CHAPTER 16

The Role of Medication Management in Hospital Readmissions in Norwegian Primary Healthcare Services: A Secondary Analysis

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Abstract: Medication management and the transmission of medication information between healthcare services have proven to be essential factors in hospital readmissions. The patients primary healthcare services are caring for at present have complex medical conditions, leading to even greater challenges in transferring correct information across different healthcare services. This chapter describes how healthcare personnel perceive medication management as an influencing factor in hospital readmissions, and explores which elements may lead to medication-related hospital readmissions from the primary healthcare service.

Keywords: Medication management, hospital readmissions, primary healthcare services, patient safety

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Background

Transitions in healthcare are well-documented sources of preventable harm. One of the key influencing factors relates to medications and medication management, which often lead to hospital readmissions as a consequence (Dautzenberg et al., 2021; van der Does et al., 2020). More specifically, research has shown that a large percentage of medication errors connected to hospital readmissions (30%) were transition errors, and that 40% of all medication-related readmissions were preventable (Uitvlugt et al., 2021). When a patient is transferred from one healthcare service to another, the risk of adverse events increases (Kapoor et al., 2019). In particular, this relates to coordination, communication and information exchange between the different healthcare actors during this process (Kripalani et al., 2007; Laugaland et al., 2014; Storm et al., 2014). As the world population grows older, and more people receive complex medical care at home and in primary healthcare services, more complex information must be exchanged between healthcare actors (Glans et al., 2020; Schoonover et al., 2014). This implies that the problem of medication-related hospital readmissions is likely to continue to increase.

A hospital readmission is, according to the Norwegian national quality indicator, "an acute admission, regardless of the cause or hospital of the readmission, which occurs between eight hours and 30 days after discharge from a prior hospital stay (primary admission)" (Kristoffersen et al., 2017, p. 5). In addition, the literature often distinquishes between necessary and unnecessary hospital readmissions. Patients are readmitted necessarily if the readmission is due to acute illness, worsening of a chronic illness, complications after surgery, or if they are in need of other kinds of hospital care. An unnecessary hospital readmission is a readmission that could potentially be avoided, but still occurs due to, for example, organizational difficulties, such as lack of patient information, lack of competence or staffing or poor communication between different healthcare actors (Australian Commision on Safety and Quality in Health care, 2019; Kent et al., 2011).

Hospital readmissions related to medications are defined in different ways. The most common definition is, "admissions due to adverse drug reaction (ADR)", where a drug reaction is an unintended response to a medication, for example a side effect. Another definition is, "admission

due to an adverse drug event (ADE)", which includes any unfortunate occurrence related to the use of a drug. And lastly, a hospital readmission related to medications may be defined as "admission due to drug-related problems", which includes events involving a patient's medication, which may inhibit achieving an optimal outcome (Linkens et al., 2020). This chapter includes all types of drug-related hospital readmissions using the term "medication-related readmissions".

Aim and Research Question

This chapter aims to describe how healthcare personnel perceive medication management as an influence in hospital readmissions from primary healthcare services, and further, what factors within medication management may lead to hospital readmissions.

The research question was as follows: How do healthcare personnel perceive medication management as an influencing factor in hospital readmissions? The results will be discussed in light of previous research and human factors theory.

Context

The Norwegian healthcare service is managed and financed through two separate decision pathways, that is, the specialist healthcare services are subordinate to the state, and the primary healthcare services are subordinate to the municipalities (Grimsmo et al., 2015; Ministry of Local Government and Modernisation, 2019). The specialist healthcare services include somatic and psychiatric hospitals, while the primary healthcare services include general practitioners (GP), nursing homes, home care services, health centers, emergency rooms and rehabilitation services. In Norway, there are 356 different municipalities, and each one provides healthcare services at their own discretion, within comprehensive national regulations (The Health and Care Services Act, 2011). This means that there is considerable variation in how the different primary healthcare services are organized and delivered, including differences in areas of expertise, differences in skill mix, and differences in task allocation (Sperre et al., 2020).

Coordination, cooperation and holistic patient pathways between the hospitals and the primary healthcare services have been on the agenda for decades (Veggeland & Berg, 2013). This did, however, gain even more attention when the coordination reform (an overarching health reform) was introduced to the Norwegian healthcare services in 2012 (Bruvik et al., 2017). This reform encouraged earlier hospital discharges, and subsequently increased the responsibilities of primary healthcare services, particularly in terms of caring for a larger number of patients with complex medical needs (Abelsen, 2014).

