


運用智慧醫療提升照護品質研討

啟動感染管制e智慧

感染管制智慧領航

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SNQ國家品質標章證書

CERTIFICATE OF SYMBOL OF NATIONAL QUALITY

國品字第 B00126 號

國立臺灣大學醫學院附設醫院

啟動感染管制智慧 e 鑰

參加 2018 SNQ 國家品質標章 **醫療院所類 / 醫院醫務管理組** 評鑑活動，

經大會評審委員會評選，決議通過認證，特此證明。

有效期限：中華民國 108 年 12 月 31 日止

This is to certify that **The e key to the wisdom of infection control** of **National Taiwan University Hospital** has been awarded The Symbol of National Quality in the **Hospital Management Section, Hospital Category** by Research Center for Biotechnology and Medicine Policy.

Date of Validity: Until Dec. 31st, 2019

Symbol of National Quality 國家品質標章

財團法人生技醫藥科技政策研究中心

國家品質標章評審委員會
Jury of Symbol of National Quality

總召集人 陳維昭 Convener **Wei-Jao Chen**

財團法人生技醫療科技政策研究中心
Research Center For Biotechnology and Medicine Policy

董事長 王金平 Founder **Jin-Pyng Wang**

中 華 民 國 一〇七 年 十一 月 三十 日

獎狀

國立臺灣大學醫學院附設醫院

感染管制智慧領航- 臨床微生物監測系統、醫療照護相關感染監測系統

榮獲 2019 國家醫療品質獎

智慧醫療類智慧解決方案組

行政管理領域

智慧醫療 Smart Management 2019

銅獎標章

財團法人醫院評鑑暨醫療品質策進會

董事長 林啓禎

中華民國 108 年 12 月 11 日

2019年醫策會國家醫療品質獎

智慧解決方案組-行政管理領域

Infectious Diseases

Invisible

Unaware

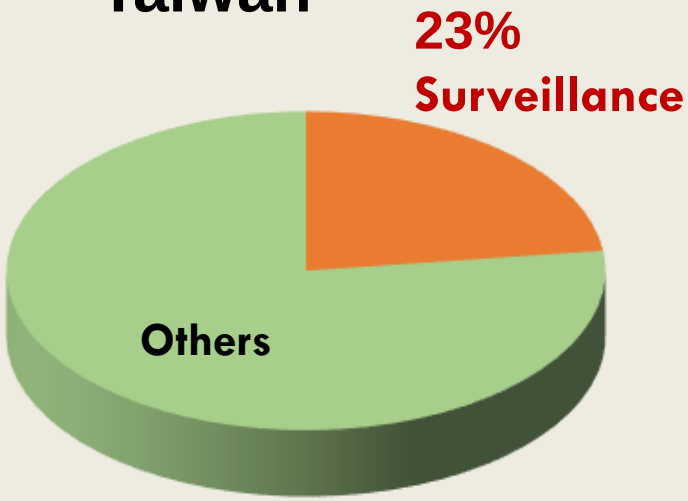
What the mind does not know, the eye does not see

Misidentification

傳統監測佔去太多人力資源及時間

Time spent by ICP undertaking HAI surveillance

Taiwan



Australia

- **1675 hours or 36% (17%–61%)**
- **Increased with larger number of hospitals beds,**
- **>40% if 800 beds or more**

ICP, infection control professionals; HAI, healthcare-associated infections

王復德、陳瑛瑛、陳宜君,感染控制雜誌 2010,

Mitchell BG, et al. Infection, Disease & Health 2016;21:36-40

系統開發緣由

回饋時效延遲
無法提升品質

SARS疫情衝擊
品質指標停擺

監測佔去太多
人力資源及時間

從無紙化電腦資料倉儲，到運用資訊科技結合醫療數位化發展，監測與行動緊密結合

2007 → 2008 → 2009 → 2010 → 2017 →

- 2007 跨專業團隊成立
- 2008 重點微生物自動監測
- 2009 尿道感染自動收案
- 2010 血流感染自動收案
- 2017 醫療智慧支援決策系統

