Evolving prescribing practice through personalisation, the judicious use of decision aids, and clinical reasoning.

A submission in partial fulfilment of the requirements of the University of Derby for the award of the degree of Doctor of Philosophy by Published Works.

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Preface

This critical appraisal is original work by the author and contains co-authored and independent works by the author, Jill Gould. Please see **Appendix 1** for a detailed list.

Table 1. List of included published works

1.	Gould, J. and Day, P. (2012). Hearing you loud and clear: student perspectives of audio feedback in higher education, *Assessment & Evaluation in Higher Education*, DOI:10.1080/02602938.2012.660131 https://www.tandfonline.com/doi/abs/10.1080/02602938.2012.660131
2.	Brown, I. and Gould, J. (2013). Qualitative studies of obesity: A review of methodology. *Health*, 5, 69-80. doi: 10.4236/health.2013.58A3010 https://www.scirp.org/journal/paperinformation.aspx?paperid=36211
3.	Day, P., Gould, J., and Hazelby, G. (2020). A public health approach to social isolation in the elderly. *Journal of Community Nursing*, 34(3), 54–59. https://www.jcn.co.uk/journals/issue/06-2020/article/a-public-health-approach-to-social-isolation-in-the-elderly
4.	Gould, J. and Bain, H. (2022a). *Principles and practice of Nurse prescribing- Transforming Nursing Practice Series* Publisher: SAGE Publications Ltd ISBN: 9781526469908 https://uk.sagepub.com/en-gb/eur/principles-and-practice-of-nurse-prescribing/book265193
5.	Gould, J., and Bain, H. (2022b). The professional, legal and ethical dimensions of prescribing. Part 1: professional. *Primary Health Care*. doi: 10.7748/phc.2022.e1773 https://journals.rcni.com/primary-health-care/evidence-and-practice/professional-legal-and-ethical-dimensions-of-prescribing-part-1-professional-phc.2022.e1773/abs
6.	Gould, J., and Bain, H. (2022c). The professional, legal and ethical dimensions of prescribing. Part 2: legal and ethical. *Primary Health Care*. doi:

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	10.7748/phc.2022.e1774 https://journals.rcni.com/primary-health-care/evidence-and-practice/professional-legal-and-ethical-dimensions-of-prescribing-part-2-legal-and-ethical-phc.2022.e1774/abs
7.	Gould, J. and Bain, H. (2022d). Assessment framework for prescribing: lower limb skin tears August 2022 *Journal of Community Nursing 36(4):42-49* https://www.jcn.co.uk/journals/issue/08-2022/article/assessment-framework-for-prescribing-lower-limb-skin-tears Gould, J. and Bain, H. (2023) Applying a prescribing model to a skin-tear injury *Journal of General Practice Nursing, September 2023, pp.53-59.* https://www.journalofpracticenursing.co.uk/journals/issue/09-2023/article/applying-a-prescribing-consultation-model-to-a-skin-tear-injury
	Not yet Published – excerpts in Appendix 4 Gould, J. and Day, P. (2024 tbc) Sound and vision: a contextual exploration of audio-visual feedback in post-COVID-19 higher education, The Journal of Learning Development in Higher Education* (JLDHE) (Publication date TBC) *This article is not being submitted in the critical appraisal, but some parts of it have been included in the Appendix and referred to in the text.*

*Please note: first person narrative is used in the **Abstract** and **Chapter 1** (Background and Context) to set the scene of the critical appraisal, primarily by referring to **my** published works or research philosophy. The remainder of the critical appraisal uses the academic convention of third person, or depersonalisation.*

Abstract

Background

Prescribing practice by nurses, pharmacists, and allied health professionals has progressed significantly over the past four decades and is expanding at an accelerated rate. My research questions, educational approaches, and written works stem from an ambition to promote best clinical and educational practice for prescribing decision-making. Published works related to the topics of education, research, and prescribing have been appraised.

Aims & Objectives

The overarching aim of this critical appraisal was to examine my unique body of research and peer-reviewed published works spanning 20 years and evaluate the impact on education for enhancing prescribers' decision-making skills.

The underpinning question throughout these works and the appraisal is:

***What contributes to the evolvement of prescribers' clinical decision-making*?**

The objectives are:

1. To critically appraise varied methods of research and knowledge transfer to constructively impact the practice of future prescribers.
2. To evaluate how reflexivity, critical thinking, and self-awareness affect practice and examine educational techniques to stimulate these.
3. To analyse key influences on personalised decision-making, identifying strategies to optimise its inclusion in prescribing practice.
4. To examine how published works including mnemonics and models can contribute to prescribing practice, analyse limitations, and recommend ways to address these.

Methods

Peer-reviewed published works from 2012 to 2024 are examined to question their influence on prescribing practice and draw conclusions as to how contributions to education and research can be optimised in the future. Review questions centre around knowledge acquisition for prescribing in implementing best practice and effective, person-centred decision-making. The appraised research covers distinct methodologies including primary qualitative, quantitative, as well as secondary integrative review. As such, it spans several approaches, frameworks or paradigms including positivist, critical realism, contextualism, and pragmatism. The primary research generated new knowledge around educative feedback methods while secondary research and resulting publications widely disseminated new information of pertinence to clinical practice, such as a novel clinical decision-making model for prescribing. Ethics approval was previously attained for the primary studies, while for the purpose of this appraisal, ethics was approved for a qualitative survey evaluation of the prescribing consultation model. A diverse set of publications including the decision-making model for prescribing, are appraised in relation to their influence on practice. Consideration is given to my learning journey as a researcher and educator and the themes are gathered to produce a revised model for prescribing practice and other educational resources for future dissemination.

Findings

Principal findings of my primary research (Gould and Day, 2012) demonstrate a link between academic feedback methods and students' self-reported confidence. Secondary research, particularly into research methods for obesity studies (Brown and Gould, 2013) highlight the importance of researcher reflexivity, as a transferrable principle to education and clinical practice. Other research such as a prescribing textbook (Gould and Bain, 2022a) and its subsequent articles (Gould and Bain, 2022b, 2022c, 2022d, and 2023) inform strategies for clinical decision making in prescribing practice. Findings note the use of decision aids to be useful in guiding earlier stages of practice for novice prescribers as they expand their clinical reasoning skills required for safe and effective prescribing. Evaluation of a prescribing consultation model highlights a need to be more direct in advocating for person-centred decision-making and prompted changes to the original model.

Impact

Evidence of impact on clinical education comprises the wide dissemination of published works which also prompted speaking engagements within the United Kingdom and internationally. The uptake of the research publications and textbook demonstrates potential for advancing health professionals' knowledge of clinical decision-making for prescribing by informing and influencing education and practice. Recommendations include partnering for endorsement of the revised prescribing model to further influence the practice of personalised clinical decision-making.

Please Note:
Prescribers within this critical appraisal are mainly referred to as prescribers or "Non-Medical Prescribers" (NMPs), otherwise known as:
"Independent Prescribers" by the General Pharmaceutical Council (GPhC) or "Independent and Supplementary Prescribers" by the Nursing and Midwifery Council (NMC) and Health and Care Professions Council (HCPC).

Other prescribers include medical doctors (General Medical Council) or Community Practitioner Nurse Prescribers (NMC) who are identified separately within this document.

A Glossary can be found in **Appendix 2** with definitions of types of prescribers in **Appendix 3**

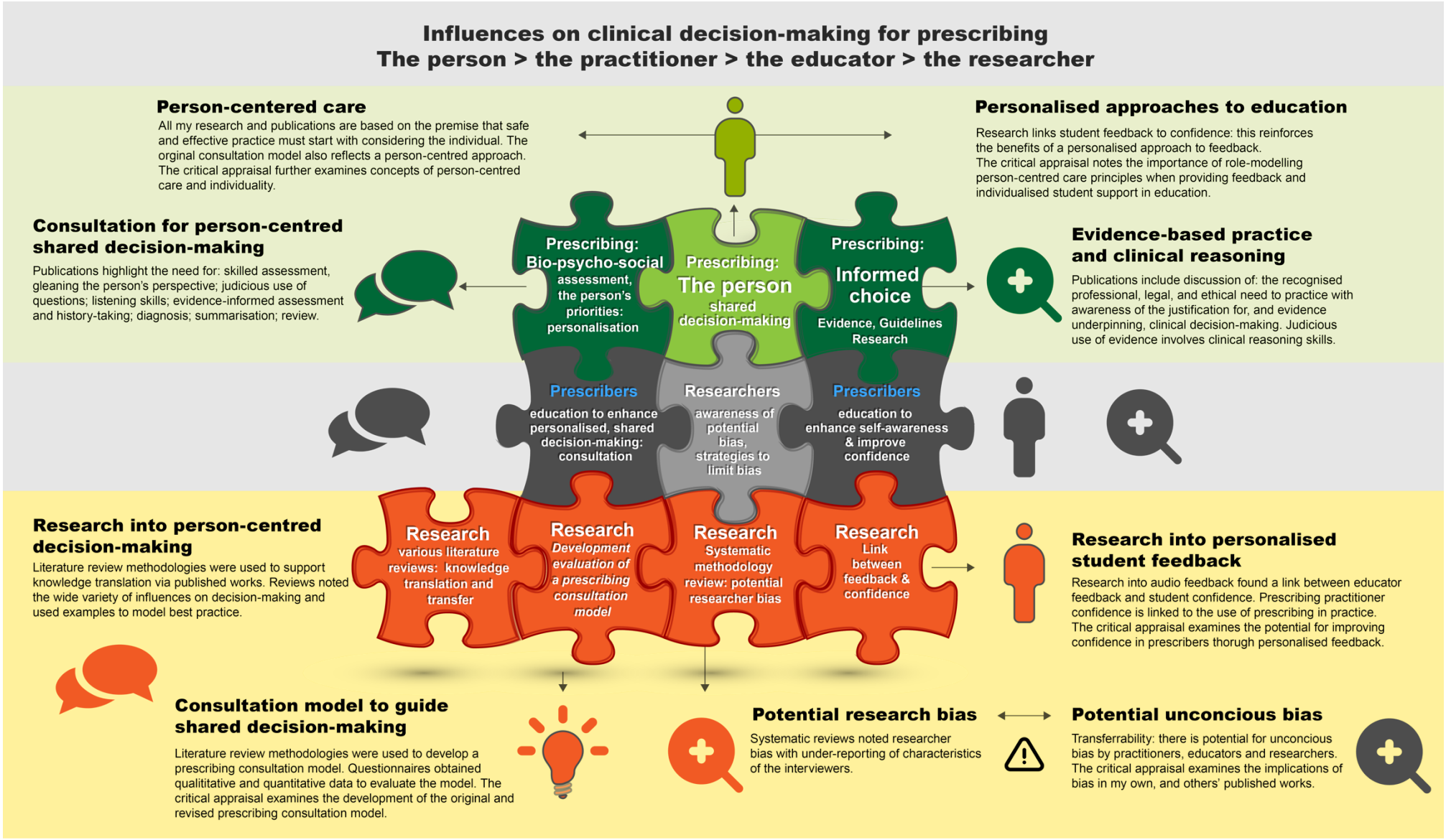
Chapter 1 – Background and context

1.1 Introduction

This critical appraisal is focused on themes within my research publications broadly linked to decision-making for prescribing. **Figure 1.** provides an overview of these topics noting where there is transferability of concepts between practice, education, and research. The thread running through the entirety of the work is self-awareness and personalisation to promote informed choice for prescribing decision-making. This encompasses the need for critical thinking and attentiveness to potential biases while disseminating effective knowledge translation as an educator.

Evolving as a confident and competent prescriber is multifaceted and improved by person-centred and individualised educational approaches. Prescribing decision-making is illustrated in my research through a prescribing book, journal articles, and an original prescribing consultation model (PRESCRIBE-SAFER). The initial prescribing consultation model (RAPID-CASE) was first published in a prescribing book (Gould and Bain, 2022a) and improved upon through critical analysis of survey evaluation. Other factors impacting on decision making, such as the influence of feedback on prescribers' confidence, and the need to be aware of the risk of unconscious bias as a practitioner, educator, or researcher have been explored in my research and are examined in this critical appraisal.

Figure 1. Influences on decision-making for prescribing and research themes within this critical appraisal.



1.2 Background and context to prescribing

Prescribing in the United Kingdom by clinicians outside of the medical profession has evolved over the past few decades with benefits noted for both practitioners and the people in their care (Latter *et. al.*, 2012; Tinelli *et. al.* 2015; Courtenay and Griffiths, 2022). The Medicines Act (1968) legislated prescribing for doctors, dentists, and veterinarians and set out the legal categories of medicines for the purpose of public protection. Government commissioned reports into community nursing and prescribing (Department of Health and Social Security (DHSS), 1986; Department of Health (DH), 1989) prompted legislation which enabled community nurses to prescribe from a limited Nurse Prescribers' formulary (the Medicinal Products: Prescription by Nurses etc. Act, 1992). This formulary was narrow in scope with very few systemically acting medicines and only permitted prescribing by District Nurses and Health Visitors. Despite these limitations, Nurse Formulary prescribing was highly successful in demonstrating benefits such as improved multi-professional working, health outcomes and people's experience of care. This cautious start activated processes involving research, reports, and public consultations to progressively extend prescribing rights.

Prescribing expanded incrementally over successive decades, eventually leading to full formulary prescribing by nurses and pharmacists in 2012 (Human Medicines Regulations, (HMR), 2012). Positive evaluation, closer multidisciplinary working, and service expansion prompted further legislative changes to allow prescribing by Allied Health Professionals: podiatrists, physiotherapists (HMR, 2013), therapeutic radiographers, (HMR, 2016), and paramedics (HMR, 2018)) with restrictions for controlled drugs (CDs). A history of the various prescribing legislation is illustrated in Figure 2. This includes Acts for CDs as each profession has different prescribing rights for these. Apart from CD restrictions, non-medical prescribers can prescribe any medicine, for any condition, as long as it is within their scope of professional practice.

Figure 2. A history of prescribing development in the United Kingdom 1968-2025

Medical practitioners have played a key role in the upskilling of these professionals as pre-2018 regulatory body prescribing standards only allowed proficiency sign-off by Designated Medical Practitioners (DMPs) who are General Medical Council (GMC) registrants (NMC, 2006, GPhC, 2010, HCPC, 2013). In 2018, changes to prescribing standards (HCPC, 2018, GPhC, 2022, NMC, 2024) authorised sign-off by non-medical prescribers who are not on the GMC register. All prescribers who are suitably qualified and meet the associated competencies (RPS, 2019) can support prescribing students as Designated Prescribing Practitioners (DPPs). While this represents a further level of responsibility for non-medical prescribers, in practice, medical doctors continue to contribute greatly to the education and support of trainee prescribers. Although there is no published data identifying the professional backgrounds of DPPs, anecdotally a significant majority continue to be GMC registrants which suggests a continuation of the valuable multi-disciplinary working that enabled non-medical prescribing to flourish.

The number of Nurse, Pharmacist, and Allied Health Professional registrants with a prescribing qualification is notably increasing across most categories and disciplines apart from Community Practitioner Nurse Prescribers as more community nurses complete Independent and Supplementary prescribing, and pharmacist Independent and Supplementary prescribers as that award is no longer offered (as per **Table 1**).

