

## 中文摘要

根據 SARS 的經驗，當 SARS 和禽流感等高傳染性疾病發生時，若缺少一套有效的監控隔離系統來因應這種突發狀況，疫情將會大規模的擴散，造成比海嘯或地震更大的災害。而一套有效的防災系統應該在平時就能與地方公衛系統密切整合，進行各項的照護工作，當疫情爆發時，此套系統能夠立即導入於個案通報與隔離訪視，確實落實防疫的工作。

本研究透過各種不同 IT(Information Technologies, IT)技術的整合與應用，提出適用於疫情防治之居家隔離監控與行動訪視系統，本系統提供了五個主要功能區塊(1)通報表單模組：為解決通報系統建置太慢的問題，本系統以 XML 作為定義通報表單內容方式，讓表單的修改更具有彈性，並結合通報系統介面產生引擎，快速設計出一套通報系統作為通報資料收集；(2)即時回報平台的建立：主要目的解決疫情爆發時，缺乏一套統籌的醫療資源整合系統的問題。即時回報平台以 Web-Based 的方式建立管理介面，讓醫療人員可以透過不同的裝置登錄到此平台，進行資料的觀看，並利用 XML 標準協定交換各系統之間資料；(3)遠端居家隔離監控模式之規劃，以往居家隔離對於隔離者的健康狀況無法確實掌控，造成防疫上的漏洞。透過遠端健康照護模式除了利用無線生理訊號量測裝置，記錄並回傳隔離者每日生理訊號外，系統同時提供娛樂互動功能，讓隔離者在居家隔離時能跟遠端的醫護人員進行文字訊息傳送、檔案傳送、視訊等功能，在視訊部份每分鐘最快可以傳遞  $123\pm 3$  張檔案大小為  $16.7\pm 0.1$ KB 的視訊畫面；(4)健康照護地理資訊系統，對於過去觀察隔離者資料無法與地理資訊系

統結合，面對高傳染性疾病，對於感染者地緣關係的資料無法確實掌握的問題，因此以傳統 GIS (Geography Information System, GIS) 技術為基礎，在街道、地標等地理位置資訊圖層上增加被隔離者居家環境、醫療單位或民政單位等地理資訊，將個案居家、社區醫療資源與地區衛生防疫單位等位置資訊以圖像的方式加以呈現，讓防疫小組可以具體掌握居家隔離者的地理空間資訊，以利人員調度與派遣；(5) 行動居家訪視系統設計，改善以往訪視員在訪視結束後對於訪視記錄的資料回報需二次輸入，造成資料缺乏即時性和無法有效利用網路資源的問題。行動居家訪視系統讓訪視員在訪視活動時，可以攜帶行動裝置將居家隔離訪視紀錄的資料儲存於行動裝置上，當有緊急情況發生或訪視工作結束可即時的經由網際網路將資料回傳，方便訪視人員於任何地點、任何時間都可以即時取得或是回報最新的居家隔離狀況。在資料傳送效率方面對於 61.1KB 檔案只需要  $1.6 \pm 0.3$  秒即可完成傳送。

本研究已於雲林長期照護中心內建立健康照護系統，目前已經收集 4988 筆個案數，將來若有疫情爆發時，將啟動本系統各項功能區塊，協助防疫小組進行防災救援的工作，讓災情受到有效的控制進而減少災害造成的傷害。

## Abstract

According to the experience of SARS, when high infective diseases such as SARS and bird flu, etc. take place, if it lacks an effective control and isolating system to respond this sudden condition, the epidemic situation will be diffused extensively, which might cause the disaster severer than that of tsunami or earthquake. And an effective disaster prevention system should be able to be integrated to local public health system closely at ordinary time, in order to take various healthcare works. When the epidemic situation is broken out, this system should be able to be introduced into case notification and isolating visit immediately, so as to really implement the work of epidemic prevention.

This research proposes A New System Development Model Apply to Quarantine Period Monitoring and Home Visiting of High Infective Diseases through the technological integration and application of different Information Technologies (IT). This system provides 5 main function blocks: (1) The report form module is used to solve the problem that the setup of notifying system is too slow. The XML is used to define the content of report form, which makes the modification of the form be more flexible. The interface of notifying system is combined to create the engine, let non-information personnel can use relevant operation interface to set the module, and design a set of notifying system to collect the notifying information fast; (2) A real-time reporting platform, which is used to solve the problems such as the lack of a set of integrated medical system upon the occurrence of epidemic situation. The real time platform uses Web-Based to create the management interface, which enables the medical personnel to log in to this platform through different devices, carry on the watching of information, and utilize XML standard protocol to exchange the data between every system; (3) A homecare subsystem. Health condition of isolator can not be controlled very well in the past, which causes the loophole on epidemic

prevention. For the remote healthcare mode, except the wireless physiological signal measuring device is used to record and feedback daily physiological signal data of isolator, the system provides the amusement function at the same time, which enables the isolator to carry on the functions such as transfer of text information, transfer of file, video information etc. with the remote doctors and nurses at home. For the video information,  $123\pm 3$  Frames with  $16.7\pm 0.1$ KB can be transmitted per minute; (4) The Health Geographic Information System (H-GIS) is used. It was unable to combine the observation information of isolator with the Geography Information System in the past. Facing to high infective disease, the information of geographical relationship of infected person is unable to be grasped. So the traditional Geography Information System (GIS) technology is used to show the geographical information such as the residence environment of isolator, medical unit or civil administration unit etc. at the street, land mark etc. The position for home of case, medical resources of community and regional health epidemic prevention unit etc. can be shown by picture, and enables the epidemic prevention group to grasp the geographical space information of isolator concretely, and sends outside with favorable personal scheduling; (5) For the design of mobile home visiting system, improve the visiting person who has to write down the visiting information two times, which causes the information to lack the instant property and unable to utilize resources of the network effectively. The mobile home visiting system lets the visiting personnel to carry the mobile device while conducting the visiting activity, and record the home isolation visiting information in the mobile device. When the emergent condition is occurred or the visiting work is completed, the information can be transferred back via the internet network immediately, it is very convenient for the visiting personnel to get or report the newest home isolating condition at any place, any time immediately. For the transfer speed of information, it only takes  $1.6\pm 0.3$ s to complete the transfer of 61.1KB file.

This research has already created the healthcare system in Yunlin long-term care

center. At present, 4988 cases have been collected. It is believed when the epidemic situation breaks out in the future, if the functional block of this system is activated. It will help the epidemic prevention group to take precaution against natural calamities, and let the disaster receives effective control and reduce the injury caused by the calamity.