total coded references. It refers to how virtual wards connect different parts of the health system to support seamless patient journeys. Despite lower frequency, participants emphasised its importance for successful implementation.

Participants viewed integration as a major opportunity of the virtual ward model. Participant D stated:

> *"I definitely see real opportunities for more integrated care between hospital and community services, something we're always trying to expand"* (Participant D).

This statement captures a key benefit, that virtual wards can bridge the historical gap between hospital discharge and community follow-up. Participant A similarly noted the opportunity for:

> *"Integrated care where both acutes and communities (staff & resources) work to deliver virtual ward patient care"* (Participant A).

Participant E highlighted an existing integration problem:

> *"Monitoring patients is challenging post-discharge due to delays in discharge documentation reaching us, which impacts continuity and quality of care in the community"* (Participant E).

This challenge matches findings from NSW Health (2022), where digital integration was used to improve communication between acute and community providers. A virtual ward could address this by involving GPs or community services in the care loop from before the point of discharge, ensuring information continuity.

This theme connects strongly to Research Objective one - Doccla's service development and Objective three - enhancing care practices. Integration of Care represents an intersection between the **Technical Factors quadrant (interoperability) and Organisational Factors quadrant (governance frameworks) in the conceptual framework (Figure 2.5)**, highlighting the socio-technical nature of healthcare integration. From the literature, integrated care is a central goal of virtual ward models. Lasserson and Cooksley (2023) described virtual wards as emerging from integrated case management approaches intended to reduce hospitalisations through coordinated care. Norman *et al.*, (2023) emphasise that virtual wards require integration strategies with primary care and community support services aligning with the participants' visions of cross-boundary care (Norman *et al*., 2023).

One advantage of integration mentioned by Participant D was reducing hospital-acquired infections while maintaining monitoring. This is supported by Shi *et al*., (2024), who found that HAH models can have comparable or better outcomes than traditional care (Shi *et al*., 2024).

Internationally, the New South Wales (NSW) Virtual Care Strategy in Australia offers a leading example of integrated care delivery. Their model connects acute hospitals with local health districts and general practice using shared digital platforms and multidisciplinary care teams (NSW Health, 2022). This approach has improved continuity of care post-discharge and reduced hospital bed demand, aligning closely with Participant E's concern about discharge documentation delays. Similarly, the NSW Agency for Clinical Innovation (2024) highlights their virtually enhanced community care programme as reducing unnecessary admissions through integrated virtual hospital services. Applying a similar structure in Ireland, as part of Doccla's model, would require interoperable systems, collaborative

governance, and joint care pathways to fully realise the integration potential participants identified (NSW, 2024).

Participants view Integration of Care as a key benefit of virtual wards, enhancing continuity between acute and community sectors. This aligns with literature promoting integrated, patient-centred care approaches (Lewis, 2010; Norman *et al*., 2023), though realising this benefit will require deliberate planning and open communication to align systems, workflows and multidisciplinary teams.

4.3.8 Implementation Strategy

Implementation Strategy was a recurring theme, mentioned by most participants 80% (n = 4) and accounting for 9% of total coded references (n = 6). It encompasses the plans, structures, and actions required to successfully deploy and sustain virtual wards. Participants raised elements of strategy particularly in relation to improvements, future planning, and governance structures.

A key suggestion was establishing formal governance structures. Participant D recommended:

> *"Having a steering group with experienced clinicians to help guide implementation"* (Participant D).

To provide leadership and multidisciplinary input. Participant A similarly suggested:

> *"VW patient advocate and steering group"* (Participant A).

To ensure the patient perspective is represented.

Learning from others was another strategic approach. Participants A and D both mentioned "twinning" with other hospitals implementing virtual wards. Participant D stated:

> "Learning from other institutions *would be valuable"* (Participant D).

Suggesting staff visits to reduce fear and resistance. This implies a strategy of building a community of practice among sites adopting virtual wards, with Doccla potentially facilitating knowledge transfer from NHS deployments to the Irish setting.

Phased implementation with evaluation was also recommended. Participant E noted the need for:

"Continuous evaluation" (Participant E).

And Participant D suggested extra support during early phases, implying a pilot approach with close monitoring and iterative improvements. This aligns with Doccla's evolution through pilots and expansion, as discussed in Chapter one.

Resource planning featured prominently also. Participant B also noted:

"Training and staff flexibility" (Participant B).

would be essential, reinforcing the need for adaptable workforce planning alongside infrastructure and funding considerations.

Participant E's call for:

"Governmental financing" (Participant E).

And Participant A's mention of:

"Support from national" (Participant A).

Reflects that a strategic plan must include a business case and funding model. Participant E advocated for HSE Board support, suggesting executive sponsorship can ensure prioritisation and funding.

