

Original Research

An audit on problem lists transfers in general practice in Leeds, United Kingdom

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Abstract:

Background: Problem-oriented medical records are the standard among electronic health records (EHR) but after 50 years of use, problem lists (PL) do not seem to be the solution to clinicians' information needs.

Objectives: To perform a quality improvement evaluation of PL content, considering available guidelines on its characteristics (accuracy, clarity, concision, currency) when transferring patients from one primary care organisation in England to another in Leeds. The standard should simply be the need to confirm currency. PL should be ready to be used safely after a brief check-up.

Methods: During six months, all patients registering at a primary care setting in Leeds had their PL updated when they were transferred with an existing English electronic medical record. The content of the PL was later analysed by looking for the number of items in both lists (active and inactive), for the presence of duplicates and synonyms, and for items that needed to be added. It is normal practice to review the records at the time of transfer, usually by a nurse or healthcare assistant, but it was done by a general practitioner (GP) aiming to maximise the quality of the final PL.

Results: Of the 175 newly registered patients studied, 3077 PL items were collected. Active PL included an average of 5.7 entries per patient, while inactive PL had an average of 11.8 entries. The number of duplicates per patient was about 1.8, while the number of synonyms was around 1.2. Unnecessary items were common. When records were reconciled, there was a 66.7% reduction in active PL entries and an 86.4% reduction in inactive entries.

Discussion: Handover of PL among family physicians fails to transfer high-quality data. Different organisations follow distinct patterns in the use of PL. Major changes may be required to improve the flow of accurate, concise and up-to-date information. It could be argued that without further training, the use of clear guidelines or better support from health informatics, the PL will not provide the important summary information that clinicians need, which will affect clinicians' decision-making and to the detriment of patients.

Keywords: Electronic health record, Health informatics, Information management, Problem list, Problem oriented medical record

Summary points

What is already known on this topic?

PL are supposed to be a table of contents of the patient's needs, but their quality is very variable and often inadequate.

What this audit adds?

Handover of clinical information as PL among primary care settings in England is inadequate, and the data transferred has not been adequately maintained and updated.

On receiving records, updating PL requires considerable manual effort due to insufficient software functionality.

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The administrative task of reviewing patients' PL on transfer of care should be checked at practice level to improve their quality.

How this audit might affect research, practice or policy?

Training and the use of guidance on the use of PL could contribute to a better sharing of information.

Clinical software providers could improve the functionality of their products to facilitate the process of eliminating duplications and synonyms present on PL.

Introduction

Background

In England, general practitioners have been using electronic health records (EHR) for several decades, which are used by different clinical software providers. In 2007, a secure HL7 V3 messaging system, known as GP2GP, was introduced [1] to enable the digital transfer of the full record of the patient -including clinical data from primary care consultations, tests results, and correspondence- among practices. It can transfer data from and to any of the clinical software used by family physicians' organisations in England. The clinical information is entered as a mix of text and coded data. The files follow the concept of Problem-Oriented Medical Records. It means that all the information stored in the electronic record is organised using Problem Lists (PL), "a written list of medical problems requiring management, to rapidly communicate the overall burden of medical illness in a patient" [2]. The PL are divided into two lists, active or current matters, and inactive or past matters. The electronic record always contains these sections, although they are not constantly filled. This coded data, which is quite visible on the notes, helps the clinician understand the health needs of the patient [3]. The clinical coding language currently used in the UK is SNOMED-CT. It is utilised by all the different clinical software in service in general practice, although there still present many legacy codes, as previously different clinical software used distinct versions of Read codes. When patients move among different practices, their electronic records are automatically transferred to their new doctors so that continuity of care is not interrupted. It is expected that the digital records will be reviewed after the referral, at least regularly taken medication and their PL are concerned. In the past, appointments were made with a healthcare assistant or a nurse for this process, and called "new patient health check". Nowadays, under current pressure on general practitioners (GP) in England, especially in deprived areas [4] such as ours, it is considered more of an administrative task that is not primarily done by doctors, as their paperwork is dedicated to the direct care of their patients [5] and is probably not considered as relevant as it should deserve to be.

