Prerequisites and Responsibility for Appropriate Prescribing – the Prescribers’ View

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Abstract

The overall aim of this thesis was to explore aspects of the subjective views and experiences of doctors as prescribers, focusing on responsibility for and factors of importance in achieving appropriate prescribing. To provide insights into the prescriber’s perspective the study designs were qualitative.

In the first studies secondary care doctors’ perceptions of appropriate prescribing and influences in prescribing were investigated in interviews. The doctors perceived that appropriate prescribing needed continuous revision. From the perspective of the prescribers the definition of prescribing could be rephrased as: “the outcome of the recurring processes of decision making that maximises net individual health gains within society’s available resources”. Among the influences in prescribing were guidelines, colleagues and therapeutic traditions.

In the subsequent studies the experiences of exchanging information regarding a patient’s drugs in an electronic patient medical record (e-PMR) shared between primary and secondary care and views of responsibility was explored, using focus groups with both primary and secondary care doctors. Considering the gap between health care levels, doctors’ views of responsibility in prescribing and exchange of information are of concern.

The doctors expressed how they assume information to be in the e-PMR and active information transfer has decreased. On the other hand, they experienced an information overload in the e-PMR system. There is a need for improved and structured communication between health-care givers. Taking responsibility to review all the patient’s medications was perceived as important, but described as still not done. Lack of responsibility taken was often due to acts of omission, i.e. that doctors did not make needed changes to the list of medications due to different barriers. The barriers rested both with individual doctors and the system, but to ensure solutions that are realisable in practise, perspectives of the doctors need to be taken into consideration when overcoming those barriers.

Keywords: computer-assisted drug therapy, prescription drugs, physician’s practice patterns, drug prescriptions, computerised medical records systems, continuity of patient care, hospital medication systems, drug utilisation review, responsibility

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List of Papers

This thesis is based on the following papers, which are referred to in the text by their Roman numerals.


III Ljungberg, C., Kettis Lindblad, Å., Mörlin, C., Schwan, Å., Tully, M. P. Primary care and hospital doctors’ experiences of prescribing information transfer using a shared electronic patient medical record system. (In manuscript)


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<tr>
<td>DIKW</td>
<td>Data-Information-Knowledge-Wisdom</td>
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<tr>
<td>EES</td>
<td>Elektroniskt expert-/expeditionsstöd, (electronic expert/dispensing support)</td>
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<td>e-PMR</td>
<td>Electronic patient medical record</td>
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<td>FASS</td>
<td>Farmaceutiska Specialiteter i Sverige, the Swedish Medicines Compendium</td>
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<tr>
<td>GP</td>
<td>General practitioner, doctor in primary care</td>
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<tr>
<td>MAI</td>
<td>Medication Appropriateness Index</td>
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<tr>
<td>NPÖ</td>
<td>Nationell patientöversikt (National patient summary)</td>
</tr>
<tr>
<td>PAI</td>
<td>Prescribing Appropriateness Index</td>
</tr>
<tr>
<td>SBAR</td>
<td>Situation, Background, Assessment and Recommendation</td>
</tr>
<tr>
<td>SBU</td>
<td>Statens beredning för medicinsk utvärdering, (The Swedish Council on Health Technology Assessment)</td>
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<tr>
<td>SEK</td>
<td>The currency of Sweden: Swedish crowns</td>
</tr>
<tr>
<td>SIL</td>
<td>Svensk Informationsdatabas om Läkemedel (Swedish informational database of drugs)</td>
</tr>
<tr>
<td>SKL</td>
<td>Sveriges Kommuner och Landsting (The Swedish Association of Local Authorities and Regions)</td>
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<td>WHO</td>
<td>World Health Organization</td>
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Background

Typing “prescribing” or “prescribing of drugs” into Google produces millions of hits. These include, on the first page, everything from formalized policies and guidelines to gossip about the death of Anna Nicole Smith. This surfeit of references shows the many forms in which information about prescription drugs can be encountered and also shows that all of us can probably relate to the issue in some way. In Sweden drugs sold on prescription are those that can lead to risk for the patient, even if used correctly, or those that are often used in the wrong way. Prescription drugs can also contain substances that need to be further investigated or need parental administration. (1) Hence, contact with health care personnel is necessary.

In Sweden drugs, including both non-prescription and prescription drugs, were sold for 34.5 billion Swedish crowns (SEK) in 2008. The cost is increasing; as a comparison it was 23.5 billion SEK in 2000, which can be explained by more individuals using drugs and a growing elderly population. The use of new and expensive drugs has increased as well. Prescription drugs used in community health care account for 71% of the total drug sales in Sweden 2009 and drugs used in secondary care for 18%. (2)

Most drugs are thus prescribed by primary care doctors. They handle prescribing for more common diseases, as well as prescribing of preventive therapies. The prescribing process in the more specialised secondary care is, however, also important, not only in itself but because of its influence on prescribing in primary care. (3–4) Looking at costs, prescribing in secondary care contributed most to the increase of total drug costs in Sweden in 2009. (2)

In research on prescribing, studies often describe prescribing in specific drug categories, such as psychotropic drugs or antibiotics. These studies are often quantitative, trying to estimate the burden of inappropriate prescribing in these drug categories. Besides the studies of specific drug categories, the literature contains many studies of different patient groups, such as patients with specific diseases or of different age groups, with prescribing for the elderly as most common. The setting for studies of prescribing of drugs is mostly primary care.
Patients who are prescribed drugs visit both secondary care and primary care intermittently, depending on their current needs. The patients also often use drugs from several different drug categories and belong in several patient groups concurrently. The patient’s use of both primary and secondary care means that the information about the drugs the patient is on resembles a puzzle where the pieces do not always fit together. Deficits in the information transfer regarding the patient’s drugs can result in inappropriate drug use, drug-related hospital admissions and contribute to adverse events. (5-7) Considering the significance of the outcomes of prescribing, the importance of appropriate prescribing becomes evident.

The prescriber

In Sweden doctors, dentists, veterinary surgeons, midwives, dental nurses and district nurses can all prescribe drugs to various degrees. This thesis is, however, limited to doctors as prescribers. Swedish doctors are free to prescribe what they choose for use in humans, as long as it is compatible with science and reliable experience. (8)

Research on the prescriber has focused on how the prescriber makes the prescribing decision, looking at cognitive processes, for example, by using written patient cases and letting the prescriber consider them. (9-10) Methods common in marketing research, such as perceptual mapping, have also been used. (11) Examples of factors that have been found to influence the prescriber are shown in Figure 1.

As is evident from Figure 1 (page 15), prescribing is a complicated phenomenon, being influenced by personal, political, economical and organisational factors. Still, the doctor will find him- or herself at the front line, and has the direct power to influence prescribing. Although prescribing is a well-studied subject quantitatively, qualitative studies are less common, yet they provide important insights into the complexity of prescribing. Qualitative studies have, for example, contributed a deeper understanding of how clinical experience influences hospital doctors’ views of appropriate prescribing, in that it promotes a more holistic perspective of patient care. The importance of self-perception for GPs’ prescribing, and GPs’ different perspectives of prescribing depending on whether they focus on biomedical factors, the patient or society, are other examples. (12-14)
Appropriate prescribing

In spite of all the literature being published in the field of prescribing there are few definitions of appropriate prescribing. More general descriptions of what constitutes good prescribing have included: maximising effectiveness, minimising risks, minimising costs and respecting patient choices. (15)

Buetow et al. (16) defined appropriateness as “the outcome of a process of decision making that maximises net individual health gains within society’s available resources”. Appropriateness is then the outcome if the patient receives the “right” drug, regardless of on what grounds the prescribing decision is based. The outcome is regarded here as the immediate outcome of the prescribing decision, i.e. the prescription, rather than longer-term outcomes for the patient. (17) Prescribing can be rational, regarding the process of decision making, but still inappropriate, if the decision is for example based on too little or incorrect information. Information in this respect is both the general information the prescriber has, like information about the drug and treatment guidelines, but also experience from previous patients and patient-specific information, such as other drugs used by the individual, other diseases and drug allergies. Hospital doctors in the UK have been asked how they judge appropriateness in their own or their colleagues’ prescribing decisions, and they described appropriate prescribing as prescribing that is indicated, necessary, evidence-based and of acceptable cost and risk-benefit ratio. (18)

Even though definitions are scarce, the view of appropriate prescribing can be reflected in the way it is evaluated using indicators of appropriate prescribing. An indicator is a signal for attracting attention, a criterion that should be met. (19) The choice of an indicator should be based on relevance, validity and measurability, and the outcome of the indicator must be possible to interpret with respect to quality. (19) Examples of dimensions evaluated can be over- or under-prescribing and mis-prescribing, i.e. choosing the wrong drug. (20) Examples of indicators for individual drug use previously published are the Medication Appropriateness Index (MAI), (21) the Prescribing Appropriateness Index (PAI) (22) and indicators for appropriateness in long-term prescribing. (18, 23-24) Examples of indicators from the different indexes are, regarding the indication for the drug: “Is there an indication for the drug?” (MAI); “The indication for the drug is recorded and upheld in the BNF (the British National Formulary)” (PAI); and “The indication for the drug is recorded in the inpatient medical record” (long-term prescribing).
Appropriate prescribing can be described in theory, with factors that should be taken into consideration in an ideal process. In practice many things can influence the individual prescriber’s decision, and they are not all part of the ideal process. Exploring these factors is important if achieving appropriate prescribing is desired.

Influences on prescribing

A prescribing decision is affected by many things, indeed “prescribing can be regarded as a function of the patient, the prescriber and the environment.” (20) Different factors within these categories are described below, with some examples of how they have been described to affect prescribing behaviour. Figure 1 gives an overview of different factors affecting prescribing, illustrating the complexity of the issue. Although this was prepared for prescribing in the Canadian context, many of the factors have international relevance.

The prescriber

Factors influencing the prescriber in making prescribing decisions include education, knowledge, skills and attitudes. Assumptions about the patient and experience with drugs, (25) also called experiential knowledge, knowledge of the patient and scientific knowledge (26) are other factors. In acquiring this knowledge there are many information sources for the individual doctor to deal with. There are textbooks, scientific journals, guidelines, local recommendations and formularies, just to name a few. This can be a bit daunting; one doctor estimated that that to keep up to date in general internal medicine he would have to read 20 articles each day. (27)

Accessibility to drugs is another factor. In prescribing, there can be many different preparations to choose from; in Sweden almost 10,000 drugs are approved for use. (28) It has been described how the doctor has an “evoked” set of drugs, the drugs he or she usually chooses between for the indication. Habits also influence prescribing decisions. The doctor can choose a drug by habit or through active problem solving. (29) Prescribing decisions without much consideration, habitual behaviour, has been observed to be as high as 40% when general practitioners were asked to treat hypothetical patient cases. Drug allergies, possible drug-drug interactions, side-effects and cost were often not considered. (30) GPs themselves think that cost is an important issue, but rank effectiveness and safety first. (31)
Figure 1. Factors affecting prescribing during the clinical encounter, as reviewed by Sketris et al. (25)
The patient

The patient is an important source of influence in prescribing. Just to name a few of the factors, the patient’s experience of illness, values, beliefs and preferences can affect the prescribing decision, as reviewed by Sketris et al. (25) (Figure 1). The patient often knows which drugs have been prescribed, but more importantly which drugs are, or will be used. The patient’s expectations also play a role in prescribing, as doctors sometimes make prescribing decisions with which they are uncomfortable to meet the patient’s demands. (32-33) In view of the increased focus on shared decision making in health care, the impact of patient influence on prescribing may become more manifest. Shared decision making can be combined with evidence-based medicine, but there are barriers to the implementation. (34-35) Examples of such barriers are time constraints and attitudes of the prescriber. (36)

The environment

Different factors within the organisation of the practice influence prescribing, such as the organisational culture and access to multidisciplinary services like specialist nurses, pharmacists or clinical pharmacologists. (25) Prescribing decisions made by hospital doctors are affected by the hierarchy in the hospital and relationships to other members of the hospital multidisciplinary team; the doctors prescribe what is expected of them even though these decisions can be uncomfortable. (32, 37) Colleagues are an important part of the environment; doctors in training in primary care often use colleagues for information exchange, rather than scientific literature. This could be out of convenience, as colleagues are sometimes closer at hand. (38) As the doctors become more senior, they can rely more on their own experiences than on senior colleagues*. (32) Colleagues are used more as information sources in secondary care, as doctors work more closely in the hospital setting. (39) Following the hospital or ward routine can also be important. (10) There are often “prescribing norms”, i.e. therapeutic traditions in the ward and it is often an expectation for doctors to prescribe within these norms. (37) Hospital consultants have been shown to rely on scientific literature and meetings when prescribing new drugs within their own speciality, but consult colleagues of other specialties when prescribing new drugs outside of their own speciality. (40)

Access to electronic patient medical records (e-PMRs) can also affect prescribing, (25) as can computerised decision support. Computerised advice on drug dosage has for example been shown to affect prescribing, thereby reducing the risk of toxic drug levels and reducing the length of hospital stay.
According to a systematic review, computerised clinical decision support for prescribing is probably more helpful after drug selection, rather than affecting the initial choice of therapy. For example, it may be useful in providing alerts about drug-drug interactions. The information in the e-PMRs and in the computerised decision support may be the same as before computers were used, but the use of computers in prescribing can remind the prescriber of guidelines and make them immediately accessible at the time of making the prescribing decision.