Method

This chapter was based on a secondary analysis (Ruggiano & Perry, 2019) of data from a previously conducted case study on hospital readmissions (Glette, 2020; Glette et al., 2019; Glette, Kringeland, et al., 2018; Glette, Røise, et al., 2018). Two municipalities with four affiliated nursing homes (one short-term home and one long-term home in each) were included in the primary study, in addition to a common hospital for both municipalities. Data collection consisted of interviews with general practitioners (GPs) (n = 8), nursing home physicians (n = 2), hospital physicians (n = 15) nursing home leaders (n = 7), nursing home nurses (focus groups) (n = 17), and nursing home observations (ca. 40 hours). In the secondary analysis, Braun and Clarke's (2006) analysis method was applied (as opposed to Graneheim and Lundman's approach, which was used in the primary analysis). Braun and Clarke's (2006) approach enabled the identification of focused features of the dataset, which in this case were medication management and hospital readmissions. The aim of the secondary analysis was to view the dataset in a new way, with the new research question as the backdrop. A distinctive view of the dataset was ensured by using clean uncoded transcripts, and applying a different analysis approach than was used in the parent study (Ruggiano & Perry, 2019). However, some of the results identified in the secondary analysis overlapped with the primary analysis, due a similarity of focus in the two studies. The analysis resulted in three themes, with seven subthemes, describing how medication management may influence hospital readmissions (Table 1 demonstrates the analysis process in Theme 1).

Table 1. Example of Analysis: Theme 1

Themes	Sub-Themes	Codes
T1: Inadequate coordination and communication of the patients' medical treatment	Lack of Access to the patients' medication lists	Lack of knowledge of the patient and their medication list
		Lack of medication information in the ER
		Needing the medication lists to make medical assessments of the patients
	Changes in medication are poorly communicated	Challenge in relation to dissemination of medication changes
		Poor medication information when the patient arrives at the nursing home
		Poor coordination when there are changes in the medication
		Lack of updated medication lists after stay at short-term nursing home
		A common documentation system could reduce readmissions
		Hospital stay summaries with updated medication list arrives too late
		The use of outdated medication list in the hospital
	Early discharges: Lack of observations of the effect of medication changes leads to readmissions	Too early discharge after an infection
		Early hospital discharge leads to inadequate observation of the effect of the medication

Ethics

The primary study was approved by The Norwegian Center for Research Data (NSD) (reference number: 49331). All participants signed a written informed consent form before participating in the study. Written approval was retrieved from the participating hospital, and oral approval was received from municipal leaders. Overall, the research complied with the Norwegian National Research Ethics Committee's research guidelines.

Results

Inadequate Coordination and Dissemination of the Patient's Medical Treatment

An overview of the patient's medications was perceived as essential in adequately assessing the patient's medical condition, and further treatment

and care. However, this information was lacking or incomplete in several primary care contexts. In the emergency room (ER) the information they had access to was described as random. They did not have access to patients' medical records, and needed to rely on the information the patients themselves could provide. If the patient had been admitted to the hospital previously, there could be a hospital stay summary available, but this was not always the case. The ER doctor needed to find information by making calls to the hospital, which was considered burdensome when the ER was busy. A too busy ER combined with lack of patient information could lead to a hospital readmission.

The nursing home nurses observed that the patients, in some cases, arrived from the hospital to the nursing home with poor information about medications, medication changes or explanations for medication changes – a problem solved by making calls to the appropriate actors. It was also stated that the hospital sometimes used outdated medication lists during the patient's hospital stay. This meant that when the patient came back to the nursing home, previous changes done by the nursing home physician a long time ago, were reset, and therefore incorrect. This overall coordination issue was described by a nurse in a short-term nursing home:

> I believe that the biggest issue is the medication. We're starting up [medical treatment] here [at the nursing home] and they're [the hospital] starting up [medical treatment] there … there is no coordination between them [the nursing home and the hospital].

It was also explained that there could be poor access to information on medication changes, and the assessments that had been done in relation to these changes, when the patients had been on a short-term stay (in a nursing home), and were transferred to a long-term nursing home.

