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Timeline of and Expectations for the National Medication List in Sweden

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Abstract. It is important to separate the continuous chains of medications orders (or decisions by the prescriber) in modern electronic health records from the one-way communication of prescriptions from healthcare to pharmacies. To support the self-administration of prescribed drugs the patient needs a continuously updated list of medication orders. For the NLL to function as a safe resource for the patient, it is necessary to have the information updated, curated, and documented by prescribers in a one-step process within the electronic health record. Four of the Nordic countries have chosen separate ways trying to achieve this. The experiences and obstacles during the introduction of the mandatory National Medication List (NLL) in Sweden and the resulting delays are described. The planned integration for 2022 is now delayed to 2025 and will probably only be achieved in 2028 or even 2030 in some regions.

Keywords. Medication management, shared information lists, user-centred design.

1. Introduction

An electronically shared medication list (SML) can be defined from different perspectives. Focus can be on the medication orders, i.e. the decisions regarding treatment with drugs that a prescriber (most often a physician) is responsible for, or on the prescriptions, i.e. the one-way communication from the prescriber to the dispensing pharmacist.

The term prescription is often used to describe the decision by the physician (the medication order) as well as the communication of information from a prescriber to the dispensing pharmacist, for instance, as an e-prescription. It is essential to distinguish between the decision and the communication since not all medication orders will be communicated, for instance, when a dose is temporarily changed, or the treatment with a drug is stopped prematurely. In addition, medication orders are valid weeks to months after the date of the last dispensation of a prescription.

If the goal of a SML is to support the patient to self-administer drugs at home and to provide prescribers, other healthcare personnel, and pharmacists with a complete and up-to-date list of a patient's medication orders, then it is not sufficient to gather all valid prescriptions communicated to the pharmacists and all dispensed drugs. The challenge is whether to create a shared list of continuously updated medication orders from

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different prescribers or a shared list of prescriptions and dispensed drugs and how to reconcile them with each other through integration with the electronic health records (EHRs) and work processes capturing all medication orders into the updated SML.

The Nordic countries have taken different approaches [1] primarily focusing on either medication orders or prescriptions when constructing a SML. Denmark [2] was the first of the four countries to establish a SML with a nationwide mandatory platform where a medication order in the electronic health record, EHR, automatically updates the SML. Norway [3] also primarily focuses on supporting physicians and patients with a SML integrated into the EHR consisting of all medication orders, thus achieving updated information on valid prescriptions for pharmacists. Finland [4] and Sweden [5] have focused on gathering all e-prescriptions and dispensations in parallel or in a 2nd step providing tools when integrated into EHRs for prescribers to update the prescriptions. Similar initiatives exist or are under development in other countries with different expressed goals and technical solutions.

In Sweden, the National Medication List (Nationell läkemedelslista, NLL) is a new mandatory register at the E-health Agency of Sweden (E-hälsomyndigheten, eHM) [5]. The EHM is also the authority responsible for the Swedish participation in the eHealth Digital Service Infrastructure, EHDSI, including ePrescription and eDispensation. NLL covers all issued prescriptions for dispensations at pharmacies and the dispensed medications for up to five years. The stated goal of NLL is to *"provide the healthcare, pharmacies and the patient with the same information about the medications prescribed and dispensed to the patient"* i.e. not medication orders [5]. The 21 regions providing most of Sweden's healthcare have EHRs and mandatory e-prescriptions. Thirteen regions will switch to new EHRs between 2023 and 2030, resulting in 17 counties using Cambio Cosmic, two Cerner Millennium and two other solutions.

This paper aims to give an insight into the timeline for and an understanding of identified obstacles to implementing a SML in Sweden.

2. Method

This text is a scoping review of statutes, commission reports, articles and letters in Swedish describing the introduction of the National Medication List in Sweden.

3. Timeline

During 2000–2015 two successive projects, PALL (the patient's medication list) and NOD (the national database of medication orders aiming to collect all medication orders within the healthcare system) were initiated by the regions. Legal issues stymied the development of PALL while NOD was abandoned when the government in 2016 suggested a mandatory list of all prescriptions, later named NLL. The law from 2018 stipulated the start of the new register in May 2021, with the last date for the current e-prescription format in June 2022. This last date was postponed to May 2023 due to the covid-19 pandemic. Due to further delays, the government in late 2022 proposed to postpone the mandatory integration with EHRs to December 2025.