Profession	Qualification	2012*	2017	2022/23	10-year increase
Nurses and midwives	Community Practitioner Nurse Prescriber (V100/V150)	**33,000**	**39,076**	**39,174**	**+6174**
	Independent / Suppl. Prescriber (V300)	**23,000**	**39,877**	**63,148**	**+40,148**
Pharmacists	Supplementary Prescriber & Independent / Supp. Prescriber	**2000**	**1331**	**1124**	**- 876**
	Independent Prescriber	**0**	**5061**	**16,918**	**+16,918**
Allied Health Professionals	Supplementary Prescriber	**0**	**708**	**3492**	**+3492**
	Independent Prescriber	**0**	**993**	**3813**	**+3813**
	Total prescribers	**58,000**	**87,046**	**127,669**	**+69,669**

Table 1. Number of prescribers (Courtenay *et. al.*, 2012, p.2*; General Pharmaceutical Council (GPhC) June 2023; HCPC, 2021; NMC (2023), September 2023). **Figures were estimated in 2012*

This evolution of prescribing rights implicates an expansion of advanced level skills that were previously the sole domain of medical practitioners (Latter *et. al*., 2012; Abuzour *et. al*., 2018; Cope *et. al*., 2020; Evans *et. al*., 2021; Pooler, 2021; Graham-Clarke, *et. al*., 2022; Courtenay and Griffiths, 2022; Seck *et. al.*, 2023). Despite the growing reliance on prescribers beyond medical doctors, there has been limited examination into differences in ways of knowing and learning between these practitioners and a paucity of research on the prescribing decision-making of non-medical prescribers, with a systematic review by McIntosh *et. al.* (2016) finding only three suitable research papers. Prescribing by a greater range of practitioners is seen as a valid way to ease health service demand (Leong *et. al*., 2021; MacVicar and Paterson, 2023) and has been largely successful (Latter *et.al*., 2012; Holland *et. al*., 2023) but may invoke an expectation to prescribe even when circumstances test the boundaries of the clinician's scope of practice. The environment in which capability is developed can impact prescribers, particularly when there are pressures on services. For example, acknowledging the potential concerns for nurse prescribers, the position statement for the British Association of Critical Care Nurses states that non-medical prescribing must not be used as a staffing solution or a substitute for unsafe or poor medical prescribing practise (Plowright *et. al*., 2023).

Despite growing pressures on health care staff to acquire and use these advanced skills, not all prescribers are using their qualification or prescribing regularly, with various reasons for this proposed (Taylor and Bailey 2017; Magowan, 2020). Common barriers, particularly for those who are newly qualified, include anxiety, job stress, time pressures, workloads, low autonomy, inadequate support, or limited access to continuing professional development (CPD) (Noblet *et. al*., 2018; Casey *et. al*., 2020, Magowan, 2020) or other barriers specific to the post or prescriber (Graham-Clarke *et. al.,* 2022). A study by Pandolfo *et. al.* (2022) into consultant doctors linked fear to a lack of experience while Lim *et. al.* (2018) found the effort, fear, anxiety, and lack of confidence of novice prescribers was similar between doctors and nurses. Woit *et. al*.'s (2020) scoping review reported varying levels of confidence and insight by pharmacists with some viewed as worryingly overconfident.

Select published works in this appraisal centre on feedback that embeds a strengths-based approach to help incite self-efficacy and strengthen confidence (Gould and Day, 2012, 2024). More directly linked to the practice of prescribing, the published works around prescribing contemplate accountability for ones' acts and omissions which is seen as integral to practice (NMC, 2018) and based on assumptions about knowledge and competence. These publications, research, and teaching strategies are broadly designed to instigate deeper understanding and a more analytical approach to knowledge acquisition and clinical competence. Enquiries as to how clinical knowledge is derived are fundamental to my research, writings, and educational practice.

Knowledge acquisition is complex and includes physiological influences on how people learn and reason. Along with innate capacity, it has been firmly established that from an early age, nurture and experience influence brain development (Stiles, 2011). In the context of diverse aptitudes and ways of knowing, my research and publications seek to make logical connections, simplify theories, and generate new concepts, or new ways to express them, to aid learning and improve prescribing practice.

The legal authority to prescribe embeds enhanced autonomy and accountability obliging professionals to be explicit in their clinical reasoning for decision-making (Gould and Bain, 2022a). This involves drawing on a knowledge base and balancing evidence with cultural, social, environmental, psychological, and public health factors (Gould and Bain, 2022a). Clinical reasoning also requires the ability to attain, select, and draw conclusions from information gained through consultation (Gould and Bain, 2022a, 2022b, 2022c, 2022d). The appraised selected works focus on these interplays of influences.

Collectively, my published works attempt to promote safer prescribing through attentiveness to influences on clinical decisions and reflexivity for awareness of limitations and knowledge gaps. This is a distinct body of writing that addresses some areas that would benefit from further examination and research, such as the competence and confidence of prescribers, person-centred approaches and how these can be positively influenced. The publications presented in this critical appraisal (CA) have taken note of both the intrinsic and acquired differences between learners and the importance of reflecting diverse perspectives.

Personalisation in an educational context can be seen as modelling best practice in relation to person-centred clinical practice. As individuals with distinct characteristics, ways of knowing, and experience, prescribers must be both supported and challenged to enhance person-centred care. Strength-based methods of education such as supportive feedback techniques, and the use of decision-aids such as an original prescribing consultation model have been examined to appraise influence on prescribing education, practice, and the ongoing expansion of clinical reasoning. This appraisal is focused on education for safe and defensible prescribing, proposing that a structured approach, using mnemonics, guidelines, and other aids improves the accuracy of and confidence in the practitioner's judgement. With growing reliance on independent and supplementary prescribers, University and practice-based educators need to employ reliable strategies to help build entrustability in new prescribers taking on this great responsibility.

Chapter 2 – Research paradigm and philosophy

Critical examination of published works has revealed links between research, educational theory, and knowledge acquisition. Research and the nature of knowledge can both be viewed through ontological and epistemological perspectives (Brown and Dueñas, 2020). Studying divergent approaches was needed to unpick key philosophies across the appraised publications as they embrace different ways of knowing. The dichotomy of deductive reasoning versus inductive or empirical evidence is seen in types and approaches to research, knowledge attainment, and in educational theories. Interrogations into research, data, and the reliability of findings are also core to the topic of clinical decision-making. Research, like clinical practice, can be subject to oversights, inaccuracies, or biases, with a need to be aware of these and strive for objectivity to inform defensible judgements.

The potential for bias is well-recognised in research publications, so it is not unexpected to find identifiable biases in the published works examined. Broadly, these encompass common potential research limitations such as small sample sizes, and the locus of the researcher within the qualitative studies. For the literature reviews which include the textbook and journal articles on prescribing, it is necessary to consider the place of expertise as this may lead to potential biases. For example, the influences of experience and context when shaping the focus, selection, and interpretation of included research evidence. As an educator or researcher, it is essential to be able to justify or substantiate the accuracy of information, alongside finding the most effective means of knowledge transfer. The ways in which researchers justify their methods and conclusions revolve around an awareness of their own grasp of the nature of knowledge and reality through the identification of appropriate research paradigms or conceptual frameworks in which theories are constructed (Braun and Clarke, 2013).

This appraisal considered examples of primary research which used qualitative means of data collection, through focus groups and quantitative means, through surveys. In relation to the nature of reality and ability to grasp it, the underpinning philosophy and primary research approach leans towards positivism (Brown and Dueñas, 2020) but with a commixture of critical realism whereby the world has an objectively true nature

(Kozhevnikov and Vincent, 2019) and the view that realities can be multiple and experienced differently by individuals, known as contextualism (Braun and Clarke, 2013; Madill *et. al*., 2000). Reality and our understanding of it can be subject to context, interpretation, and constructs, but these paradigms predominantly focus on the social or cultural aspects of experience and understanding. Qualitative research entails a need to acknowledge the researcher's subjectivity and influence.

Applying controlled measures to gain greater objectivity aligns with an intrinsic affinity with logic and the search for objective truths (realism). Qualitative techniques and the paradigms created to describe them can be seen as overly focused on participants' lived experience to explain their subjective reality, with less attention on the influence of innate processes or ways of thinking. Being aware of deductive reasoning or learning styles as impacting on qualitative research findings is little explored and can be seen as a research gap that some of the appraised publications address. Hyde (2000) suggests that although qualitative research is aligned with inductive reasoning (starting with observations), there is still a place for deductive reasoning (applying generalisations or theories to specific instances). An imbalance between these can be counterproductive for educators who strive to address differences in people's innate ways of knowledge acquisition on the continuum between deductive reasoning and observation. Contextualism is also seen as an educational philosophy whereby events are inextricably connected to their current and past context (Fox, 2006).

In addition to context, education and research are impacted by innate processes, not necessarily stemming from experience. For example, in the presented research into student views on audio-visual feedback, learners' perception and responses may be influenced as much by their inherent learning styles as by their cultural milieu or previous learning experiences. Reflexivity is important to qualitative research for identifying priorities, questions, and in recognising potential bias in the interpretation of results. In parallel, clinical decision-making is known to be subject to bias with reflective practice used in health care education to reduce its intrinsic risks. Some research considered in the appraisal used literature review methodology and showcased being self-aware of the need to make sense of the world through interpreting pre-existing evidence and using deductive reasoning to make logical connections.

The presented literature reviews have used systematic selection, interpretation, and assimilation of research and other evidence that allowed new learning or the strengthening of previously identified themes. These works are most aligned with integrative literature review techniques that generate new concepts and knowledge through making associations with established and appropriately wide-ranging data sources (Broome, 2000). Unlike other types of review, integrative reviews are not confined to a specific research design, leading to potentially better understanding of the complex topics associated with clinical practice (Oermann and Knalf, 2021).

In relation to quantitative research, which is prominent in prescribing, for example in randomised controlled drug trials, pressures to assure the internal validity of research can potentially limit the wider generalisability and practical application. Zwarenstein (2022) stated a clear case for a more pragmatic approach to scientific research and outlined critical challenges for researchers who are expected to demonstrate a high degree of internal validity. Research protocols and methods for randomised controlled trials understandably exclude specific groups or individuals for reasons of ethics and safety, but also for the purpose of strengthening the internal validity of their studies.

Common examples for medicines research include narrowing the age range e.g. excluding children, or older adults, rejecting people with multi-morbidities due to the risks of confounding factors or unpredictable outcomes, or selecting those who are more likely to be adherent to treatment regimens (to avoid dilution effects). This leaves notable research gaps across age ranges and populations with the burden on prescribers in relation to “unlicensed” or “off-label” use when the manufacturer has not licensed the product for certain ailments or populations (Medicines Healthcare Regulatory Agency (MHRA), 2014, and Joint Formulary Committee (JFC), 2024). Common examples include the first line treatment for Attention-Deficit Hyperactivity-Disorder (ADHD) and some anti-depressants for children, as the research is non-existent or insufficient for these (MHRA, 2014, JFC, 2024), with the onus on prescribers to individually assess risk.

Zwarenstein (2017, 2022) and other proponents of pragmatism in clinical trials such as Dal-Re *et.al*. (2018) and Schwartz and Lellouch (2009), aspire to maximise external validity by reframing the purpose of the research as answering questions to help

decision-making, while balancing this with the need to retain internal validity. Explanatory research and a positive framework contribute to the scientific understanding of medicines and their mechanisms of action, but the methodologies involved risk losing sight of the context of clinical practice, affecting whether the results can directly contribute to decisions about care. Conversely, pragmatic or contextualised approaches are used to improve external validity without significantly compromising measures to assure internal validity and to answer questions around best practice in clinical settings (Sackett, 2011; Zwarenstein 2017).

In relation to clinical scientific research, hierarchies of evidence place pre-appraised systematic reviews (or meta-analyses) at the top, followed by randomised controlled trials, down to "expert opinion" on the lowest level. However, Howick *et. al*., (2011) note that all evidence hierarchies present the problem that "*psychologically and sociologically speaking, they encourage people to stop using judgment*". Research strength and its safe, effective, practical use depends on the questions being asked and the use of clinical judgement (Howick *et. al*., 2011). Most of the appraised works involved the process of formulating original and appropriate queries, finding, categorising, appraising, and interpreting evidence sources to aid the dissemination of evidence-informed practice. To clarify this process of integrating primary and pre-appraised research, a revised hierarchy of evidence focusing on pre-appraised sources for practical application is illustrated in **Figure 3**.

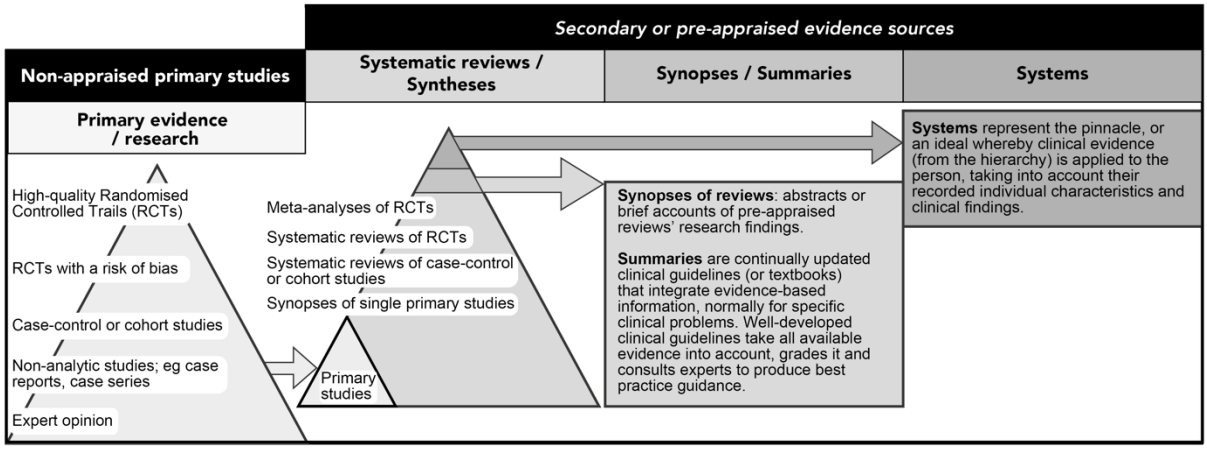


Figure 3. Gould J. (2024) Evidence-informed practice hierarchy

Adapted from: DiCenso et. al. (2009); Oxford Centre for Evidence-Based Medicine (OCEBM) Levels of Evidence Working Group (2011); and Murad *et. al*. (2016).

This model is linked to educational philosophy in several ways. For example, primary research hierarchies consistently hold double-blinded randomised controlled trials as the pinnacle, but in relation to prescribing, these are deficient or non-existent for some populations such as children. Applied to education, prescribers must use clinical reasoning to make judgements as to the appropriateness of the research, while at the other end of the spectrum, they can be seen as performing an "experiment" with every person they prescribe for. The null hypotheses for these daily "studies" are that the product will not have the desired effect. This tactic emphasises the importance of reviewing and reporting the effects of prescribing decisions. However, nurses have been found to report fewer adverse drug effects compared with doctors (Deslandes *et. al*., 2022) despite reporting being linked to drug safety.