Hospital physicians found it difficult to communicate changes done in the patient's medication lists. Medication changes were written in the hospital stay summary, but they worried that the changes did not reach the right actor (home care service in this case), since the hospital stay summary was not sent to them directly, but to the patient's general practitioner (GP). It was also said that all patients received a discharge note in

which medication changes were communicated, but there was no guarantee that this note was passed on to the nurses by the patient. Issues described in transferring medication information to the primary healthcare services from the hospital are illustrated in the following quote by a hospital physician:

> Multidose, yes … They don't appear in the e-prescription, so if we add a new prescription, it is not certain that it will be included in that multidose …. There are also medication adjustments that we don't necessarily include in the e-prescription, but which we add to the hospital stay summary, and it's not certain that the home care services see it, because we don't have the possibility to send it to them [the home care service] directly, and we don't have an overview of which home care service [area] each patient belongs to.

Additionally, the primary care physicians stated that the hospital stay summary (with included medication lists) sometimes arrived late. This was also seen during nursing home observations on several occasions. Nursing home physicians made calls to the hospital to have the summaries faxed over. In one nursing home they even went to the hospital physically to get the necessary documents (they were close to the hospital). Another concern mentioned by a hospital physician, was that different medication treatment regimens were started up by different healthcare professionals (nursing home physicians, GPs, hospital physicians) with limited coordination between them. It was suggested by several healthcare professionals that a common documentation system with access to all patient information (including the medication lists) could reduce hospital readmissions, improve coordination, and save time in regard to transferring the medication list back and forth in the different systems.

As also identified in the parent study, there was agreement among primary healthcare professionals that patients were often discharged too early from the hospital after intravenous (IV) antibiotic treatment. In many cases, the patients were discharged from the hospital to the primary healthcare services the same day that they had switched from IV treatment to oral treatment, leading to limited observation of the effect of this change. The patients frequently relapsed and needed to be readmitted to the hospital. This was described as an issue in both nursing

homes and among GPs. Hospital physicians argued that it was difficult to know when and if an infection flared up, and that they could not keep the patients in the hospital indefinitely to avoid relapses. Another said that in light of a readmission related to an infection relapse, it could be thought that the hospital discharge was too early.

Discrepancy Between the Primary Care Service's Treatment Capacity and the Hospital's Expectations

Several hospital physicians had opinions on what medical treatments the primary healthcare service should be able to offer to the patients discharged from the hospital. These options included IV antibiotic treatment, fluid treatment, and blood transfusions. Some patients were even discharged from the hospital while still receiving IV antibiotics, but only in special cases (e.g., a patient suffering from dementia). However, not all nursing homes had the competence nor capacity to provide IV antibiotic treatment for their patients. In one nursing home they did not always have a nurse on call, for example during the night shift. This was not only problematic in relation to antibiotic treatment, but also, for example, in pain management. There were further descriptions of limited knowledge of the effects, and uses, of some of the medications the hospital physicians requested. And in some cases, they did not have the medication the patient needed in place for the patient's arrival, especially if the hospital discharge was abrupt. One nurse said:

> What's a little strange is that sometimes they come out [from the hospital] very quickly. Fast in and fast out. And then there are some notes and stuff, what [medications] they're supposed to have. Because they've started on new medications, and we don't have these medications at the nursing home, and they [the medications] have to be ordered. You can order urgently and receive the medication in a couple of hours, but you can't do that with all of them [all medication types].

Another challenge described by nursing home physicians was that it was difficult to dose medication without having access to appropriate testing

equipment (e.g., increase or decrease diuretics without access to blood-work). Most nursing homes had IV treatments incorporated into their routines, and could provide this service to their patients, but they did not have access to all antibiotic types. That said, there were different opinions on whether the hospital physicians were responsible for familiarizing themselves with the treatment capacity in the different nursing homes or not. Some admitted that they investigated whether the nursing home, to which the patients were being discharged, could continue treatment. Others expected the nursing homes to have this competence in place.