After 50 years, since the concept of PL was coined, current PL have not proven to be "medical records that teach and guide" [6]. On the contrary, this central block of patient health records has raised many concerns regarding their currency, completeness, accuracy and their benefit over decades [2] [7] [8]. In consequence, current physicians seem to accept the shortcomings and do not trust the PL, resulting in "chart lore" (persisting [9] incorrect or outdated health information in the Problem Oriented Medical Record) [9]. Furthermore, it is accepted that PL provides insufficient information during handover of care, for example, discharging from intensive care to primary care physicians [10]. It is a matter of inefficiency due to a lack of commitment to the accuracy, completeness and timeliness of the PL. One of the roots of the problem may be the fact that, until recently, guidelines have not been present and neither have been widely disseminated among family physicians, who were left on their own to organise their patients' PL [11]. The PL exists to ensure that important summary information about a patient's past and present conditions, that is relevant to their current care, is readily available [12], and patients would benefit from their doctors better understanding their holistic needs.

Our primary care setting, in Leeds, with six general practitioners looking after about 8800 patients, has always been quite proactive, doing regular audits and quality improvement programs, discussing them in clinical meetings and looking for ways to provide better care. In this audit, the aim was to measure the PL content of the records received and the content once reconciled, to comprehend the amount of work needed to process the records, and to decide what steps are required to improve the content of the PL, which would result in better and faster clinical decision-making [13]. The principles that we have always followed in updating the PL are the same as those that have been published [12] [14] (see [Appendix 1](#) for the principles used). The PL must focus on chronic conditions, including those acute diseases that are still being treated, and with entries on previous operations or history of cancer, as these could affect decisions to be made during consultation. The PL on the records in different organizations should follow similar standards (see [Table 1](#)) and the transfer of PL should not require much effort to update them. There is also a concern that, many items accumulate in the inactive lists over time, as a way of storing them when probably there were items not worth keeping such a high profile in the record. The practice has agreed on what should be part of the PL, following previous research on attitudes by GPs in Leeds [11], and more up to date guidelines [12].

A service evaluation was designed to assess the quality of the PL of new patients registering in our practice, and the amount of effort needed to update them by analysing the level of errors, duplications, synonyms and how concise they are. The PL should be limited to matters relevant to the future care of the patient. An adequate

transfer of records should take minimal time and focus on updating the entries, and checking if they are still current (and remain in the active list) or not (being inactivated).

Table 1. Basic principles to decide the content of the PL [12] [14]

Item	PL should be concise, and limited to the following:
1	Any condition which is relevant to a patient's current care.
2	Major past conditions that may have long term consequences or complications.
3	Chronic medical conditions.
4	Operations that may have long term consequences or complications.
5	Any other issues that may impact on care.

Objectives

To measure the content of PL received, when patients change primary care physicians' organisations, to assess the changes required in the PL and to provide continuity of care from what was expected to what was considered to be necessary.

Material and methods

Audit design

An assessment of quality improvement was designed, based on the observed changes in PL during transfer. The expectation is that PL received by a healthcare unit are up to date and little time is required to update the PL and ensure the continuity of care. All new patients, during the audit period, would be identified, usually at the "requested status", a term to define a patient who has requested a change of organisation to receive care. At this stage, all the electronic data is available to the receiving unit, but the PL is non-modifiable), and the incoming PL data would be collected. Once the transfer is complete, the status of the patient is changed to "GMS registered" (meaning that the patient has access to general medical services by the receiving organisation), and PL are no longer necessarily locked (although unfortunately, several items were still unmodifiable by the receiving unit). The records would then be reviewed and updated. The project will compare the initial and reconciled PL after transfer.

Audit method

The data collection took place between January 2022 and July 2022. All new patients who joined the practice within the period of data collection and had a previous EHR were included. Some patients were transferred without a previous EHR, either because they were newborns or because they had immigrated to England, and they were excluded from the audit.

Variables collected for each patient included age, previous GP practice and location, and contents of the PL, both active and inactive listed items were to be included in the analysis. All information was collected from the

received EHR and processed by the author.

The project was conceived to run for six months, aiming to obtain between 100 and 300 patients, as it would provide a sufficiently large number of PL items to analyse. Simple statistical methods, embedded within Microsoft EXCEL, where the data was collected, were used to describe the findings.

Results

In the six months during which the data were collected, two hundred and sixty-three patients registered as new patients in the practice. There were 88 patients with no previous EHR and in consequence, they were excluded. Of the remaining 175 patients, from whom PL were transferred, 129 patients came from other 54 practices in Leeds and 46 came from 36 practices in different areas of England. The average was 1.92 patients per referring practice. It was notable that two of these patients re-registered in our practice after having no registered GP provider for some time.