While clinicians are more likely to use pre-appraised research, they need to be aware of the risks of summaries and guidelines such as economic analysis taking priority or being outdated when new evidence becomes available. A further point of educational significance is that of "systems" (OCEBM, 2011) as these are in effect, proposing to perform the duty of clinicians when undertaking evidence-informed clinical decision-making. Systems broadly refer to a form of artificial intelligence (AI) where the most recent relevant research on a topic is used alongside the data from the individual (such as blood test results, etc.) to support decision-making. While systems are in various stages of development, some promising results have been seen with "decision support systems" (Moghadam *et. al*., 2021, p. 22) and AI is starting to address some types of prescribing, such as for antimicrobials (Huang *et. al*., 2023). For example, a systematic review by Pennisi *et. al*., (2025) found that AI systems or machine learning (ML) systems demonstrated a "strong predictive performance and diagnostic accuracy", proposing that their use in AMS holds potential for more precise prescribing, a reduction in antimicrobial resistance, and more efficient use resources. However, this review of 80 studies also highlighted several reasons why the findings have limited generalisability and suggested that further research is needed (Pennisi *et. al*., 2025).

AI may hold specific value in this area as anti-microbial resistance (AMR) is a recognised threat to global health (World Health Organisation (WHO), 2015, 2023), with concerns such as increased antibiotic prescribing in remote consultations (Armitage and Nellums, 2021). There is a recognised need to develop competence for Anti-microbial stewardship (AMS) (Courtenay *et. al*., 2019; Courtenay and Chater,

2021) as well as a need to keep up to date with guidance, research, and new knowledge or decision-support systems, such as those built upon AI.

Using AI for antimicrobial prescribing most closely resembles what Di Censo *et. al*, (2009), OCEMB, (2011) and Murat *et. al*., (2016) defined as systems in their research hierarchy, but there are other forms and uses of AI with potential impact on prescribing. AI is an increasingly recognised strategy for transforming health care and its use to aid decision-making needs to be carefully considered. The Medicines Healthcare Regulatory Agency (MHRA) in the United Kingdom (UK), with the US Food and Drug Administration (FDA), and Health Canada, jointly identified core guiding principles for the use of AI and machine learning (MHRA, 2021). These included such aspects as the intended, or appropriate use of the AI product, known limitations, and risks, such as unintended bias. Current guidance (MHRA, 2023a, 2025a) also suggests using the MHRA Yellow Card system to report problems with software as a medical device. Advice for healthcare professionals (MHRA, 2023a) includes being alert to risks of potential errors when using Electronic Prescribing and Medicines Administration Systems (ePMAS), and reporting near-misses and harms using the Yellow Card scheme.

Some examples of AI technology being researched and appraised for approval include treatments for stroke (MHRA, 2022), speeding up diagnosis for Parkinson's and lung cancer (MHRA, 2023b, MHRA 2023c), recognising serious kidney illness (MHRA, 2023d) and improving breast cancer treatment (MHRA, 2025b). With the widening use of AI to aid diagnosis and decision-making, prescribers will need to understand how to use systems effectively, recognise their limitations, and as with any form of evidence, be able to justify and explain decisions. A critique of consultation models, including the PRESCRIBE-SAFER prescribing consultation model, is that the influence or place of AI has not been explicitly noted. While AI can be seen as reflected in several parts of the PRESCRIBE-SAFER model such as Evidence-based diagnosis, Formulary (evidence-based treatment options), and antimicrobial stewardship, its positionality for informed decision-making could be more clearly stated.

Related to informed choice, AI can also be used as a way for prescribers to better understand and communicate pertinent information, such as the rationale for prescribing options or safety-netting advice. One example is the complex process by

which two commonly prescribed drugs can produce a rare but life-threatening interaction: flucloxacillin and paracetamol, causing high anion gap metabolic acidosis (HAGMA). Prescribers reliant on information from the British National Formulary (BNF) (JFC, 2025), or the electronic medicines compendium (eMC, 2024), will find some mention of the risks, but little explanation of how or why this interaction occurs. For example, the BNF lists the interaction as having been reported anecdotally, with a Severe rating but no indication of prevalence or risk factors. The eMC (2024) notes concomitant use as a caution due to the risk of HAGMA and identifies it occurs as more severe when the person also has renal impairment, sepsis, or malnutrition, especially if the maximum daily doses of paracetamol are used. The BNF (JFC, 2025) has likely classed the evidence as anecdotal as the only published research is clinical case studies (Duncan *et. al*., 2023, Eid *et. al*., 2024, Scafetta *et. al*, 2024). Anecdotally, when questioning prescribing students, there is widely variable accounts of attention to, or understanding of, HAGMA by Designated Prescribing Practitioners. This ranges from dismissing the possible interaction without explanation, to a thorough discussion of the risks, with some advising discontinuation of paracetamol while taking flucloxacillin.

As educators or prescribers who want to be confident in their decisions and communication, AI can assist in interpreting and simplifying complex information. In this instance, using Chat GPT to gain an explanation of what HAGMA is, and the practical risks, can be seen by prescribers as providing a clearer message than relying on the BNF, or interpreting scientifically written case studies. To illustrate this, Box. 1. is an excerpt from the abstract of a systematic review of case studies linked to HAGMA (Scafetta *et. al*., 2024, p.1), and Box 2. is an excerpt from Chat GPT (2025):

Box 1. Scafetta *et. al*., (2024, p.1) *Drug-Related Pyroglutamic Acidosis: Systematic Literature Review*

> "Acquired pyroglutamic acidosis is a rare, potentially fatal metabolic derangement, which usually occurs after paracetamol use, frequently combined with a β-lactamase-resistant penicillin or vigabatrin. This condition predominantly affects adults, especially women with factors like undernutrition, alcohol-use disorder, or kidney disease, often during infection. The accumulation of organic acids is a well-known cause of metabolic acidosis. This acid–base imbalance often arises in conditions that lead to increased levels of L-lactic acid or ketones (primarily β-hydroxybutyric acid), and in advanced kidney disease. Other contributors include the

production of D-lactic acid by gut bacteria and the consumption or administration of (di)-ethylene glycol, methanol, or propylene glycol.

The clinical features included diminished consciousness (60%), Kussmaul breathing (56%), and nausea or vomiting (27%). At least 92% of patients were on paracetamol therapy for >10 days at an appropriate dose, 32% on a β-lactamase-resistant penicillin, and 2.3% on vigabatrin. Besides severe anion gap acidosis, patients also presented with hypokalemia (24%) and kidney function deterioration (41%)."

Box 2. OpenAI Chat GPT (2025) *Paracetamol and flucloxacillin interaction*

There is a rare but serious interaction between paracetamol and flucloxacillin that involves high anion gap metabolic acidosis (HAGMA) due to accumulation of 5-oxoproline.

Mechanism: Paracetamol metabolism involves glutathione-dependent pathways. Flucloxacillin, a penicillinase-resistant beta-lactam antibiotic, may disrupt glutathione homeostasis in certain susceptible patients. This disruption can lead to accumulation of 5-oxoproline (pyroglutamic acid), resulting in metabolic acidosis, especially in patients with: renal impairment, sepsis, malnutrition, advanced age, high cumulative doses of paracetamol.

Clinical Observations: May present with confusion, tachypnea, and unexplained metabolic acidosis. Risk increases if both drugs are used concurrently over several days.

Recommendations:

- Monitor for acid-base disturbances when both medications are used, especially in high-risk patients.
- Consider limiting paracetamol duration or using alternative antipyretics if long-term antibiotic treatment is needed with flucloxacillin.
- Routine interaction is not serious for healthy individuals, but caution is warranted in compromised patients.

This example use of AI provides an account that is easier to grasp, while containing the salient points, although limitations are noted. For instance, there is no mention of alcohol use disorders, and the clinical features are less well-defined compared with points extracted from the systematic review (Scafetta *et. al.*, 2024). Thus, a safer more judicious use of AI for promoting informed choice would be for prescribers to start with guidelines and research evidence sources as the foundation of their knowledge and use supplementary AI where a simplification or rewording would be helpful. Prescribers must achieve and maintain RPS (2021) competencies which include assessing the material risks and benefits of treatment as well as explaining these in an understandable way to promote informed choice. Being able to provide an evidence-informed rationale for management options and convey these effectively are crucial to safe, effective, person-centred prescribing.

Research publications in the form of books and articles using review methodology can also be seen to interpret complex and wide-ranging information to successfully convey essential principles. While both AI and researchers have limitations and are subject to potential bias, people can choose to critically reflect and foster self-awareness to assist with preserving objectivity. The following chapters look more closely at the place of research for underpinning prescribing decisions and educational approaches.

Chapter 3 – Self-awareness, self-efficacy, and confidence

3.1 Self-awareness

Research methods endeavour to distance the researcher from data collection and findings, to uphold objectivity and thus enhance validity. The values, characteristics, experiences, and perspectives of researchers may not be openly stated but can have an impact on the research question, process, and outcomes. To promote objectivity, researchers are expected to acknowledge and reflect on their own views and potential biases to ensure rigor and validity in their research. Olmos-Vega *et. al*. (2023) recommend reflexivity for embracing the unique perspective or subjectivity of the researcher through a continuous process of critique and evaluation of "*how their subjectivity and context influence research processes*". English *et. al*. (2022) explicitly connect reflexivity in research to the clinical setting as a process for knowledge building but separate from reflective practice. The parallels include the need to be being transparent around influences and decisions and to recognise that what practitioners bring to their encounters with the people in their care can sway the direction and outcome of the consultation. Jenkens *et. al*. (2019) discuss reflexivity in relation to Aristotle's notion of phronesis (prudence, or wisdom), which can also be seen to involve embodiment, open-mindedness, and perception. Reflexivity in the context of truth-seeking and reasoning to underpin 'good' actions involves unpicking what has contributed to the practical wisdom, such as prior understanding, assumptions, and perspective (Jenkens *et. al*., 2019).

The publications examined span both research and clinical realities through attention to reflexivity. A systematic review of research methodology (Brown and Gould, 2013) specifically addressed questions around researcher reflexivity to make suggestions for future research (See Table 2.2 for key findings). This review of obesity studies showed that while other aspects of qualitative research methodology were noted to varying extents, there was markedly poor researcher reflexivity regarding the characteristics of the interviewers. Only 9.7% (n=3 out of 31 studies) mentioned the body size of the interviewer and little awareness of the potential impact on data collection was shown even when the studies concluded obesity stigma as a key finding. Recommendations included reporting on aspects such as body size of the interviewers as a potential

influence on responses, and to consider alternative methods such as telephone interviews. This has clear links to reflexivity in relation to clinical practice, as obesity stigma is a well-recognised issue that shows no evidence of having improved over the past 10 years (Brown and Gould, 2013; O'Donoghue *et. al*. 2021; Rathbone, 2023).

Table 2. "Qualitative studies of obesity methodology review" key findings summary

Brown and Gould (2013) Qualitative studies of obesity methodology review
Methods
A systematic review; independent analysis to extract data and derive key themes.
Key findings
• Some sample characteristics were reported consistently, such as gender where women (78.8%) outnumbered men (21.2%) by four to one. • Socio-economic background was not consistently reported. • Most studies considered quality issues in data collection, analyses and generalisability of findings. • However, 70.2% (n=22) of the studies noted no interviewer characteristics and 90.3% (n=28) did not mention the body size of the interviewer. • The studies were weak as regards researcher reflexivity in relation to interviewer characteristics and obesity stigma, with only 3% reporting on this. • The impact of obesity stigma was not attended to in the qualitative research reviewed.
Recommendations
• Sampling biases should be considered, with a view to recruiting more men. • Clearer information about study participants is essential, including socio-economic status. • Studies involving face-to-face interviews should include salient interviewer characteristics including body size.

Impact

While this research methodologies paper (Brown and Gould, 2013) only has 20 citations, the reach has been sustained over time with more than 17,000 noted downloads. Perusal of the research citing this methodological paper and a random sample of obesity-related qualitative studies since its publication shows only a slight increase in evidence of researcher reflexivity. To better measure changes over time, and the potential impact of this study, the systematic review would need to be repeated using the same search terms, inclusion / exclusion criteria with new dates. A limitation to the significance of the findings is that the papers reviewed ten years ago showed a marked preference for face-to-face interviews whereas remote means have since expanded, limiting the benefits of returning to this research question. While a body of clinical research recognised the effect of practitioners' weight when consulting with this population, this research paper is unique in its examination of potential research bias when conducting face-to-face interviews.

When compared to qualitative studies, systematic review methodology may require less attention to the researchers' position. However, it could be argued that the expertise of the researchers and prior awareness of obesity stigma influenced the research query and may have also led to looking for this finding, rather than it emerging from the literature. Proponents of both integrative and systematic reviews note the importance of systematically and independently screening studies before ordering, coding, and categorising findings to better show objectivity of the emergent themes (Cooper, 1998, Whittemore and Knafl, 2005). The independent evaluation and synthesis of the literature was explicitly stated in the papers on the theme of obesity (Brown and Gould, 2011, Brown and Gould, 2013). Cronin and George (2020) note that for all types of literature reviews, guarding against bias involves a comprehensive and balanced depiction of relevant findings. While quantifying the occurrence of specific themes, such as whether researchers noted the socio-economic status, age, gender, or weight of participants demonstrated balance (Brown and Gould, 2013), the foci of the discussion was less expansive on some of these. This attention to obesity stigma may be a bias of both authors and it could reflect an unexamined aspiration to promote equity across health communities. Jenkins *et. al*. (2019) note the potential of reflexivity to improve awareness of ones' position of privilege and become more vigilant in identifying oppressive practice environments.

Attention to the potential influence of interviewer characteristics and beliefs has been noted as a limitation in other studies such as research into audio-visual feedback. A scoping review showed a significant majority of research into the topic omitted to mention whether the researcher was also the marker (Appendix 4). While most failed to identify this as a potential limitation, some papers took a stance that the marker as researcher (and interviewer) was valuable due to their deep, shared understanding of the practices being reviewed (Cavaleri, 2019). In both studies into student feedback (Gould and Day, 2012; Gould and Day, unpublished, 2024, Appendix 4), the markers were involved in the research and although an academic unknown to the students conducted the focus groups, participants were aware of the authors' involvement, implying their responses could have been influenced by this.

In relation to reflexivity in clinical practice, one's own biases or limited understanding of an issue could influence decision-making as could a deep understanding and empathy. Both reinforce the importance of reflexivity in examining the genesis of decisions and the myriad influences on these. The need for clinical reflexivity is implied and explicitly stated in the prescribing textbook and associated articles, through the positioning of the "RAPID-CASE" consultation model (Appendix 5) (Gould and Bain, 2022a). Applying a model to practice is posited as comparable to noting the methods by which research decisions are made as it demonstrates the decision-making process and provides a means by which justification can be structured. It is incumbent on educators to create the conditions by which learners can develop their own ways of knowing. The use of this model or framework is presented as one of a selection of ways prescribers can articulate decision-making, while the central message of needing to be able to do this is emphasised in publications about prescribing, professionalism, and the law (Gould and Bain, 2022a, 2022c). The impact of the model and related publications is examined in context of the clinical decision-making process in Chapters 4 and 5.

