Electronic Health Records in Danish Home Care and Nursing Homes: Inadequate Documentation of Care, Medication, and Consent

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Abstract

Background – Electronic health records (EHRs) are used in long-term care to document the patients' condition, medication, and care, thereby supporting communication among caregivers and counteracting adverse drug events. However, the use of EHRs in long-term care has lagged behind EHR use in hospitals. In addition, most EHR research focuses on hospitals.

Objective – This study gives a countrywide status of the documentation-related risks to patient safety in Danish home care and nursing homes, which are the two main providers of long-term care. Such a status provides a basis for national improvement efforts and international comparisons.

Method – The study is based on the reports from 893 inspections of home care and nursing homes by the Danish Patient Safety Authority (STPS).

Results – As much as 69% of the inspected institutions document inadequately to an extent that has led to demands (i.e., issues the institution is legally obliged to rectify) or requests (i.e., issues the institution is merely asked to rectify) from STPS. Documentation issues about the patients' condition and care are present in nearly all institutions that receive demands (97%) and in the majority of those that receive requests (68%). Documentation issues about medication and consent to care are also common, but less so. The predominant risk to patient safety is incomplete documentation. It covers 72% of the documentation issues identified in the institutions that received demands; the remaining risks concern inconsistent (11%), non-existent (7%), inaccessible (5%), and non-compliant (5%) documentation. The documentation inadequacies are similar for home care and nursing homes.

Conclusion – Inadequate EHR documentation is a widespread problem in Danish long-term care. While previous research mainly focuses on how EHR documentation affects patient medication, this study finds that documentation issues about the patients' condition and care are more prevalent and that issues about their consent are also common.

Keywords: electronic health record, patient-safety risk, long-term care, home care, nursing home

1   Background and Significance

The long-term care for citizens who can no longer live unassisted, mostly due to advanced age, is an extensive task in present-day healthcare.[1-3] Many of these citizens have multiple chronic conditions and are dependent on daily medication. Their condition and care are documented in electronic health records (EHRs). In addition to medication information, EHRs for long-term

care provide for extensive patient-history information, descriptive patient information, communication among diverse providers, and integrated care.[4] While EHRs have been found to be "more effective than not" in long-term care settings,[5] their use in these settings has lagged behind EHR use in hospitals.[6, 7] Furthermore, many countries have but weak initiatives for ensuring the safety of systems such as EHRs.[8] In Denmark, EHR documentation is used throughout home care and nursing homes, which are the two main providers of long-term care, apart from relatives.

This study investigates the documentation-related risks to patient safety in Danish home care and nursing homes. These risks pertain to documentation practices that may lead to misunderstandings about the patients' condition, to medication errors, and to administering care against the patients' wishes. The documentation is made in EHRs, the use of which is mandatory. In addition, some supplementary documentation is made in paper-based records, such as medication lists kept in the patients' medication boxes. Most of the staff in long-term care is nurses, but long-term care is also provided by healthcare assistants (akin to nurse aides); the patients' medication is prescribed by physicians.

Home-care providers[9-14] and nursing homes[15-20] are in contact with citizens for much longer periods of time than hospitals, which mostly administer acute care. The long-term relationship with the patients influences the role of EHRs by increasing the importance of, for example, patient history information.[4] It also calls for studies of EHR use in long-term care. The findings of these studies are mixed.[5, 21] Improved access, accuracy, legibility, and communication are common positive effects.[4, 14, 17, 22] Inadequate documentation[10, 11, 19, 20, 23, 24] and lack of improvement in patient outcomes are among the shortcomings.[14, 15, 18] Reasons for the inadequate documentation include the consumed time,[9, 25] insufficient staff competences,[24, 26] poor EHR usability,[16, 23] and low experienced need for EHR documentation.[17, 27] The low experienced need helps explain why nurses in long-term care are less positive toward the use of EHRs than nurses in hospitals.[28] However, previous research does not explain how widespread the patient-safety risks associated with EHR documentation are on a national scale.