The pharmaceutical industry might influence prescribing, both through information and clinical trials. In terms of behaviour, a Swedish cross-sectional study showed that primary care units that received drug information from the pharmaceutical industry adhered less to prescribing objectives set by regional primary health care authorities. Information to health care personnel about drugs is regulated in Sweden, and health care management must authorise activities for health care personnel. A study of GPs and hospital doctors asking how they had retrieved information the last time they prescribed a drug that was new to them, showed that both categories underestimated the influence of pharmaceutical representatives. Looking at clinical trials, semi-innovative drugs, drugs that are new but similar to products on the market have been shown to be more frequently adopted in a university hospital if they had been studied in a clinical trial there.

**Evidence-based medicine and guidelines**

Formalisation within an organisation, i.e. the presence of certain rules and standardised procedures, is a way of facilitating work and is generally seen as a way of improving quality of care and increasing patient safety. The evidence-based medicine movement can be seen as a part of this. The concept of evidence-based medicine (EBM) is expected to be used in all health care and also in the prescribing of drugs. A notion that health care costs are increasing has created a need to prioritise between treatment alternatives. To evaluate and find the best methods is then a way of sorting out the less effective and non-economical treatment alternatives. The EBM expression was coined in 1992, but the foundation was laid earlier. The movement’s originator, Archie Cochrane, published a book in 1972 entitled “Effectiveness and efficiency: Random reflections on health services”, where he stated that randomised controlled trials were the most reliable sources for knowledge. Practising EBM has been described as using clinical expertise together with clinical evidence from systematic research. In practice the evidence base is also often incorporated into guidelines that the local health care providers are expected to follow.
It can however be difficult to make prescribers base their decisions on evidence, i.e. implementing evidence-based prescribing in practice, as many other influences affect the decisions as discussed above. Changes in prescribing behaviour are possible if needed, but must be implemented on all levels, both with the individual doctor and with the wider environment. (50) As an example of differences in environment, differences in the attitudes towards treatment guidelines have been seen between teaching and non-teaching hospitals, with the teaching hospitals being more positive in general, possibly for the guidelines’ usability in teaching. (51)

Literature that is critical of evidence-based medicine states that data retrieved on a population level is not always transferable to individual patients, and that individual interventions are easier to study and give better evidence than group interventions. It is also claimed that clinical skills are not accounted for, clinical autonomy is lost with guidelines, patient views are not included and that it is difficult to translate evidence into practice. (52) Comparisons of views held by the local Drug and Therapeutics committee (one of several authorities issuing guidelines) and practising primary care doctors showed that on the committee level patients could be regarded as standardised, while in practice there were many more factors, symptoms and diseases to take into account. This made the patient’s knowledge very important on the practice level but completely disregarded at the committee level. (53)

Guidelines, often based on EBM, have been described as “medicine generators”, recommending multiple drug use for each diagnosis the patient has. (54) Guideline non-adherence may well be rational and the outcome appropriate, for example not prescribing preventive long-term treatments for a patient with short life expectancy. (55) Guideline deviation can however complicate shared care between different caregivers. Communication between caregivers is important to clarify responsibilities and what is expected of different caregivers, both in adhering and deviating from guidelines. (56)

Responsibility for prescribing

Although guidelines can help in clarifying responsibilities, health care is a complex organisation with many actors; this causes difficulties in making clear the responsibility for different parts of care. Prescribing drugs for patients is an example of a task within health care that involves several caregivers, especially if the patient receives both primary and secondary care. This requires cooperation between caregivers, often at different levels within health care. Quality of prescribing has been shown to correlate negatively with the number of prescribers in elderly nursing home residents, (57) which
shows that the coordination, or rather lack thereof, can be a problem. Responsibility for prescribing would thus be regarded as a moral responsibility (see Theoretical framework, below) for ensuring an appropriate therapy for each patient – therapy that is effective, cost-effective, safe and in accordance with patient preferences.

In Sweden each prescribing doctor is responsible for collating his/her own prescriptions into a list of medications for each patient, but when the list of medications is shared electronically between different health care levels there is no specified legal responsibility for the patient’s entire drug list. (58-60) Everyone working in health care has, however, an individual legal responsibility for how they fulfil their duties. (61) In addition, health care professionals also have the Hippocratic injunction to do no harm; “primum non nocere”. (62)

In a study investigating hospital letters for patients discharged with potentially risky drug therapies requiring regular monitoring, only 25% stated who should be responsible for the monitoring. (63) To assess who carries the responsibility for certain parts of the work can then be troublesome. “The problem of many hands often turns the quest for responsibility into a quest for the Holy Grail.” (64)

Perceived lack of responsibility for a patient between several care givers can lead to non-compliance with drug guidelines, simply because of different perceptions of how responsibility in the guidelines should be interpreted. Primary care doctors can, for example, feel a lack of responsibility to prescribe for patients treated by specialists. (55) Lack of clarity in responsibility has also been suggested as an explanation for doctors’ unwillingness to discontinue a drug, in spite of alerts from a computerised decision-making support system. (65)

General practitioners have been shown to hold different understandings regarding the responsibility of a patient’s drug list. Some felt that the responsibility was imposed on them, some felt responsible only for their own prescriptions, others for the whole list. Some perceived a different but shared responsibility with other doctors and the patient and some held the patient responsible for the transfer of information regarding his drugs. (66) It has also been described how emergency doctors limit their work to handling only ‘here and now’ drug-related problems, to cope with limited time and limited information about the patient’s drug treatment. They thus did not review the patient’s drug list while the patient was in the emergency ward, unless the patient’s symptoms were obviously drug-related. (67)
Information transfer in health care

Appropriate prescribing rests on adequate and well-functioning information transfer between health care levels. Seamless care, achieving a flow of patients and information through different levels of health care without losing information and maintaining patient safety, has been stressed in the literature during recent years. To achieve this type of flow, i.e. a continuity of care, three types of continuity have been described as necessary: relational continuity, management continuity and informational continuity. (68) Relational continuity concerns the relationship between the patient and the care provider(s) (but continuity of care can be achieved without having a personal doctor). (69) Management continuity is about managing the disease in a consistent way, yet being flexible about changing needs. The informational continuity relates to the information that links care providers and care events. This information can be either disease- or patient-focused, but the information in medical records tends to be medical rather than personal. (68) Informational continuity is essential to successful drug therapies; information about an initiated, changed or discontinued drug therapy must be made available for the care provider responsible for the patient’s follow-up. An example is when a patient is prescribed a new drug in hospital and then discharged with the primary care doctor taking over the patient.

Communication problems between health care levels has been shown to cause preventable drug-related hospital admissions, (7) showing that transfer of care between health care levels could introduce a risk to patient treatment and safety, due to lack of completeness in information transfer between those levels. (46) Aspects of quality in information transfer that have been studied are the timeliness, completeness and accuracy of the information. (6) Incomplete referral letters and poor timeliness of replies to referrals are common (70) as are clinically relevant errors in medication history. (71-72) About 20% of prescribed drugs are unknown to the hospital when the patient is admitted; discrepancies are common. (73-74) Multiple data sources regarding the patient’s drug treatment are a problem; discrepancies between these sources can be clinically significant and possibly fatal. (75) These discrepancies can be due to both lack of completeness and accuracy; drugs that the patient is using are missing and drugs that the patient no longer uses are still included.

Information transfer at discharge from hospital is also important; drug therapies initiated in hospital can be a large part of GPs’ prescribing. (3) The information transfer at discharge from hospital is often done through a discharge summary that contains a short description of the patient’s stay in hospital, including a list of the drugs at discharge. The discharge letter contains
a more detailed account of the patient’s stay in hospital and usually is sent a few weeks after discharge. Medical errors related to transfer from hospital to primary care are common and may increase the risk of rehospitalisation. (76) Large problems of accuracy in discharge summaries have been shown. (6, 77-78) Although the majority are minor errors, a few can be judged to be potentially dangerous. (78) A Swedish study on information transfer regarding elderly patients found that in total 19% of the transfers included erroneous information on medications. (79)

Problems of completeness of information in the discharge letter can be lack of information on reasons for therapy changes done in secondary care, (80) and on required regular monitoring of risky drug therapies (63) as well as missing prescribed drugs. (73) The problem of timeliness is often described for both discharge summaries and letters, i.e. primary care would like to receive them sooner than is now the case. (56, 81)

A qualitative interview study shows that in prescribing specialist medicines GPs have perceived a lack of understanding from hospital doctors that GPs are generalists rather than specialists. (56) Lacking specialist knowledge and beset by time constraints, the GP may have problems reading up on the specialist literature concerning a specific drug therapy. Timeliness is another problem in prescribing specialist drugs; it takes time for the discharge letter to arrive. Hospital doctors in the same study thought the information transfer was sufficient and that costs involved in prescribing were the real explanation for GPs’ reluctance to prescribe specialist drugs. (56)

Many of the studies made on transfer of information are dated, and reflect differences in health care systems in different countries. Now many countries are implementing solutions to the problem of timeliness and completeness, for example using information technology. However, an Australian study comparing discharge summaries sent by e-mail, fax, mail or by patient delivery showed that fax or e-mail were most effective with regard to timeliness, but fax was still preferred by general practice. (82) The accuracy of discharge summaries in e-PMRs has also been criticised in Austria. (83) So it is not just a question of introducing new media for transferring information; health care providers also need to adapt and get used to these solutions.

In light of this, it is unsurprising that a set of quality indicators for shared care of a patient, when prescribing specialist medicines, should include good communication between hospital and primary care, a clarification and acceptance of responsibilities and roles of both parts and an agreement on which information needs to be exchanged. (56) In other words, an agreement is reached on how completeness and appropriateness of information transfer should be achieved.
The problem of information transfer regarding drugs is acknowledged both nationally and internationally. The WHO has launched an Action on Patient Safety, the High 5s project, which is an initiative to prevent adverse effects and promote patient safety in seven countries. Assuring medication accuracy in transitions in care is one of the focus areas. (84) The Swedish Association of Local Authorities and Regions, SKL, has launched a national plan to increase patient safety, in which preventing medical errors in transitions of care is one area of focus. (85)

A possible method of improving information has been increased structure and standardisation of information content. In a project in the south of Sweden with “medication reports”, a more structured discharge letter has been evaluated, and has been shown to significantly reduce medication errors and decrease adverse clinical consequences in elderly patients. (86-87) Other suggested solutions for improving transfer of information include standardising how it is written, for instance with the SBAR tool. SBAR stands for Situation, Background, Assessment and Recommendation (88) which corresponds to how information should be structured in transfer of information, in order not to leave out information that can be of importance to the recipient.