3.2 Self-efficacy and confidence

Unlike the systematic review (Brown and Gould, 2013), the research into audio and audio-visual feedback used qualitative methodology to investigate student views of the feedback they had received (Gould and Day, 2012) (see Table 3 for a summary of findings). As the participants were purposively sampled across several cohorts undertaking a programme embedding a prescribing qualification, some insights can be drawn and extrapolated to the topic of self-efficacy and confidence for prescribing practice. This qualitative work (Gould and Day, 2012) was original in gleaning the views of post-registration students, though had limitations common to many other studies (Appendix 4) such as sample size, characteristics, and marker involvement in the research.

In relation to the sample, using focus groups with a necessary maximum number of participants can hinder the generalisability of findings as they are unlikely to be representative any specific population (Robinson, 2019). There is debate among researchers whether the fact that participants know each prior to the focus group impacts on findings, with some researchers arguing conversely that discussions may be more inhibited with a group of strangers (Robinson, 2019). The students in the feedback focus groups knew each other so it is possible that group norms or “group think” prejudiced the discussion. For example, one group had seemingly agreed a point, but after a pause a single participant expressed the opposing view in a way that suggested reluctance to contradict colleagues. When participants are known to each other it may be challenging to gauge group dynamics or if participants feel they can speak candidly (Hollander, 2004). Sample size is a noted limitation with all types of studies but particularly quantitative research (such as surveys) due to issues with the accuracy and generalisability of findings (Vasileiou et. al., 2018; Kieser, 2020; Peterson and Foley, 2021). Small sample sizes and participant selection can lead to flawed findings and even clinical harm, such as the increase in measles cases due to an erroneous link made between vaccines and autism (Smith and Noble, 2014).

In the research into feedback methods, focus group volunteers may be more likely to contain students who were positive about the feedback. This pitfall was avoided in the second study (Gould and Day, 2024 tbc), where all students on the module who received video feedback participated in the focus groups. Another potential weakness

is that the markers were involved in the study. Whilst these limitations are acknowledged, the findings consistently supported the use of feedback methods other than written with positive views expressed on how these impacted on the recipients' motivation, self-efficacy, and confidence (Gould and Day, 2012, 2024 tbc).

Table 3. "Hearing you loud and clear" key findings summary.

Gould and Day (2012) Hearing you loud and clear: student perspectives of audio feedback in higher education
Methods
Questionnaires (students); focus groups (students); individual interviews (markers); independent analysis to extract data and derive key themes.
Key findings
• 92% of students expressed that audio feedback contributed to their learning; 88% felt supported by this type of feedback; and 98% noted it was detailed. • Despite the benefits of audio feedback being clearly expressed by students in the first four questions, a significant minority (27%) stated they would prefer to not have audio feedback for their work. • Some students found it challenging and support is required to meet their needs. • Lecturers varied considerably in their response to audio feedback with some in clear favour and others expressing discomfort or doubts about its benefits
Recommendations
• Agree concise guidance for the timing and main content of the feedback. • Continue evaluation of feedback methods; undertake further research to ascertain student and staff views. • Explore options for widening the appeal of audio feedback, such as methods that embed a visual element.

Anecdotally, it has been observed that acquiring a new skill through post-registration educational programmes such as prescribing can cause expressions of anxiety and lack of confidence. For example, anonymous posts by new prescribing students during induction include strongly worded themes around fear of failure and potential to cause harm as a new prescriber. Rooney (2015) found this anxiety is sometimes specific to the academic aspects, but otherwise, there is scant literature examining the learning experiences of prescribing students. Publications over the years have mainly addressed the issue of confidence and practice of qualified prescribers (Courtenay *et. al*., 2012; Weglicki *et. al*. 2015; Abuzour, 2018; Lim *et. al*., 2018; Summers and East, 2021). Research by Abuzour (2018) found a direct link between self-reported confidence and the likelihood to prescribe.

Awareness by educators is needed around the affective aspects of learning and differences between student in their starting point and their strategies for developing practice expertise. For example, some clinicians will have highly developed reflective skills and be comfortable with engaging in self-assessment and continuous learning, but others may be more resistant to acknowledging their limitations, or less open to feedback and judgments about their performance. Mahon and O'Neill (2020) link this to unconscious biases and Ehrlinger *et. al*. (2008) note that a lack of self-insight may also limit the person's ability or openness to learn from feedback. Within the focus group, some participants expressed negative emotional responses to the audio feedback they received (Gould and Day, 2012). This may have been linked to its personalisation or to existing reflexivity and self-efficacy which can impact on the extent to which the person feels vulnerable when receiving feedback. While there may be some risks of audio feedback adversely impacting students, it was also found that lecturers were seen as more approachable (Gould and Day, 2012).

Feedback needs to be supportive of student self-efficacy, prompting greater trust in their capabilities and in approaching new information and study with confidence and motivation. The role of feedback is to ensure those with lower self-efficacy use the learning opportunity to effect change, rather than adding to feelings of doubt, anxiety or being overwhelmed. The research proposed ways to mitigate potential lack of confidence when exposed to judgments about performance and to foster reflexivity to optimise the learning experience. Strategies to achieve this include encouraging reflection and self-assessment, promoting a supportive learning environment through

personalised feedback, and creating an atmosphere where students feel safe to voice their anxieties, ask questions, and seek guidance. In contrast to a deficit model with its focus on errors and inadequacies, a strengths-based approach using positive reinforcement through feedback is noted as more conducive to enhancing confidence and competence (Clynes and Raftery, 2008, Burgess *et. al.* 2020).

A practical barrier to video feedback is marker perception that it is more time-consuming, although the literature review findings (Appendix 4) suggest most markers find alternative methods of feedback more efficient than written. There can be reluctance to adopt new techniques when under time pressures, and an acknowledgment that the learning curve can initially add time to the marking and feedback process (Hall *et. al*., 2016).

Impact

The primary study into student and staff views on audio feedback (Gould and Day, 2012) is valuable despite the age of the work and its limitations, with the article continuing to be regularly cited. Google Scholar note 145 citations total, over half of them (73) within the past 5 years. The follow-up study into audio-visual feedback has been challenging to publish despite containing some potentially useful findings. Feedback from prospective publishers noted the length of the article, and advice has been acted upon to create two distinct articles for publication. This highlights a limitation common to research articles in needing to fit sometimes complex or nuanced findings into a tight word count or framework. Supplementary questions have been prompted by the findings and further research is proposed to capture changes in reflexivity, confidence, and engagement with audio-visual feedback.

Chapter 4 - evidence, consultation, and clinical reasoning

The prescribing textbook and associated articles (Gould and Bain, 2022a, 2022b, 2022c, 2022d, 2023) offered an evidence-based structure to prescribing decision-making. Where primary research qualitatively sought student views (Gould and Day, 2012), integrative or secondary methods were used to assimilate, interpret, and commend evidence-based guidance for prescribing. Of the research, the textbook and articles linked to it implicate the highest prospect of subjectivity but also have the greatest reach and impact potential. Primary research identifies observable phenomena to generate new knowledge whereas the literature review approach to the textbook and articles involved synthesising primary and secondary research, established guidelines, and expert practice. These writings seek to review and summarise existing evidence to support and enhance knowledge transfer.

The intention is to assist prescribers in their ability to justify decisions while adopting a personalised approach to practice. The textbook addresses a full range of topics, and the consultation model (RAPID-CASE, Appendix 5) was specifically devised for the purpose of improving prescribers' skill in justifying and elucidating informed choice and decision-making by using a structured and logical approach. It was formed through an iterative process which sought to update the National Prescribing Centre's (NPC, 1999a,b) original prescribing pyramid. This was published over 24 years ago with recent survey findings (Appendix 5) showing it is still the leading model being used by respondents despite a lack of contemporary topics such as social prescribing, anti-microbial stewardship, or environmental and cultural influences.

"RAPID-CASE" is an original model primarily generated from practice and education experience in tandem with an abstraction of pertinent parts of earlier consultation models, to better reflect current practice and align with the Competency Framework for all Prescribers (CFAP) (Royal Pharmaceutical Society (RPS), 2021). In addition to the NPC (1999a,b) prescribing pyramid, facets of "RAPID-CASE" are based on well-tested medical models including Byrne-Long (1976), Neighbour (1987), Pendleton (1984, 2003), and Silverman et. al., (1998). For example, the "Rapport" section is reflected in the Byrne-Long (1976) stage 1 "*The doctor forms rapport with the patient*" but also references the RPS CFAP (2021, p.9) Competency 1.5: "*Demonstrates good consultation skills and builds rapport with the patient/carer*" and embeds Pendleton's (1984, 2003) mnemonic "ICE" (*Ideas, Concerns and Expectations*). A selection of

reference points for the model can be found in **Table 4**. These were identified over years of examining and teaching models related to prescribing, and through a systematised search of literature on the topic of clinical consultation.

Table 4 – RAPID-CASE with source references **across all sections*

Rapport / initial stages: Informed consent / mental capacity; person's view of the presenting issue; Ideas, Concerns, Expectations
• Mental Capacity Act (2005); Department for Constitutional Affairs (2007) The MCA 2005 Code of practice • General Medical Council (GMC) (2020) Decision-making and consent • Balint, M. (1957). The doctor, his patient, and the illness. • Nursing and Midwifery Council (NMC) (2018) The Code; NMC (2024) Part 3: Standards for prescribing programmes* • Royal Pharmaceutical Society (RPS) (2021) Competency framework for all prescribers* • Pendleton, D., Schofield, T., Tate P, Havelock, P. (1984). The Consultation: an approach to learning and teaching.
Assessment of bio-medical: History of PC and actions so far; Medical / surgical / mental health history and current health; Allergy status; Current medication (prescribed and other)
• Carter J. and Singh P. (2024) *Consultation models in practice*; Denness, C. (2013) *What are consultation models for?* Diamond-Fox, S. (2021) Understanding consultations and clinical assessments at advanced level • Harper, C. and Ajao, A. (2013) Pendleton's consultation model: assessing a patient • Hastings, A. and Redsall, S. (2006) The Good Consultation Guide for Nurses • Mukwende, M.,Tamony,P., Turner,M (2020). Mind the Gap: A handbook of clinical signs in Black and Brown skin. • National Prescribing Centre (1999a) Signposts for prescribing Nurses – General principles of good prescribing; National Prescribing Centre (NPC) (1999b) The Prescribing Pyramid Fact Sheet No.3, Sept 1999 • Neighbour, R. (1987) The inner consultation • Nuttall, D. and Rutt-Howard, J. (2019) The Textbook of Non-Medical Prescribing
Psycho-social and context: Family history; Social and mental well-being; Equality, diversity and inclusion; Potential vulnerabilities
• McCance T., *et. al.* (2021), Fundamentals of Person-Centred Healthcare Practice • Mehrabian, A. (1972). Nonverbal Communication • Rotter, J. (1954). Social learning and clinical psychology

- Silverman JD, Kurtz SM, Draper J (1998) Skills for Communicating with Patients. Radcliffe Medical Press

Investigations / clinical examination(s): Physical Examination; Tests / Investigations; Referral AND

Diagnosis: Differential Diagnoses; Working Diagnosis Summary; Shared Understanding

- Peterson *et.al*. (1992) Contributions of the history, physical examination, and laboratory investigation in making medical diagnoses.
- National Institute of Health and Care Excellence (NICE); NICE Clinical Knowledge Summaries (CKS)
- Scottish intercollegiate guidance Network (SIGN)

Stop and Think: Deprescribing / Alternatives: Is a prescription needed? Have alternatives been considered? Would de-prescribing address the problem?

- Drinkwater, C., Wildman, J., Moffatt, S. (2019) Social prescribing *British Medical Journal*
- The King's Fund (2017) Social prescribing
- World Health Organisation (WHO) (2023). Antimicrobial Resistance

Cost-effective? On formulary? Pack size etc.?	**Appropriate?** Is it suitable for this person? Acceptable? Is concordance likely? EDI

- Electronic Medicines Compendium (eMC) Medicines.org*
- Joint Formulary Committee (JFC) British National Formulary*
- Taylor, B. (2021) Culturally sensitive prescribing of common symptom management drugs

Safe? Contra-indications / Side-effect / Interactions considered? Safety-netting advice

- Cumberlege, J. (2020). "First Do No Harm" Independent Medicines and Medical Devices Safety Review
- General Medical Council (GMC) (2021) Good practice in prescribing and managing medicines and devices;
- Medicines Healthcare Products Regulatory Agency (MHRA); NICE Clinical Knowledge Summaries (CKS) (2022) Adverse Drug Reactions
- World Health Organisation (WHO) (2017) Global Patient Safety Challenge 'Medication Without Harm'

Effective? Evidence based? - Based on guidelines? - Justifiable?

- Cochrane Evidence summaries: https://www.cochrane.org/evidence
- National Institute for Health and Care Excellence (NICE); NICE Clinical Knowledge Summaries (CKS)

- Strauss *et. al*. (2019) Evidence-Based Medicine: How to Practice and Teach EBM Fifth Edition Elsevier

The RAPID-CASE model was first published in the peer-reviewed textbook "*Principles and Practice of Nurse prescribing*" (Gould and Bain, 2022a) prompting positive feedback, reviews, and invitations to speak at conferences. Evaluation of the model was through an online survey (approved by the University of Derby (UOD) ethics committee) and informal feedback at conferences, from students, and colleagues. The survey results (Appendix 5) showed 94% of respondents would be "likely" or "very likely" to use the model in the future. However, despite the largely positive survey comments, aspects of the model elicited notable points that warranted analysis. This feedback in combination with critical thinking and exploration of new information sources, prompted consideration of specific improvements.

The primary area of concern about this model's appraisal stems from the relative lack of engagement with its evaluation which may be linked to limited reach or researcher authority. In contrast, the 1999 (NPC, 1999a, 1999b) prescribing pyramid was published by a centrally established prescribing body, lending authority for its use, particularly in the absence of other suitable models. With the closure of the National Prescribing Centre, practitioners and educators generally use older medical models, with partial guidance from regulators, professional associations such as the Royal Pharmaceutical Society (RPS), the National Institute for Health and Care Excellence (NICE) or the Scottish Intercollegiate Guideline Network (SIGN). However, none of these organisations have developed or advocate the use of a consultation model or other authorised decision-aid for prescribing. A future ambition is to collaborate with an established organisation to refine the model for more widespread adoption.

Another area for refinement may be in changing its position between a practical framework, or aide memoire, and a consultation model. Most medical models outline general phases of a consultation such as Neighbour (1987) with 'checkpoints' along the journey including: connecting, summarising, handover, safety-netting and housekeeping. In contrast, the RPS (2021) competency framework identifies 76 distinct prescribing competencies practitioners are expected to embed as safe and

effective prescribers. As per Gould and Bain (2022a, p.49) "*consultation models can be seen as the recipe, with assessment frameworks' discrete pieces of information as the ingredients or the key components*". Where traditional medical consultation models direct towards broad steps to progress the episode of care, the RAPID-CASE model also outlines some of the practical details, and RPS (2021) competencies within those steps. This combination of a model and framework with specific practical tasks, drew some critical feedback in that it appeared to be advocating a practitioner-led consultation, and that it is potentially less suitable for prescribing for people presenting with mental health-related concerns. Such comments underlined that the model is unique in attempting to provide an overarching consultation structure, while serving as a prompt for some of the particulars required for safe prescribing.