This theme integrates all previous themes into an actionable roadmap (Objectives One and Two). Implementation Strategy encompasses elements from **all four quadrants of the conceptual framework (Figure 2.5)**, though primarily reflects the **Implementation Process Factors** quadrant through its emphasis on phased deployment and clinical champion engagement, core components of Rogers' (2003) Diffusion of Innovation theory. The literature emphasises that clear implementation frameworks are critical for innovations like virtual wards. NHS England's Virtual Ward Toolkit (2024) outlines similar steps to those suggested by participants, including stakeholder engagement, workforce planning, clinical governance, and evaluation metrics. Best *et al.*, (2012) highlight that successful large-system transformations require leadership engagement, stakeholder alignment, and iterative learning, principles echoed by Participant C's emphasis on consultant buy-in and organisational support. From the case study perspective, Doccla's approach includes regulatory approval, demonstrating value, and scaling internationally (Chipman, 2023). For Ireland, this means adapting their model to the local context through engagement with the HSE, pilot sites, and eventual national rollout.

In conclusion, Implementation Strategy ties together all previous themes into a coherent action plan. Participants recognise that a structured, well-supported approach is needed to address governance, resources, technology, and human factors methodically.

4.4 Limitations of Findings

While this analysis provides valuable insights into the implementation of virtual wards in Ireland, several limitations should also be acknowledged:

1. Although the sample captured diverse healthcare roles, each was represented by only a single participant, potentially not capturing the full spectrum of views within each profession.
2. Thematic saturation varied across the eight themes, with Integration of Care receiving notably fewer references with 6% (n=4) of total 68 coded references. This may reflect participants' varying engagement with integration challenges or indicate that these concerns become more prominent in later implementation stages.
3. These findings primarily capture anticipatory perspectives rather than extensive implementation experience, as virtual wards are still in early phases in Ireland. This timing means findings emphasise projected opportunities and challenges rather than lessons from sustained practical application.
4. Participants' perspectives were collected during a specific timeframe (March- April 2025) when certain technological limitations were prominent. The rapid advancement of solutions, such as passive monitoring technology, means some barriers identified may soon be addressed through innovation.
5. While patients were not interviewed directly, two participants shared patient feedback from virtual ward pilots. As such, insights into patient experience are indirect and based on healthcare professionals' interpretations.

Despite these limitations, the consistency of themes across diverse participants and alignment with literature suggests the findings provide a credible foundation for understanding virtual ward implementation in the Irish healthcare context.

4.5 Summary of Findings

Through thematic analysis of the interviews, this chapter has detailed healthcare professional's perceptions of virtual ward implementation. The findings demonstrate a rich understanding of both opportunities and challenges across the eight key themes:

- **Patient Experience and Access:** Participants expect virtual wards to benefit patients through improved comfort and care access, while cautioning that support is needed for less tech-savvy individuals. This addresses Research Objective three by highlighting enhanced patient-centred outcomes, aligning with literature reporting high satisfaction in HAH models (Lewis, 2010; CADTH, 2024).
- **Resource Allocation:** There is strong belief that virtual wards can relieve pressure on hospital resources and potentially reduce stays and fewer readmissions (Objective. three). These insights mirror health system goals to increase virtual capacity (HSE, 2024) and are supported by research evidence of reduced readmissions with virtual care (Shi *et al*., 2024).
- **Staffing and Training:** Participants unanimously emphasised the necessity of dedicated staff and comprehensive training programmes (Objective two). This aligns with implementation studies highlighting workforce readiness (Norman *et al*., 2023) and connects to Doccla's model of providing its own clinical support team (Objective. one).
- **Technology and Infrastructure:** All stakeholders highlighted the dual importance and challenge of technology (Objective two). Reliable connectivity, user-friendly devices, and system integration are seen as essential for patient safety and programme success. These concerns particularly reflect the Irish context with rural broadband variability.
- **Communication and Engagement:** Participants recommended stakeholder education, awareness campaigns, and champion involvement (Objective two), strategies supported by diffusion of innovation theory and NHS implementation experiences. This theme underscores that even perfect technology fails without staff acceptance and patient trust.
- **Clinical Governance:** Clear governance frameworks are essential to maintain quality and safety (Objective two). This finding connects to many other themes and aligns

with recommendations that virtual ward programmes define accountability frameworks (Norman *et al*., 2023).

- **Integration of Care:** Participants were optimistic that virtual wards will promote better coordination across hospital and community settings (Objective. three), aligning with the core mission of virtual wards identified in literature (Lewis, 2010; Lasserson & Cooksley, 2023).
- **Implementation Strategy:** Participants outlined a roadmap including steering groups, phased rollouts with evaluation, cross-site learning, and securing high-level support (Objectives one & two). Mirroring established change management principles (Kotter, 1996; NHS England, 2024).

Overall, these findings are highly consistent with existing literature while adding depth specific to the Irish context. The triangulation between participant perspectives, published evidence, and Doccla's model suggests that the identified themes are robust and relevant.