2   Objective

This study aims to give a countrywide status of the documentation-related risks to patient safety in Danish home care and nursing homes. Such a status is important in assessing the prevalence of the risks associated with EHR documentation, in appreciating the conditions and challenges specific to long-term care, in providing a basis for national improvement efforts, and in enabling international comparisons.

3   Method

The data analyzed in this study are inspection reports from the Danish Patient Safety Authority (in Danish, Styrelsen for Patientsikkerhed, STPS). The inspection reports were analyzed using qualitative content analysis.[29]

3.1   Danish Patient Safety Authority

STPS is an institution under the Ministry of Health. As one of its tasks, STPS supervises health institutions in Denmark. A key instrument in this supervision is inspections, for which health institutions are selected following a risk-based strategy. That is, within each focus area (e.g., long-term care) STPS primarily conducts inspections at the institutions with a high estimated risk to patient safety. Most inspections are initiated by STPS or following up on a previous inspection, but inspections may also be conducted in response to concerns raised by citizens.

A patient-safety issue central to the inspections is documentation inadequacies. There are four possible outcomes of an inspection:

Ban: the inspection has identified patient-safety issues that are so severe that the inspected institution is legally banned from providing care within a specified area until the issues have been rectified.

Demand: the inspection has identified severe patient-safety issues; the inspected institution can continue its work but is legally obliged to rectify these issues within the deadline set in the inspection report.

Request: the inspection has identified issues that negatively affect patient safety or the quality of care; the inspected institution is requested to rectify these issues within the deadline set in the inspection report.

Nothing to report: the inspection has not found issues related to patient safety and the quality of care.

All inspections are documented in reports that are openly available at https://stps.dk for three years. After three years, the reports are removed because they are no longer considered current. Reports about the same institution replace each other so that only the newest is available. That is, the reports give the current status of the inspected institutions with respect to patient-safety issues.

3.2   Inspection procedure

An inspection is a qualitative assessment. It involves that an STPS inspector visits the institution, which is notified ahead of the visit. Each visit lasts from a couple of hours to a full day and involves a mix of:

Observation with particular focus on the practices associated with handling the patients' medication. The observation also serves to get a general sense of the quality of care.

Interviews with staff about their practices and their knowledge of procedures. Occasionally, patients or their relatives are interviewed about their experience of the care.

Record auditing to assess whether the documentation complies with procedures and is consistent with the administered care. Typically, three patients' records are audited.

The formal documentation of an inspection is the inspection report. It contains the full list of findings and another list with the demands and requests for the rectifying actions to be taken by the institution.

3.3   Data analysis

The inspection reports were accessed in October 2019. There were 893 reports, which covered inspections of home care and nursing homes in the period 2016-2019. Information about the inspection outcome (ban, demand, request, or nothing to report) was prominently displayed and easy to extract. The inspection reports were analyzed in a two-stage process of content analysis.[29] Content analysis uses coding to turn qualitative data into counts of predefined categories.

First, all 893 reports were analyzed to count the number of demands and requests listed in each report and to code whether the reports contained inspection findings about risks related to the EHR documentation. The reports listed the inspection findings in a table with columns indicating (a) the inspection parameter, (b) whether it was met, and, if not, (c) a description of how the inspected institution failed to meet the parameter. The unmet parameters constituted

the patient-safety risks that gave rise to demands and requests because they increased the likelihood of errors and oversights. For example, incomplete documentation of a patient's current medication increased the risk of medication errors. For each report, the set of unmet inspection parameters about EHR documentation was coded for whether it contained issues about the patients' condition and care, the patients' medication, and the patients' consent to the care. These categories emerged from an initial exploration of the inspection reports, see Table 1 for descriptions of the categories. Once defined, the categories were used to code the reports deductively.

Second, the inspection reports that led to demands were coded in more detail. These inspections identified the most severe risks to patient safety (because no inspections led to bans). For this coding, all unmet inspection parameters in the tables of findings were coded individually. Each of these issues was coded for whether they were about risks related to EHR documentation. If so, their type and associated risk were also coded (Table 1). The type classification was the same as in the institution-level coding of all 893 inspections, except that the individual issues were coded rather than the entire reports. The risk classification was specific to the issue-level coding. It consisted of six categories that detailed how the issues constituted a risk to patient safety, for example by documentation not being accessible. The coding was made by a single coder, the author.