A significant risk of any model is when it is followed too closely to the exclusion of salient information. For example, Mitcheson and Cowley (2003, p. 413) found that the laudable intention of Health Visitors targeting their resources through a standardised health needs assessment led to "*potentially harmful side effects*". They concluded that the structured assessment instruments left no room for participation by clients and were ineffective in identifying relevant needs (Mitcheson and Cowley, 2003). The prescribing textbook (Gould and Bain, 2022a) noted some of the limitations to remind that rigidly following a model or template can inhibit the disclosure of information and cause a power imbalance, as well as potentially missing key information or cues. While there is practical necessity to gain and record accurate data, this must not be at the cost of the person's voice being unheard.

Further analysis, feedback, and survey results for the "RAPID-CASE" model indicated the title may also limit its adoption or dissemination, as the mnemonic "RAPID" implies a speedy or rushed consultation, in contrast to the intention of promoting a measured and thorough approach. Similarly, "CASE" may be open to the misinterpretation of referring to the person being consulted with, rather than its intended meaning as building a case for the prescribing decision. Alongside feedback around potential for greater emphasis on personalisation, alternatives to prescribing, and the need to include 'review', the model has been re-worked in (Appendix 6).

On reflection and having travelled internationally to present at conferences (Appendix 7), it was also apparent that not enough attention was paid to ensuring wider multi-cultural or international populations are reflected. For example, the RAPID-CASE

model did not explicitly mention cultural influences on decision-making. The updated model directly refers to equality, diversity, and inclusion, although it is not expansive enough to include more detailed or specific assessments such as those implicated for assessing a variety of skins tones. Retaining the format of a simple, single-page document limits the scope and depth so terminology needs to be concise and carefully chosen. Of particular importance is for the model to showcase clearly and unambiguously that the consultation should be person-led and not practitioner-led, with outcomes reflecting personalised informed choice.

Mitcheson and Cowley (2003) made a significant observation that a pre-determined structure can reduce participation and limit the essential communication that more naturally emerges from an interpersonal relationship. Although it is posited as a type of assessment framework, the RAPID-CASE model is predominantly targeted at new prescribers to foster evolving competence in clinical reasoning. While the model has been iteratively derived from authenticated sources, evaluation is needed to test validity and ensure it is fulfilling its stated purpose, without being positioned as a pre-determined list of questions that presuppose a person's needs (Mitcheson and Cowley, 2003). As prescribers progress towards expertise and mastery (Mortimore, *et. al*., 2021), there should be less reliance on tools as critical reasoning skills allow for a more conversational and relationship-based approach.

Decision-making for prescribing was formerly exclusive to medical practitioners whose development embeds clinical reasoning and is strongly influenced by senior clinicians (Lim *et al.*, 2018). Conversely, the trajectory towards expert practice for nurses is normally linked to adoption of theoretical models, policies, protocols, and guidelines. Lim *et al*., 2018 suggests that nurses new to prescribing had previously established clinical expertise so primarily sought support for decisions in relation to specific areas such as pharmacology. However, nurses in the study by Lim *et. al.* (2018, p. 1109) saw doctors as "*ultimately responsible for the diagnosis*" which implies potential hesitation in taking full ownership of their prescribing.

Along a continuum between the extremes of inductive and deductive reasoning, empiricism and protocols, there can be seen overlap between professionals. For example, Wilson (2013) highlights there are limits to how much information that can be used for decision-making and that these are irrespective of the level of training or expertise of the practitioner. The judicious use of aids such as algorithms, mnemonics,

and guidelines are posited as a strategy to ameliorate these constraints and reduce dependence on memory (Wilson 2013). Likewise, these may help with the ever-growing complexity in healthcare as Balogh *et. al.* (2015, n.p.) suggest "*the sheer volume of advances, coupled with clinician time constraints and cognitive limitations, have outstripped human capacity to apply this new knowledge*".

However, guidance and decision aids risk being disregarded if they are too complex. A study by Dyar *et. al*, (2021 found that simplicity was key to wider adoption of a clinical protocol as frustration can result in policies being underused when they are too long, overly specific, prescriptive and / or inaccessible. These considerations were at the forefront when designing the consultation model, while advocating for the use of resources such as the NICE Clinical Knowledge Summaries to inform decision-making for specific presentations or conditions. Attending to these factors, a new model using mnemonics is proposed (Appendix 8).

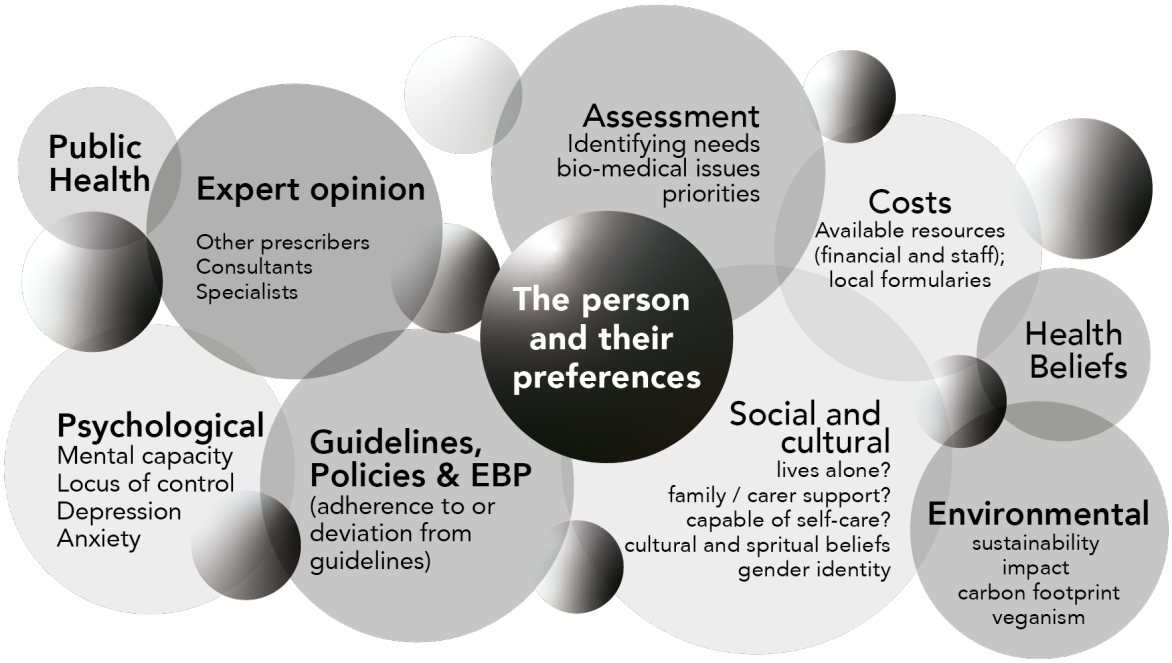
Table 5. “Principles and Practice of Nurse Prescribing” key findings summary

Gould and Bain (2022) Principles and Practice of Nurse Prescribing
Methods
A review of previously published literature including professional standards.
Key findings

• There are relatively few consultation models for nurses who have acquired roles that involve diagnosis, or models that embed principles for prescribing.
• Decision-making is based on a variety of influences **(Figure 4)** including (but not limited to):
  • Previous / prior knowledge
  • The person’s priorities
  • The consultation
  • Evidence-based practice
  ○ Pre-appraised research such as guidelines
  ▪ for diagnosis
  ▪ for informed choice in treatment
  ○ National and local formularies
  • Deprescribing, medicines optimisation, and social prescribing
  • Psychological factors, well-being, mental capacity
  • Social, cultural, religious factors
  • Public health practice and priorities
  • Resource availability (as per national and local guidelines and formularies)

Recommendations
• Further research into clinical reasoning for decision-making and continued evaluation, development, and dissemination of a prescribing consultation model • The addition of environmental factors, sustainability, and social aspects, such as diversity, equality, and inclusion in relation to influences on decision-making. • Address the need to balance the use of frameworks with more advanced conversational styles that recognise the primacy of interpersonal relationships.

Figure 4. Influences on prescribing decision-making (Gould and Bain, 2022a)



Impact

The publishers (Sage) of the textbook "*Principles and Practice of Nurse Prescribing*" (Gould and Bain, 2022a) report higher than projected sales of over 1500 units in under 2 years and have commissioned a new textbook which implies their support. Sales rank at Amazon U.K. (Appendix 9) and a positive review from the Journal of Prescribing Practice (Rees, 2023) further endorse the textbook (Appendix 10). The two articles in "Primary Health Care" (Gould and Bain, 2022 b,c) were identified by the Editor as among their most popular in 2022, however, broader reach was lacking due to access to this journal being limited to subscribers. The article in the Journal of Community Nursing (Gould and Bain, 2022d) shows more interest (Research Gate) and the publisher re-printed it in their GPN journal (Gould and Bain, 2023). Less formal impacts have been reported by students and colleagues who have offered positive unsolicited feedback, with one example provided in Appendix 11. It is acknowledged that unprompted feedback is unlikely to be volunteered if it is negative. Also linked to the textbook publication has been a series of speaking engagements at conferences. These have included educational or continuing professional development events for prescribers throughout the UK, and a poster presentation at a conference in Canada. As a distinctive combination of model and framework that replaces a dated tool from

the inauguration of prescribing for nurses, the intention is to work collaboratively with an organisation to further refine and ratify it for dissemination.

Chapter 5 - person-centred care and influences on decision-making

When considering impacts on decision-making for prescribing, the crucial need to attend to wider influences on health was examined through critical analysis of the textbook, related prescribing articles (Gould and Bain, 2022a, 2022b, 2022c, 2022d, 2023), and an additional article on social isolation (Day, Gould and Hazelby, 2020). Although the NPC (1999a,b) prescribing pyramid referred to “negotiating a contract with the patient”, its section on examining the needs of the “patient” has less emphasis on establishing rapport or identifying the person’s perspective of priorities. It indistinctly refers to examining ‘holistic’ needs, while the subsequent NPC (2012) competency framework was more overt on the topic of shared decision making. However, wider influences such as cultural or environmental aspects were not noted until the 2016 version of the prescribing competency framework (RPS, 2016a). The prescribing pyramid (NPC, 1999a,b) illustrated a markedly more practical approach, including the mnemonic ‘2-WHAM’ which is narrow in its scope of questions and originally used by pharmacists when recommending over-the-counter products.

The practical RAPID-CASE (Gould and Bain, 2022a) signalled the value of a person-centred attitude from the outset through selected terminology or nomenclature. For example, the model and publications purposely avoid using the word “patient” to describe someone in a practitioner’s care. That small but deliberate choice to identify recipients of health care as “people” or a “person” intends to model best practice and remind readers and students from the outset that they are not prescribing for a condition, or ailment, but for a person who may, or may not be experiencing these. This has been reflected in some publications (such as NMC, 2024), although it is notable that many public documents such as the most recent CFAP (RPS, 2021) continue to use the term “patient” or “patient-centred care” instead person or person-centred. Cox and Fritz (2022) note that word choice and language usage can impact the therapeutic relationship and make a strong case for reconsideration of the term “presenting complaint”, while Park *et. al*, (2021) provide clear examples of stigmatising language found in medical records.

Despite experience, evaluation, and reflection, it remains unclear whether the core message of the person being at the centre of clinical practice is truly embraced by prescribing students or modelled by practitioners. As some of the survey feedback implied the model could be less mechanistic and more person-centred, the proposed revised model (Appendix 6) emphasises the person at every stage including through a "Stop & Think" signpost. This serves to bring the person to the forefront, although it is recognised that changing attitudes and encouraging prescribers to attend to the person's view and priorities can be challenging to capture within a simple model. While the lengthy CFaP (RPS, 2021), with its 76 distinct competencies, goes into greater detail, it is not a tool designed for acting as a consultation aid. A balance is needed whereby prominence is given to the import of the person's view while acknowledging the time and effort this requires, although focusing on the person's priorities is potentially more efficient and effective.

Great emphasis is placed on the financial (and human) costs of prescribing errors (Dornan *et. al*., 2009; Elliott *et. al*., 2018; Alshahrani *et. al,* 2021) but relatively little attention is given to the wastage and impact of unfilled or unused prescriptions. An estimated £300m of medicines go unused with billions of items are dispensed the community setting, but up to 50% of them not taken as intended, and an associated opportunity at reducing costs (RPS, 2016b) and improving care. Examination of psycho-social and public health influences on decision-making for prescribing, and openness to consider alternatives to medicines can help address problems linked to overprescribing, polypharmacy, and a lack of concordance for treatment regimes.

The emphasis on placing control and choice with the person being prescribed for is exemplified by "Elicit - Provide - Elicit" (EPE) (Miller and Rollnick, 2013) within the revised prescribing consultation model. This entails checking the person's comprehension by eliciting their understanding, interspersed with "provide" where information is given. Advocating the use of EPE reminds of the balance required between the practitioner and person in their care so there is not an unsought dominance of practitioner views and responsibilities to the exclusion or diminishing of the person's perspective and priorities. Solutions offered in the article about social isolation (Day, Gould, and Hazelby, 2020) also hold potential to address some of the problems for which medical treatment is sought. For example, social isolation has been linked to poor physical and mental health (Luo *et. al.*, 2012), higher blood pressure (Hawkley *et. al.*, 2010), increased risk of developing heart disease (Xia and Li, 2018),

depression and functional decline (Perissinoto *et. al.*, 2012) and a 40% increased risk of dementia (Sutin *et. al.*, 2018). If a social prescribing, or non-medical solution could be offered, even if to delay the start of medicinal treatment, this would represent a cost-benefit and potential for better quality of life. Using the example of depression, numerous possible treatments for mild to moderate depression that may delay or prevent the need for anti-depressive medicines can be identified, with some of these outlined in Table 6.

Table 6. "Social Isolation in the elderly" key findings summary

Day, Gould and Hazelby (2020) A public health approach to social isolation in the elderly
Methods
A review of previously published literature.
Key findings

• The Covid-19 pandemic significantly increased social isolation.
• Social isolation is a growing issue of major concern for many older people and linked to a variety of medical and mental health conditions.
• Potential solutions include:
  • befriending, mentoring, home visiting, telephone support, or gatekeeping (such as care navigators), or community linkers such as wardens.
  • intergenerational programmes could be considered within the remit of social prescribing and could be a key public health strategy to tackle social exclusion.
  • group interventions targeted at specific needs (for example, diabetes), have an educational angle, or be social activity-based groups (e.g. day centres, community cafes, lunch clubs)
  • programmes to support individuals to increase participation in existing activities (e.g. libraries, gardens), or outreach programmes and volunteer schemes (e.g. professionally-led choirs, etc)
  • arts, gardens, and gardening, which have been shown to have a multi-faceted impact on well-being.