4.5.1 Connection to Conceptual Framework

When examined through the lens of the conceptual framework presented in Chapter two, these findings validate the multi-dimensional approach to virtual ward implementation. Technical factors alone are insufficient for successful implementation, organisational readiness, individual acceptance, and structured implementation processes must be addressed simultaneously. The findings emphasise Rogers' (2003) concepts of trialability and observability through recommendations for phased implementation and cross-site learning. Similarly, they highlight the domains of adopter system and value proposition as outlined in the NASSS framework developed by Greenhalgh *et al.*, (2017), through the emphasis on clinician engagement and patient-centred benefits. This theoretical alignment suggests that successful implementation requires a holistic approach addressing all four quadrants of the conceptual framework. The insights set the stage for Chapter five, highlighting critical success factors and potential pitfalls for virtual ward implementation.

In conclusion, while virtual wards are viewed very positively for their potential patient benefits and system efficiencies, realising their potential requires addressing implementation challenges across these eight thematic areas. Chapter five will build on these insights to

provide specific recommendations, considering practical applications and implications for policy, practice and future research.

Chapter 5: Conclusion and Recommendations

5.1 Introduction

This chapter presents the conclusion and recommendations from this investigation into virtual ward implementation in Ireland. Drawing on insights from five healthcare professionals across diverse roles, it consolidates perspectives on both Doccla's implementation approach and the HSE's adoption considerations for virtual wards. The findings are explicitly linked to both primary research (interview data), secondary research (literature review) and relevant theoretical frameworks. The aim is to ensure a comprehensive understanding of implementation factors and best practices in the field. This is followed by introducing seven evidence-based recommendations and suggestions for future research. To conclude, the overall journey is described in a personal reflection.

5.2 Key Findings

The key findings are organised into two main categories. Firstly, five findings related to Doccla's implementation approach which are based on secondary research and supported by interview data. Secondly, five findings related to HSE adoption considerations which are based primarily on primary interview data and contextualised with secondary research. Each finding is connected to relevant theoretical frameworks to provide deeper insight.

5.2.1 Doccla Implementation Findings

1. Patient-Centred Technology Design - This research has found that Doccla's approach prioritises user-friendly technology, enhancing patient experience while maintaining clinical safety. This directly addresses Objective ones's focus on analysing Doccla's service development. Also aligning with the NASSS Framework, which emphasises simplicity as a key determinant of successful technology adoption. Designing with the user's actual capabilities in mind, (rather than assumed digital proficiency) particularly benefits digitally vulnerable populations (Greenhalgh *et al.*, 2017).

Doccla offers both pre-configured devices and a bring-your-own-device (BYOD) option via its downloadable patient app (Doccla, 2024). This dual approach enables options according to patient preferences and digital literacy levels. While NHS England (2024) recommends "ready-to-use" equipment for less digitally confident patients, BYOD may increase

engagement among proficient individuals by leveraging familiar devices. This flexibility potentially contributes to the high compliance rates observed in practice (Doccla, 2024).

Wani *et al.*, (2020) caution that personal devices often lack the robust security infrastructure of hospital issued equipment. This increases data breach risks and complicating cybersecurity enforcement. This tension between accessibility, flexibility, and standardisation represents a key implementation challenge, one that Doccla addresses through its hybrid deployment model. Balancing patient choice with clinical governance and information security.

2. Comprehensive Clinical Support Model - Notably, Doccla integrates clinical staff alongside technology to deliver a complete care model. Illustrating a key component of their implementation methodology (Objective Two). This reflects socio-technical systems theory, which suggests that healthcare innovation success depends on aligning technology with human processes (Berg, 1999). The NHS Operational Framework reinforces this approach by mandating multidisciplinary teams for virtual ward oversight (NHS England, 2024). However, Norman *et al*., (2023) caution that outsourced monitoring can blur responsibility boundaries if local clinicians feel excluded. This tension between centralised efficiency and local accountability represents an implementation challenge that Doccla addresses through its integrated staffing approach. This confirms the company's recognition that technology alone is insufficient (Doccla, 2024).

3. Phased Implementation Strategy - Significantly, Doccla employs a methodical, staged approach to implementation that builds on lessons learned from each deployment. Examining a core element of their implementation methodology (Objective Two). This strategy demonstrates Rogers' Diffusion of Innovation theory (Rogers, 2003), particularly through the concepts of trialability and observability. By starting with pilots, healthcare organisations can test the innovation on a limited scale and observe results before wider implementation. NHS guidance supports this approach, indicating that early experiences with phased expansion improved staff confidence (NHS England, 2024). McGowan *et al*., (2024) provide an important counterpoint, warning that prolonged pilots can stall momentum and delay benefits. This finding reveals an implementation tension between caution and scale that suggests short, time-bounded pilots with predefined success metrics represent an effective compromise (McGowan *et al.*, 2024).