Electronic Patient Medical Records

One way of improving available documentation and information transfer can be the use of an electronic patient medical record (e-PMR). With a shared e-PMR, completeness and timeliness should be the best possible, as all caregivers have access to all data entered and drugs prescribed in the e-PMR. Many hope this can be a possible solution to some of the problems in information transfer discussed above, as poor quality of information and documentation is a common contributing factor to prescribing errors. (89)

Even though the implementation of electronic medical records has come far in many industrialized countries, they are not as widely used in secondary as in primary care. (90-91) Electronic exchange of health information between healthcare providers is not common, although it has been introduced in Canada, the US, the UK and the Netherlands. (90) Different regional health care information systems have been shown to improve clinical data exchange and access, which improves communication and coordination within the region. (92)

A shared e-PMR should be a goal if continuity of care is regarded as important, as there is a need for sharing information to achieve that continuity. (69) In a survey of 431 Swedish doctors from seven counties, a majority
(81%) thought their e-PMR system was easy to use and 88% thought it was easy to prescribe drugs within it. (93) It was hoped before e-PMRs were widely introduced in Sweden, that computerised prescribing support would increase the quality of in-hospital prescriptions. (94) Implementation of information technology systems in hospitals, however, is not straightforward as the care is more specialised, and this is probably a contributing reason to why e-PMR systems are less implemented in secondary care. To facilitate the implementation the system should ideally be well developed already and require little training, but allow for adjustments to local clinical needs. (95) Earlier studies show that work complexity and e-PMR systems that are not well integrated in the clinical work make clinicians hold on to paper-based solutions in parallel. (96) Keeping old work routines has also been described in hospital, resulting in less benefit from the new e-PMR systems. (97) Factors determining the degree of implementation success are organisation culture, design, leadership, quality structure, technical competence and doctor involvement. Doctor involvement is crucial as their power influences the organisation culture, and without doctor support implementation is difficult in the clinical service area, as reviewed by Wardhani et al. (98)

An example of a tool that can improve prescribing is an electronic medication order entry system that indicates when a drug-drug interaction occurs. A problem is when doctors experience alertness fatigue and stop reacting to these alerts. The clinical relevance of the alerts and the way doctors act on them must be evaluated and considered. Clinical judgement is still invaluable. (99) A study of computerised decision-making support showed that it reduced inappropriate prescribing, but pre-existing inappropriate drugs were not discontinued. The authors explained this with issues not related to the computerised support itself, such as an unwillingness of doctors to discontinue a drug prescribed by another doctor or concern that the patient might disagree. (65)

It is important to remember that e-PMRs are tools and their implementation is per se no guarantee of quality. Adoption of an e-PMR in practice has not shown any association with the quality of care in general practice; no association to quality was found in the duration of e-PMR use either. (100) Irrespective of the system used, aspects of quality must be considered and implemented in practice.
Theoretical framework

This thesis was spurred by the clinical problem of inappropriate prescribing, and a will to gain more knowledge that may contribute to the handling of the problem. The work has been truly inductive in the sense that the planning and data-collection stage have not been guided by specific theoretical perspectives. (101) Theoretical perspectives have been brought in at the end of the analysis phase of the work, enlightening the discussion in Papers III and IV. In Paper III the Data-Information-Knowledge-Wisdom (DIKW) hierarchy presented here is used in interpretation of the findings, and in Paper IV theoretical perspectives of moral responsibility informed the identification of themes in the later stage of the analysis.

The DIKW hierarchy

In Paper III the dichotomy between an abundance of information and the lack of relevant information was a concern to the interviewed doctors. To enlighten the continued analysis, the Data-Information-Knowledge-Wisdom (DIKW) hierarchy was used, where a differentiation is made between data (products of observation) and information (residing in processed data). Knowledge is an application of data and information, while wisdom is evaluated understanding (i.e. “why”), which requires judgement. (102-103) The volume tends to decrease as one moves from data (high volume) to wisdom (low volume). The theory is often depicted as a pyramid, with wisdom at the top and data at the bottom. (104) The originator of the model is unclear (105), but the oldest reference to the idea of a hierarchy is the poet T.S. Eliot:

Where is the Life we have lost in living?
Where is the wisdom we have lost in knowledge?
Where is the knowledge we have lost in information?
(106)

The DIKW hierarchy can be used in relation to prescribing, for example when looking at documentation of prescribing, i.e. what needs to be or can be documented when a drug is prescribed. Is it the information supporting the decision or the prescriber’s knowledge? The hierarchy can also be used for classification of the communication with the patient; does the prescriber provide information or knowledge to the patient regarding the drug therapy?
**Moral responsibility**

The final stage of the analysis in Paper IV was based on perspectives of moral responsibility, exploring the responsibility for an individual’s drug treatment. Moral responsibility can be discussed using two main types of models, agential models and social models. (107) In agential models, causal agency is important. If an individual causes harm to others by an act of commission (or by an act of omission), he or she is morally responsible.

Social models, on the other hand, focus on social role. Moral responsibility is not based on causal agency but on social practice of “blame and praise”. Moral responsibility is dependent on the social role of an individual, ascribed by the community. Hence, an individual can be held responsible for an act of commission (or an act of omission) they did not actually cause; if the individual’s social position demands it. According to Nordgren, (107) social role is most important as the moral relevance of causal agency is determined by the social practice; causal agency can be relevant to moral responsibility but is not a prerequisite.

In the case of an act of omission, one can distinguish between intentionally not acting and just not acting. An example can be helping someone who is in an emergency situation, where there is a difference between not understanding cries for help and simply ignoring them. Causal responsibility requires an intentional act of omission, but moral responsibility can sometimes be ascribed for acts of omission even if the individual was unaware of the duty to perform such an act. Nordgren also argues that generally there are degrees of moral responsibility and that we usually have a greater responsibility for acts of commission than for acts of omission.

“Taking responsibility” is the act of accepting or assuming responsibility. To do so we do not need to have the causal responsibility; one can accept responsibility for others’ actions, such as those of employees or children. As causal agency does not determine moral responsibility, different individuals can assume different responsibilities for themselves. “Having responsibility” implies being appointed a social position of responsibility for a certain activity or institution. (107) Hence, taking responsibility is a more or less voluntary act by the individual, whilst having responsibility is inflicted on the individual. Moral responsibility in relation to prescribing can be seen from the perspective of the prescriber, which responsibility the prescriber is ascribed or takes in relation to prescribing. It can also be from the perspective of the patient, the responsibility the patient has and takes for prescribed drug treatment, i.e. issues of compliance.
The studies in this thesis were conducted to contribute to the understanding of information sources used by hospital doctors and their views of appropriate prescribing. Although much is known about more quantitative aspects of prescribing of drugs, such as drug utilisation studies and epidemiological studies, the prescribers’ subjective views on their behaviour and responsibility and the process of prescribing are less studied. When they are studied, this is done in primary care or secondary care separately.

Threats to patient safety can be distinguished between errors in actions taken, for example in administering drugs, or errors due to inaction, for example failure to identify side-effects of drugs. (46) The former kind of error is more visible and easier to measure, but both types of errors are important for quality and safety. With a qualitative method, these less clear adverse events, such as not discontinuing a drug that is no longer indicated, can be discussed and brought to attention.

If the patient’s drug therapy is to be seen as a whole, the pieces of the puzzle need to fit together. The information transfer between different levels of health care is then of importance for achieving appropriate prescribing for the patient, who is also transferred. Doctors’ views of responsibility in prescribing are interesting considering the gap between primary and secondary care. By looking at the doctors’ experiences of using shared electronic patient medical record system, ways of improving the transfer and clarifying the responsibility of prescribing can hopefully be identified for the future. This way the puzzle can eventually be completed.
Aims

The overall aim of this thesis was to explore aspects of the subjective views and experiences of doctors in their role as prescribers, focusing on responsibility for and factors of importance in achieving appropriate prescribing.

The specific aims were to:

- Explore hospital doctors’ views of appropriate prescribing.
- Identify factors that hospital doctors believe influence their prescribing.
- Investigate primary care and hospital doctors’ experiences of using a shared electronic patient medical record for information regarding individual patients’ drug therapies.
- Explore hospital and primary care doctors’ views of their responsibility in drug treatment.
Study setting

The studies in this thesis were conducted in Uppsala University Hospital, a large teaching hospital in the middle of Sweden, and in primary care centres surrounding it, both rural and in the city centre. The hospital is one of eight specialised hospitals in Sweden, called regional hospitals, and has about 8,000 employees and 1,100 beds. (108-109)

Sweden is divided into 290 municipalities, 18 county councils (and two regions in the south of Sweden). Uppsala is Sweden’s fourth largest municipality, with almost 200,000 inhabitants. (110) Municipalities, county councils and regions are responsible for different parts of the local community and the county councils are mostly involved in health care. (108) They usually have a local Drug and Therapeutics Committee that contributes to safe and cost-effective use of drugs within the county, (111) as does Uppsala County Council. In Uppsala County there are 41 primary care centers, of which 14 are privately owned.

Electronic patient medical records in Sweden

A survey in 2009 found that 14 out of 19 responding county councils and regions in Sweden had implemented e-PMRs, and the remaining five county councils were on their way. A shared complete e-PMR for both primary and secondary care was already implemented in six of the county councils. In seven county councils a shared list of medications was in use and nine other county councils had begun the implementation of such a list. (112)

Multiple systems of electronic medical records are in use in Sweden. A project called the National Patient Summary (in Swedish Nationell Patientöversikt (NPÖ)), is however underway and will make information from the patient’s medical record accessible to all health care providers in the country, providing the patient has given consent. (113) The NPÖ is currently piloted in two county councils and is expected to be implemented nationwide before the end of 2012. (114) A national list of prescriptions issued for the patient
and drugs dispensed, available for prescribers, is also planned, and will be implemented before 2012. (114-115)

To provide prescribers with correct and updated information in the decision support of the e-PMR, a national project of Swedish Informational Database of drugs, Svensk Informationsdatabas om Läkemedel (SIL), has been launched. (116) SIL collects information from the county councils’ drug and therapeutics committees and other knowledge databases. All county councils and regions should be invited to use SIL before the end of 2010. (114) The SIL project, however, is falling behind schedule and the Ministry of Health and Social Affairs has therefore decided to launch another prescribing support system, called Electronic Expert Support, EES (in Swedish Elektroniskt Expertstöd) in four emergency wards in the autumn of 2010. (117) EES is also called Electronic Dispensing Support and can also be used for support in dispensing in pharmacies, e.g. checking drug-drug interactions. (118) The system is currently being tested in a sample of pharmacies in Sweden, but will probably be more widely implemented later. The implementation, however, is voluntary for the pharmacy companies.

Electronic patient medical records in Uppsala

In 2007, Uppsala County Council implemented a county-wide e-PMR system, which is shared between primary and secondary care. (119) Uppsala is one of the first counties in Sweden to implement such a system, and has the largest number of affiliated health care users of a shared e-PMR. The e-PMR project in Uppsala started on a small scale in 2003, and was fully introduced in both primary care and secondary care in 2007. Some wards at the hospital have however not started to use the drug module of the e-PMR yet. The county is continuously working on both the system and its implementation, with educational and other measures. (119) Private practitioners were excluded from the system at the time of the study, but can now be connected as well. (120)

All caregivers are expected to document all health care given to the patient in the same medical record. Paper medical records have been scanned in and are now a part of the e-PMR. The stakeholders hoped that a common system will both increase patient safety and be time-saving by increasing accessibility to the patient’s medical record. The county council also wanted to be able to collect epidemiological data from e-PMRs in the county. (120) Doctors have been mostly involved in this work after the implementation, suggesting ways of improving the system.
The system provides patient health information and data, including all clinical notes, order entry and results management. It also includes some clinical decision support, with links to FASS, the Swedish medicines compendium. The drug module of the e-PMR is described in Table 1. Electronic prescriptions can be written in the e-PMR and drugs that are recommended by the local Drug and Therapeutics Committee are indicated.

Table 1 The drug module of the e-PMR in Uppsala)(119).

