

# 利用藥品儲位標籤電子化以增進庫存管理之效益

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## 摘要

### 背景/目的：

藥品儲位標籤可明確顯示藥品相關資訊,且可針對劑型、劑量與音型相似(Look-Alike, Sound-Alike, LASA)藥品進行提示。然傳統紙本標籤的資訊無法隨時更新,更換時消耗大量人力、物力,且人工作業恐有誤植的風險。本研究將藥庫傳統紙本藥品標籤電子化,利用電子紙可即時呈現資訊與圖像的特性,串接院內相關資料庫,將批號、效期與庫存量等管理資訊同步呈現於標籤上,並藉由圖像化方式提醒藥師特殊藥品(如高危藥、化療藥等)。此外,劑型提示則由原先色彩標示進階為劑型圖像,利於辨認。

### 研究方法：

藉由訪談了解使用者需求以進行電子標籤版型規劃,並經由實體模擬排版供使用者回饋意見以進行優化。為使電子標籤上同步顯示藥品基本資料(如商品名、學名、劑型與劑量等)、庫存相關資訊(如藥品條碼、庫存量、批號效期、近效期提示等)與圖像化提示(如劑型、高危藥品、化療藥品等),透過物聯網技術將藥品基本檔與存管理系統資訊介接。本研究以前後測問卷調查使用者(藥師、實習生)對於電子標籤使用前後工作時間、資訊獲得及整體滿意度進行成效分析。

### 主要發現：

- (1)大幅降低更換標籤時間,平均每張約縮短30分鐘。
- (2)增進標籤資訊品質,並有效管控藥品效期。
- (3)提升標籤易讀性:將劑型、高危藥與化療藥等資訊以圖像化方式呈現,取代過往以特殊符號或色彩提示,大幅提升標籤易讀性。

### 結論與建議：

將傳統紙本標籤更為電子標籤,可大幅縮短更換標籤所需的時間,有效增進藥品資訊的同步性,並且增加標籤易讀性,提供使用者充足的資訊。期望藉由本專案的執行基礎與經驗,進一步推廣至門診藥局、各衛星藥局,使電子標能依本部需求客製化呈現不同資訊,以達到維護用藥安全、增進新人教育訓練,同時增加藥品管理的準確性與便利性。

關鍵字：電子藥品標籤、電子紙、物聯網

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## Abstract

### Background/aim:

The current medicine shelf label displays important information, such as the product name, generic name, and also indicates the dosage form, the unit dosage and provides warning signs for the Look-Alike, Sound-Alike (LASA) products to prevent dispensing error.

However, label replacement and maintenance require a lot of labor and materiel resources, and the information on the traditional paper label cannot be updated in a timely manner, and also, there is a risk of potential human errors, which all raises the challenge of effective medication management. This study uses the electronic shelf label (ESL) to digitalize the traditional medicine shelf labeling of the medication warehouse of the pharmacy department. Through connecting to the inventory management system, the ESL displays real-time product information and graphic icons. Information such as medication barcodes, real-time inventory, batch numbers, and expiration dates can be displayed on the electronic shelf labels. It also alerts pharmacists of special drugs (such as high-risk drugs, chemotherapy drugs, etc.) through graphic icons. In addition, we use graphic icons instead of color differences to distinguish the various dosage forms, which makes it more clear and comprehensible.

### Method:

To design the template of ESLs, we discussed with users regarding their needs and used an actual ESL to simulate the template, and collected the users' feedback. Through the internet of things technology to connect the inventory management system and medication information database, the basic medicine information (i.e. product name, generic name, dosage form and unit dose), inventory information (i.e. medication barcodes, real-time inventory, expiration date/batch number and warning of near-expiry medication), and graphic icons (i.e. dosage form, high alert medication and cytotoxic medication) can be displayed simultaneously. This study uses the pretest-posttest to analyze the users' (pharmacists and pharmacy interns) opinion on the impact of implementing ESL on their workload, information quality and total satisfaction.

### Main findings:

1. The time needed for label replacement reduced significantly (about 30 minutes per-label).
2. The quality of labeled information improved, and easier to manage the expiration dates of medication.
3. A more understandable label information: the use of graphic icons to distinguish various dosage forms, high-alert medication and cytotoxic medication is easier for users to understand.

### Conclusion and suggestion:

Replacing traditional paper labels with electronic labels can greatly shorten the time needed for manual label replacement, improves the synchronization of medication information, makes the label easier to understand and provides more comprehensive information for all medications.

This project of medication shelf labeling renovation will help ensure safe medication use, enhance staff training, and improve the accuracy and efficiency of medication management. With the experience of this pilot project, further expansion and implementation may be considered in the ambulatory pharmacy and in-patient satellite pharmacies, with customized information display tailoring to the needs of each workflow of pharmacy services.

**Keyword:** electronic shelf label, electronic paper, internet of things technology