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A Patient-Centered Approach to Collecting and Displaying Patient Identifiers

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Abstract. Patient identifiers such as name, date of birth, or gender are the first line of defense to ensure the accuracy of the health data displayed in health information exchange. Health data display is the impetus for clinical decisions and patient outcomes and directly correlates with promoting interoperability and health information exchange. Therefore, constant monitoring of quality metrics is imperative for clinical leaders to keep a pulse on what is happening within their organizations. However, the electronic health records (EHRs) designer should also take precautions to ensure the visualizations are not misleading, given that EHRs have been shown in some studies to lead to increased patient safety events.

Keywords. Patient safety, patient identifiers, electronic data visualization, personal health records

1. Introduction

"Despite the promise of EHRs' improving quality of care and patient safety, a growing body of evidence has found potential safety hazards associated with their use " [1]. Health data display directly correlates with promoting interoperability and health information exchange, including data sharing in provider-to-provider, patient-to-provider, and provider-to-patient exchanges. Visualizing health data contributes to decision-making related to healthcare needs and statuses. Research shows that visualization has improved patients' decision-making by representing risks, distinguishing between urgent and non-urgent diagnostic test results, and enhancing understanding of treatment options [2]. The integrity of health data display ensures safe practice for clinicians and optimal patient outcomes.

In the US, patient identifiers, such as name, date of birth, and gender identity, are used to validate a patient's identity, inadvertently mitigating data integrity risks. Visualizing these identifiers allows clinicians and patients a seamless validation process. In addition, there is a value-added in universal formats for displaying this information.

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2. Methods

Guided by user-centered design principles, we reviewed a prevailing EHR system in the US healthcare systems to establish a preliminary understanding of an issue evidenced in the literature. The system depicts multiple approaches to visualizing patient identifiers for all system end-users, including patient-facing platforms. The lack of a standard approach to visualizing patient identifiers has the potential to directly impact health data integrity as well as increase the potential for patient safety concerns. For example, a sample patient profile depicted a picture of the patient on the left side of the screen. A system-generated male or female image was used if no picture was uploaded into the EHR system. Below the image, the name was shown in the Last Name, First Name format. The gender and date of birth followed the name display. Two options, 1) "M" for male or 2) "F" for female, were used to distinguish gender identity. In addition, the date of birth was shown in the two-digit month, two-digit day, and four-digit year format. This sample profile provides one of many approaches to visualizing patient identifiers.

In addition, existing literature pertinent to the topic was reviewed to examine the common issues regarding patient identification and the resulting data issues.

3. Results

The EHR belies several vital issues with the provider-side data entry that may have unfortunate consequences for the patient. Three main categories are focused on standard patient identifiers: name, gender, and date of birth.

3.1. Names

Names are not necessarily standardized for all patients. Names can be different across cultures. For example, Dutch names have a specific spelling convention in which the tussenvoegsel (affix before the main part of the last name) is not capitalized between the first and last name, such as the van in Vincent van Gogh [3]. Issues can arise if an electronic health record (EHR) system forces capitalization, given that most healthcare providers would generally prefer to have the correct legal name for their patients. Further issues can arise if the patient's name does not necessarily follow the FirstName, Middle Initial, LastName format.

In Filipino naming conventions, the person often follows the tradition of using both the father's and mother's surnames. The traditional naming convention can take the form of First Name(s), the Mother's Paternal Family Name, and the Father's Paternal Family Name [4]. Some people may also have dual first names, further complicating matters [4]. Women may also change their name upon marriage, replacing their mother's last name with their father's and changing their father's last name to their husband's [4]. This modified form would look like First Name(s), Father's Paternal Name, and Husband's Family Name [4]. Issues may arise in the continuity of health documents if the patient needs more space to enter all their names or if the patient changes their name after marriage.

3.2. Date of Birth

In our example (Figure 1), the date is shown in the DD/MM/YY format. This format can also lead to confusion, given that most parts of the world use the MM/DD/YY format [5]. Though the date here is relatively clear about which section is the month versus the year, a date such as 03/01/22 can have several ambiguities. For instance, was the person born on March 1st or January 3rd? The ambiguity could be more straightforward for end-users needing more knowledge of the intended formatting. The year also might be considered ambiguous in this situation. The patient may have been born in either 1922 or 2022. Infants and the elderly, of course, have very different medical needs, and this could be disastrous if two patients with identical names and identical-looking birthdays were mixed up.

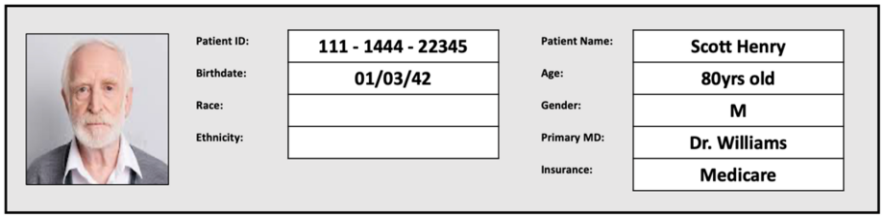

Figure 1. Sample Demographic Data Entry Form.