Targeted Work to Avoid Medication-Related Hospital Readmissions

Health personnel worked with the objective of avoiding hospital readmissions. Some patients had an observational stay at a nursing home after a hospital stay, when medication lists and their ability to administer the medications themselves were reviewed. This was perceived as a measure to reduce medication-related hospital readmissions. Primary care physicians often called hospital physicians for advice on how to provide the best treatment for their patients. Some examples are guidance on pain management for patients with back pain or advice on what medications to use for anxiety in patients suffering from dementia. Some hospital physicians tried to figure out where the patient was going after the hospital stay (e.g., what home care area they belonged to) to provide necessary information to the home care service nurses regarding medication changes, for example. This was, however, extremely time consuming, and not possible to do in all cases. In one nursing home they explained that they reorganized their personnel across wards to ensure adequate competence in all wards if there was a lack of personnel. This was to ensure that no nurses were responsible for both administration of medications and their shift at the same time. Lastly, healthcare personnel described working intentionally to keep patients in the nursing homes if they needed antibiotic treatment, when this was the best option for the patient. The following quote from a nursing home physician describes this:

> The patient is better served by having familiar personnel around them, and we have good access to antibiotics and most things here. So, it shouldn't be necessary with [hospital] admissions for elderly patients severely affected by dementia.

It was also observed that a patient, who became acutely ill on the day he was being discharged from the nursing home, was rather moved to a more advanced ward at the nursing home for antibiotic treatment, in order to be spared a hospital admission.

Discussion

The results from this study showed that access to patient information varied, and coordination and communication in relation to medicine changes were poor. These were issues identified in both the hospital and in the primary healthcare service. Moreover, patients were discharged from hospital after medication changes (IV antibiotic to oral antibiotics) without proper observation of the effect of this change, often leading to a relapse and a need for hospital readmission. Most nursing homes had the competence to treat patients with antibiotic IVs, but they did not have access to all antibiotic types. Overall, all healthcare personnel worked to avoid medication-related hospital readmissions.

Treating Patients with Complex Medical Conditions

All Norwegian municipalities are responsible for ensuring access to good quality health and social services, for all their inhabitants, independent of age or diagnosis (Ministry of Health and Care Services, 2021). The scope of this responsibility has, however, increased in recent years, and will continue to increase in primary healthcare services worldwide (World Health Organization, 2018). Patients the primary healthcare services are now caring for, have more complex medical conditions, with more complex medical needs (Loeb et al., 2016; Osborn et al., 2015; Wallace et al., 2015). However, it has been demonstrated in this and similar studies, that there is a lack of suitable equipment, competence, and in some cases, access to correct medication, to care for these patients adequately (Glad et al., 2018; Søreide et al., 2019). For example, as demonstrated in this study, there was a lack of access

to the correct antibiotic type, and competence to provide antibiotic treatment in some nursing homes, despite the large amount of nursing home patients needing antibiotic treatment (5.2% of all Norwegian nursing home residents) (Norwegian Directorate of Health, 2019). Moreover, like Rustad et al. (2017), we found that there were difficulties in providing the correct type of medication at the right time, particularly when hospital discharges were abrupt, or occurred during weekends.

Transfer of Patient Information

This study identified problems relating to the transfer of patient information between healthcare service levels. Particularly, information about changes in medications and treatment regimens have been previously well-documented, and perceived as problematic at both ends of the healthcare service (the hospital and the primary healthcare service) (Laugaland et al., 2014; Pinelli et al., 2017; Rustad et al., 2017; Storm et al., 2014; Vatnøy et al., 2019). Several issues concerning the transfer of patient information tied to medication management directly were found. Some examples were: confusion with the medication list; and subsequent application of outdated lists; medication lists arriving late (along with the hospital stay summary); lack of access to the medication list (particularly among ER doctors); and having to transfer medication lists from one system to another. These issues are not unfamiliar (Breuker et al., 2021; Johnson et al., 2015; Kerstenetzky et al., 2018). In their literature review, Kerstenetzky et al. (2018), for example, found that medication discrepancies were common when patients transitioned between healthcare settings. Their quantitative analysis found that 76% of long-term care facility records had at least one medication discrepancy when compared to the hospital medication list. Similar results were also found in Breuker et al. (2021), where unintended medication discrepancies occurred in 29.4% of admissions or discharges, demonstrating the potential hazard of transferring medication lists from one system to another. Overall, Frydenberg and Brekke (2012) found that inadequate communication about patients' medications across healthcare service levels resulted in numerous and potentially harmful medication errors. In our study, poor information

exchange regarding patients' medications was perceived as a factor potentially leading to hospital readmissions.