4. Integration with Existing Systems - Furthermore, Doccla addresses interoperability challenges by designing its platform to feed data directly into hospital management systems

including electronic health records (EHR) (Doccla, 2024). Illustrating a key aspect of their technical infrastructure (Objective Two). This approach exemplifies Berg's (1999) socio-technical systems theory, which emphasises that healthcare technologies and clinical workflows must evolve together for successful implementation. It also aligns with Bahga and Madisetti's (2013) Healthcare Information Systems Integration framework. Which emphasises that successful health data exchange requires both technical compliance standards and workflow compatibility. Seamless integration was critical to Ireland's virtual mental health ward success (Kirwan, Creedon and Donohue, 2024) and is listed as a priority in the HSE National EHR Programme (HSE, 2024). However, the analysis by Greenhalgh *et al.*, (2010) offers an important counterargument, demonstrating that technical integration alone is insufficient when workflows are not redesigned in parallel. This tension between technical connectivity and practical workflow adaptation highlights, that successful implementation requires attention to both dimensions. The systematic review by Stead *et al.*, (2011) on best practices in health information technology integration confirms that organisations achieving the highest integration success rates, combine technical interoperability with comprehensive workflow redesign. The findings indicate that interoperability must be accompanied by parallel workflow redesign to achieve optimal outcomes.

5. Governance and Safety Protocols - Finally, Doccla has established robust governance structures through CQC registration and implemented clinical risk management standards (DCB 0129/0160) (Doccla, 2024). Demonstrating an essential component of their implementation approach (Objective Two). This governance approach reflects the NASSS Framework developed by Greenhalgh *et al.*, (2017), particularly its emphasis on regulatory and governance domains as crucial determinants of implementation success. It also aligns with Renn's (2008) Risk Governance theory, which emphasises the importance of formal procedures when introducing complex technologies into sensitive environments. These standards are mandatory for all English virtual ward suppliers (NHS Digital, 2023). However, Lasserson and Cooksley (2023) caution that the current evidence on the outcomes of virtual wards is still limited. This creates a clear tension between the need for strong governance frameworks and the ongoing development of the evidence base. Williams *et al.*, (2020) recommend an adaptive governance approach, which balances maintaining core safety protocols with the ability to update practices as new evidence becomes available.

5.2.2 HSE Adoption Findings

The following five HSE adoption findings directly address Research Objective Three: evaluating the potential impact of virtual wards on acute hospital care delivery from healthcare stakeholders' perspectives.

1. Digital Literacy and Access Barriers - This research has identified that digital literacy gaps and connectivity issues hinder equitable access to virtual wards in Ireland, particularly affecting older patients and rural residents. This finding aligns with the Individual Factors quadrant of the conceptual framework (Figure 2.5), particularly Davis's (1989) Technology Acceptance Model which highlights that perceived ease of use significantly influences technology adoption. It also aligns with van Dijk's (2020) Digital Divide framework, which identifies four sequential barriers: motivational, physical access, skills, and usage. The NHS addresses similar challenges through device loans and carer training (NHS England, 2024). While digital exclusion appears significant, the meta-analysis by Shi *et al.*, (2024) offers a contrasting perspective, showing that older age groups, can achieve high adherence with minimal coaching. This creates tension between theoretical digital divide concerns and practical intervention possibilities. The evidence indicates that while digital barriers exist, strategic interventions including device provision and targeted coaching can substantially mitigate exclusion risks.

2. Resource and Capacity Constraints - The Irish healthcare system faces significant resource constraints that virtual wards could potentially address. Practical evidence confirms the severity of these constraints, with INMO (2024) documenting record trolley numbers. NHS England's (2024) data suggests that virtual wards can effectively address similar challenges, releasing the equivalent of 7,000 beds daily. This finding reflects the Organisational Factors quadrant of the conceptual framework (Figure 2.5), which is identified as a critical domain in the NASSS Framework developed by Greenhalgh *et al.*, (2017), influencing technology adoption and sustainability. Also, Resource Dependence Theory, which explains how organisations innovate to manage environmental pressures (Pfeffer and Salancik, 1978). However, Lasserson and Cooksley (2023) warn that while hospitals may save money, extra pressure and costs could shift to community services if budgets aren't carefully managed. This shows there's a potential conflict between focusing solely on hospital savings and looking at the bigger picture across the whole health system.

3. Clinical Workforce Readiness - Additionally, workforce preparedness emerged as a major implementation challenge. Davis's (1989) Technology Acceptance Model proposes that adoption depends on perceived usefulness and ease of use, which are factors directly influenced by training quality. NHS England (2024) guidelines reflect this understanding, requiring structured training for all roles before implementation. In contrast Ash, Berg and Coiera (2004) demonstrate how poorly implemented systems can result in unintended consequences beyond technical errors. This includes disruptions to established clinical workflows, communication patterns and professional relationships. The finding demonstrates Berg's (1999) socio-technical systems theory, by highlighting the interdependence between technical systems and social/clinical processes in healthcare implementation. Additionally, Sittig and Singh's (2015) socio-technical model for health IT implementation provides a comprehensive framework for understanding these interactions, emphasising that training must address both technical competency and workflow integration. Revealing discrepancies, between technology focused and human centred perspectives on implementation. The systematic review by Bates *et al.*, (2018) on digital health training best practices confirms that programmes addressing both technical skills and workflow adaptation yield significantly higher adoption rates than technical training alone. The evidence suggests that comprehensive, role-specific training combined with ongoing support, represents the most effective approach to workforce preparation.