<table>
<thead>
<tr>
<th>The drug module of the e-PMR contains three lists:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medicine list</strong></td>
</tr>
<tr>
<td>All drugs that the patient is currently on.</td>
</tr>
<tr>
<td>Contains dosage, duration of therapy, initiating</td>
</tr>
<tr>
<td>doctor, and doctor responsible for the medication</td>
</tr>
<tr>
<td>for each drug. Also has columns for indication</td>
</tr>
<tr>
<td>and therapy goal. The system provides prescribing</td>
</tr>
<tr>
<td>support and warns if there are drug-drug</td>
</tr>
<tr>
<td>interactions in the list. Gives access to a list</td>
</tr>
<tr>
<td>of all drugs that the patient has had earlier.</td>
</tr>
<tr>
<td><strong>Inpatient drug chart</strong></td>
</tr>
<tr>
<td>Used in hospital when administering drugs.</td>
</tr>
<tr>
<td><strong>Prescription list</strong></td>
</tr>
<tr>
<td>List of the patient’s prescriptions. Information</td>
</tr>
<tr>
<td>about what has been prescribed, when and how</td>
</tr>
<tr>
<td>much for each drug.</td>
</tr>
</tbody>
</table>
Methods

The papers in this thesis are all based on qualitative research. In qualitative research the subjective meaning, the view and the experience of that meaning as described by the respondents is investigated. (121) A qualitative study can be inductive, as is the work in this thesis; hypotheses are then created based on the research findings. In qualitative studies observations typically are fewer, but richer and more detailed than in quantitative research, since more observations are often needed to quantify and reach statistically significant results. Qualitative sampling procedures do not generally allow for statistical analysis. As the aim in qualitative studies is to catch different experiences and describe them qualitatively, statistical analysis is also often irrelevant.

The design was a qualitative descriptive analysis, i.e. a "data-near" analysis and interpretation of findings. (122-123) The studies in this thesis have used an interpretivist perspective, trying to see things from the respondent’s point of view in the analysis. This perspective was originally described within the symbolic interactionist sociology or interpretivism, where meaning is considered to be coming from social interaction, and understanding of social life consequently stems from exploration of real-life situations and people’s experiences. (124) This thesis, however, does not take an interactionist sociological perspective, but has a more empirical approach inspired by Tully et al. (18) The ambition has been to keep the analysis grounded in the data. This has been ensured by an iterative approach throughout the analysis, where the outcome of the analysis has been verified by checking and re-checking data.

Interviews (Papers I-II)

Interviews can be used if individual and detailed accounts are desired, (125) and as the possibility of probing issues further was wanted, semi-structured interviews were conducted. Thus an interview guide was written by the researchers, but the interviews were allowed to deviate from this, with the interviewee taking the lead. Questions could be put in any order, re-worded
or explained further, in order to keep the natural flow of the dialogue. (126) Prompts were also frequently used to further explore the issue discussed.

The interview guide was tested in a small pilot study of three doctors. Some changes were made before data collection started. The guide asked for influences in prescribing (Paper II), the doctor’s own view of appropriate prescribing (Paper I) (see Appendix 1), and the validity of a set of appropriate prescribing indicators (results not published).

All interviewees were doctors working at a large university hospital, as it was presumed that they would be able to set aside time for a research study. One of the directors of the hospital gave permission and then doctors purposively selected by the researchers were contacted in order to cover different levels and specialities. A letter was sent to the chosen doctors, briefly describing the purpose of the study. Doctors were recruited for interview in rounds; after each round was completed, a further set of letters was sent out to doctors from different specialities and levels. In total, 38 doctors were asked to participate. Analysis was carried out iteratively. After 15 interviews, saturation (127) was judged to have been reached, so recruitment ceased. The saturation point is reached when no additional information from the interviews contribute to the explanation of the data. (127) This is also called the point of redundancy. (101) Characteristics of the interviewed doctors are presented in Paper II. The thesis author was the interviewer in all interviews.

All the interviews were conducted at the hospital, except for one that was conducted at the university. In order not to take too much time from the doctors’ clinical work, the interviews were often at lunch-time, when a lunch sandwich was offered. The interviews took approximately 20-45 minutes. The interviews were audio-taped with permission, and transcribed verbatim. The interviews took place between June and October 2004.

Focus groups (Papers III-IV)

Focus groups can be an appropriate method when data that the research participants are willing to share in a group is wanted, for example with peers. Direct interaction between hospital and primary care doctors was wanted; therefore focus groups were chosen with a mixed group in the second stage of the study. In a focus group interaction among the participants should be encouraged. In running the group the researcher, the moderator, must lead the discussion in a way that allows the participants to talk with each other
rather than with the moderator. (128) Focus group studies often consist of four to six groups, each with about six to ten participants. (129-130)

A letter briefly describing the purpose of the study and the planned focus group was mailed to clinical directors at the same hospital as in Papers I and II. The directors allowed the researchers to run focus groups at lunch-time in the hospital, with doctors from a range of medical specialities. A similar letter was sent by e-mail to primary care centres, where doctors were known to have regular continuing education meetings to discuss topics relevant to their clinical practice. At the primary care centres, focus groups were held at lunch-time, except for one group that was run after office hours at a regular continuing education meeting.

Two doctors – one hospital doctor and one primary care doctor – functioned as formal gatekeepers, (131) facilitating our access to the hospital and primary care centres. They were a support in answering questions regarding practical issues like appropriate times for the focus groups and locations, as we wanted to have the doctors feel as comfortable in the focus group situation as possible and to minimise the hassle of participation for them. It was judged that they had made such significant contributions to design and acquisition of data that they were invited to participate in the study as co-authors, in accordance with available guidelines in the area, (132) and as such also critically revise the manuscripts and finally approve the work to be published.

Eight focus groups were held, four each with hospital and primary care doctors. In total, 14 hospital doctors and 24 primary care doctors participated, with a variation from two to ten within each group. Twenty-two were men and 16 were women. The secondary care doctors had a range of specialities, including renal, emergency and general medicine and geriatrics. After the data from the separate groups had been preliminarily analysed, a mixed focus group was held with fourteen primary care (n=8) and hospital doctors (n=6) recruited from the earlier separate groups. Eight participants were women and six were men. All participants of the separate focus group participants were invited to participate in the mixed group. During this mixed focus group session, the researchers described the outcome of the preliminary analysis in a PowerPoint presentation. The objective of the mixed group was to allow the doctors to discuss the findings from the separate groups in order to validate and explore variations in the data, as well as to promote a discussion combining both perspectives.

A moderator led each focus group. A more experienced moderator moderated one primary care group and two hospital groups, i.e. the first group, while the doctoral student watched and learned, and then moderated the rest
of the focus groups. Both researchers attended all focus groups, acting as observers and taking field notes in the groups they did not moderate. Two undergraduate students were additional observers in some of the focus groups. After each focus group the moderator and the observer(s) had a short debriefing, using questions suggested by Krueger. (133)

The focus group interview guide (see Appendix 1) was semi-structured and constructed by the researchers. The topics for discussion were ways of transferring information on drugs, the contents of the information, the amount of information, responsibility for the information and, at the end of the discussion, how the information should be retrieved in the future.

The focus groups lasted between 60 and 90 minutes, with the exception of the mixed focus group which lasted two hours. The focus groups were audio-taped with the consent of the participants. The recording equipment failed in one hospital focus group. The observer wrote out a detailed record of the meeting from memory immediately afterwards, supported by the field notes, which the moderator was allowed to read and comment upon. The focus groups took place between November 2007 and September 2008.

Analysis

All interviews and focus groups were audio-taped and transcribed verbatim. The analysis was performed by the thesis author and was presented for feedback from the supervisors at different stages. A formal, systematic checking of the analysis by a senior researcher was carried out in the focus group studies, Papers III and IV (described below).

The studies in this thesis have used an interpretivist perspective, trying to see things from the respondent’s point of view. A certain amount of interpretation can however never be avoided, and according to hermeneutic theory some perspective is always applied. (134) The analysis was inductive, i.e. conducted without predetermined hypotheses. In Papers III and IV, a theoretical perspective was taken in the final stages of the analysis phase of the research (see below), as is often the case in inductive studies. (135)

The transcripts were coded in relation to the aims, so that meaning-bearing units relating to doctors’ experiences were identified. Analysis was carried out using the constant comparative method, assisted by the NVivo 1.2 and 8 software (QSR International Pty Ltd., Melbourne, Australia). With the constant comparative method the data being analysed is weighed against earlier collected and analysed data. This is done to form and reform the categories
and overarching themes and to explore variations in the data, both within an interview/focus group and between interviews/focus groups. (128) The method is recommended in inductive studies, as it involves building a framework where no pre-determined framework exists. (101)

Table 2. Examples of coding and final theme from the analysis of the focus groups.

<table>
<thead>
<tr>
<th>Quotation</th>
<th>Code</th>
<th>Category</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>“When I take out the list of medications to write prescriptions for the patient. Yes, there are the medications that we are working with at the moment, but there in that list of medications there is also Antabuse [disulfiram]. Well, the patient hasn’t told me or talked about that, now everything comes into a new light. What do I do then?”</td>
<td>Ethical dilemmas</td>
<td>Problems of privacy</td>
<td>Consequences of the system</td>
</tr>
<tr>
<td>“You look through the list of medications at rounds and you justify verbally why you remove one drug and initiate another, but that information is not written down in any way. That would be a way of course, to try to have the routine that every small change of medications should lead to a small note, that you try.”</td>
<td>Justification for changes</td>
<td>Lack of documentation</td>
<td>Perceived barriers to taking responsibility</td>
</tr>
</tbody>
</table>

The analysis was thematic (135) and was carried out by the author of this thesis. After coding text segments related to the study aim, codes were condensed into categories, and each category was given a description. The categories were also changed iteratively as more interview data was analysed. The categories, with illustrative quotations from each category, were assembled and combined into overarching themes (see Tables 2 and 3). In Paper III, the DIKW model (see Theoretical framework) illuminated the interpretation of the results and in Paper IV theoretical perspectives of moral responsibility (i.e. “having” vs. “taking” responsibility) (see Theoretical framework) guided the formation of the themes.
The analyses were subjected to continuous discussion with co-authors, and for this purpose categories and some quotes were translated into English. In the final checking of the analysis by a senior researcher (ÅKL), the contents and the descriptions of the categories were scrutinised, to see if the identified categories had any bearing on data. The senior researcher could also suggest recodings and recategorisations, which were discussed until consensus was reached. This approach was inspired by Hill et al., (136) and similar audits of the analysis are also recommended by Lincoln and Guba. (101)

Table 3. Themes and categories from Paper IV.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Everybody” has responsibility</td>
<td>Every doctor has responsibility</td>
</tr>
<tr>
<td></td>
<td>GPs have main responsibility, specialists for parts</td>
</tr>
<tr>
<td></td>
<td>Everyone has responsibility for good information transfer</td>
</tr>
<tr>
<td>“Nobody” takes responsibility</td>
<td>GP taking responsibility</td>
</tr>
<tr>
<td></td>
<td>Specialists taking responsibility</td>
</tr>
<tr>
<td>Perceived barriers to taking responsibility</td>
<td>Increased specialisation</td>
</tr>
<tr>
<td></td>
<td>Lack of understanding of each other’s work situation</td>
</tr>
<tr>
<td></td>
<td>Lack of documentation</td>
</tr>
<tr>
<td></td>
<td>Lack of time</td>
</tr>
<tr>
<td>Consequences of not taking responsibility</td>
<td>Not enough follow-up</td>
</tr>
<tr>
<td></td>
<td>Accumulation of drugs</td>
</tr>
</tbody>
</table>

After each focus group, the moderator and the observer(s) had a short debriefing session, trying to catch the immediate impressions and reflections after the focus group. (133) These audiotaped sessions were listened to during the analysis phase to validate the analysis against this direct notion.

**Ethical aspects**

According to Swedish regulations at the time of the planning and data collection, ethical approval was not necessary for interview studies of professionals, in their roles as professionals. Each participant in the interviews and focus groups was given an information leaflet about the study and the possibility to discuss the study. They were then asked to sign a consent form, agreeing to the interview being audio-taped and indicating that they understood that they could withdraw from participation at any point in time for any reason. The audio-tapes and transcripts were kept confidentially and all participants were de-identified in the transcription of the interviews and focus groups.
Summary of findings

Paper I

The results in Paper I present the hospital doctors’ views of appropriate prescribing; they were asked to describe what appropriate prescribing for individual patients was to them. Data collection for the second paper was done in the same interviews as for Paper II.