Another issue that worried some of the physicians included in this study, was that different medication treatment regimens were started up by different physicians at different healthcare levels, with limited coordination between them. Communication and coordination between hospital physicians and primary care physicians are believed to be essential in providing high-quality, safe medical care (Sankey, 2017), and physicians are mostly well aware of this importance. However, studies supporting our findings say that physicians' ability to accomplish this in their daily work is limited by organizational factors. Jones et al. (2015), for example, found that heavy workloads and subsequent time limitations, lack of proper communication tools, lack of feedback loops to confirm receipt of information, and difficulties in locating the right information about the patients were barriers to adequate coordination.

Overall, efforts to address communication and coordination inadequacies have, in previous research, been shown to reduce errors and hospital readmissions, demonstrating that there is an untapped potential to improve quality of care in this context (Bellon et al., 2019; Henke et al., 2017; Laugaland et al., 2012).

Human Factors Theory

Human factors theory has gained recognition, due to its ability to provide system design methods that address the needs and desires of stakeholders in the healthcare system, in addition to other important sociotechnical aspects of healthcare (e.g., document and establish a shared understanding of different processes to identify improvement areas) (Wooldridge et al., 2017). According to human factors theory, performance (e.g., providing safe patient transfers) results from interactions in the healthcare system, whereas healthcare personnel are considered one of several embedded components. However, healthcare personnel are considered to be central in the work system, meaning that efforts must be taken so that system design (e.g., organization of the healthcare service) supports the healthcare personnel working within it (making sure that the design

fits their capabilities, limitations, and performance needs) (Holden et al., 2013). Through the perspective of medication management and hospital readmissions, several issues perceived as unsupportive of healthcare personnel's needs were identified. These include a lack of communication tools to provide well-coordinated care, poorly established guidelines on how to communicate the upstart of new treatment regimens, and lack of suitable equipment to treat patients in nursing homes. These results, if taken into account and applied by healthcare services policymakers, may facilitate an improvement of the systemic factors that do not support healthcare personnel's performance, and thereby improve healthcare quality (Wooldridge et al., 2017). Moreover, there is a need for more research exploring how medication-related hospital readmissions occur, focusing particularly on healthcare personnel's perspectives, so that a shared understanding of how processes may be improved can follow.

Conclusion

This study demonstrated a need for improved communication and coordination regarding medication management and medication changes, and in addition, a need to increase healthcare personnel's knowledge of each other's activities and treatment capacities. The lack of access to proper communication tools and well-functioning coordination routines were perceived, by the healthcare personnel in this study, as factors increasing medication-related hospital readmissions. Human factor theory can facilitate research exploring healthcare personnel's perspectives on how these issues may be addressed, and thereby enable organizational changes, which can better support healthcare personnel's performance. In doing so, unnecessary medication-related hospital readmissions and errors may be reduced.

References

Abelsen, B., Gaski, M.,. Nødland, S. I,. Stephansen, A. (2014). *Samhandlingsreformens konsekvenser for det kommunale pleie-og omsorgstilbudet*. [The consequences of the coordination reform for municipal health and care services] International Research Institute of Stavanger (IRIS).

Australian Commision on Safety and Quality in Health care. (2019). *Avoidable hospital readmissions*. Our Work. https://www.safetyandquality.gov.au/our-work/indicators/avoidable-hospital-readmissions#definition-of-'hospital-readmission'

Bellon, J. E., Bilderback, A., Ahuja-Yende, N. S., Wilson, C., Altieri Dunn, S. C., Brodine, D., & Boninger, M. L. (2019). University of Pittsburgh Medical Center home transitions multidisciplinary care coordination reduces readmissions for older adults. *Journal of the American Geriatrics Society*, *67*(1), 156–163. https://doi.org/10.1111/jgs.15643

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp0630a

Breuker, C., Macioce, V., Mura, T., Castet-Nicolas, A., Audurier, Y., Boegner, C., Jalabert, A., Villiet, M., Avignon, A., & Sultan, A. (2021). Medication errors at hospital admission and discharge: Risk factors and impact of medication reconciliation process to improve healthcare. *Journal of Patient Safety*, *17*(7):e645-e652. 10.1097/PTS.0000000000000420.

