醫院導入 LOINC 檢驗碼之先期研究

Adoption of LOINC into Hospital Settings in Taiwan

中文摘要

近代檢驗作業資訊化乃各醫療院所檢驗科所必須從事的重要工作之一，但目前國內各醫療院所檢驗資訊系統(Laboratory Information System；LIS)因各院規模、環境背景不同而各自發展，其檢驗資訊也因各院檢驗項目與作業方法不太一樣造成只能在院內或同一體系醫療院所內流通，如果檢驗資訊需透過電腦作業進行院際傳遞，各院檢驗系統便會形成無法辨識它院檢驗資訊之情況，因此國內需有一適用臨床診斷照護之國家檢驗標準碼供各醫療院所進行院內檢驗資訊標準化，國內目前各院通用的健保碼雖亦有定義檢驗項目資訊，但由於當初設計上是以批價使用並不適用於臨床。

LOINC(Logical Observation Identifier Names and Codes)乃近年來國際完整且普遍被採用的國際檢驗標準，如能導入國內醫療院所使用會比自訂國內檢驗標準碼更節省時間、人力及物力成本。但 LOINC 對國內醫療院所而言仍是個相當陌生的名詞，因此有意願進行檢驗資訊標準化之醫療院所雖然很多，但在不了解 LOINC 本身對於國內醫療院所檢驗環境是否適用、無標準導入研究可供參考及導入時與檢驗作業流程及醫療資訊系統哪些層面有關等原因，造成想透過 LOINC 進行院內檢驗資訊標準化之醫療院所遲遲不知如何進行。

本研究將以北部某區域教學醫院之檢驗科及醫療資訊系統為研究環境，以國內發展之 NHI-LOINC 檢驗碼轉換輔助系統(NLMA)所提供之 NHI-LOINC 對應資料庫及 RELMA 為 LOINC 對應輔助工具，訂定院內檢驗項目與 LOINC 對應機制：先建立檢驗主檔—LOINC 對應資料庫，讓每個院內檢驗碼均能對應到一組 LOINC；接著於檢驗報告資料庫中新增 LOINC 欄位以提供讓檢驗科人員所決定院內檢驗碼於當次檢驗作業時所對應唯一 LOINC 能予以置放；最後針對 LOINC 導入時醫院於檢驗作業流程及醫療資訊系統之因應加以說明並訂定導入步驟。

透過本研究所提出的導入方法，成功將該院檢驗主檔內之院內檢驗碼對應到一組 LOINC，可對應(包含一對一及一對多對應)比例絕大部份均為 80%左右，成功建立檢驗主檔—LOINC 對應資料庫及建立檢驗報告檔之 LOINC 欄位；並針對該院檢驗作業流程為因應 LOINC 導入而建立了檢驗科人員決定 LOINC 唯一碼及透過醫療資訊系統之檢驗單開立畫面新增醫令備註欄位供開單醫師補充檢驗資訊可作為協助檢驗科人員決定 LOINC 唯一碼之參考；並針對醫療資訊系統因應 LOINC 導入於系統操作流程、使用者界面及資料庫三方面所造成之改變予以說明；最後依該院導入經驗建立了 LOINC 導入步驟。

本研究在導入 LOINC 前先先針對檢驗作業流程與其相關醫療資訊系統作全盤性了解，且應用 NHI-LOINC 對應資料庫及 RELMA 進行院內檢驗碼與 LOINC 對應，並提出於檢驗作業流程中解決院內檢驗碼與 LOINC 之一對多對應之問題，

使檢驗報告中能呈現該院內檢驗碼所對應之唯一 LOINC，驗證了 LOINC 可於國內醫療院所導入之想法並成功依此導入經驗建立導入步驟
提供未來有意願導入 LOINC 進行院內檢驗資訊標準化之醫療院所作爲標竿學習之用。

英文摘要

Being able to exchange examination results in electronic format between medical laboratories is very important for modern medical care. However, the Laboratory Information System (LIS) in Taiwan is currently developed individually by each hospital. If laboratory information is relieved from a hospital via computer network, it is unidentifiable at the receiving end. Therefore, the establishment of a nation-wide standard code for medical laboratory examinations is required. On the other hand, the National Health Insurance (NHI) codes can be readily recognized and exchanged without problems between the information systems of different hospitals in Taiwan. Furthermore, each hospital already has the mapping mechanism between its own LIS and NHI coding system.

Unfortunately, the NHI coding system was designed for billing only. It is inappropriate for communication between the LIS of different hospitals without major modification. Because Logical Observation Identifier Names and Codes (LOINC) is the most popular, complete and recent laboratory coding standard in the world, adopting it would be more efficient than creating a new one by ourselves. This research investigated the feasibility to adopt LOINC through NHI coding system in a median size teaching hospital of northern Taiwan and tried to define the actual work flow that was required for the whole process.

NHI-LOINC Mapping Assistant (NLMA), a web-based tool similar to Regenstrief LOINC Mapping Assistant (RELMA) previously developed in our lab, was the key to adopt LOINC through NHI coding system. We first set up a LIS-LOINC mapping database to match each local LIS code with one group of LOINC with the help of NLMA. For the LIS code that did not have a matching NHI code, RELMA was used for its LIS-LOINC mapping. We then added new LOINC columns, which included extra examination information provided by the physician who prescribed the test, in the laboratory report database so that technicians could choose an unique LOINC code for some LIS codes when there was no one-to-one LIS-LOINC mapping. Finally, based on the experience of adopting process, the step-by-step work flow was identified to help the future LOINC introduction to other hospitals.

We found that the successful LIS-LOINC mapping rate was 80%, which included both one-to-one and one-to-multiple mapping. It was not difficult for a laboratory technician to choose an unique code from a group of LOINC candidates based on the information provided on laboratory report database. We noticed that most of the time was spent in the mapping of LIS codes that had no corresponding NHI codes, the determination of an unique LOINC code, the programming for the LIS-LOINC database, and the modification of user interface.

The research let us understand the operation process of a medical laboratory and its relevant information system in depth. It proved that the introduction of LOINC through NHI by NLMA and RELMA was feasible. We also identified and solved the difficulties encountered during the process. Although there might still other problems yet to be found when LOINC is incorporated into the LIS of different hospitals, we believe that we have provided a good example and established a reference work flow to facilitate hospitals which are interested in adopting LOINC into their system.