4. Clinician Engagement and Leadership Support - Furthermore, consultant endorsement emerged as a critical determinant of virtual ward referrals. Rogers' (2003) diffusion theory specifically identifies opinion leaders as crucial for clinical adoption a position directly supported by this research. While Stewart, Manges and Ward's (2015) work on patient safety initiatives (not specifically virtual wards) offers complementary insights on combining top-down and bottom-up approaches, the findings presented by Kirwan *et al.*, (2024) provide an important qualification, showing that sceptical consultants can block referrals despite management enthusiasm. This creates a dilemma between hierarchical authority and clinical autonomy. The evidence implies that effective engagement hinges on combining visible executive level backing, along with open communication among consultants and multi-disciplinary teams.

5. Governance Framework Requirements - Finally, this research identified that clear processes for safety and accountability are needed before virtual wards can be rolled out on a large scale. This finding relates directly to the Organisational Factors quadrant of the

conceptual framework (Figure 2.5), reflecting the emphasis within the NASSS Framework developed by Greenhalgh *et al.*, (2017), on governance and regulatory considerations as critical implementation determinants. Scally and Donaldson's (1998) clinical governance model stresses the importance of strong leadership, clear responsibilities and ongoing quality checks to keep patients safe. NHS Digital (2024) offers clinical risk standards to help apply these ideas in digital health settings. However, Lasserson and Cooksley (2023) highlight a problem, many virtual ward evaluations do not include patient safety data, which makes it more difficult to judge how safe these services really are. This mismatch between the goals of good governance and the lack of safety evidence reflects wider challenges in managing new digital healthcare systems. The data suggest that using recognised safety standards and tracking patient safety from the start, would help build trust and confidence in virtual wards.

5.2.3 Summary of findings

When viewed through the lens of the conceptual framework presented in Chapter 2 (Figure 2.5), these findings validate the multi-dimensional nature of virtual ward implementation. The Doccla implementation findings primarily address technical factors (integration with existing systems) and implementation process factors (phased implementation strategy), while also considering individual factors (patient-centred technology design). The HSE adoption findings highlight organisational factors (resource constraints, governance frameworks) and individual factors (digital literacy, clinical workforce readiness). Together, these findings demonstrate that successful implementation requires attention to all four quadrants of the conceptual framework simultaneously, supporting the socio-technical perspective, that healthcare technology implementation involves complex interactions between technical systems and social contexts (Berg, 1999). The findings also validate the conceptual framework's synthesis of multiple theoretical perspectives, showing how different theories illuminate complementary aspects of the implementation process. This integrated understanding forms the foundation for the recommendations that follow.

5.3 Recommendations

Based on these findings and their theoretical underpinnings, the following evidence-based recommendations are proposed:

1. **Implement Passive Monitoring Technologies**

   The HSE Digital Health team should consider utilising Doccla's passive monitoring tools to address the digital literacy barriers identified in HSE Finding one (1) (Doccla, 2025). As noted by Participant C, many older patients *"have not been able to transfer to the virtual ward"* due to technology challenges. This addresses the Individual Factors quadrant of the conceptual framework (Figure 2.5), particularly Davis's (1989) Technology Acceptance Model by enhancing perceived ease of use through simplified monitoring approaches. This recommendation also aligns with User-Centred Design principles, which advocate for designing interactive systems that reduce mental load and accommodate users with limited digital skills (Chammas *et al.*, 2015). It also addresses Digital Divide theory (van Dijk, 2020) by lowering skills barriers to participation.

2. **Develop a National Digital Infrastructure Plan**

   The Department of Health, with the HSE eHealth Division, should develop a national connectivity strategy to address the *"Connectivity black spots",* identified by Participant A in HSE Finding one (1). This recommendation targets the Technical Factors quadrant of the conceptual framework (Figure 2.5), addressing core infrastructure elements that Berg's (1999) socio-technical systems theory, identifies as necessary technical foundations for social acceptance. Equally addressing the infrastructure dimension of Digital Divide theory and applies Resource Dependence Theory (Pfeffer and Salancik, 1978) by ensuring equitable access to the resources needed for virtual ward participation.

3. **Establish a Clinical Governance Framework**

   The HSE Clinical Governance Department should develop standardised protocols for virtual wards, addressing HSE Finding five (5). This framework should include escalation pathways and triage protocols similar to the *"existing hospital early warning systems"* referenced by Participant D. Lasserson and Cooksley (2023) emphasise that ensuring patient safety outside the hospital setting requires robust triage and escalation protocols. Their analysis of NHS virtual ward implementation highlights that governance frameworks must be established prior to scaling. This recommendation addresses the Organisational Factors quadrant of the conceptual framework (Figure 2.5), reflecting the emphasis on governance within the NASSS

Framework developed by Greenhalgh *et al.*, (2017) as a key domain for sustainable implementation. It also applies Clinical Governance theory (Scally and Donaldson, 1998) and Risk Governance theory (Renn, 2008) by establishing systematic approaches to quality assurance and risk management.