Bruvik, F., Drageset, J., & Abrahamsen, J. F. (2017). Fra sykehus til sykehjem – hva samhandlingsreformen har ført til [From hospitals to nursing homes—What the Coordination reform has led to]. *Sykepleien Forskning.o.422*(2017.60613). https://sykepleien.no/sites/default/files/pdf-export/pdf-export-60613.pdf

Dautzenberg, L., Bretagne, L., Koek, H. L., Tsokani, S., Zevgiti, S., Rodondi, N., Scholten, R., Rutjes, A. W., Di Nisio, M., Raijmann, R., Emmelot-Vonk, M., Jennings, E. L. M., Dalleur, O., Mavridis, D., & Knol, W. (2021). Medication review interventions to reduce hospital readmissions in older people. *Journal of the American Geriatrics Society*, *69*(6), 1646–1658. https://doi.org/10.1111/jgs.17041

Frydenberg, K., & Brekke, M. (2012). Poor communication on patients' medication across health care levels leads to potentially harmful medication errors. *Scandinavian Journal of Primary Health Care*, *30*(4), 234–240. https://doi.org/10.3109/02813432.2012.712021

Glad, T., Olsen, T. H., & Clancy, A. (2018). Promoting nursing competence in municipal healthcare services: An interview study of experienced nurses' perceptions. *Nordic Journal of Nursing Research*, *38*(3), 135–142. https://doi.org/10.1177/2057158517721833

Glans, M., Kragh Ekstam, A., Jakobsson, U., Bondesson, Å., & Midlöv, P. (2020). Risk factors for hospital readmission in older adults within 30 days of discharge: A comparative retrospective study. *BMC Geriatrics*, *20*(1), 467. https://doi.org/10.1186/s12877-020-01867-3

Glette, M. K. (2020). *Exploring hospital readmissions from the primary healthcare service: A multiple case study: Bd. no. 525*. University of Stavanger, Faculty of Health Sciences.

Glette, M. K., Kringeland, T., Røise, O., & Wiig, S. (2018). Exploring physicians' decision-making in hospital readmission processes: A comparative case study. *BMC Health Services Research*, *18*(1), 725. https://doi.org/10.1186/s12913-018-3538-3

Glette, M. K., Kringeland, T., Røise, O., & Wiig, S. (2019). Hospital physicians' views on discharge and readmission processes: A qualitative study from Norway. *BMJ Open*, *9*(8), e031297. https://doi.org/10.1136/bmjopen-2019-031297

Glette, M. K., Røise, O., Kringeland, T., Churruca, K., Braithwaite, J., & Wiig, S. (2018). Nursing home leaders' and nurses' experiences of resources, staffing and competence levels and the relation to hospital readmissions: A case study. *BMC Health Services Research*, *18*(1), 955. https://doi.org/10.1186/s12913-018-3769-3

Grimsmo, A., Kirchhoff, R., & Aarseth, T. (2015). Samhandlingsreformen i Norge [The Coordination reform in Norway]. *Nordiske Organisasjonsstudier*, *17*(3), 3–12.

Henke, R. M., Karaca, Z., Jackson, P., Marder, W. D., & Wong, H. S. (2017). Discharge planning and hospital readmissions. *Medical Care Research and Review*, *74*(3), 345–368. https://doi.org/10.1177/1077558716647652

Holden, R. J., Carayon, P., Gurses, A. P., Hoonakker, P., Hundt, A. S., Ozok, A. A., & Rivera-Rodriguez, A. J. (2013). SEIPS 2.0: A human factors framework for studying and improving the work of healthcare professionals and patients. *Ergonomics*, *56*(11), 1669–1686. PubMed. https://doi.org/10.1080/00140139.2013.838643

Johnson, A., Guirguis, E., & Grace, Y. (2015). Preventing medication errors in transitions of care: A patient case approach. *Journal of the American Pharmacists Association*, *55*(2), e264–e276. https://doi.org/10.1331/JAPhA.2015.15509

Jones, C. D., Vu, M. B., O'Donnell, C. M., Anderson, M. E., Patel, S., Wald, H. L., Coleman, E. A., & DeWalt, D. A. (2015). A failure to communicate: A qualitative exploration of care coordination between hospitalists and primary care providers around patient hospitalizations. *Journal of General Internal Medicine*, *30*(4), 417–424. PubMed. https://doi.org/10.1007/s11606-014-3056-x

Kapoor, A., Field, T., Handler, S., Fisher, K., Saphirak, C., Crawford, S., Fouayzi, H., Johnson, F., Spenard, A., Zhang, N., & Gurwitz, J. H. (2019). Adverse events in long-term care residents transitioning from hospital back to nursing home. *JAMA Internal Medicine*, *179*(9), 1254–1261. https://doi.org/10.1001/jamainternmed.2019.2005