For appropriate prescribing the doctors first of all stressed the importance of focusing on the patient, taking in the characteristics of the individual and the specific disease the patient had. The treatment should be “tailored” to the individual patient. The indication should be correct, based on evidence or experience, to avoid inappropriate prescribing. Appropriate prescribing could also be seen from a cost perspective, perceived as important both for society and for the patient. The doctors were concerned with cost-effectiveness, avoiding overprescribing and choosing the cheapest, but equally effective alternative.

Appropriate prescribing for the individual was described as something that changed over time, a continuing process. The patient’s drugs should be reviewed and followed up. Initiation of the drug therapy should also be done at the right time, sometimes waiting before initiating a drug therapy could be appropriate. Follow-up should also take place after discontinuing a drug therapy to see if this was the right decision.

Not all doctors saw documentation as necessary for appropriate prescribing, but all regarded it as important, both for their own reminders, and for colleagues’. Examples of what should be documented were the indication, a justification of the prescribing decision and the plan for the drug treatment.

In conclusion, it was suggested in Paper I that, for appropriate prescribing from the prescribers’ point of view, the definition by Buetow et al. (16) should be rephrased as: “the outcome of the recurring processes of decision making that maximises net individual health gains within society’s available resources”. 

Paper II

The second paper presents the results of individual qualitative interviews with hospital doctors regarding factors influencing their prescribing of drugs. First of all the doctors spoke of the more concrete and basic influences of prescribing, such as the patient, guidelines and other written information sources as well as cost as influences of the prescribing decision. Consulting guidelines were more common in areas outside of the doctor’s own specialty and deviating from guidelines was not seen as controversial, as long as the doctor relied on his or her own knowledge and experience. Cost was described as an important factor in prescribing, but it was stated to be difficult to bring the societal perspective of costs for drugs into the individual decision to prescribe for one patient who might need expensive therapy.

After taking the more basic prerequisites into consideration, the doctors also spoke of other, less concrete influences in prescribing decisions, such as personal habits and being familiar with a drug or a brand name. Colleagues and discussions were also seen as important sources of information. The doctors claimed that they had no time for more formalised meetings to discuss the latest scientific evidence, but had *ad hoc* discussions with their colleagues in connection with their everyday work, i.e. specific patient cases. Some colleagues had their own niches, where they stayed up to date on the latest scientific evidence. This division in expertise seemed to evolve informally but helped them to cover large topic areas by combining their expertises. Related to this theme were the therapeutic traditions within the ward or in the hospital. Some drugs were familiar there and consequently, when changing wards, the doctors adjusted to the therapeutic traditions and prescribed what the local tradition dictated. According to the doctors the pharmaceutical industry was the only provider of education about drugs. The doctors admitted that they were influenced by marketing, but said that they tried to be objective. Aggressive marketing could also be a source of irritation, and this could also negatively influence prescribing decisions, according to the interviewees.

In conclusion, if changes in prescribing behaviour are desired, factors warranting more attention include understanding how to influence local therapeutic traditions and the doctor’s personal habits for prescribing. The importance of clinical experience and information exchange with colleagues should not be underestimated in providing information about drugs to hospital doctors.
The analysis in this paper was inductive, but perspectives from the DIKW hierarchy informed the interpretation of the results. When applying the DIKW hierarchy to the e-PMR, observations like laboratory test results and drugs prescribed would be considered data, a recorded diagnosis based on the laboratory results would be information and justifications for choices of therapy and planning of treatments would be knowledge. Wisdom, i.e. the application of the writer’s or reader’s experience to the content of the e-PMR, was not described by the doctors as being recorded in the medical record.

The analysis resulted in three main themes: views of the system, consequences of the system and ways of reaching the ideal system. In describing the system, the doctors described the shared e-PMR as having many advantages, for example less time was spent on ordering paper copies as the information was often already in the system. Data and information were easily available immediately, when needed. The doctors however reported that no one was used to the new e-PMR yet, so it was not easy to find “the balance” in what should be documented. The data and information about medications caused particular problems for the doctors. The hope that the shared e-PMR would provide a reliable single source of information about the patient’s drug therapy had not been realised. The list of medications was not always accurate, as it was not updated, and could therefore never be trusted. Changes could, for example, only be put down as a note in the medical record, risking the possibility that the next doctor might miss the information. The reasoning behind medication changes was not always documented either, corresponding to knowledge, which the doctors thought made it difficult to know if changes were intentional or not. The difficulty experienced with handling more complex drug therapies, like warfarin schedules, in the e-PMR made it a hazard to patient safety and this was a strong argument for not using the medication list or the drug module at some clinics, according to the hospital focus groups. The warfarin schedules seemed to be kept on paper in both hospital and primary care and were difficult to access from the other health care level. However, both groups, i.e. hospital and primary care doctors, believed that it was easier for the other health care level to access information from their workplace than it was for them.

Hence, when looking at the consequences, the knowledge, i.e. the synthesis of data about what was done, why it was done and what should be done in the future, was often not documented, as it was tempting to save time by simply referring to data and information that could be found elsewhere in the system.
Another consequence was that as they had access to a lot of data and information, the doctors felt an obligation to take it all into account in their decision making. Previously, they thought it had been more understandable and acceptable if some information was missed inadvertently, as it would not have been readily accessible.

Ways of reaching the ideal system would be, according to the focus groups, to make it compulsory to use the e-PMR for documentation of drug therapy, to avoid the use of parallel systems and to collect all information in one place. Structuring the information regarding drugs with the use of templates for documentation, including justifications for changes in the drug regimen and specified plans for follow-up on prescribed drug therapy, were also described as a way of improving the system.

In conclusion, the doctors expressed how they assume information to be in the electronic system, and hence other forms of information transfer have decreased. At the same time, they experienced an information overload with the e-PMR system. In order to change this and make the e-PMR system the “ideal” system there is a need for improved structure of the information as well as better communication between health care givers on different levels.

Paper IV

In Paper IV, the early stages of the analysis revealed the importance of the dichotomy of “having” versus “taking” responsibility. This observation inspired the building of themes from the categories in the final stages of the analysis. The themes were: “Everybody” has responsibility, “Nobody” takes responsibility, Perceived barriers to taking responsibility and Consequences of not taking responsibility.

According to doctors at both health care levels each treating doctor should be responsible for ensuring that all information is correct for the next caregiver. In discussing responsibility in relation to prescribing, this was often discharged as going through the medication list and updating it, so that the next treating doctor would have correct information. The primary care doctors described themselves as having a more comprehensive responsibility for the patient and the drug treatments, and it happened that the primary care doctor revised the patient’s whole drug therapy. Sometimes this was done after consulting specialists in certain areas, as the primary care doctors were unwilling to take responsibility for more specialised drugs prescribed by specialists in the hospital. The primary care doctors described how nowadays they were expected to prescribe more recently marketed and more special-
ised drugs than before. They thought there were financial reasons for this, and that the secondary care wanted to save time and resources. The primary care doctors were however not always comfortable with prescribing drugs of which they lacked knowledge. The primary care doctors instead spoke of the need for hospital doctors to review the list of medications each time the patient was discharged from hospital.

In contrast, nobody said they formally had the overarching responsibility for the patient’s drug treatment, and it was clear from all the focus groups that this was perceived as a problem. In the mixed group the need for a single doctor being responsible for the list of each patient was discussed, and the primary care doctors claimed that they did not have the time for this. In addition to time constraints, being unfamiliar with drugs outside of one’s own specialty leads to uncertainty and unwillingness to accept full responsibility for the whole medication list. The mixed focus group talked about the problem that nobody had a more general medical knowledge these days; according to the hospital doctors the trend was increasing specialisation in different areas. The doctors perceived that the specialties are becoming more and more like separate niches, and no one is able any longer to take the overall responsibility for the patient. They also felt less ownership of, and thereby less responsibility for, the list now that the medical record was shared.

Lack of documentation was another perceived barrier to taking responsibility; the primary care doctors wanted clearer instructions for the follow-up of drug therapy in primary care. Many hospital doctors stated that discussions of the drug therapy might take place only verbally at rounds, and that documentation of those prescribing decisions was lacking. For the hospital doctors it was difficult to plan a future discontinuation of a drug and recommend it, as it was described as hard to anticipate what will happen or how the treatment will work. The hospital doctors said they were also a bit careful about giving too explicit instructions on how treatment and follow-up to drug therapies should be carried out in primary care, as they felt reluctant to instruct a colleague.

Lack of understanding of each other’s work situation was perceived by the respondents as another barrier to taking responsibility. There seemed to be very few interfaces between hospital and primary care doctors, according to the doctors themselves. Doctors from different health care levels did not routinely meet, informally or formally and, at the time of the study, had no clear channels between them for communication. Apart from the documentation passed between them in written or electronic format they rarely interacted. Another barrier to taking responsibility for both sectors was lack of economic incentives.
In conclusion, taking the responsibility to review all the patient’s medications was perceived as important, but was described as difficult in daily practice. Consequences of responsibility not taken were exemplified by deficient follow-up of prescribed drug therapy in primary care and the risk of drugs not being discontinued, which can be seen as threats to patient safety. The barriers to taking responsibility rested both with individual doctors and the system itself, but perspectives of the doctors working in practice must be taken into consideration when overcoming barriers, to ensure solutions that can be realised in practice.
Addressing the first specific aim of this thesis, identifying the hospital doctor’s views of appropriate prescribing, it was found that the doctor’s view of appropriate prescribing contained a time perspective. Although most decisions were right at the time they were made, things happened that eventually made the prescribing inappropriate. The doctors spoke of the importance of follow-up and review of drug therapy for appropriate prescribing. To make this possible, communication with the next caregiver is important; in the case of the hospital doctors their prescribed therapy is often supposed to be followed up in primary care.

Given that appropriate prescribing is the desired outcome, the second aim was to identify which factors hospital doctors believe influence their prescribing. The factors the doctors thought influenced them in their prescribing decisions were, as expected, guidelines and written sources, the patient and cost. The doctors also spoke candidly of the influences of marketing, personal habits, colleagues and therapeutic traditions. From the interviews, the hospital prescribers seem to feel rather independent in their prescribing decisions. Deviation from the list of recommended drugs and guidelines was not seen as controversial as long as it was based on knowledge and experience. The prescribers did however describe themselves as influenced by the therapeutic traditions at their workplaces.

The next aim was to investigate both primary care and hospital doctors’ experiences of using the shared electronic patient medical record for information regarding individual patients’ drug therapies. The information about the patient and the patient’s drug therapy can also be considered to be a prerequisite of appropriate prescribing. The new shared e-PMR system had made all information and data available, which saved time in not having to order and handle paper copies. A problem was perceived however in that information was seldom summarised, and this made it difficult to acquire knowledge of the patient’s drug therapy and especially the reasoning behind it. The knowledge is limited to what can be retrieved from the information overload of the e-PMR. The ideal of a resolved information transfer between secondary and primary care had not yet been achieved with the implementation of the shared e-PMR system.
The final aim was to investigate hospital and primary care doctors’ views of their responsibility in drug treatment. The doctors expressed that they had the responsibility, but barriers made it difficult to take responsibility for the patient’s whole drug therapy. Taking responsibility was discussed as updating the patient’s list of medication, i.e. reviewing the patient’s drugs. This was described as not done today. It can be discussed how easy it is to take responsibility if the knowledge about what has been done and planned, regarding the patient’s drugs is not communicated between health caregivers. According to the hospital doctors’ expressed need for review of drugs, appropriate prescribing is not achieved.

Methodological considerations

The studies’ main strengths are that they are done with the doctors themselves in the context of their own workplace. An additional strength of the studies is that the perspectives from both primary and secondary care are studied and combined. There are however limitations to the studies, as discussed below.