4. **Create a Dedicated Implementation Team Structure**

   HSE hospital management should establish dedicated clinical and technical teams, for virtual ward implementation. This will address the workforce readiness issues identified in HSE Finding three (3). This recommendation applies Socio-Technical Systems Theory (Berg, 1999), by acknowledging that successful implementation requires integration of both technical and social elements. These teams should take responsibility for planning rollout, setting up systems, training staff, managing patient triage processes and ensuring continuous improvement through regular feedback and monitoring. Including a robust communications strategy to lead awareness and education efforts across the hospital. Ensuring all staff understand what virtual wards are, how they work, and what roles different professionals play. By clearly communicating the benefits and boundaries of virtual care, this could reduce uncertainty and address the *"fear factor"* expressed by Participant D. This structure reflects NHS England's operational guidance, which highlights the importance of multidisciplinary implementation teams in supporting virtual ward setup, change management, delivery, and ongoing training (NHS England, 2024).

5. **Develop a Clinician Engagement Strategy**

   The HSE, with individual hospitals, should create a structured approach to encourage consultant buy-in, addressing HSE Finding four (4). This strategy should include Participant D's suggestion to send *"staff to go and see how these are implemented elsewhere"* and educational initiatives showcasing patient outcomes from the current pilot. According to Stewart, Manges, and Ward, (2015) a confident, top-down approach will foster bottom-up trust and enables continuous learning during rollout (Stewart, Manges, and Ward, 2015). This recommendation directly applies Rogers' Diffusion of Innovation theory (Rogers', 2003) by leveraging the influence of opinion leaders and creating opportunities for observability of the innovation's benefits. While some clinicians may remain hesitant or sceptical, the opportunity to observe peer-led implementations can help address uncertainty and foster open dialogue, which is a

key step in overcoming resistance to change, as noted in behavioural adoption literature (Greenhalgh *et al*., 2004).

6. **Support a national rollout and expansion of virtual wards across multiple care pathways**

   The HSE's Acute Operations division should develop a national strategy to scale virtual wards across all hospital groups and community settings. This aligns with NHS England's (2024) approach, which successfully expanded from COVID-19 pilots to comprehensive national implementation, achieving significant bed capacity savings. As McGowan *et al*., (2024) demonstrate, successful scaling requires coordinated national standards, while allowing for local adaptation to specific clinical contexts. This recommendation addresses HSE Finding two regarding resource constraints, with the systematic review by Shi *et al.*, (2024) confirming that virtual wards can reduce length of stay across multiple clinical pathways. The strategy should extend beyond acute discharge to include Chronic Disease Management, Maternity services, and post-operative recovery, reflecting the principle within the NASSS framework developed by Greenhalgh *et al.*, (2017) that innovations addressing multiple system needs, achieve greater sustainability.

7. **Leverage Doccla's Clinical Support to Enhance Staff Buy-In**

   Hospital leadership teams should consider actively promoting Doccla's clinical support model to address clinician concerns identified in HSE Finding four (4). This recommendation integrates elements from multiple quadrants of the conceptual framework (Figure 2.5), particularly addressing Davis's (1989) Technology Acceptance Model by enhancing perceived usefulness through workload benefits. Greenhalgh *et al.*, (2017) emphasise that adoption is enhanced when innovations reduce rather than increase workload for frontline staff. This principle is supported by Thomas *et al.*, (2022), who found that healthcare professionals are more receptive to digital health solutions when they perceive clear workload benefits rather than additional responsibilities. By positioning Doccla's clinical team as partners in patient monitoring rather than adding to existing duties, this approach directly addresses Participant C's observation about clinician scepticism and Participant D's concern that monitoring *"needs to be staff-specific"* (Participant D). Norman *et al.*, (2023) identified clinical factors such as workflow changes and staff buy-in as critical

barriers to virtual ward implementation, highlighting that attention to team composition and clinical support is essential for successful adoption. Their review emphasises that organisational factors including adequate resources and training are key to virtual ward success. All supporting this recommendation's potential effectiveness in the Irish context.

5.4 Future Research

To build on this research, the next step would be to include the voices of patients and caregivers. This would provide crucial insights into how virtual wards are experienced by those receiving care. Additionally, as technologies like passive monitoring continue to evolve rapidly, further research is warranted to examine how such innovations reshape implementation priorities, including staff roles, digital equity, user experience and accessibility. The financial implications of virtual ward implementation also merit exploration. While costs were outside the scope of this study, future research could assess setup and ongoing operational expenses in comparison to traditional hospital-based care delivery.

Another valuable area for investigation would be the broader system wide effects of virtual ward implementation. A longitudinal study could track patient flow metrics before and after rollout, examining not only discharge efficiency and readmission rates but also practical downstream impacts, such as reduced pressure on emergency services, including ambulance demand and A&E departments, outpatient clinics, shorter waiting room times, staff morale or even decreased hospital car park congestion. Capturing these operational knock-on effects would provide a more holistic understanding of how implementing virtual care models influence the wider healthcare ecosystem.