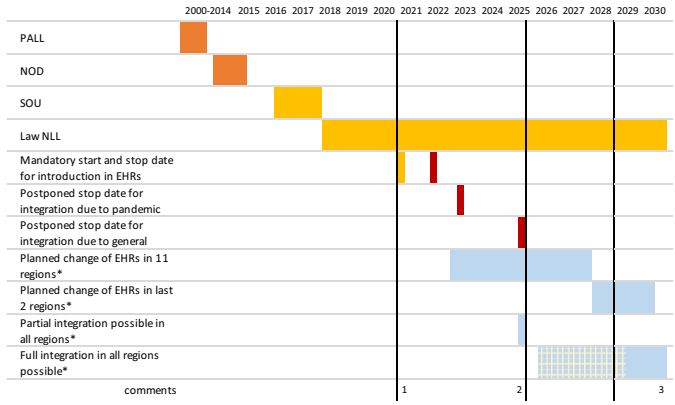

Figure 1. Timeline of the development and deployment of the shared medication list in Sweden.
*Estimated plans as interpreted from SALAR's open letter [7]. Numbers – see comments in the text.

3.1. First step – access to information for patients and prescribers through a separate log-in plus publication of specifications for developers of EHRs

With the 1st step of the introduction of NLL after May 2021 (Figure 1, #1), physicians can access and, from late 2021, revise prescriptions. In addition, a new interface and extended history (five years) of dispensed medications are available for both patients (Läkemedelskollen) and prescribers (Förskrivningskollen, intended as a backup system). Läkemedelskollen has two medication lists for the patient, one for prescriptions and one for dispensed medications. The trade name is highlighted in both lists, with the substance name available. Frequent mandatory generic substitution at pharmacies (in 48% of all dispensations 2022) has led to a mismatch between prescribed and dispensed trade names often confusing patients.

3.2. Second step – stepwise integration

HL7 Fast Health Interoperability Resources (FHIR) is used for the planned integration of NLL with EHRs. The integration was supposed to be fully deployed before June 2022 but has been delayed for several years. In the 13 regions planning to switch EHR during the next few years, there was a lack of interest in allocating resources for a fast-track development that would become redundant within a few years. For the eight regions already using Cambio Cosmic, a delay in published specifications and, more importantly, problems in envisioning how a full integration could be devised triggered concerns expressed in an open letter in November 2019 focusing on lack of support for processes in the healthcare [6].

In early 2022 a risk analysis of the process of introducing NLL was performed by the network of Chief Medical Officers responsible for patient safety among regions and large private providers [7]. The risk analysis focused on the need for more time to substitute the current format of e-prescriptions in time through updated EHRs after May 2023. Even more critical from a strategic standpoint was that the specifications developed by eHM focused on the one-way and non-continuous process of prescriptions – as opposed to continuous chains of medication orders both for in-patient and out-patient medication orders in the EHRs. Based on this, a full integration supporting the everyday

work processes in healthcare, avoiding double documentation and additional tasks for the physicians, was deemed impossible to develop and deploy within the time frame available by the network of Chief Medical Officers.

In August 2022, The Swedish Association of Local Authorities and Regions (SALAR) informed the Ministry of Health and Social Affairs that the regions could not implement NLL in the EHRs as mandated by law in May 2023 [8]. The assessments of a possible schedule from SALAR were:

- Access to information in NLL through read-only by users (i.e., not a full integration into the list of medication orders) of EHR in all regions is not possible before 2025 due to the time needed to establish FHIR in established EHRs.
- Writing from EHR to NLL (substituting the e-prescription with the new FHIR-based format) will not be possible for all regions until 2028–2030.

The assessments were also predicated on a list of necessary established solutions and some uncertainties regarding possible consequences of the new EU Medical Device Regulations introduced in 2021. In addition, technical issues regarding the identification and authentication of users were raised.

SALAR described the main problem as the need for significant updates in the EHRs, necessary since the EHRs are based on continuous medication orders and not the logic based on current intermittent prescriptions devised by the E-health Agency for the NLL. Considerable technological and logistical challenges were identified to provide a seamless user experience for healthcare personnel.

The government in December 2022 proposed to postpone the mandatory integration of EHRs with NLL from May 2023 to December 2025 Figure 1, #2).