A summary of the findings is presented in Table 2. The average age of the included patients was 39.9 years, ranging from 0.6 to 94 years of age (Standard Deviation 26.6).

When looking at the number of items (coded entries) in the PL, active lists contained an average of 5.7 items per patient (ranging from 0 to 48) while inactive lists comprised 11.8 items as an average (with a maximum of 158 items in the PL). The total number of items collected was 991 from the active PL and 2066 from the inactive PL.

Regarding the contents, the most common codes can be found in Table 3. Many of them, particularly in the inactive list, could be considered irrelevant for the future care of the patient. In total, there were 693 different unique codes in the active PL and 1092 different unique codes in the inactive PL.

When considering the quality of the PL, the number of existing duplicates was considered first. For this analysis, both lists, the active and the inactive, were merged, as the same coded item could be in both lists simultaneously. When using PL, all instances regarding the same health issue are expected to be under one single header in the PL. A more complex situation is pregnancy. "Patient currently pregnant" is a code that often remains in the active list (example, patient 142), but also in the inactive list (example, patient 10) when the code should have been replaced by the delivery type. Types of delivery could remain in the PL, and although could be "duplicates" they would not be if they represent unique different events. In total, 310 duplicates were found, with an average of 1.8 per patient, ranging from 0 to 28. Duplicates were found in 58 patients (33.1%).

Table 2. Findings summary

Active PL (APL)		Inactive PL (IPL)	
Received APL		Received IPL	
Number of patients	175		
Total number of items	991	Total number of items	2066
Average per patient	5.7	Average per patient	11.8
Maximum number of items in a patient	48	Maximum number of items in a patient	158
Median number of items	3.0	Median number of items	3.0
Number of duplications	311	Number of synonyms	187
Average per list	1.8	Average per list	1.2
Maximum number of duplications in one PL	28	Maximum number of duplications in one PL	14
Reconciled APL		Reconciled IPL	
Total number of items	340	Total number of items	283
Average per patient	1.9	Average per patient	1.6
Maximum number of items in a record	14.0	Maximum number of items in a record	90.0
Number of added items	340	Number of added items	12
Average number of additions	1.9	Average number of additions	0.1

Table 3. Most common codes (SNOMED-CT and legacy Read codes) encountered in PL received and number of occurrences in the sample

Active Problems	Number	Inactive Problems	Number
Asthma	17	Chest infection NOS	27
Notes summary on computer	15	Blood sample taken	22
Accident and Emergency department	10	Cough	21
Depressive disorder	10	Suspected UTI	20
Mixed anxiety and depressive disorder	8	Constipation	17
Not for attempted CPR (cardiopulmonary resuscitation)	8	Knee pain	16
Type I diabetes mellitus	8	Chest pain	15
Drug overdose	7	Low back pain	15
Essential hypertension	7	Headache	14
Hypertensive disease	7	Upper respiratory infection NOS	14
On gold standards palliative care framework	7	Abdominal pain	14
Prevention	7	Eczema NOS	13
Vitamin D deficiency	7	Self-referral to hospital	13
Chronic low back pain	6	Shoulder pain	13
Depressed mood	6	Accidental fall	12
Pre-diabetes	6	Acute exacerbation of chronic obstructive airways disease	12
Shoulder pain	6	Notes summary on computer	12

The codes used in PL are affected by personal interpretation and in the same way the evaluation of synonyms, a second area analysed. It was considered that diagnoses should remain in the PL and replace symptoms or tests that were coded as items in the PL. There were 187 synonyms in the PL received, with an average of 1.2 per patient, and with a maximum value in one PL of 14 (patient 163, with 158 items in the PL, including 27 duplicates). Synonyms were found in 72 patients (41.1%). Items, such as the type of delivery of a baby, were not considered synonyms if they represented different events, but in patient 141 “delivery normal” and “spontaneous vaginal delivery” referred to the same event, while an “emergency lower segment caesarean section” was

omitted in the inactive PL.

Further issues with the quality of the PL were encountered. Some items were inactive, but still needed to be monitored, such as patient 200, with item “Cerebral infarction NOS” inactive, and re-activated on review of the record.