Interviews

The influences on prescribing and the views of appropriate prescribing share some similar aspects, such as patient-specific factors and cost. This could partially be due to the fact that they are based on data retrieved in the same interviews. Separating parts of the interviews is difficult as they are ongoing discussions. It could have been helpful to alternate the order of these two themes in the interviews, to see if this would have generated different results. In the pilot interviews the questions were put in another order, where the doctors were asked to describe their perceptions of appropriate prescribing first. It was however found that this question was too broad and difficult for the beginning of the interview; the doctors needed to get started by talking about the subject from a more specific perspective.

It has been described that there can be differences in what respondents tell depending on who they think the interviewer is. (137) In the interviews and focus groups it was an advantage that the interviewer was not a doctor, as being explicit and clarifying questions came more naturally. It was perceived that the doctors saw the interviewer(s) as unthreatening and it was made clear that scrutinising the doctor’s prescribing was not part of the study. The doctors however knew that the researcher was a pharmacist and this might have evoked social desirability. Another disadvantage of the interviewer
being a pharmacist, and not a doctor or nurse, might be a lack of clinical perspective. This may lead to missing dimensions in the data that are unfamiliar to someone who is not involved in clinical practice. The interviewer had, however, some specialisation in clinical pharmacy in addition to her pharmacist degree, even though the doctors were not specifically informed of this. This will also be discussed later on in terms of trustworthiness and credibility of the studies.

A limitation in the analysis is that it was performed by one person, even though it was discussed with and refined by the co-authors of the papers. Involving another person could potentially reveal other interpretations of the data.

The interviews were conducted with doctors working in medical specialties, as they were expected to have insights and much experience in prescribing. It is however possible that hospital doctors in other specialties have other views of appropriate prescribing and of their influences in prescribing. For example, the views of general and orthopaedic surgeons, who do not work with drugs as a primary therapy, would be interesting to investigate further in future studies.

The interviews were carried out in one of the most specialised hospitals in the country. It is possible that the prevalence of very knowledgeable colleagues with “niches” is higher there than in other hospitals. This might limit the transferability of results to other settings.

Focus groups

Some primary care focus groups pre-existed as peer discussion groups for further education and some participants worked in the same primary care centre. The fact that the group members knew each other may have made them more comfortable, but if sensitive issues had been brought up in the discussion it would have been necessary to reflect on the implications for the group members. (128) No such problems were detected in this study, but the risk can still not be disregarded.

Separate groups of primary care and hospital doctors were chosen as it would allow the participants to discuss freely among their peers. (138-139) This kind of segmentation also carries a comparative dimension into the research. (129) In the mixed focus group, the preliminary analysis of the results was presented. Presenting the preliminary data analysis in this way can be seen as a kind of second-stage research, where the researchers return to the field to further explore certain earlier findings and develop the analy-
sis. This could also be used for example if experiences of different sub-
groups need to be further explored; second-stage focus groups can then be
held with participants from the subgroup in question. (128)

The doctors who participated in our studies all volunteered and there is a
possibility that the participating doctors in general are more positive towards
meetings, discussion and exchange between colleagues in general than their
peers. If the subject of desired exchange between prescribers is further stud-
ied other designs could be used, such as questionnaires.

The doctors who served as co-authors of the focus groups participated in one
separate focus group each. Their experience as focus group participants was
judged to be important for their function as gatekeepers as it was easier to
tell colleagues about the study and the effort needed in participation if they
had the experience. They were however asked not to participate in the mixed
focus groups in order to minimise their influence on the results. Although
contributing to the planning of the study, these two co-authors did not par-
ticipate in the analysis of the focus groups, and were only allowed to read
and comment on the almost finalised manuscripts, where all citations and
focus groups were de-identified.

Focus group studies often consist of four to six groups. (129) We performed
four focus groups with hospital and primary care doctors, respectively, be-
fore saturation was judged to have been reached. Due to last-minute cancel-
lations one of the hospital focus groups had only two participants, and could
not function as a proper focus group. Last-minute cancellations are a prob-
lem when conducting focus groups with doctors. (139) Ideally, more than
one mixed group should have been conducted as well, but the number of
eligible doctors was restricted given that they were recruited from the limited
pool of participants in the previous focus groups. On the other hand more
doctors than those who had signed up beforehand came to the mixed group.
If this had been known earlier the group could have been split in two.

A high proportion of the primary care doctors participating in the mixed
group came from the same previous primary care focus group. It so hap-
pened that more participants volunteered to the mixed group from that focus
group. It would have been desirable if the primary care doctors in the mixed
group had been distributed throughout the separate focus groups. However,
there was no indication that primary care doctors from the first focus group
would hold very different views from the other primary care doctors.

In total more primary care doctors (n=24) than hospital doctors (n=14) par-
ticipated in the focus groups, as fewer hospital doctors volunteered, or they
were prevented from coming to a scheduled focus group. This might make
the data from the primary care groups richer and more diversified. However, focus groups with fewer participants, like our hospital groups, allow each participant to give further details about their views, which can be an advantage as well. (130)

In the group with only two doctors, the researchers (one moderator and two observers) actually outnumbered the interviewed doctors. This was unfortunate and unforeseen as more doctors were scheduled to attend. In response, the observers moved away from the table where the doctors and the moderator sat, staying in the background.

There were two moderators in this study, but there was only one moderator per focus group. Both moderators moderated focus groups of each category, so differences between the different categories of groups should not be due to different moderators. The moderators had slightly different styles of leading the focus groups; one was quieter than the other, avoiding the risk of leading the discussion too much, but on the other hand dominant participants of the group were allowed to talk more. Both moderators attended all focus groups however, each acting as observer when not being moderator, which ensures continuity in the groups, as both have heard the discussions in all focus groups.

It has been shown that barriers to implementation given in interviews can be constructions, created to keep up an appearance of rationality. (140) Observations or other methods could be used to add to the understanding of the research participants’ work situation, but this was beyond the scope of our studies.

Trustworthiness

Lincoln and Guba (101) have suggested four criteria for trustworthiness; the operationalisation of these criteria in the studies will be discussed below.

Credibility

Before the study the researcher should spend time in the studied culture, to understand the context also called “prolonged engagement”, according to Lincoln and Guba. (101) This is also a way of building trust before engaging in the research. The length of this prolonged engagement is relative. Before conducting the interviews and focus groups the author took courses in clinical pharmacy, which included internship at medical wards. The lengths of these internships were limited to a couple of weeks, but the experience pro-
vided an insight into hospital doctors’ everyday practice and a familiarity with language terms used. The internship was however not with the doctors who later participated in the interviews, so a specific trust was not built.

In the interview studies of the thesis the problem of information transfer regarding the patient’s drugs between hospital and primary care was mentioned. It was therefore investigated whether primary care doctors also perceived this as a problem in a pilot interview study with three primary care doctors. (141) The magnitude of the problem from the primary care doctors’ point of view became clear, and the focus group studies were planned around this problem.

The use of different researchers, although it may be discussed if they all can be submerged in the data, is also a way of achieving credible results. (101) The team members can ensure each other’s “honesty”. In the focus groups, two researchers participated in both the data collection and the analysis, thus being very familiar with the entire study in detail. Having members of the studied populations reading and commenting on the manuscripts is yet another way of ensuring the credibility of the results, also called “member checking”. (101) These member checks have been described as most crucial for a study’s credibility. (142) The findings were presented in the mixed focus group, which indicated the credibility of the initial analysis. The time span between the separate focus groups and the mixed focus group gave the participants some time to reflect on the research issues and the possibility to share those reflections in the mixed group, allowing their perceptions to mature. Also, if the participants had felt that something was missed, misunderstood or misrepresented in the separate focus groups, there was an opportunity to bring it up in the mixed focus group.

Transferability

The results from these studies can probably be regarded to be transferable nationally. Although Sweden is divided into regions and counties, the organisation of health care by the county councils is generally very similar. As described in the background of the thesis, the factors found to influence prescribing have been described in research before. Indeed the social factors involved in prescribing new drugs were described as early as the 1960s. (143) The fact that many information sources are used in prescribing is also true for general practice in Sweden. (144) The results regarding e-PMRs could possibly be transferable more widely than that; a study of two hospitals in Norway showed similar problems with information overload in the e-PMR. (97)
**Dependability**

Just as validity is based on reliability, the credibility has a foundation in the dependability of the study. It has been argued that if credibility is shown, dependability is established as well. Methodological changes can occur during a study, but these changes need to be tracked and visible to others, so that they can understand and evaluate the process and decisions made by the researcher. (142) A way of establishing dependability is using an “auditor” to examine both the research process and the research product. (101) No such external auditor has been present in our studies, apart from the involvement of different researchers, discussed under “credibility” above. All studies in this thesis however have been or are intended to be published in peer-reviewed journals. To make it easier for the reader to estimate the dependability of the results, it is however helpful if the methods used in data collection and analysis, have been thoroughly described.

**Confirmability**

In order to ensure confirmability an auditor, as described above, should investigate how well inferences made from the collected data are supported. (101) Apart from the continuous discussion with the co-authors, no such audit has been made. This type of audit is however rare and is also dependent on resources when involving external researchers. (101) As described earlier, the initial analysis was however discussed in the mixed focus group and the participating doctors were given the opportunity to comment on the preliminary interpretations of the results.

**Discussion of findings**

**Appropriate prescribing**

The follow-up and a time perspective of appropriate prescribing could be seen as a national prescribing norm, which the doctors are trying to live up to. A theory used to explain behaviour, the theory of reasoned action, highlights the importance of norms for causing specific behaviours. According to the theory, the intention to engage in certain behaviours is a crucial causative factor. The stronger the intention to do it, the more likely is the performance of the behaviour. Thus, the stronger the intention is to update the list of medications, the more likely it is that the prescriber will do so. The intention depends on the attitude toward the behaviour and perceived norm. The attitude in turn depends on outcome beliefs about the behaviour and the per-
ceived norm depends on normative beliefs, i.e. perceived social pressure. (145) Follow-up of drug therapy could be an example of a perceived norm for prescribers.

In clinical studies of drugs, providing scientific evidence of the drug’s effect, follow-up and close monitoring of the patient are necessary to study the effect, avoiding side-effects and ensuring compliance with the treatment (see for example ref (146)). When the drug is later released on the market and used in everyday practice in much less controlled circumstances, for example in non-compliant patients and those with comorbidities, the effects of the drug can be less evident and the perceived side effects or different interactions can cause problems. In a way, the doctors’ wishes for increased follow-up of drug therapy to achieve appropriate prescribing is a way of wanting the idealised study environment of the clinical study back, the environment that once gave the drug an evidence base. It has been described how the Swedish Council on Health Technology Assessments (SBU), who evaluate medical methods critically, in their comprehensive assessments urges the research society to adapt scientific knowledge to reality and vice versa; clinical practice should adapt their everyday work to make existing scientific knowledge more applicable. (47) Follow-up on prescribed drug therapy can be an example of such an adaptation. In discussing appropriate prescribing in Paper I, the hospital doctors talk of the importance of follow-up, and this requires effective transfer of information. Given this, a rephrasing of Buetow’s definition is suggested: ‘the outcome of the recurring processes of decision making that maximises net individual health gains within society’s available resources’. It can be questioned, however, whether it is possible for doctors today to have this continuity in drug therapy, given that care is fragmentised into different health care levels and specialisations.

An interview study of hospital doctors in the UK found that there should be an indication, an evidence base for the drug and acceptable cost and risk-benefit ratio (147) for prescribing to be appropriate, which would correlate to the individualisation of treatment and cost themes in Paper I. The doctors in the interviews expressed the need for scientific evidence or experience. In the British study, “continuing medication indefinitely” and “lack of review of continued need” are described as examples of inappropriate prescribing, but the time perspective seems to have been more emphasized in our interviews. An explanation could be that the UK study asked the doctors to describe how they judged appropriateness in a prescribing decision made by themselves or colleagues, while the doctors in this study were asked to describe appropriate prescribing more broadly, which allowed an inclusion of the time perspective.
Indicators for prescribing should contain an indicator for planned evaluation of the outcome, as well as reviews of the individual’s complete drug therapy. Nowadays when information often is shared electronically this could also be practically possible, as information is more readily retrievable for a large number of patients. Drug reviews as a way of achieving appropriate prescribing has been acknowledged in the literature. (148) Most indicators today are however designed to be used in either primary or secondary care. Applying indicators of appropriate prescribing can probably be facilitated with the use of search terms in the e-PMR.