Recommendations

- A public health response and the mobilisation of communities and volunteers to improve health in this hidden, neglected, and marginalised population is needed.
- For older people, district nurses can be the first, or only contact, so there is potential to be alert to factors indicative of loneliness, such as hearing or sight loss, lack of visitors, changes in hygiene, activity or mood, or bereavement.
- Multi-agency and community action are required to respond to the growing concerns caused by social isolation.

Impact

The article on social isolation in the elderly has been extensively read (with over 8,000 reads and noted on Research Gate and 30 citations noted on Google Scholar). The impact on prescribers is less direct, but inclusion of principles in the RAPID-CASE and revised PRESCRIBE-SAFER models, represents a potential influence for these practitioners.

Proposed model

Critically appraising this body of literature prompted a visualisation of the "pieces" needed for practitioners to be able to articulate a clear picture of their clinical decisions. While the PRESCRIBE-SAFER model provides a practical reminder of key features for prescribing decision-making, the model "PIECES" (Figure 3. and Appendix 11) looks more closely at the inner dialogue and outer expressions of clinical reasoning. This positions the need for person-centredness and justifiable decision-making at the forefront, while advocating for self-awareness, critical thinking, and continuing development.

Figure 5. The PIECES Model (Gould, J., 2024)

The explanatory text linked to the model (Appendix 11) centres on questions to be posed pre- and post- consultation. While the model is original, some of the questions stemmed from seminal work by Kennedy (2004) who noted the need for both theoretical (knowing that) and practice-based (knowing how) knowledge. This includes knowing the person, their current needs, how these may change over time, available resources, or services to address these needs, and knowledge deficits (Kennedy, 2004). Additionally, current practice requires the integration of up-to-date, reliable sources of information, an ability to justify decisions, and self-awareness of biases, capabilities, and development needs. An emphasis is also placed on critical thinking or reasoning, as integral to continual progression towards the advanced level practice required of a prescriber.

Conclusion

This critical appraisal sought to demonstrate how peer-reviewed, published works have addressed the key question of what contributes to prescribers' clinical decision-making and improved outcomes for the people in their care.

The objectives were to:

1. critically appraise varied methods of research and knowledge transfer to constructively impact the practice of future prescribers.
2. evaluate how reflexivity, critical thinking, and self-awareness affect practice and examine educational techniques to stimulate these.
3. analyse key influences on personalised decision-making, identifying strategies to optimise its inclusion in prescribing practice.
4. examine how published works including mnemonics and models can contribute to prescribing practice, analyse limitations, and recommend ways to address these.

Research axiology, key philosophies and paradigms were examined and linked to educational theory and strategies. Aspects of the presented published works were examined and reinforced the need for reflexivity, critical thinking, and self-awareness to ensure practice decisions that are not subject to involuntary biases. Some of the educational strategies to promote self-awareness include supportive, targeted feedback, modelling these behaviours and through the revised prescribing model which showcases person-centredness.

This appraisal examined key influences on personalised decision-making, the place of reflexivity, self-awareness, and education, as well as considering the place of mnemonics, models, and guidelines in contributing to best practice to underpin clinical decisions. Key influences on personalised decision-making were evaluated in relation to the use of a revised prescribing consultation model. This appraisal reinforced the need for reflexivity and in research, education, and clinical practice to promote pragmatic, person-centred approaches to care.

While the published works have already had some impact, the potential for further dissemination of decision-aids such as mnemonics and models to contribute to prescribing practice has been highlighted. Limitations have been noted, with several recommendations for addressing them. A stated focus in policy and publications is that of a person-centred approach, as for example, seen in the National Prescribing Centre's (NPC, 2007) "*competency framework for shared decision-making*", that was subsumed in part of the current Competency Framework for all prescribers (RPS, 2021).

However, despite the continued focus on placing the person central to decision-making, the same policies and publications taint this approach by identifying people as patients. This can lead to an unintended consequence of 'patients' being seen as analogous to the problem or condition for which they are presenting, rather than as a person with their own priorities and agenda seeking professional support. While it is acknowledged that models, documents, and policies advocate for a person-centred approach to decision-making, it is proposed that structuring the prescribing model to convey that message clearly and at several points through the consultation holds potential to refocus attention on the person at the centre of care decisions. The examined published works demonstrate teaching and modelling personalisation and offer ways in which research and practice can be further developed.

Recommended future study / areas for development

Supplementary to the works examined within this critical appraisal, the following are priorities for further development.

- Research into the impact of educational feedback on confidence, self-efficacy and prescribing practice.
- Evaluative research into the PRESCRIBE-SAFER model to contribute to its further development.
- Seek collaboration with an authority such as the National Institute for Health and Care Excellence (NICE) or a charity to work collaboratively to gain endorsement of the model and improve its dissemination.
- To continue to engage with regulators and policy developers to advocate for changing accepted terminology from "patients" to people / persons.
- To develop a new "Evidence-Informed Decision" (EID) model to simplify the hierarchies of evidence outlined in Figure 2 and place the practitioner central.

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Appendix 1- List of published works

ORCID Link: https://orcid.org/0000-0001-6567-8435

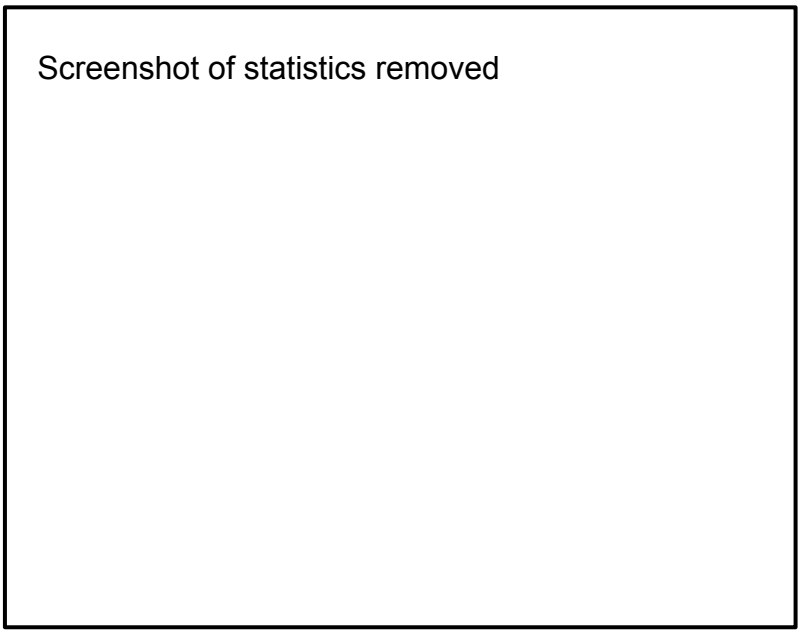
The pages to follow comprise details and snapshots of information taken on **May 17, 2024** for each of the published articles considered within this critical appraisal. The numbers will have changed since then as the reads etc. increase each day.

Information includes:

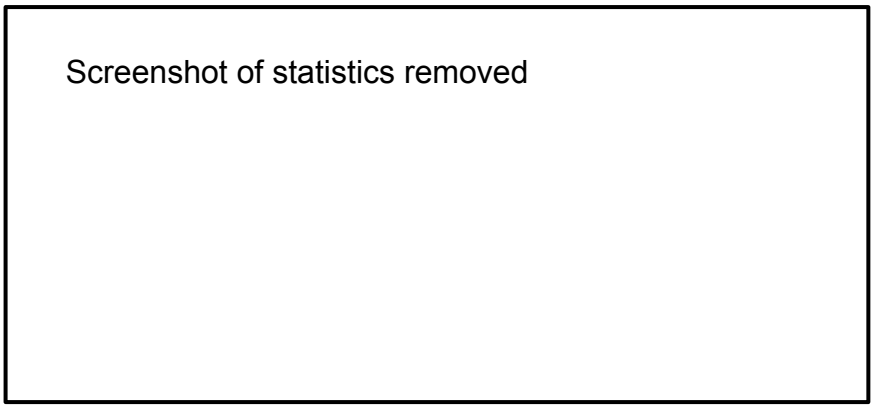
1. Reference for the publication and a link to the full text version (where available).
2. Author contribution details (Signed forms uploaded to the research system)
3. A description of the Journal / publisher and why it was selected.
4. Details of the article's reach including:
    a. Number of citations (various sources)
    b. Number of reads (Research Gate)
    c. Research interest score impact (where available)
    d. Other pertinent information

While this information is specific to the included publications, below is a snapshot summary of my published works from Research Gate and Google Scholar.

Research Gate



Google Scholar



List of included published works

1 Gould, J. and Day, P. (2012) Hearing you loud and clear: student perspectives of audio feedback in higher education, *Assessment & Evaluation in Higher Education*, DOI:10.1080/02602938.2012.660131
https://www.tandfonline.com/doi/abs/10.1080/02602938.2012.660131

Author Contribution	JYG 50%	PD 50%

This is a peer reviewed Journal with very good reach and research impact factor of 4.440. It has only a 12% acceptance rate and is a recognised leader in the field of assessment in higher education. This Journal was chosen as it was directly related to the research aims and findings and considered to be a distinguished journal for this topic area.

- TandF online reports 2,382 views and 49 Cross Referenced Citations.
- Research Gate (RG) reports 602 reads, a research interest score of 55.6 with 99 citations.
- Google Scholar reports 146 citations.
- Semantic Scholar notes 85 citations, 5 of which are “Highly Influential.”

TandF online

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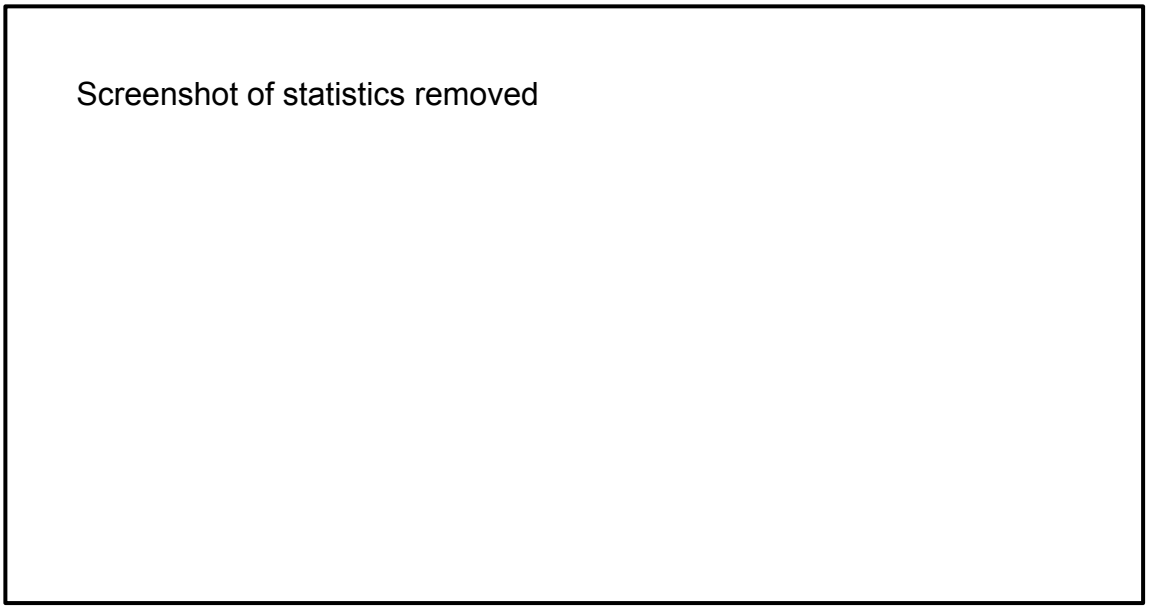
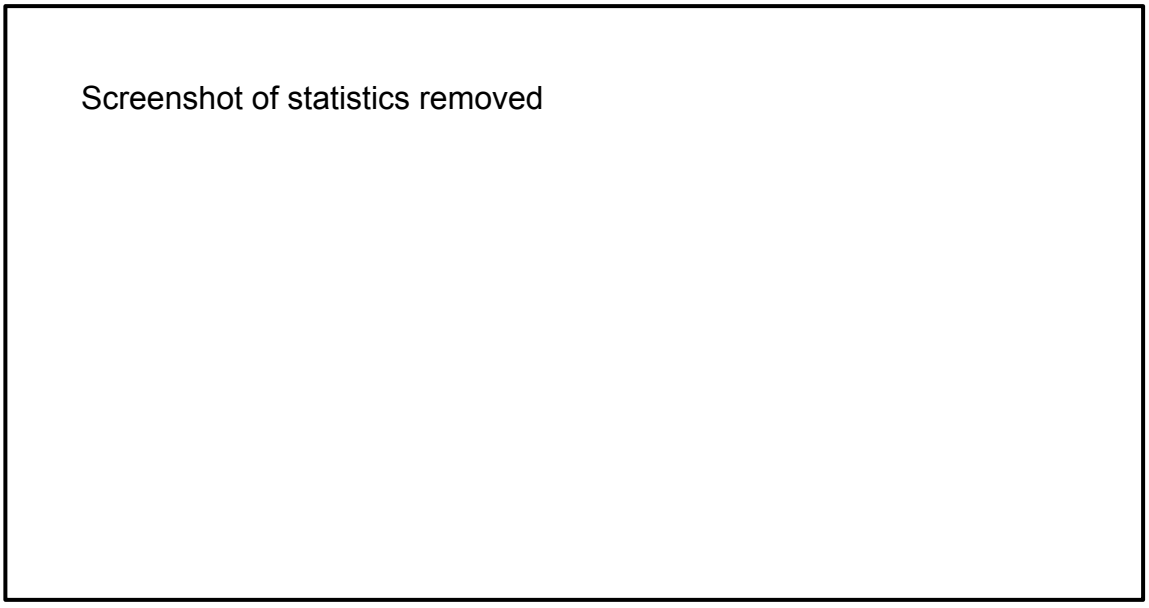
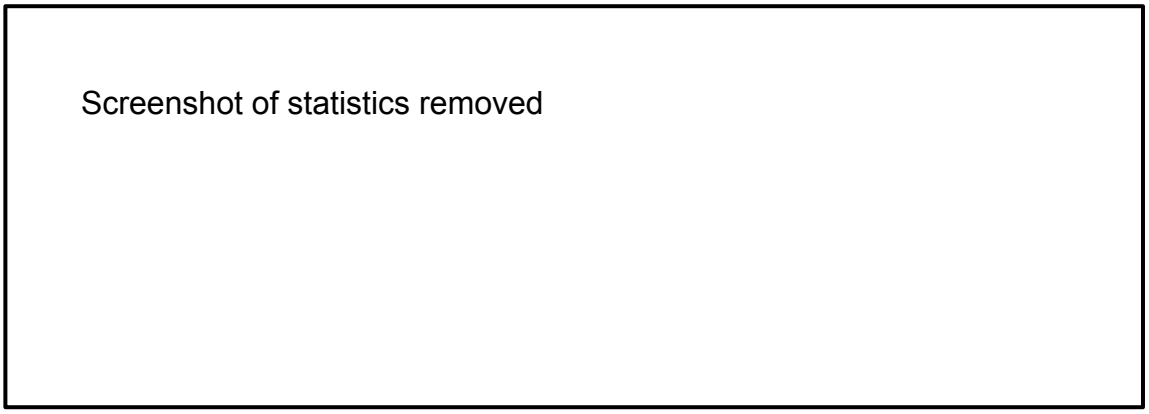
List of included published works







2 Brown, I. and Gould, J. (2013) Qualitative studies of obesity: A review of methodology. *Health*, 5, 69-80. doi: 10.4236/health.2013.58A3010 https://www.scirp.org/journal/paperinformation.aspx?paperid=36211

Author Contribution	JYG 50%	IB 50%

This is a peer reviewed Journal with excellent reach. The Journal's impact factors are as follows: h5-index: 21; h-index: 52; and Impact Factor: 0.74. It was primarily chosen for its open access and potential impact as this was an NHS funded research project and it was of highest priority to get the article published in an Open Access Journal.