3.3. Gender

In 2015, the United States Department of Health and Human Services instantiated rules mandating the inclusion of sexual orientation and gender identity (SO/GI) data fields for systems certified under Stage 3 of the Meaningful Use of Electronic Health Records (EHR) program [6]. Our sample display shows the patient's gender as "Female." The display provides a certain degree of cisnormativity that can be present in healthcare - the assumption that all people assigned as a female at birth will continue to identify as a woman and that all people assigned as a male at birth will continue to identify as a man [7]. The current fields on our EHR display would leave the gender status of a trans patient ambiguous at best and incorrect at worst.

4. Discussion

The visualizations used in healthcare can affect many aspects of EHRs and patient data. Multiple healthcare systems and their individuality in (EHR) contribute to the inconsistency in submitting patient identifier data [8]. The EHR we used as an example is one of many in the US [8]. Based on this, our group came up with a few suggestions for potential solutions to the abovementioned issues.

The entry of correct legal names into EHRs is critical for many reasons, including, but not limited to, billing, continuity of care, data quality, and patient quality assurance. Given that names can be the same in some cases, having patient displays contain a photo on the clinical or chart view side would be a better approach. Allowances could be made to allow for the entry of more than three names, spaces, and non-standard capitalizations. End-user education may also be critical in this area, as naming conventions can vary from country to country.

Date of Birth can take many formats in any given EHR system. These formats include but are not limited to ISO8601 standard, North American Format, British/Australian Format, and the default Oracle 9i format. Given this, some sort of standardization of the EHR-designed format across the nation may be good to devise. For example, the standard design could be defined with clearly labeled boxes like the ones in Figure 2. The recommended standard avoids the confusion and cognitive load of remembering the correct date format for the EHR system. Another solution might be to have patients verify their birthdays at each encounter.

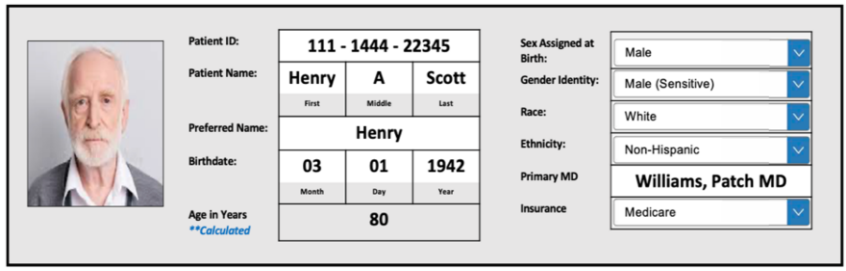

Figure 2. Recommended Demographic Data Entry Form.

Gender identity can be a tricky topic to navigate for any medical professional. At the very least, health records should allow cross-checking gender identity with the sex assigned at birth to reduce errors in data interpretation [9]. Currently, the state of gender in some EHRs is reflected in Figure 1. This representation can easily confuse doctors about the gender identity versus the biological sex of their patient. The group posits that a pop-up that displays the biological sex, gender identity, and preferred name and pronouns of the patient to the provider, such as the one in Figure 3, may assist practitioners in assuring quality care for their patients.

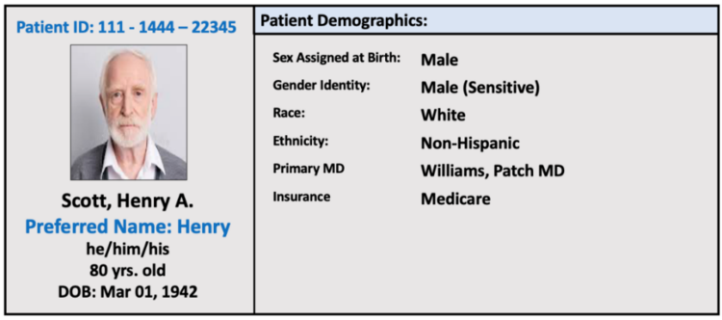

Figure 3. Recommended Future State of Chart View of Demographic Information.

Our group developed a generic set of recommendations while examining the EHR system. These recommendations include providing ongoing training on regulatory compliance, patient safety, and cultural sensitivity to include DEI (Diversity, Equity, and Inclusion). Additionally, our recommendations are to update the EHR systems to include health data visualizations that improve usability and are patient-centered. In addition, implement best practices for patient identification that consider federal and state regulations at minimum, standardize workflows for data collection to include scripting, and incorporate two patient identifiers that support 2-factor identification.

The paper has a few limitations that are worthy of discussion. Only one EHR system was analyzed in the scope of our study. The impacts of our proposed design choices were not examined within a medical practice. The system we examined was within the US medical system alone. The authors propose analyzing more EHR systems, further comparisons with international systems, and further testing for our proposed design in future studies.

5. Conclusion

Patient identifiers such as name, date of birth, and gender identity are components of the initial step to health data integrity and patient validation. More importantly, how patient-identifying health data is displayed promotes interoperability and efficiency in health information exchange. Recognizing the importance of patient safety is paramount in improving the healthcare culture [9]. Education, process changes, and technology are identified as approaches to improve the accuracy of patient identification [10].

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