In the initial phases of this doctoral project, there were attempts to develop generic, patient-specific indicators of appropriate prescribing. It was however difficult to find an appropriate generic standard. The national Swedish medicines compendium, FASS, (149) was used for this purpose, but when clinicians were asked about the indicators’ face validity, problems with applying FASS as an external standard became evident, and the plan to develop indicators was abandoned. Similar concerns have existed with the BNF in the UK. (150) When applying the translated indicators to patient medical records in a pilot study, the problem of insufficient documentation of prescribing decisions also threatened the validity of the indicators. (151)

Disseminating non-commercial drug information to prescribers

Guidelines often have the intention of giving the prescriber evidence-based advice, “ready to use” in practice. (152) In this sense the guideline is an attempt to create part of a perceived norm in prescribers, when applying a reasoned action model to prescribing.

The different perspectives of the issuing authority of the guideline and the practising doctor however make it difficult to always follow such a norm of evidence-based prescribing. (53) In practice, there are so many more factors to take into account. The authority of issued guidelines is also valued differently today. Before, the authority of the publisher, for example a governmental agency, could be enough to give the guideline authority. Today, the authority comes from solid scientific knowledge or other expert knowledge. (153) This is perhaps especially true for a knowledge-based practice like medicine, where practitioners have a lot of knowledge themselves, and may also participate in the development of guidelines, which was also true for the interviewed doctors in Paper II. Hence, deviating from guidelines was not seen as controversial either as long as one relied on personal knowledge and experience, but the younger doctors were described as more compliant to guidelines in general.
In the second paper, the hospital doctors also describe how important interaction with colleagues is for prescribing. Having the colleagues as a kind of “human filter” and pursuing the therapeutic traditions are examples of how they use social interactions to deal with the information overload. This would correspond to the environmental factors discussed in the background and the patient- and prescriber-specific factors were also reflected. Alternatively, secondary care doctors have also been found to rely mainly on scientific literature and scientific meetings when prescribing new drugs. (40)

A more managerial implication of Paper II is the importance of social interaction in providing drug-related information to hospital doctors. Indeed the social factors involved in prescribing new drugs were described as early as the 1960s, (143) but are also true in highly specialised care in Sweden today. Considering the importance the doctors ascribe to the collegial discussion, some effort should be put into involving doctors that have a “niche” within the subject area in educational outreach visits. Chances are that their colleagues might listen to a person they know has specific knowledge, rather than to an external person who lacks this legitimacy. The use of so-called “local opinion leaders” can be effective in educational outreach visits. (154) Interactive educational interventions with feedback on both actual prescribing behaviour and prescribing in written patient cases given and discussed in a group of colleagues have been shown to influence prescribing for urinary tract infections significantly. (155) The feedback on individual prescribing behaviour and the discussion with colleagues was perceived by researchers as creating a normative pressure to change on GPs with an inappropriate prescribing behaviour. (156) The doctors in the interviews in Paper II expressed a lack of information about drugs at the time of the study, but they did not ask for more non-commercial information. Whether this was due to a perceived lack of quality of or lack of experience with, non-commercial drug information was not studied.

By encouraging the collegial discussion the information can be incorporated and discussed in relation to the clinic’s own norm of prescribing, which would probably be more rewarding for the doctors. These findings can also be discussed in the light of the DIKW hierarchy; information regarding drugs can be made into knowledge by a colleague. He or she can apply the information to the context of the health care unit and combine it with factors such as experiences and the therapeutic traditions. Colleagues may also possess the same tacit knowledge, a type of knowledge that is practised in action, but that is difficult to describe to others, as it has often not been reflected upon and verbalised. (157)
The introduction of e-PMRs – new problems as well as solutions

A study in the same hospital where the studies for this thesis were conducted shows that at least one discrepancy was found in 51% of inpatients’ lists of medications. (158) This concurred with the doctors’ perceptions of the list of medications as being inaccurate and poorly updated (Paper IV). Undeniably if the list of medications is not updated in a systematic way, it can never be trusted.

In a situation where all data and information from all health care levels were available in one shared e-PMR, the doctors in our focus groups also described an information overload. Knowledge was not always summarised and explicitly explained to the next care givers; they were instead expected to read the information themselves. Before, when the doctors did not have access to all data, knowledge was more often transferred through summaries at discharge. Now all information is available in an electronic “repository”. The next care giver may not find all information or possess the knowledge necessary to come to the right conclusion. The doctors were, however, positive to the idea of a shared e-PMR and believed that it would facilitate their work in the future.

The implementation of e-PMRs needs to take time, letting both systems and people adapt to new ways of working. The ideal e-PMR system cannot be reached immediately; this is true for many IT-related implementations (see ref (159) discussing an implementation of a global finance and accounting IT system at Ericsson). The health care personnel need to take active part in the implementation to ensure that the systems are user-friendly and adapted to the local context. Implementation of information systems in health care can be seen as a mutual process of transformation; both the organization and the technology needs to undergo changes, thereby reaching the ideal becomes a process of organizational development. (160-161) Implementing e-PMRs is often referred to as “rolling out” the system in practice; this expression suggests that the need for time and adaptation is not always understood within management.

Barriers to implementation given in interviews can be constructions, as mentioned earlier, keeping up the appearance of rationality. (140) Time constraints exemplify such barriers; they were also discussed by the doctors in our interviews and focus groups. If these are constructs they are probably not consciously made, as the doctors really seem to experience these barriers. To dismiss these barriers would infer a lack of empathy for the work situation in which the doctors find themselves. Capacity for empathy has been described as one of the key capabilities needed for organisational development. (161) The implementation of the shared e-PMR system can be seen as such a de-
velopment. To apply a completely rational view of implementing IT as merely “a new piece of equipment”, presents the risk of important actors not seeing the challenge and effort that the implementation of a new IT system is for the employees. This can be seen as a lack of empathy for those who are most central to achieving possible revenues from an implementation – the people working in practice. (161) The doctors in the focus groups described a lack of responsiveness from management and an overconfidence in the system itself as a problem-solver, which could be seen as a lack of such empathy. After the focus groups, a meeting was held with the county’s working group responsible for the e-PMR and its implementation, in order to impart information on the findings of the study.

*Ethical aspects of e-PMRs*

The doctors in our focus groups discussed how the e-PMR had made them come across information about the patient that might be difficult to handle in the meeting with the patient. This brings to mind the concept of moral distress, defined as “traditional negative stress symptoms that occur due to situations that involve ethical dimensions and where the health care provider feels she/he is not able to preserve all interests and values at stake”. (162) The doctors in the focus groups experienced problems with sudden access to information that could be regarded as sensitive for the patient and described that they did not always know how to handle that. In the medical sense all information can be useful, but not from an ethical aspect. In literature it has been described that the PMR systems might be expanded to contain more information about the patient to support public health. (163) This raises a lot of concern regarding patient consent and privacy on ethical issues. The private practitioners in our focus groups said that they had patients who worked within health care themselves, who did not want their patient medical records to be accessible to all health care givers and therefore chose a private primary care doctor who did not use the shared e-PMR system. Since the focus groups were performed, however, private practitioners have also been given the opportunity to connect to the shared e-PMR system.

*Having and taking moral responsibility for the patient’s drug therapy*

The moral responsibility of updating the list of medications seems to be evident to the doctors; they refer to barriers like time constraints to explain their acts of omission. The act of omission in not updating the list of medications is thus intentional, which could be said to increase the moral responsibility of the act of omission. (107) They perceive that they have a responsibility as they as prescribers are given a responsibility for the patient’s prescribed drugs, but they do not take it. Taking the responsibility is harder in practice than in theory.
Nordgren’s suggested asymmetry of perceived degree of moral responsibility between acts of commission and acts of omission is also being suggested from the results. (107) If a prescriber updates the list and makes a mistake, the moral responsibility could be perceived as greater than if the prescriber had done nothing to the list of medications, even if that might also lead to harm to the patient. According to the doctors, the risk of making mistakes in making alterations in the list is relatively high because important information may be missed in the abundance of the e-PMR, or the prescriber may lack knowledge of specialist treatments.

Taking responsibility is the individual’s own assumption of responsibility, and different prescribers can assume different responsibilities for themselves. Bastholm-Rahmner et al. have shown that GPs can have different views of their responsibility for the list of medications. (66) Some primary care doctors in the focus groups did state that they assumed full responsibility for the patient’s list of drugs, and made changes to it based entirely on their own judgement. Others wrote to the initial prescriber and asked for opinions before changing something like the dosage of a drug.

In the primary care-specific focus groups, the doctors leaned towards having a more comprehensive responsibility for the patient’s prescribed drugs than the secondary care doctors, but in the mixed focus groups they did not confirm this. Perhaps the GPs did not volunteer to take the overall responsibility in the presence of the secondary doctors, fearing that this would tempt the latter to abdicate from their part of the responsibility. The secondary care doctors seemed to actively ascribe the primary care doctors’ responsibility by only prescribing drugs for a short time when the patient was discharged. The primary care doctors, on the other hand, seemed to ascribe the hospital doctors responsibility for drug therapies initiated in hospital, and described the secondary care doctors as not taking this responsibility, which was a source of annoyance.

The doctors perceived updating the list of medications as important. They did not however seem to perceive a social pressure, a perceived norm with a reasoned action perspective to update the list of medication. As “nobody” is updating the list of medications, the perceived social pressure to do so is low; perhaps that also lowers the perceived ascribed moral responsibility. In the UK, the NHS issued guidelines to establish responsibility for prescribing in shared care. (164) Guidelines can be one way of establishing responsibility if there is a normative pressure to follow that guideline in practice. According to the doctors their actual control is low as they lack the knowledge necessary for updating the list regarding drugs outside of their own specialties.
To achieve updates of the list of medications, there is probably no point in trying to improve doctors’ sense of responsibility, as they already are aware of this and the importance of taking the responsibility to update. With a reasoned action perspective it is both the perceived normative pressure and the perceived behavioural control that need to be in focus for the desired change and the doctors themselves seem to want improvement. Clearer orders for all doctors to do the update will increase the expectations for the work to be done before the patient visits the next care giver. Such a change of routine was shown in a Norwegian study, comparing the implementation of e-PMRs in two hospitals. In the hospital where an update of the list of medications at admission and discharge was recommended the trustworthiness of the list of medications increased. As a positive side-effect, it also gave an increased overall doctor satisfaction with the e-PMR, as they benefited from already entered data when using other functions of the system, such as electronic prescribing. (97)

Another factor that presumably increases the social pressure to update the list would be a possibility to show to other care givers when the list was updated and by whom. In our study, the doctors asked for the ability to ‘sign’ the list of medications with their name and date when the list was updated. This would be a way of showing the next care-giver who had contributed, which could motivate doctors to update the list, i.e. taken responsibility could be socially rewarded. It would increase the perceived norm of the need for updating the list and the sense of ascribed responsibility to do so.

Economic incentives could give resources to overcome time-barriers and it would also increase the social pressure within wards and primary care centres for the doctors to do the update. However there is a risk that the doctors may only feel more pressured by time constraints. Assigning the duty to other health care personnel, like pharmacists, who already keep a focus on drug-related issues could be another way of achieving reviews of the list of medications. Involving pharmacists in drug monitoring is discussed below. Pharmacists, however, can however never take the full responsibility in Sweden as they cannot prescribe.

Exchange between prescribers

Considering care from the patient perspective, it is hard to understand the gap between primary and secondary care doctors. They rarely interact even though they handle the same patients and they seem to lack an understanding of each others’ working methods in managing drug therapy. The doctors talk about the increased specialisation that they perceive in health care, which also leads to a fragmentisation. The doctors themselves also seem to want an increased exchange over the health care levels. More effort could be put into
letting the doctors communicate on subjects that are of significance to all, like information transfer in their interface. (166) For delivery of seamless care, such contacts are important. (167) The contacts are also a way of increasing the perceived social pressure to take responsibility for the patient’s drug therapy, by decreasing the sense of fragmentisation. An increased focus of horizontal management within the organisation of health care has been effective in care for the elderly, (168) with “task groups” meeting four times a year involving all parties, such as nurses, primary health care centre managers and home care services to discuss problems in the cooperation. This way of increased exchange and cooperation between health care givers could also be a way of improving coordination between primary and secondary care. “Task groups” with representatives from both health care levels could discuss perceived problems in the collaboration and be able to find solutions to some of those problems.