4 Results

The 893 inspections covered 49% of the home-care providers and 54% of the nursing homes in Denmark.[30] Because new inspections replaced older inspections of the same institution, there were more inspection reports for the most recent years: 330 (2019), 317 (2018), 200 (2017), and 46 (2016). Only 177 (20%) of the inspections found nothing to report. As much as 681 (76%) of them led to requests, 35 (4%) to demands, and none to bans. The distribution was similar for home care and nursing homes. The 35 inspections that led to *demands* made an average of 12.34 demands and an additional 0.71 requests. The 681 inspections that led to *requests* made an average of 4.81 requests.

4.1 Institution-level results

In total, 620 (69%) of the 893 inspection reports identified risks related to EHR documentation. More specifically, documentation issues were identified in 100% of the inspections that led to demands and in 86% of the inspections that led to requests. The documentation issues identified in inspections that led to demands as opposed to requests mostly differed in frequency; they were similar in kind. The documentation issues included that:

- Temporary staff did not have access to the EHR and, thus, had to administer care to patients without reading or updating the patient records.
- Access to an old EHR had been terminated two months after a new EHR was introduced without migrating records from the old to the new EHR, thereby blocking access to the patients' old records.
- The electronic records did not systematically reference the supplementary paper-based records, thereby creating considerable risk that some paper-based records went unnoticed.
- Staff was uncertain about where and how information should be recorded in a new EHR four months after its introduction.
- The documentation was ambiguous and unsystematic, thereby leaving the staff without an overview of the patients' condition and care.

Table 2 shows that the documentation issues were mainly about the patients' *condition and care*. As much as 97% and 68% of the inspections that led to demands and requests,

respectively, identified such issues. Examples included no documentation of the arrangements made with the physician responsible for a patient and the simultaneous presence of two different plans for the action to be taken on a patient's health issue. In contrast, 63% (demands) and 46% (requests) of the inspections identified documentation issues about *medication*. A frequent issue was that the product name of the medication was not documented in the EHR or did not match that in the patient's medication box, thereby making it difficult for the staff to know whether the medication in the box was another product with the same content or not the right medication. Finally, 63% (demands) and 35% (requests) of the inspections identified that the EHR did not contain documentation of the patient's informed *consent* to the care. Staff is required to obtain consent whenever there are changes in the administered care. In some cases, consent had been obtained orally, but not documented. In other cases, the EHR did not contain information about whether the patients' mental state made it possible for them to give informed consent and, if not, who should do it on their behalf.

4.2   Issue-level results

The 35 inspections that led to demands identified 366 issues. As much as 219 (60%) of these issues related to EHR documentation. Table 3 shows the distribution of the 219 documentation issues across risk categories. The majority of the risks concerned that documentation was not written or remained incomplete (158 issues, i.e., 72%). This risk category was by far the most frequent for the issues about the patients' condition and care. For example, an issue stated that adequate documentation of the patient's diseases and disabilities was missing in all three audited records. For medication, the most frequent risk category was inconsistent documentation (19 issues, i.e., 53%). For example, an issue stated that the prescribed medication did not match the current medication for any of the patients whose records were audited. One patient's records contained multiple, non-identical lists of the current medication. For consent, the risks were distributed between documentation that was incomplete (42%) and did not exist at all (58%). While fairly few issues were about consent, these issues were spread across many inspections and thus occurred in many institutions. Finally, there were 11 cases in which entire staff groups, typically the temporary staff, did not have access to the EHR.

