Non English Characters Representation for Patient Safety in the Electronic Health Record Systems – an International Issue

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Abstract and Objective

Accurate patient identification is an essential component in providing both safe and effective diagnostic and therapeutic services. The name borne by individual patient is often the key to identify patients. Globally there is at least 20% of the population who bear names with Chinese characters only. It is therefore important to have the correct Chinese characters represented accurately in the Electronic Health Record. However, Chinese characters differ from the typical Western alphabet set in that there are multiple variants in the strokes in the Character Set. Up to 5% of all patients in Hong Kong bear names which are not listed in the ISO 10646 code lists. Therefore, it is imperative that an international common standard in the Standard Non-English Character Sets and Variants be instituted in order to allow correct representation and registration in a health registration system, Patient Master Index (PMI). This should be done in a consistent and unambiguous manner so as to achieve an accurate patient identification and to match with patient's associated artifacts.

Keywords:

Patient identification, Patient safety, Chinese characters

Methods

The ISO 10646 provides a unified standard for the coding of characters in all major languages in the world including traditional and simplified Chinese characters. Chinese characters are based on radical-strokes. Some Chinese invented unique characters to make up a unique name for a baby. In Hong Kong, up to hundreds of unusual or uncommonly used characters cannot be found in common dictionaries and some are atypical logograms created in an ingenious manner**.** For those 'newly constructed' Chinese characters, a standard procedure is adopted to create a new glyph in the Hospital Authority (HA). First, the glyph would be Code Matched, if not found, a True Type Font would be created, added to database, documented and sent to Government for approval and update in the ISO 10646 committee.

Results

There are a total of 14,108 records in the Chinese Commercial Code Big5 table, and 2,200 records are Simplified Chinese characters. A total of 676 traditional Chinese characters are created by the HA to cope with the invented characters. Nevertheless, there are currently 360 Chinese characters of all the patient names of Patient Master Index in Hong Kong that are not listed in ISO 10646. This affects around 434,000 (5%) of all patients. In spite of this, all Chinese names can be displayed correctly in HA using the Chinese creation method as described above. In external systems outside the HA, many Chinese names cannot be displayed or have to be displayed with glyphs different from the patient's original character if they are outside the standard codes of ISO 10646.

Conclusion

Identification error is a major category in medical errors, and it is often associated with patients' names. In future, if there is an international collaborative electronic medical records system, one of the challenges would include using patient names in their local formats. However, different coding standards exist and they are often not compatible with each other. The same internal code may represent different characters in different coding standards. Electronic information sent from one part of the world may become miscoded or incorrectly displayed when the information is received by the computer systems in other parts of the world. Therefore, a common reference standard for Chinese fonts may need international efforts to create a broader coverage of Chinese characters. This is the same case with other non-English characters variations. Health care organizations and policy-makers should understand these problems and give incentives to generate changes in culture, systems, training, and information technology to improve patient safety.