3.2.1 Integration – Writing from EHR to NLL

A time-limited solution by the E-health Agency for receiving e-prescriptions, translating, and writing these to NLL – *"the Transformator"* – is a critical service to facilitate the continued use of current EHRs. Before integration, it is necessary to avoid both documenting medication orders in the EHR and communicating in parallel in a separate web-based process with the E-health Agency. This complexity is also a focal point of SALAR's analysis and the main reason for presenting 2030 as a probable date for the integration to be available in all regions (Figure 1, #3). Another aspect is that medication orders in the EHRs that do not result in a traditional e-prescription have to update NLL.

3.2.2 Integration – Writing from NLL to EHR

A less well-understood complexity is the need for automated transfer of information about prescribed and dispensed medications from the NLL to the EHR. When information from a list of prescriptions is supposed to update the list of medication orders in another EHR, the necessary information to link this to an existing or introduce a new ordination chain in the EHRs is lacking. The problem also highlights the possible need to introduce new information in the process *"write from EHR to NLL"*, linking the information transferred to NLL to a specific chain of medication orders in the EHR from where it originated, see 3.2.1. These aspects are not covered in the analysis by SALAR, where *"writing from NLL to EHR"* is interpreted not as an integration and thus presented as possible to achieve in 2025.

4. Discussion

The term *"shared medication list"* implies that it is a list of the patient's ordered medication that can support self-administration by the patient directly or with the help of a resource person without medical training. A compilation of valid prescriptions will, however, not fulfil that expectation.

NLL will not by itself significantly improve the quality of the information available for dispensation unless it is integrated in the EHRs and the work processes of prescribers. As highlighted by the risk analysis performed in 2022 [7], a technical compilation of prescriptions made available to the patient daily requires continuous updating and curating of the content by a trained professional to fulfil the demands on a medication list. Correct information will be possible only when the NLL is fully integrated into the EHRs, and a standard work process among prescribers to update and curate NLL through a one-step process in the EHR has been deployed.

5. Conclusions

The introduction of NLL is a positive step, but the perspectives of human, organization and technology [9] still need to be addressed. The need to focus on medication orders to provide the patient with an updated medication list as in Denmark [2] and Norway [3] is relevant for similar projects in Europe if the goal is to support the patient.

Before a full integration in the EHRs has been achieved, most of the benefits of the register cannot be fulfilled. A narrow focus on prescription handling has complicated both integrations in current and new EHRs and in supporting the development of a future common work process by prescribers and pharmacists.

Shared responsibility for finding common ground between authorities, healthcare, pharmacies, prescribers, and pharmacists is needed to achieve the true potential of NLL as a SML for patients as well as for healthcare personnel and pharmacists.

References

[1] Hammar T, Bergmo TS, Bülow C, et al. Nationally shared medication lists – description of systems in the Nordic countries. *Conference Proceeding Medical Informatics 2023 (accepted full paper)*

[2] Fælles Medicinkort (in Danish). Available at: https://sundhedsdatastyrelsen.dk/da/registre-og-services/om-faelles-medicinkort (accessed 4 March 2023)

[3] Program pasientens legemiddelliste (in Norwegian). Available at: https://www.ehelse.no/programmer/program-pasientens-legemiddelliste (accessed 4 March 2023).

[4] Kanta.fi - Citizens. Available at: https://www.kanta.fi/en/ (accessed 4 March 2023).

[5] Nationella läkemedelslistan (in Swedish). Available at: https://www.ehalsomyndigheten.se/yrkesverksam/nationella-lakemedelslistan/ (accessed 10 January 2023).

[6] Efterlängtad lista riskerar bli hatobjekt 2022 (in Swedish). Available at: https://www.dagensmedicin.se/alla-nyheter/nyheter/efterlangtad-lista-riskerar-bli-hatobjekt/ (accessed 10 January 2023).

[7] Riskanalys av Nationella läkemedelslistan 2022. Available at: https://sverigescheflakare.se/images/Chefslakare/Riskanalys-av-Nationella-lkemedelslistan-2022.pdf (accessed 4 March 2023)

[8] Underlag från regionerna om bortre tidsgräns NLL (in Swedish). Available at: https://assets.ctfassets.net/e03pgm1m5c6m/wVvcHxyhpGClusmXf9W0H/7cdc29e18bdd99b3599c5b49a1a81b5e/Underlag_fra__n_regionerna_om_bortre_tidsgra__ns_NLL-20220830.pdf (accessed 4 March 2023).

[9] Yusof MM, Kuljis J, Papazafeiropoulou A, et al. An evaluation framework for Health Information Systems: human, organization and technology-fit factors (HOT-fit). *Int J Med Inf* 2008; 77: 386–398.