5   Discussion

In spite of their EHRs, the inspected home-care providers and nursing homes face considerable documentation challenges. Six findings stand out:

First, inadequate EHR documentation is a common challenge in Danish long-term care. As much as 69% of the 893 inspected institutions document inadequately to an extent that has led to demands or requests from STPS. This finding substantiates previous findings of incomplete EHR documentation in long-term care.[11, 19, 31] The documentation issues underscore that the patient-safety risks associated with EHR documentation are about the interrelations between the EHRs and their use context, such as inconsistencies between the documentation and the actual content of the patients' medication boxes. The reasons for the documentation issues may, for example, be workarounds that are employed to be efficient, including that home-care nurses write on paper then transfer to the EHR, avoid charting at the point of care, and complete tasks before they document.[12] In addition, documentation issues may emerge because caregivers in long-term care experience little need for documentation[17] and prefer other information sources.[27]

Second, the documentation issues for both home care and nursing homes are primarily about the patients' condition and care and only secondarily about their medication. This finding extends previous studies, which predominantly focus on how EHRs affect patient medication.[4,

[23] However, previous studies of care plans support that without adequate documentation of the patients' condition, there is increased risk of errors and oversights in the administered long-term care.[19] For example, EHRs have an important role in communicating the information about a patient's condition and care among all those involved in caring for the patient.[32]

Third, documentation issues about medication are present in 63% and 46% of the institutions that receive demands and requests, respectively. The reasons for the high incidence of these issues include that patients in long-term care take multiple medications, which over time are prescribed and replaced by different physicians. A typical nursing-home patient takes about six different medications daily, with more than 20% taking ten or more medications per day.[4] There is a large need for better documentation and management of this medication. For example, Bao et al.[33] find that 38% of home-care recipients take at least one potentially inappropriate medication. Consistent with this finding, the documentation issues about medication provide evidence of incompleteness, inconsistency, and non-compliance with procedures.

Fourth, consent is inadequately documented. In 63% and 35% of the institutions that receive demands and requests, respectively, it is not consistently documented that the patients have consented to their care. In the previous studies of EHRs in long-term care, consent is only mentioned peripherally in the form of patient wishes regarding life-sustaining care.[22] Such wishes are a prime example of consent and illustrate its importance in avoiding that patients risk being treated in a way or at a time that they do not consider right. In Denmark, patients must give consent to all changes in their care. This requirement is meant to underscore that the patients are the final arbiters on matters relating to their life and care. Failing to document that consent has been obtained does not necessarily mean that the staff has not obtained consent orally, but the frequency with which consent is not documented suggests that the staff, on occasion, pay scant attention to consent.

Fifth, the distribution of the documentation-related risks to patient safety is similar for home care and nursing homes. It appears that the shared context of long-term care creates many similarities. The only sizable difference is that documentation issues about consent are more frequent for home care (45%) than nursing homes (28%). Previous studies have emphasized that home-care providers are mobile[13] and work alone during patient visits,[11] whereas nursing homes provide a shared physical location. These conditions could increase the need for home-care EHRs to facilitate communication among caregivers. However, mobile technologies are also reported to benefit nursing homes[34] and so is EHR support for communication.[16] Thus, previous studies support the finding of similar results for home care and nursing homes.

Sixth, the findings are specifically about EHR documentation in long-term care, which differs from acute care. The long-term perspective instills a focus on caring and gradual deterioration rather than on restoring to health. As a consequence, records in long-term care tend to be textual, particularly with respect to the evolution in the patients' condition and care.[4, 19]

Three limitations should be remembered in interpreting the results of this study. First, the study is about long-term care in Denmark. An aging population is not specific to Denmark, but the organization of the healthcare system is. Other countries may experience another mix of documentation-related risks in their institutions for long-term care. Second, STPS's risk-based strategy for selecting institutions for inspection means that institutions with a high likelihood of risks to patient safety are probably overrepresented. That said, the sample size of 893 institutions prevents that a few outliers skew the results. Third, the coding of the inspection reports has not been validated by comparing it with another coder's independent coding. While this precludes inter-coder statistics, each documentation issue has instead been described and

coded by two different people – the inspector and author, respectively. This separation bolsters the quality of the analysis by providing an independent basis for the coding.

6   Conclusion

The status across 893 Danish institutions for long-term care is that 69% display documentation-related risks to patient safety. The documentation issues for both home care and nursing homes are firstly about the patients' condition and care, secondly about their medication, and thirdly about their consent. This distribution differs from previous research, which gives precedence to documentation issues about medication. While the risk associated with the majority of the issues is incomplete documentation, there are also instances of self-contradictory documentation and of caregivers without EHR access.