- Health Journal notes the article has had 17,294 downloads, 33,229 views and 19 citations.
- Google Scholar reports 21 citations.
- Research Gate reports 4979 reads and 13 citations.

Health Journal

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Google Scholar

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List of included published works

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3 Day, P., Gould, J., and Hazelby, G. (2020). A public health approach to social isolation in the elderly. *Journal of Community Nursing*, 34(3), 54–59. https://www.jcn.co.uk/journals/issue/06-2020/article/a-public-health-approach-to-social-isolation-in-the-elderly

Author Contribution	JYG 50%	PD 30%	GH 20%

This is a peer reviewed Journal that is freely and widely disseminated internationally to community practitioners. This Journal was chosen primarily for its reach and target audience. This reflects the target audience of my research and education more generally.

- Research Gate (RG) reports 8071 reads, a research interest score of 52.5 with 14 citations.
- Google Scholar reports 30 citations.

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Google Scholar

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List of included published works

4 Gould, J. and Bain, H. (2022a) *Principles and practice of Nurse prescribing-Transforming Nursing Practice Series* Publisher: SAGE Publications Ltd ISBN: 9781526469908 https://uk.sagepub.com/en-gb/eur/principles-and-practice-of-nurse-prescribing/book265193

Author Contribution	Redacted	

The publication by Sage as part of their "Transforming Nursing Practice" series brought with it the advantage of every chapter being peer reviewed as the writing progressed. It was also chosen due to the potentially wide readership. Sage report that sales have exceeded expectations having sold over 1500 copies in the first 2 years. On the back of this publication, a second textbook has been commissioned and the authors have been invited to speak at several UK conferences.

- Google Scholar notes 3 citations.
- Research Gate notes the textbook information page has 693 reads and the textbook has 4 citations.
- The Research Gate page of the RAPID-CASE model (rather than the textbook information) indicates 4678 reads

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List of included published works

5 Gould, J., and Bain, H. (2022b) The professional, legal and ethical dimensions of prescribing. Part 1: professional. *Primary Health Care*. doi: 10.7748/phc.2022.e1773 https://journals.rcni.com/primary-health-care/evidence-and-practice/professional-legal-and-ethical-dimensions-of-prescribing-part-1-professional-phc.2022.e1773/abs
Accepted version Via UDORA: https://repository.derby.ac.uk/item/97y5x/professional-legal-and-ethical-dimensions-of-prescribing-part-1-professional

Author Contribution	Redacted	

This is a highly respected peer reviewed Journal that is part of a suite of Journals from the Royal College of Nursing (RCN). This Journal was chosen as it is read by practitioners who regularly prescribe. However, a limitation is a lack of public access – only practitioners and HEIs who subscribe to “Primary Health Care” can access the article. The University of Derby does not subscribe.

- Research Gate (RG) reports 376 reads.
- Google Scholar reports 1 citation.

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6 Gould, J., and Bain, H. (2022c) The professional, legal and ethical dimensions of prescribing. Part 2: legal and ethical. *Primary Health Care*.
doi: 10.7748/phc.2022.e1774 https://journals.rcni.com/primary-health-care/evidence-and-practice/professional-legal-and-ethical-dimensions-of-prescribing-part-2-legal-and-ethical-phc.2022.e1774/abs
Accepted Version UDORA
https://repository.derby.ac.uk/item/9ww62/professional-legal-and-ethical-dimensions-of-prescribing-part-2-legal-and-ethical

Author Contribution	Redacted	

This is a highly respected peer reviewed Journal that is part of a suite of Journals from the Royal College of Nursing (RCN). This Journal was chosen as it is read by practitioners who regularly prescribe.

- Research Gate (RG) reports 378 reads.
- Google Scholar reports 1 citation.

Research Gate

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Google Scholar

Screenshot of statistics removed

7 Gould, J. and Bain, H. (2022d) Assessment framework for prescribing: lower limb skin tears *August 2022 Journal of Community Nursing 36(4):42-49*
https://www.jcn.co.uk/journals/issue/08-2022/article/assessment-framework-for-prescribing-lower-limb-skin-tears
Reprint: Gould, J. and Bain, H. (2023) Applying a prescribing model to a skin-tear injury *Journal of General Practice Nursing, September 2023, pp.53-59*

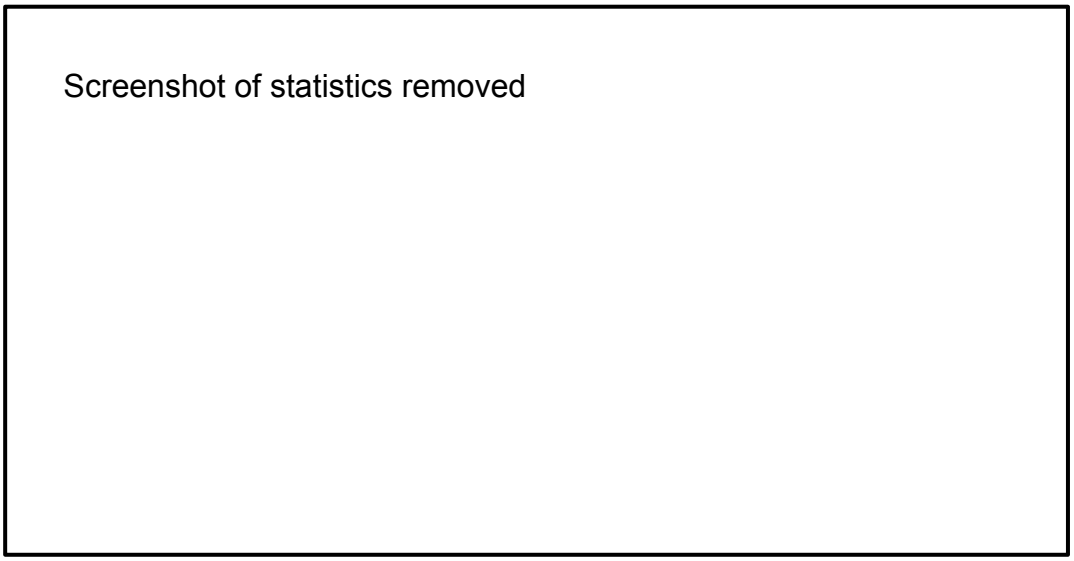
https://www.journalofpracticenursing.co.uk/journals/issue/09-2023/article/applying-a-prescribing-consultation-model-to-a-skin-tear-injury

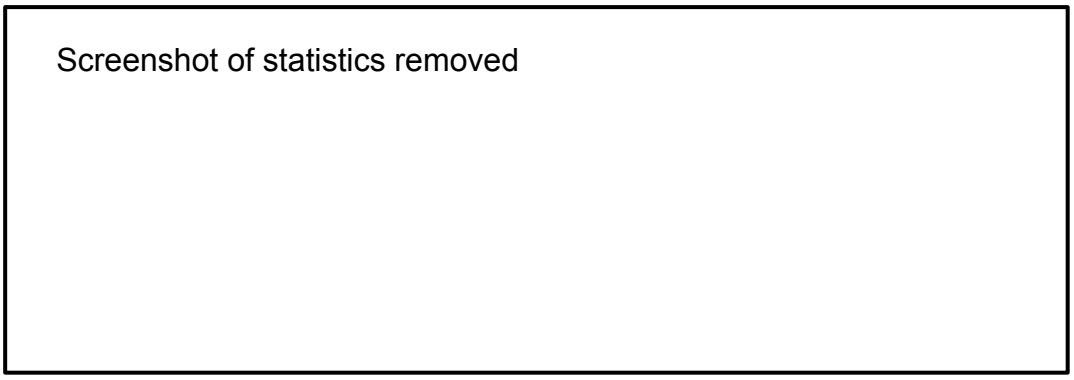
Author Contribution	**Redacted**	

This is a peer reviewed Journal that is freely and widely disseminated internationally to community practitioners. This Journal was chosen primarily for its reach and target audience. The article was published in the 50-year celebration edition and widely disseminated.
The reprint was published one year later in another journal by the same publisher (Journal of General Practice Nursing).

- Research Gate (RG) reports 100 reads and 1 citation.
- Google Scholar reports 1 citation.

List of included published works





8 Gould, J. and Day, P. (2024 tbc) Sound and vision: a contextual exploration of audio-visual feedback in post-COVID-19 higher education*, The Journal of Learning Development in Higher Education* (JLDHE) (Publication date TBC)

On advice of the journal's editor, the 10,000+ word article was divided into two parts: one to present the research findings and another for the literature review.

The first article (research) was submitted to an Open Access, peer review journal and is undergoing the review process. A pre-print link will be made available asap.

The Journal of Learning Development in Higher Education (JLDHE) is an open-access peer-reviewed journal that provides a forum for researchers writing about educational practices and theoretical and methodological approaches to learning in higher education. It is indexed by the DOAJ (Directory of Open Access Journals) and Google Scholar, as well as linked to CrossRef.

JLDHE is aimed at those interested in all aspects of how learning is facilitated and how it is experienced by students in higher education, in the UK and internationally.

Appendix 2 – Glossary

Item	*Definition*
ADHD	Attention Deficit Hyperactivity Disorder
AHP	Allied Health Professional (e.g. physiotherapist or paramedic)
BACCN	British Association of Critical Care Nurses
BNF	British National Formulary
CA	Critical Appraisal
CFAP	Competency Framework for All Prescribers
CPD	Continuing Professional Development
CPNP	Community Practitioner Nurse Prescriber
EID	Evidence-informed Decision
EPE	Elicit – Provide - Elicit
GMC	General Medical Council: the regulator for doctors within the UK.
GPhC	General Pharmaceutical Council; the regulator for pharmacist practitioners, pharmacy technicians, and pharmacies within the United Kingdom (aside from Northern Ireland – their regulator is the Pharmaceutical Society of Northern Ireland (PSNI).
HCPC	Health and Care Professions Council: the regulators for allied health professionals in the United Kingdom (UK). These include many professions, but those eligible for Independent and Supplementary prescribing are: Physiotherapists, Podiatrists and Paramedics
JFC	Joint Formulary Committee (authors of the British National Formulary)
MHRA	Medicines Healthcare Regulatory Agency
NICE	National Institute for Health and Care Excellence
NMC	Nursing and Midwifery Council (NMC)
NPC	National Prescribing Centre
RAPID-CASE	**Rapport, Assessment, Psycho-social, Investigations, Diagnosis; Cost-effective, Appropriate, Safe, Evidence-based**
SIGN	Scottish Intercollegiate Guideline Network
UOD	**University of Derby**
2-WHAM or WWHAM	This is a mnemonic for**: W-** Who is the medicine for? **W-**what are the symptoms **H**- How long have you had the symptoms **A**- What action has been taken **M**- Are you taking any other medication

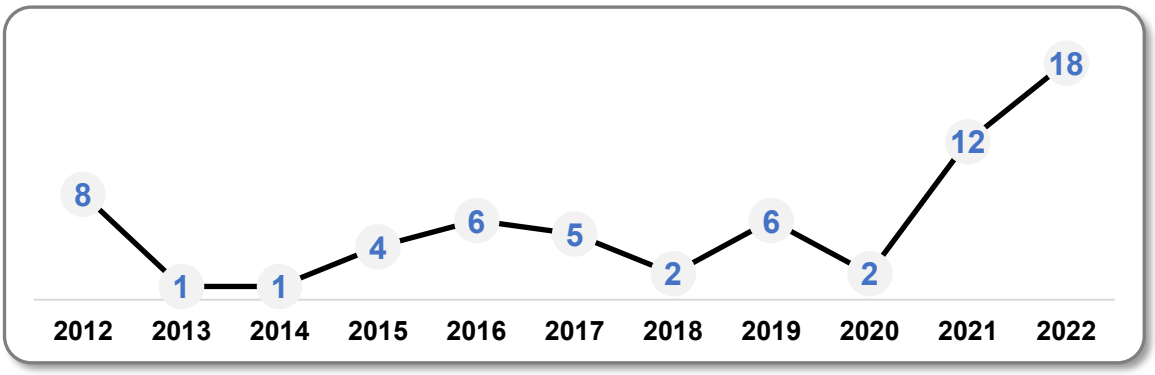
Appendix 3 - Types of prescribers

Regulator	Title description	Formulary
Nursing and Midwifery Council (Code: V100)	**Community practitioner nurse prescriber** Integral to the Specialist Practitioner Qualification (district nursing /general practice nursing, and so on) education programme and optional in a Specialist Community Public Health Nursing course	Can prescribe independently from the NPF for Community Practitioners
Nursing and Midwifery Council (Code: V150)	**Community practitioner nurse or midwife prescriber** Prescribe from the Nurse Prescribers' Formulary (NPF) for Community Practitioners as a stand-alone course, not linked to a specialist or other post-registration nursing programme	
Nursing and Midwifery Council (Code: V200)	**Nurse or midwife independent prescriber** Programmes no longer offered but there are still some NMC registrants with this qualification. Were able to prescribe from an 'extended formulary' before legislative changes in 2003 to add supplementary prescribing. V200 prescribers can now prescribe as independent prescribers on the same basis as V300 prescribers but not as supplementary prescribers	Can prescribe independently from the full British National Formulary (BNF) with 3 Controlled Drug exceptions.
Nursing and Midwifery Council (Code: V300)	**Nurse or midwife independent and supplementary prescriber.** Qualification for prescribing courses for nurses or midwives to prescribe any medicine for any condition within their competence with some controlled drugs exceptions. This title includes supplementary prescribing, that is partnership working with a doctor or dentist to implement a clinical management plan in agreement with the individual being prescribed for, and its holder can prescribe within a clinical management plan	Can prescribe independently from the BNF with 3 controlled drugs exceptions and from the full BNF as a supplementary prescriber
General Pharmaceutical Council (GPhC) (SP / ISP)	From 2003, Pharmacists were only able to undertake supplementary prescribing (as defined above), and this changed in 2006 when they were authorised to be Independent and Supplementary prescribers (ISP)	Initially only supplementary, the as above (V300)

General Pharmaceutical Council (GPhC) (IP)	From 2018, the GPhC changed the title to “Independent Prescribers” and new Pharmacist prescribers (PIPs) are no longer able to practice as supplementary prescribers.	Can prescribe independently from the full BNF with 3 Controlled Drug exceptions.
Health and Care Professions Council (HCPC) (SP / ISP)	Four types of HCPC registrants can train to become Independent and Supplementary Prescribers. Physiotherapists, Podiatrists, Paramedics and Therapeutic Radiographers. Each of these has limited access to specific Controlled Drugs.	Can prescribe independently from the BNF with CD restrictions and from full BNF as a supplementary prescriber
Health and Care Professions Council (HCPC) (SP)	Other types of HCPC registrants can only prescribe as a supplementary prescriber. This is mainly dietitians and radiographers.	As a supplementary prescriber only.
Nursing and Midwifery Council (2023b), Health and Care Professions Council (2023), General Pharmaceutical Council (2023), Gould and Bain (2022a,c).		