To summarise, the PL were reviewed, which is part of the standard administrative process for new patients. Besides removing items, the medication list was used to find diagnoses that were not present in the PL, but hidden in the EHR to add missing diagnoses in the PL. For 33 patients (18.9%), items were added to the PL. For example, patient 13 had only one single PL item, “dementia”, but had medications for “Parkinson’s disease”

and “type 2 diabetes mellitus” added to the PL.

In only ten cases (5.7%), there were no changes made to the PL. After reconciling the PL, the active lists included an average of 1.9 items (with a maximum of 14) while the inactive lists had 1.6 items on average (and a maximum of 90). An additional barrier to reconcile the records was the fact that not all items could be removed. Locked items were found in 25 patients. These items were classified as belonging to other organisations, even after transfer, and although several practices were contacted to agree on the removal of several active list items, it was considered to be too much work to do the same for all of them, even less for inactive list items. In total, it represented a reduction of the active PL content of 66.7%, while 86.4% of the inactive lists content was removed. Furthermore, the number of unique items was reduced from the initial 1573 items to 343. There was also the inclusion of data, 340 items were added to the active lists (average 1.9 items per patient) as well as 12 to the inactive lists (average 0.1).

Discussion

Electronics records were transferred from 90 practices in England, and represented a diverse group of family physicians’ organizations. The present analysis suggests that the quality of PL transferred is far from the standards expected of PL, and as a result, a considerable amount of time and effort was needed to update the records. It indicates that those staff need more time and training to check the records on transfer if a high quality and updated PL is aimed for.

The issues of PL follow what is described elsewhere regarding their quality [2] [7] [8] [11] [12]. The roots of this longstanding concern are that there is no adequate training on the use of PL, no sufficient time or guidance on their usage [11] [15]. Without enough interest to keep this section of the EHR updated, there is a high risk that in the not-very-distant future, they will be far from the medical overview that clinicians would read before consultations.

If PL are to be informative, not only do they need to be accurate and up-to-date, but also need to be concise. Keeping a PL in shape seems currently too much work [11], not routinely carried out, and the biggest consequence is the risk that it represents to the patient’s continuity of care.

To put an example of how hard is for the user of SystemOne, the clinical software used in this project, it could be pointed out that each item of the PL has to be removed one by one. The software does not allow “self-cleaning” of duplicates, which could be a welcome additional function, like better updating tools of the lists. Other providers could have better solutions for the management of PL, but when patient records are transferred from one organisation to another, the weakest

software will always create the worst lists, so the poor-quality issue will persist, considering the human factor.

Software upgrades could also improve the quality of PL [15]. For example, it could provide automated digital processes to reconcile data from both lists, which helps to remove duplicates and could even trigger an alert if the code to be entered belongs to the tree of codes where another code is already present in the PL, to deal with the synonyms found in this cohort.

A final issue is whether the codes allowed to be entered in the PL should be restricted to a pre-defined set. Or, at least, the ability to create organizational rules that prevent specific codes from generating in the PL or removing them automatically during transfer.

Further research is needed to understand the possible barriers for keeping the PL up-to-date and to figure out possible solutions. Perhaps, a combination of software changes, training and use of guidelines, can resuscitate the intended function of the PL, for the benefit of patients and clinicians.

Conclusions

Transfer of PL among practices in England requires considerable time reconciling poor-quality content, and additional training, guidance and time are needed to facilitate that task. Better management in general of PL should reduce the workload when data is transferred.

Limitations

The records were collected from a small number of practices, and the receiving end could have strong views on the way it manages its EHR and PL. Furthermore, not having several doctors to review the PL content could have led to personal views with bias. It has to be considered nevertheless that in real life, individual doctors are expected to update the PL as part of their consultations. Another limitation is software use, there could be considerable disparities in functionality among different providers and efforts required to reconcile PL, so time has not been assessed but only assessed the contents of the PL.

Ethics declarations

This is a quality improvement project, and according to England regulations Research Ethics Committee approval is not required [16].

Competing interests

The author has no interests to declare.

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Abbreviations

APL	Active Problem List
EHR	Electronic Health Record
GP	General Practitioner
HL7 V3	Health Level 7 version 3
IPL	Inactive Problem List
PL	Problem List

Appendix

The appendix for this article (Appendix 1) is available at <https://file.luminescence.cn/JDH-198%20Appendix%201.pdf>

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