5.5 Personal Reflection

This research journey has been far from linear and in many ways, that unpredictability became one of the most valuable aspects of the process. The original aim was to evaluate virtual ward implementation at University Hospital Limerick (UHL), including direct engagement with the HSE. Despite multiple attempts, participation was not secured, prompting a pivot toward examining Doccla's model solely.

An initial contact was established and a positive meeting with a Doccla representative was carried out. The plan was to interview their internal teams but unfortunately those arrangements also fell through. At times, the process looked bleak and it was disheartening to see well-laid plans fall apart.

However, with persistence and the continued support and encouragement of my supervisor, we adapted again. Refocusing the study on frontline healthcare stakeholder perspectives, while still anchoring it in the Doccla case study, which turned out to be the best outcome. It enabled the capture of a wider set of voices and generate findings that are nationally relevant. This journey has taught me the value of academic resilience, flexibility and trusting the process.

The experience has deepened my passion for digital healthcare and the enormous potential it has to transform how traditional healthcare is delivered. It has also left me with a stronger, more grounded understanding of how to carry out meaningful, real world research.

Completing this project has been one of the most demanding yet rewarding challenges of my academic journey. It has deepened my resilience, confidence, and perseverance and above all, it has reinforced my dedication to hopefully contribute in a small but meaningful way to healthcare innovation. To improve the experience for patients, their families and staff during acute hospital care delivery.

This closing chapter consolidates the key learnings from the study and offers a grounded roadmap for advancing virtual care in Ireland, all of which is possible through strategic collaboration, investment, and inclusive design to eventually make this potentially game changing technology the new normal in Irish healthcare.

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APPENDICES

Appendix 1: Ethical Consent Form

Ethics Application
and Declaration Form

Appendix 2: Participant Information Letter and Informed Consent Form

Participant Information Letter

TITLE OF THE STUDY: Implementing Virtual Wards: A Case Study of Doccla's Acute Hospital Care Transformation.

Virtual Wards Research Study

Dear Participant,

Introduction My name is John Mullaney, and I am a Master's student at Griffith College Dublin, currently pursuing an MSc in Digital Transformation (Life Sciences). I am conducting research for my dissertation titled "Implementing Virtual Wards: A Case Study of Doccla's Acute Hospital Care Transformation."

Thank you for considering participating in this research on the implementation of virtual wards in healthcare settings. Virtual wards allow suitable patients to receive hospital-level care at home, enabled through 24/7 remote monitoring technology, potentially easing the burden on hospital beds while maintaining high quality care.

WHAT THIS STUDY IS ABOUT This research aims to document Doccla's journey in transforming acute healthcare delivery through their virtual ward implementation. The study will explore Doccla's development journey, implementation approach, and potential impact on Irish healthcare delivery. Your insights will help us understand the practical aspects of virtual ward models and the challenges healthcare professionals face in adopting them.

WHAT WOULD TAKING PART INVOLVE? Participation involves either:

1. **Interview Option**: A 30-minute interview via Zoom, phone, or in person. With your permission, the interview will be recorded to ensure accurate capture of your insights. Only the audio will be used for transcription and analysis, and you will have the opportunity to review your transcript before it is included in the research.
2. **Self-Completion Option**: Complete both the Informed Consent Form and the Questions Form (links provided below).

WHY HAVE YOU BEEN INVITED TO TAKE PART? Your expertise and professional role make your insights particularly valuable for understanding successful virtual ward implementation.

DO YOU HAVE TO TAKE PART? Your participation is entirely voluntary. You may decline to participate, refuse to answer any questions, or withdraw from the study at any time

without explanation. If you wish to withdraw, please contact me at john.mullaney@student.griffith.ie.

WHAT ARE THE POSSIBLE BENEFITS OF TAKING PART? This research provides an opportunity to document innovative approaches to healthcare transformation. Your insights will contribute to the academic understanding of successful virtual ward implementation, potentially benefiting future healthcare innovation.

ANONYMITY AND CONFIDENTIALITY Your participation will be treated with the utmost confidentiality. You will only be identified as "Participant A," "Participant B," etc. in the research. All information shared will be treated confidentially, and your identity will not be disclosed in any research outputs. All company information will be handled sensitively, with particular attention to commercial considerations.

HOW WILL INFORMATION BE STORED AND PROTECTED? All data will be stored securely on my password-protected personal laptop. Interview recordings will be transcribed within two weeks and deleted following verification. The anonymised transcripts will be retained for two years after study completion. You will have the opportunity to review your transcript before it is included in the research.

WHAT WILL HAPPEN TO THE RESULTS OF THE STUDY? The primary output will be my Master's dissertation for Griffith College. The research focuses on documenting successful implementation strategies and will be handled with full consideration of commercial sensitivity.

NEXT STEPS If you are willing to participate, please either:

1. Complete the self-completion option using the links below, or
2. Reply to this email indicating your preferred participation method, and I will make the necessary arrangements.

I appreciate your consideration and would be grateful for your contribution to this research. If you have any questions, please do not hesitate to contact me.