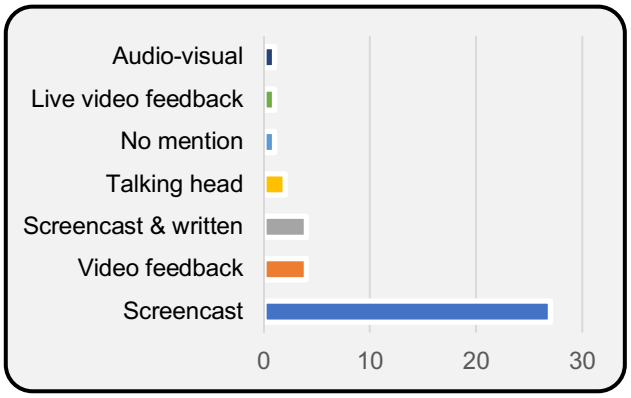
Appendix 4 – Audio-visual feedback article Scoping review

Scoping review: Literature review articles by year (2012 - 2022)



Scoping review: Sample and number of studies by video feedback type

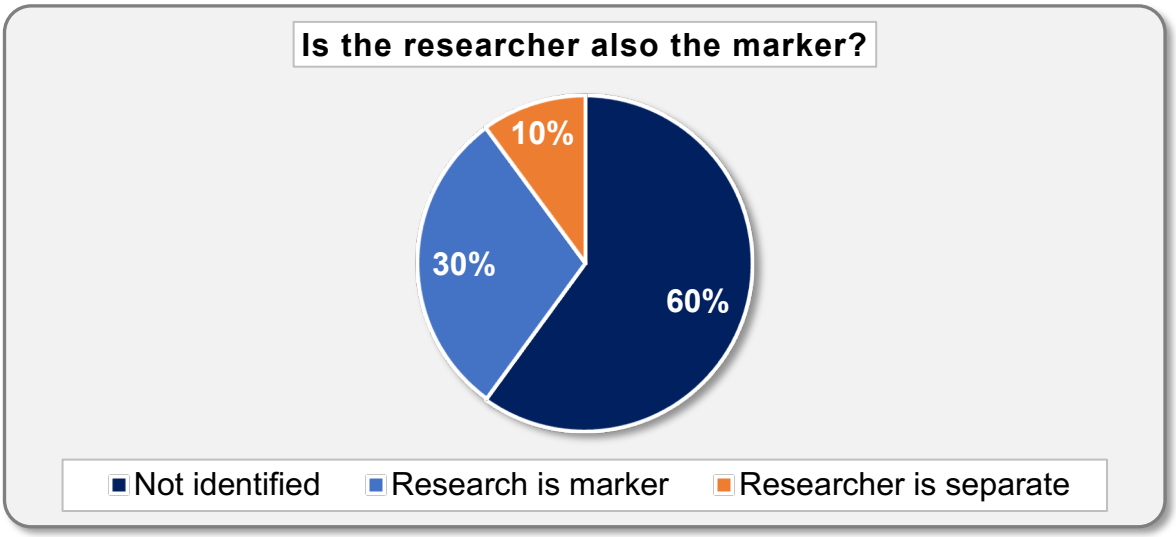
Method of Video Feedback	Sample total
Live video feedback	**16**
No mention	**25**
Audio-visual	**50**
Screencast & written	**158**
Talking head	**197**
Video feedback	**617**
Screencast / Digital Recordings	**6002**
Total	**7065**



Scoping literature review:

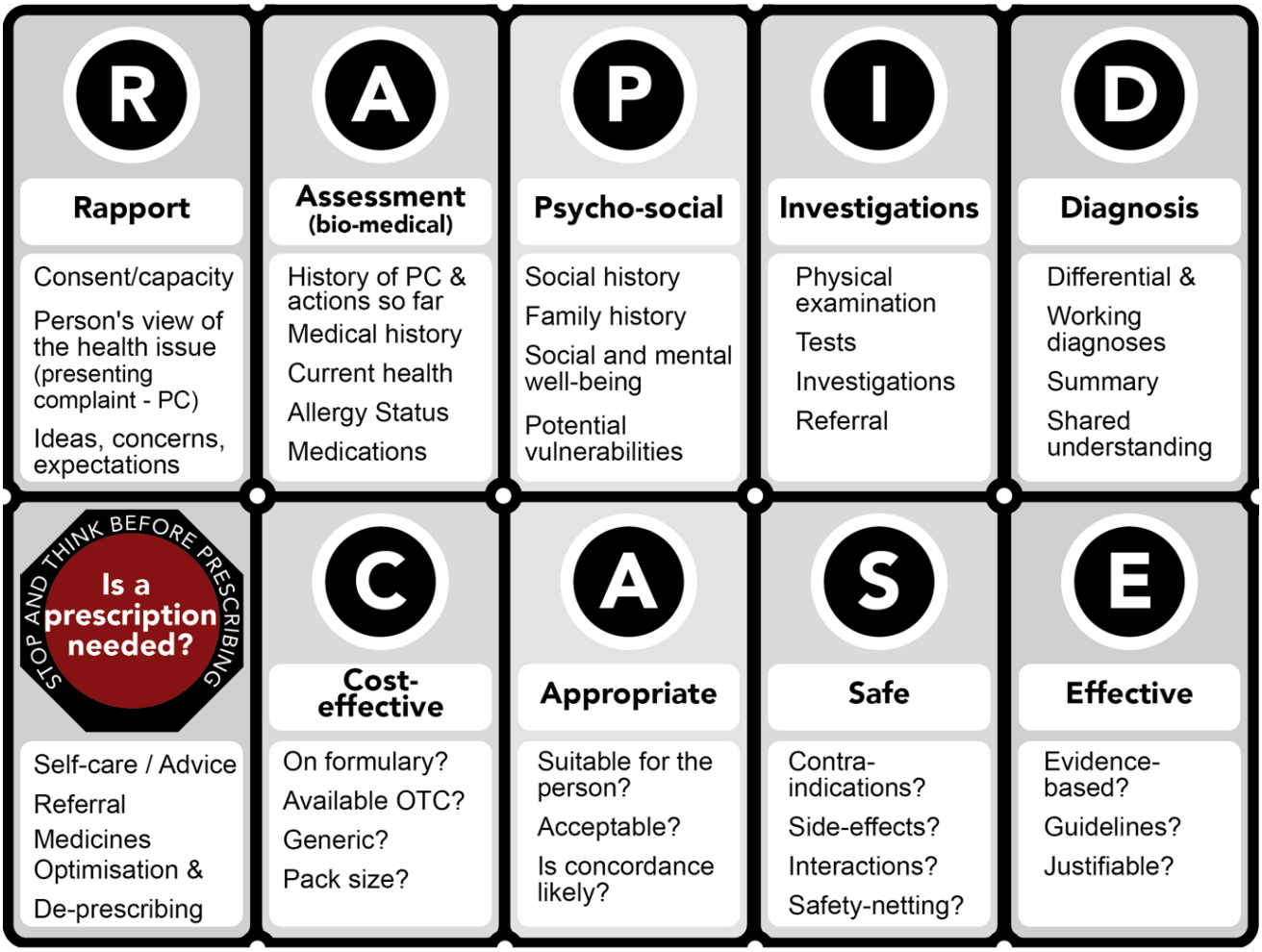
As per Figure 5, a significant number of study authors either didn't state whether the marker was the researcher (60%, n=24) or stated the researcher was also the marker (30%, n=12), with only 10% noting a separation between these roles.

Figure 5. The researcher as marker



Appendix 5 – RAPID-CASE Prescribing model

The original RAPID-CASE model from the “Principles and practice of Nurse prescribing” (Gould and Bain, 2022a, p55).



Appendix 6 – RAPID-CASE Survey findings

A summary of the key findings of the RAPID-CASE consultation model evaluation

Survey results screenshots removed

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Survey results screenshots removed

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Survey results screenshots removed

Appendix 6 – RAPID-CASE Survey findings

A summary of the key findings of the RAPID-CASE consultation model evaluation

Survey results screenshots removed

Appendix 7- List of Conference attendances

***In date order – most recent first**

2024	
September 2024	Abstract accepted: Gould J. and Bain H. (2024) *Developing clinical reasoning for advanced practice prescribing*. ICN NP/APN Network Conference 2024, 9-12 September 2024, Aberdeen, UK.
March 2024	Gould J. (2024) *Evaluation of a prescribing consultation model*. College of Health, Psychology and Social Care Research Showcase. University of Derby. March 5, 2022
2023	
November 2023	Gould J. (2023) *Evaluating a prescribing consultation model RAPID-CASE*. Association of District Nurse and Community Nurse Educators, Online development and networking meeting. (Online), November 20, 2023.
September 2023	 Gould J (2023) *Evaluating a prescribing model.* Wounds Canada, Niagara Falls, Ontario, Canada, September 28, 2023
July 2023	Gould J. (2023) *Developing prescribing practice.* University of Lincoln Prescribing Conference 2023. 12 July 2023; Lincoln, Lincolnshire. 12th July 2023
May 2023	Gould J. (2023) *Research development: Prescribing model research* Nursing in the Community Conference; Sleaford, Lincolnshire. 12th May 2023
April 2023	Gould J. (2023) *Developing prescribing practice – RAPID-CASE for prescribing consultations.* Queen's Nursing Institute. East Midlands regional conference 22 April 2023
2022	
November 2022	Gould J. (2022a) *Prescribers expanding scope of practice;* Solent NHS Trust Non-medical Prescribing conference. Thursday 17 November 2022, Southampton, Hampshire
June 2022	Day P, Hazelby G and Gould J (2022) "*Using Motivational Interviewing to promote health across the lifespan whilst emerging from the pandemic*". International Collaboration for Community Health Nursing Research; Linnaeus University, June 22, 2022

Appendix 8 – Revised Prescribing Model: PRESCRIBE-SAFER

PRE	S	C	R	I	B	E
Pre-assessment	**Stop and Think**	**Communication**	**Relevant history**	**Investigations**	**Bio-psycho-social**	**Evidence-based Diagnosis**
The person Do you know them? Have you accessed records and noted relevant information? **You** Previous experience. Awareness of scope, limitations, potential biases, or knowledge gaps.	 Your priorities as a professional. The person's priorities.	Assessment of mental capacity & communication needs. Informed consent. Active listening: Ideas, Concerns Expectations. Agreeing priorities for the consultation. Observing for cues.	Presenting history and actions so far; Medical / surgical and mental health history; Current health and lifestyle factors; Allergy status; Current medication prescribed & other.	Physical examination (as appropriate); Clinical tests / investigations; referral Use of tools or scales; checking if tools account for individual features (such as a variety of skin tones).	Family history and genetic factors Social and mental well-being; Equality, diversity inclusion and human rights; Potential vulnerabilities / safeguarding.	Diagnostic indicators. Differential Diagnoses; Working Diagnosis; Summary and Shared Understanding
At all times: **assess the person's status**	**S**	**A**	**F**	**E**	**R**	**Post consultation / decision**
  	**Stop and Think**	**Appropriateness & safety**	**Formulary**	**Environmental & Cultural**	**Review & Safety-netting**	Clear, concise, and contemporaneous record-keeping. Follow-up outcome; report and record; MHRA Yellow card report as needed. Reflect on clinical decisions and identify learning or evidence gaps. Add to personal formulary.
	 Alternatives? Lifestyle changes? Social Prescribing? De-prescribing?	Suitability for the individual; capability of person / carer for safe administration. Contra-indications cautions, side-effects, interactions considered. Acceptability to the person? How likely is concordance?	On local formulary? Adherence to or deviation from guidelines? Evidence based? Is the shared decision justifiable and cost-effective?	Sustainability & environmental impact with attention to pack size and wastage. Have public health, culture, religion, equality, diversity, and inclusion been considered?	Eliciting their understanding & providing safety netting advice. Agreeing a plan for monitoring, review, and follow-up. Eliciting their understanding of directions, review, and safety advice.	
			Anti-microbial stewardship?			

Appendix 9 – Textbook Sales data

Image removed

Figure 1. Book sales across 2 years with a peak ranking of **3243** in all books on Amazon.

Figure 2.
A peak ranking of **4th** in the category of "Pharmacology nursing"

Image removed

Figure 3.
A display at the Prescribing conference (University of Lincoln, July, 2022)

Appendix 10 – Textbook review

Review image removed

Available at: https://www.magonlinelibrary.com/doi/abs/10.12968/jprp.2023.5.4.172

Appendix 6 – RAPID-CASE Survey findings

A summary of the key findings of the RAPID-CASE consultation model evaluation

Survey results screenshots redacted

Subject: Feedback
Date: Friday, 30 June 2023 at 13:58:11 British Summer Time

Student feedback email screenshot removed

District Nurse Student

Appendix 12 – PIECES Model

The PIECES model to prompt critical thinking and reflection on episode of care. See the next page for some further explanations.

PIECES Model: questions

Pre-assessment:

- ✓ What is my current knowledge on the topic; do I have any knowledge deficits?
- ✓ Is this situation within my scope of practice? Am I safely aware of my limitations?
- ✓ Do I have situational awareness, and a grasp of what may go wrong, or what would prompt a need for urgent action or referral?

Inquiry / investigation:

- ✓ Am I aware of the potential influence of my own personal characteristics or beliefs?
- ✓ Have I investigated areas of unfamiliarity or uncertainty, and knowledge needs?
- ✓ Have I actively listened, attended to the person's concerns and priorities, and gotten to know the person or appropriate others?
- ✓ Have I considered the influences of diversity, equity, and inclusion?

Expertise:

- ✓ Have I applied my knowledge and experience, and that of the person? Do I know what needs to be done now?
- ✓ Have I collaborated with, or sought advice from others? Am I aware of alternatives, resources, or services?
- ✓ Have I elicited the person's understanding, priorities, and possible solutions?

Critical Thinking:

- ✓ Have I used a systematic approach (e.g. consultation model) leading to a logical analysis of the situation and a defensible conclusion?
- ✓ Have I considered biases, knowledge gaps, or alternatives and asked, myself "what else could it be"?
- ✓ Have I considered what may happen in the future?

Evidence:

- ✓ Have I used up-to-date research, expert opinion, or guidelines, to inform assessment, diagnoses, treatment options and advice?
- ✓ Is adherence to or deviation from guidelines justifiable?
- ✓ Have I provided sufficiently detailed information, at a suitable level, to promote understanding and shared decision-making?

Summary:

- ✓ Can I logically explain the decision-making and provide clear safety-netting advice?
- ✓ Have I elicited the person's understanding?
- ✓ Have I reflected on or re-visited this episode of care to evaluate outcomes, my knowledge, skills, or learning needs?