Involving pharmacists in drug monitoring

Pharmacists can play a role in ensuring that regular reviews of the patient’s drugs are made. Patients receiving a pharmaceutical care service from community pharmacies express an increased sense of safety regarding their drug therapy (169), and drug reviews in hospital performed by clinical pharmacists can reduce morbidity and health care costs in the very old. (170) Pharmacists could regularly go through their medication list and give their doctors suggestions for updates. It is obvious from the interviews that the doctors seldom find enough time to make such overall reviews themselves (Paper IV). The doctors could then refer patients to pharmacists for workload alleviation.

However, many pharmacists may have a long way to go before they see the patient behind the drug packages. In one of the quotations from the articles I also give away my own lack of regard for the patient’s view. I display a pharmacist focus, but the doctor brings it back to what is important:

“As an example of the power of the tradition /.../ there are these low molecular weight heparins and all surgical wards almost always use Klexane® and all medical wards use Fragmin®, and at dialysis they use Innohep®. And they have a slightly different profile, but I don’t think it has a foundation in, that they have any specific reason other than tradition. /.../ There is like a border within the hospital, in the surgery building it is Klexane® and on the other side, after that building, it is Fragmin®. /.../
Interviewer: How odd for the hospital pharmacy, they must have all three in stock and notice that they go in different directions.

Doctor: And for the patient, when the patient is moved from medicine to surgical [ward] you switch [drug]” (Doctor in specialist training 3) (Paper II)

Achieving appropriate prescribing

The prescribers perceive many barriers to taking full responsibility for the patient’s drugs. Although barriers may be relevant, it is unsatisfactory that the doctors in the focus groups refrain from actively taking responsibility. It can be argued that patient safety must be achieved regardless of the system and that barriers have to be overcome. Accessibility of information and timeliness of data extraction is gained through the implementation of e-PMRs, but this is not enough to ensure good care and patient safety. The access to knowledge about previous health care and prescribing provided to the patient is needed for prescribers. Within a safe organisation necessary information and knowledge will be communicated by all means necessary.

If good care is to be achieved, everybody has to “keep their eyes on the ball”, in this case the patient. Drugs or tools like electronic patient medical records can never consider the patient; human beings are required. The view of appropriate prescribing as something that needs to be seen as a whole, giving follow-up to the patient through the different stages of health care, is found in the interviews when the doctors are asked how they perceive appropriate prescribing. It is however not certain that they can or are willing to take on this perspective in their everyday work.

Appropriate prescribing, seen as an outcome of recurring processes, requires revision and evaluation of drug therapy. To make this possible, knowledge about what has been done and what is planned must follow the patient between health caregivers. The knowledge is required to be able to take responsibility for a patient’s drug therapy and unless doctors take that responsibility, appropriate prescribing can never be achieved.
Suggestions based on study findings

- Make use of the “human filters” (doctors with niches in specific areas) when disseminating drug information to achieve the desired collegial discussion.
- Be clear about when, where and by whom the list of medications should be updated.
- Create the functionality for doctors to sign the list digitally when updating, to make their contribution visible to others.
- Indicators to assess planned follow-up and monitoring of the prescribed drug-regime should be included in sets of indicators for appropriate prescribing.
- Recognise the implementation of e-PMRs not only as a technological development, but also as an organisational development.
- Allow time and resources for this organisational development.
- Allow time and/or resources for a qualified health care professional to update the list of medications.
- Create more opportunities for exchange, formal or informal, between doctors at different health care levels and of different specialisations.
- “Task groups” of doctors at different health care levels and of different specialisations should meet to discuss reducing the barriers perceived by the prescribers in the information transfer between health care levels.
- Investigate the involvement of a broader range of health care professionals such as pharmacists to assist drug reviews.
- Clarify that accessibility to data and information is not enough; this needs to be processed into knowledge to be useful to the next care giver.
Conclusions and summary

- Continuous review is a necessary part of appropriate long-term prescribing. Thus, from the prescribers’ point of view, the time perspective should be explicitly incorporated in definitions of appropriate prescribing, in addition to individualisation of treatment and cost considerations.

- Looking at influences on hospital doctors, factors warranting more attention include understanding therapeutic traditions and the doctor’s personal habits for prescribing.

- The importance of clinical experience and information exchange with colleagues should not be underestimated as influences on prescribing.

- The information in the e-PMR needs to be structured in a comprehensible way to facilitate reading and knowledge production. It is not just about providing information; the knowledge needs to be communicated in a satisfactory way to the next care giver.

- Taking the responsibility for reviewing all the patient’s medications was perceived as important, but was described as difficult in daily practice. The barriers to taking responsibility rested both with individual doctors and the system itself, but perspectives of the doctors working in practice must be taken into consideration when overcoming barriers, to ensure solutions that are realisable in practice.

In short, hospital doctors use colleagues and therapeutic traditions as influences in prescribing decisions. The doctors perceive that appropriate prescribing needs continuous revision and the shared e-PMR could be an important tool for these revisions. The availability of information has increased with e-PMRs, and transfer of knowledge between the health care levels could also be increased with more structure and summarisation. The doctors perceive barriers in taking responsibility for the patient’s drugs and carrying out revisions, but if these could be overcome appropriate prescribing from the prescribers’ perspective could be achieved.
Future perspectives

This thesis has looked at the doctors’ perspective, but many other actors are relevant for achieving appropriate prescribing. An example would be nurses in both primary and secondary care, who have an influence on prescribing, on the prescribing doctors, as well as on follow-up of drug therapy. It would also be interesting to look at the perspectives of hospital doctors who do not work within medical specialties. The views of clinical pharmacists could also be explored.

The objective quality of documentation regarding patients’ drugs in the shared e-PMR has not been assessed in these studies. The information found in the list of medications in the shared e-PMR could be compared to the Swedish National Pharmacy register, (171) which contains all drugs that have been dispensed for the individual patient within the last 15 months.

Regarding the e-PMR it would be desirable to ask the patients how they perceive the transfer of information. According to the doctors most patients think that information has always been shared between hospital and primary care, but this has not been studied nor has the patients’ point of view been investigated.

How the issue of responsibility for the patient’s drugs is resolved in daily practice should be further studied. This could be done with observational studies or possibly by using documentation available from different health caregivers. The impact of different interventions to promote reviews of the patient’s list of medications, such as economic incentives, should also be investigated.

The patient’s influence on prescribing in secondary care as well as the patient perspectives of the responsibility between health care levels should be further studied, for example the issue of trust in the prescriber and the relevance this has for success of drug therapy.
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♥

Sjukhusläkarna tillfrågades också om vilka faktorer som påverkar dem vid förskrivning av läkemedel. Läkarna talade om olika patientspecifika faktorer som kunde påverka valet av läkemedel, till exempel andra sjukdomar eller andra läkemedel patienten tar. Man påverkades även av olika typer av informationskällor, riktlinjer, vetenskapliga artiklar, vårdprogram och läkemedelskommitténs rekommenderade läkemedel; kostnader sågs också som viktigt. Att avvika från riktlinjer uppfattades dock inte som kontroversiellt, så länge som man baserade sitt beslut på vetenskap eller beprövad erfarenhet. Reklam antog läkarna hade en påverkan, men de försökte vara objektiva, d.v.s. inte påverkas av den. Utöver de mer påtagliga faktorerna som påverkade förskrivningen nämnde läkarna också den egna vanan vid och erfarenheten av vissa läkemedel.

Eftersom det finns så många olika informationskällor att ta hänsyn till och så lite tid till att läsa allt, så diskuterade läkarna mycket med varandra i vardagen. Många läkare hade ett intresse av något speciellt område och genom att sedan diskutera med varandra kunde de tillsammans täcka in stora ämnesområden. På sjukhuset och kliniken fanns också en vana vid vissa läkemedel. Man hade terapitraditioner som man följde och som både man självl och kollegorna var bekanta med. Bytte man klinik kunde man följaktligen börja förskriva något annat för att anpassa sig till terapitraditionen där. Det
beskrevs även att patienterna ibland fick byta läkemedel när de flyttades från en klinik till en annan inom sjukhuset på grund av olika terapitraditioner.

I landstinget i Uppsala har alla patienter fått en egen elektronisk patientjournal (e-journal) som används av både sjukhus och vårdcentraler. Alla vårdgivare man träffar får alltså tillgång till all patientinformation som finns dokumenterad inom landstinget. I denna avhandling har läkare från både vårdcentraler och sjukhus i grupp fått diskutera hur man tycker att informationssöverföringen om patientens läkemedel fungerar, mellan vårdcentral och sjukhus, med den nya e-journalen. Läkarna tycker att det har blivit en större mängd information sen man övergick till e-journal från de gamla pappersjournalerna, både på gott och ont. Det gör att det kan vara svårt att hitta den information man letar efter och de kunde vara oroliga för att missa något viktigt. För att spara tid är det också frestande att inte sammanfatta så mycket för nästa vårdgivare, utan bara hänvisa till den information som redan finns i e-journalen. När man hade pappersjournaler och en patient skrevs ut från sjukhus var behovet av sammanfattning större, eftersom vårdcentralsläkaren kanske inte hade tillgång till hela journalen från sjukhuset. Nu kan man istället bara hänvisa till e-journalen, så får vårdcentralsläkaren läsa allt och själv skapa sig en bild av vad som hänt under sjukhusvistelsen. Problemet är dock att det blir mer tidskrävande för nästa vårdgivare som behöver läsa mer och som saknar helhetsbilden av det som hänt.


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Appendices

Appendix 1. Topics covered by interview guide

Reasoning in initiating drug therapy.

Guidance in the choice of a specific drug.

Prescribing support used (written, computer-based, other…).

Other influences to prescribing (apart from already mentioned…).

How would you describe appropriate prescribing? (Requirements?)

Could you give an example, from real life if possible, of appropriate prescribing?

Could you give an example, from real life if possible, of inappropriate prescribing?

How important is appropriate prescribing? (Prioritised?, why/why not?, to whom?)

How important is the documentation for appropriate prescribing? (Necessary to document? Possible to prescribe appropriately without documenting?)
Appendix 2. Topic guide for separate focus groups

1. Background info
I would like to begin by asking you to introduce yourselves briefly; tell us:

- where you work
- how long you’ve worked as a doctor
- any inpatient care experience you have, aside from that included in your education
- if, and in that case how, you know each other

The first question:
- What did you think of when you heard that this would be about information transfer of drug therapy between inpatient and outpatient care? What did you think should be brought up? (Brainstorming form, write on board.)

2. Main discussion
What we’re primarily interested in is information about individual patients’ drug therapy.

1. What transfer methods exist today?
   a. What is good about them?
   b. What is not so good about them? Reasons for these drawbacks? Possible consequences?

2. Which transfer methods are not used (regularly) now? Why not? Is a change needed, or is one being sought?

3. What do you think of the content in the information you get?
   a. What is good in the content?
   b. What is not so good? Reasons for these drawbacks? Possible consequences?
   c. Is there existing info about treatment length and evaluation of the drug therapy?

4. How about the amount of information?
5. Who takes responsibility for the information transfer being done right? For its having the right content?

6. Who should have responsibility?

Please give concrete examples of assertions.
The moderator summarises the discussions briefly.

3. Concluding discussion
   • How should it be in the future? If you were responsible for optimising the transfer of drug information between inpatient and outpatient care, what would you do?
   
   • What do you think is most important to emphasize in today’s discussions? (Ask around the table).
   
   • Anything else that should have been discussed? (Return to brainstorming notations and my questions)

For hospital doctors: – Who writes the information to primary care?  
- What education is needed?  
- What education is provided?
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