Kent, T. S., Sachs, T. E., Callery, M. P., & Vollmer, C. M., Jr. (2011). Readmission after major pancreatic resection: A necessary evil? *Journal of the American College of Surgeons, 213*(4), 515–523. https://doi.org/10.1016/j.jamcollsurg.2011.07.009

Kerstenetzky, L., Birschbach, M. J., Beach, K. F., Hager, D. R., & Kennelty, K. A. (2018). Improving medication information transfer between hospitals, skilled-nursing facilities, and long-term care pharmacies for hospital discharge transitions of care: A targeted needs assessment using the intervention mapping framework. *Research in Social & Administrative Pharmacy : RSAP*, *14*(2), 138–145. PubMed. https://doi.org/10.1016/j.sapharm.2016.12.013

Kripalani, S., Lefevre, F. V., Phillips, C. O., Williams, M. V., Basaviah, P., & Baker, D. W. (2007). Deficits in communication and information transfer between hospital-based and primary care physicians: Implications for patient safety and continuity of care. *JAMA*, *297 8*, 831–841. https://doi.org/10.1001/jama.297.8.831

Kristoffersen, D. T., Hansen, T. M., Tomic, O., & Helgeland, J. (2017). *Kvalitetsindikatoren 30 dagers reinnleggelse etter sykehusopphold. Resultater for helseforetak og kommuner 2016.* [The quality indicator 30 day readmission after hospitalization results for Norwegian health trusts and municipalities 2016] (Nr. 10/2015). Senter for omsorgsforskning. https://www.fhi.no/globalassets/dokumenterfiler/30-dagers-reinnleggelse-etter-sykehusopphold-resultater-2016.pdf

Laugaland, K., Aase, K., & Barach, P. (2012). Interventions to improve patient safety in transitional care: A review of the evidence. *Work*, *41*(Supplement 1), 2915–2924. https://doi.org/10.3233/WOR-2012-0544-2915

Laugaland, K., Aase, K., & Waring, J. (2014). Hospital discharge of the elderly: An observational case study of functions, variability and performance-shaping factors. *BMC Health Services Research*, *14*(1), 1–15. https://doi.org/10.1186/1472-6963-14-365

Linkens, A., Milosevic, V., van der Kuy, P., Damen-Hendriks, V., Mestres Gonzalvo, C., & Hurkens, K. (2020). Medication-related hospital admissions and readmissions in older patients: An overview of literature. *International Journal of Clinical Pharmacy*, *42*, 1243–1251. https://doi.org/10.1007/s11096-020-01040-1

Loeb, D. F., Bayliss, E. A., Candrian, C., deGruy, F. V., & Binswanger, I. A. (2016). Primary care providers' experiences caring for complex patients in primary care: A qualitative study. *BMC Family Practice*, *17*(1), 34. https://doi.org/10.1186/s12875-016-0433-z

Ministry of Health and Care Services,. (2021). *Kommunale helse- og omsorgstjenester* [Governmental information page]. https://www.regjeringen.no/no/tema/helse-og-omsorg/helse--og-omsorgstjenester-i-kommunene/id10903/

Ministry of Local Government and Modernisation. (2019). *Inntektssystemet for kommunar og fylkeskommunar 2019*. [The income system for municipalities and counties 2019]. https://www.regjeringen.no/no/tema/kommuner-og-regioner/kommuneokonomi/inntektssystemet-for-kommuner-og-fylkeskommuner/id2353961/

Norwegian Directorate of Health. (2019). *Antibiotikabruk i sykehjem* [Antibiotic use in nursing homes].[online document] Oslo: Directorate of Health (last update 06th of May 2021). Available from https://www.helsedirektoratet.no/statistikk/kvalitetsindikatorer/legemidler/antibiotikabruk-i-

Osborn, R., Moulds, D., Schneider, E. C., Doty, M. M., Squires, D., & Sarnak, D. O. (2015). Primary care physicians in ten countries report challenges caring for

patients with complex health needs. *Health Affairs*, *34*(12), 2104–2112. https://doi.org/10.1377/hlthaff.2015.1018

Pinelli, V., Stuckey, H. L., & Gonzalo, J. D. (2017). Exploring challenges in the patient's discharge process from the internal medicine service: A qualitative study of patients' and providers' perceptions. *Journal of Interprofessional Care*, *31*(5), 566–574. https://doi.org/10.1080/13561820.2017.1322562