WHO SHOULD YOU CONTACT FOR FURTHER INFORMATION? Researcher: John Mullaney MSc Digital Transformation (Life Sciences) Griffith College Dublin john.mullaney@student.griffith.ie Phone: 086-1284606

Supervisor: Dr Joanne Malone Griffith College Dublin joanne.malone@griffith.ie

Thank you for your time and consideration

Griffith College Informed Consent Form

Griffith College Informed Consent Form

Consent to take part in research

Implementing Virtual Wards: A Case Study of Doccla's Acute Hospital Care Transformation

The researcher retains one copy signed by both them and the participant. The participant should also receive a copy of consent form as a record of what they have signed up to.

- I voluntarily agree to participate in this research study.
- I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind.
- I understand that I can withdraw permission to use data from my interview within two weeks after the interview, in which case the material will be deleted.
- I have had the purpose and nature of the study explained to me in writing and I have had the opportunity to ask questions about the study
- I understand that participation involves either completing a self-administered interview form (approximately 15-20 minutes) OR participating in a live interview (approximately 15-20 minutes) according to my preference.
- For the purposes of this consent form, 'interview' refers to either a live conversation or your written responses to the interview questions provided in the form.
- If I choose the live interview option, I understand it may be audio recorded with my permission for transcription purposes.
- I understand that I will not benefit directly from participating in this research
- I understand that all information I provide for this study will be treated confidentially
- I understand that in any report on the results of this research my identity will remain anonymous. This will be done by changing my name and disguising any details of my interview which may reveal my identity or the identity of people I speak about.
- I will have the opportunity to review my transcript before it is included in the research.

- I understand that disguised extracts from my interview may be quoted in my Master's dissertation which will be accessible through Griffith College library.
- I understand that if I inform the researcher that myself or someone else is at risk of harm, they may have to report this to the relevant authorities - they will discuss this with me first but may be required to report with or without my permission
- I understand that signed consent forms and original recordings will be stored securely on a password-protected personal laptop accessible only by the researcher until the examination board confirms the results of the dissertation.
- I understand that a transcript of my interview in which all identifying information has been removed will be retained for two years from the date of the exam board.
- I understand that under freedom of information legalisation I am entitled to access the information I have provided at any time while it is in storage as specified above.
- I understand that I am free to contact any of the people involved in the research to seek further clarification and information.

Researcher Details

Name : John Mullaney

Degree Programme: MSc Digital Transformation (Life Sciences)

College Details: Griffith College Dublin

Contact number: 086-1284606

Contact mail: john.mullaney@student.griffith.ie

Signature of participant

[Full Name – Printed]

Signature of research participant

---------- Date----------

Signature of researcher

I believe the participant is giving informed consent to participate in this study

John Mullaney

---------- Date----------

Appendix 3: Interview Questions

INTERVIEW QUESTIONS

1. What problems do you currently face in your healthcare setting that might be helped by implementing virtual wards?

2. Based on what you know about virtual wards, what do you see as the main opportunities and challenges for implementing this system in your work setting?

3. What support and resources would be essential for implementing virtual wards effectively in your setting?

4. How do you think your patients would cope with virtual ward care?

5. Are there any other benefits, challenges, or considerations about virtual wards that we haven't discussed yet that you believe are important?

Appendix 4: Participant Transcript

View results

Anonymous

15:40 Time to complete

Q 1. What problems do you currently face in your healthcare setting that might be helped by implementing virtual wards?

Governance, staffing, upskilling & engagement challenges to the introduction of eHealth applications & workflows.

Q 2. Based on what you know about virtual wards, what do you see as the main opportunities and challenges for implementing this system in your work setting?

Opportunities: integrated care where both Acutes & Communities (staff & resources) work both tech & clinical supported pathways to deliver VW patient care (during their episode of care) & also in follow-up OP clinics. Reduce readmissions & IPC. Challenges: Geographical area of Midwest - connectivity black-spots. Trust & engagement of specialities as pathways evolve. Comms & understanding of support for pathways, including escalations with e.g. NAS & other Community services.

Q 3. What support and resources would be essential for implementing virtual wards effectively in your setting?

Local Application, Network & Infrastructure teams for initial setup. Support from National in regards to security & integration.

Q 4. How do you think your patients would cope with virtual ward care?

N/A based on my role. From clinical feedback patient satisfaction high & would use VW again & recommend to family & friends.

Q 5. Are there any other benefits, challenges, or considerations about virtual wards that we haven't discussed yet that you believe are important?

Considerations: VW patient advocate, steering group & twining Hospitals (for support & lessons learned) as other Hospitals nationally role out the programme. Concentration on comms (incl. media & locally in hospitals e.g. pop-up stands, on current screens in waiting areas & reception) for Community info. & highlight awareness - re different care scenarios (Oncology, Pre-Op & Post-Op).

Appendix 5: Excel Coding Workbook

14th April Excel
PowerBI used Intervie

Appendix 6: Power BI Visualisations

14th April PowerBI visualisations for chap