It is hoped that this study will help in assessing the risks associated with EHR documentation, appreciating the challenges specific to long-term care, guiding national improvement efforts, and enabling international comparisons. To meet this larger objective, future work must complement counts of documentation inadequacies with analyses of their clinical relevance.

Clinical relevance statement

Inadequate EHR documentation poses patient-safety risks in 69% of Danish home care and nursing homes. Nursing-home and home-care staff should devote additional attention to the documentation of the patients' condition and care, their medication, and their consent. Staff, patients, and relatives cannot assume that the EHR documentation is complete but need to engage in oral follow-ups to ensure the quality of care.

Human subjects protection

This study analyzes publicly available documents. It does not include human or animal subjects.

Multiple-choice questions

In long-term care, what are documentation inadequacies primarily about?

a. Patients' condition and care

b. Patients' medication

c. Patients' consent to care

d. None of the above

Correct answer: option a, see Tables 2 and 3.

What is the risk most frequently associated with inadequate documentation of medication?

a. The documentation is not accessible

b. The documentation is incomplete

c. The documentation is inconsistent

d. The documentation is not procedure compliant

Correct answer: option c, see Table 3.

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Table 1. Coding scheme developed for analyzing the issues reported in the inspection reports

Category	Description	Example (translated from Danish)
Type		
Condition and care *	The patient's diseases, health problems, and care	"In one of three cases, the patient history was incomplete in that a blood clot in the heart, for which the patient received medication, was not documented"
Medication *	The patient's current and non-current medication	"In neither of the two samples did the prescribed medication correspond to the list of current medication"
Consent *	Whether the patient has given informed consent to the care	"In 3 out of 3 samples, it was not documented whether informed consent had been obtained for the care"
Risk		
Not existing	Documentation does not exist	"In one out of three samples, it was not possible to retrieve old notes about the care for a wound. Only the present plan could be retrieved as the old plan had been deleted when the care plan had been changed"
Not accessible	Documentation is not accessible	"In connection with the implementation of a new IT system, medication was administered without the possibility of checking the administered medication against a medication list"
Not read	Documentation is not read	No instances of this risk in the reports
Not written / incomplete	Documentation is not written/not updated	"In one of the samples, the problem areas had not been assessed since 2017 [the inspection was made in 2019] and the patient's problem with, for example, dysphagia was not documented"
Not procedure compliant	Documentation is not compliant with procedures	"For one patient, an ointment was prescribed without specifying which part of the body to smear and for how long before contacting a doctor again"
Inconsistent	Documentation contradicts itself	"There were inconsistencies between the prescribed medication and the medication list in 2 of 3 cases. In one case, an old marevan prescription appeared on the list of current medication […] In another case the [marevan] dosage on the medication list was not correct, even though the prescription had been changed more than 1 week before the inspection"

Note: The institution-level coding of all 893 reports involved only the categories marked with an asterisk (*). The issue-level coding of the 366 issues in the reports that led to demands involved all the categories.

Table 2. Number and percentage of inspections that revealed issues about care, medication, and consent in the EHR documentation

Issue type	Home care		Nursing homes		Total	
	N	%	*N*	%	*N*	%
Demand reports [a]						
Condition and care	22	100	12	92	34	97
Medication	14	64	8	62	22	63
Consent	15	68	7	54	22	63
Request reports [b]						
Condition and care	198	71	265	66	463	68
Medication	138	50	178	44	316	46
Consent	126	45	112	28	238	35

[a] A total of 22 (home care) + 13 (nursing homes) = 35 inspections led to demands. [b] A total of 278 (home care) + 403 (nursing homes) = 681 inspections led to requests.

Table 3. Number of documentation issues in the different risk categories (demand reports only)

Issue type	Not existing	Not accessible	Not read	Not written /incomplete	Not procedure compliant	Inconsistent	Total
Condition and care	1	0	0	115	3	3	122
Medication	0	3	0	7	7	19	36
Consent	15	0	0	11	0	0	26
Other	0	8	0	25	1	1	35
Total	16	11	0	158	11	23	219