Ruggiano, N., & Perry, T. E. (2019). Conducting secondary analysis of qualitative data: Should we, can we, and how? *Qualitative Social Work*, *18*(1), 81–97. https://doi.org/10.1177/1473325017700701

Rustad, E. C., Seiger, B. E. C., Furnes, B., & Dysvik, E. (2017). Continuity of care during care transition: Nurses' experiences and challenges. *Open Journal of Nursing*, *7*, 277–293. https://doi.org.10.4236/ojn.2017.72023

Sankey, C. (2017). *Communication with the primary care provider*. Cancer Therapy Advisor. https://www.cancertherapyadvisor.com/home/decision-support-in-medicine/hospital-medicine/communication-with-the-primary-care-provider/

Schoonover, H., Corbett, C. F., Weeks, D. L., Willson, M. N., & Setter, S. M. (2014). Predicting potential postdischarge adverse drug events and 30-day unplanned hospital readmissions from medication regimen complexity. *Journal of Patient Safety*, *10*(4). https://doi.org/10.1097

Sperre, S., Ingrid, Karanikolos, M., & Sagen, A. (2020). Norway health system review. Health systems in transition. *Norwegian Institute of Public Health*, *22*(1), i–163.

Storm, M., Siemsen, I. M. D., Laugaland, K., Dyrstad, D. N., & Aase, K. (2014). Quality in transitional care of the elderly: Key challenges and relevant improvement measures. *International Journal of Integrated Care*, *14*, e013–e013. PubMed. https://doi.org/10.5334/ijic.1194

Søreide, H., Kyrkjebø, D., & Råholm, M. B. (2019). Challenges in municipality healthcare services: The nurse leaders' perspective. *Nursing Open*, *6*(3), 889–896. https://doi.org/10.1002/nop2.270

The Health and Care Services Act. (2011). *Act on municipal health and care services* (LOV-2021-06-18-127). Lovdata. https://lovdata.no/dokument/NL/lov/2011-06-24-30

Uitvlugt, E. B., Janssen, M. J. A., Siegert, C. E. H., Kneepkens, E. L., van den Bemt, B. J. F., van den Bemt, P. M. L. A., & Karapinar-Çarkit, F. (2021). Medication-related hospital readmissions within 30 days of discharge: Prevalence, preventability, type of medication errors and risk factors. *Frontiers in Pharmacology*, *12*, 567424–567424. https://doi.org/10.1371/journal.pone.0253024

Van der Does, A. M. B., Kneepkens, E. L., Uitvlugt, E. B., Jansen, S. L., Schilder, L., Tokmaji, G., Wijers, S. C., Radersma, M., Heijnen, J. N. M., Teunissen, P. F. A., Hulshof, P., Overvliet, G. M., Siegert, C. E. H., & Karapinar-Çarkit, F. (2020).

Preventability of unplanned readmissions within 30 days of discharge: A cross-sectional, single-center study. *PLOS One*, *15*(4), e0229940. https://doi.org/10.1371/journal.pone.0229940

Vatnøy, T. K., Karlsen, T. I., & Dale, B. (2019). Exploring nursing competence to care for older patients in municipal in-patient acute care: A qualitative study. *Journal of Clinical Nursing*, *28*(17–18), 3339–3352. https://doi.org/10.1111/jocn.14914

Veggeland, N., & Berg, O. (2013). *Reformer i norsk helsevesen: Veier videre*. [Reforms in the Norwegian healthcare system: The road ahead] Akademika Forlag.

Wallace, E., Salisbury, C., Guthrie, B., Lewis, C., Fahey, T., & Smith, S. M. (2015). Managing patients with multimorbidity in primary care. *BMJ : British Medical Journal*, *350*, h176. https://doi.org/10.1136/bmj.h176

Wooldridge, A. R., Carayon, P., Hundt, A. S., & Hoonakker, P. L. T. (2017). SEIPS-based process modeling in primary care. *Applied Ergonomics*, *60*, 240–254. https://doi.org/10.1016/j.apergo.2016.11.010

World Health Organization. (2018). *Integrated care for older people: Realigning primary health care to respond to population ageing.* World Health Organization. https://apps.who.int/iris/handle/10665/326295