配合國際監測定義改版，台灣全面導入

傳統作業

全院病人
逐本翻閱
病歷

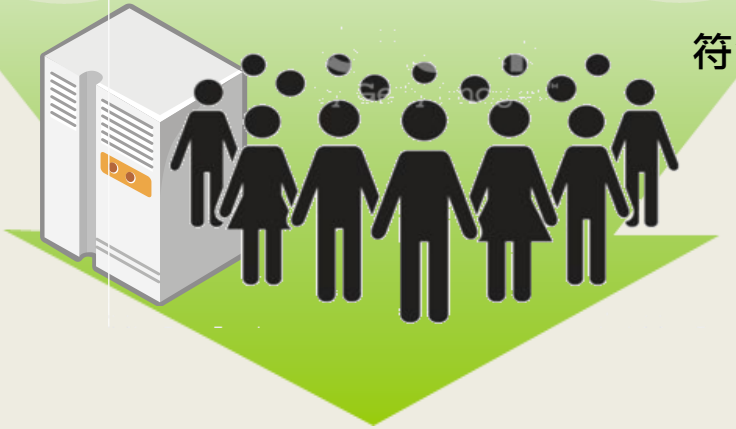
多平台
資料彙整
判讀
收案定義

發現

收案
分類

建檔
分析

17 ,925住院人次 (127,312住院人日)
18,126急診暫留人次

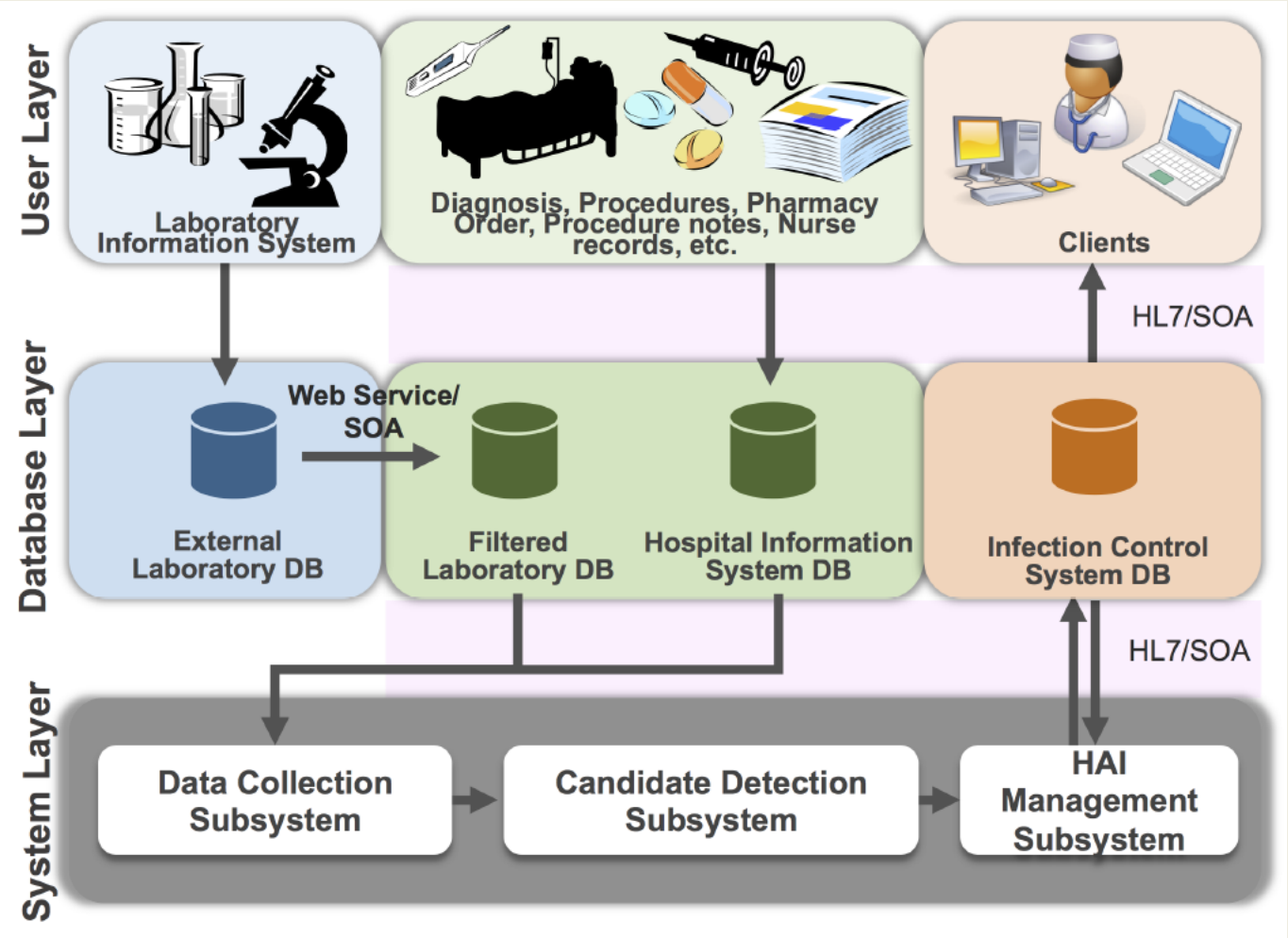


符合醫療照護感染條件13,490人次

醫療照護相關血流感染259人次、醫療照護相關泌尿道感染137人次

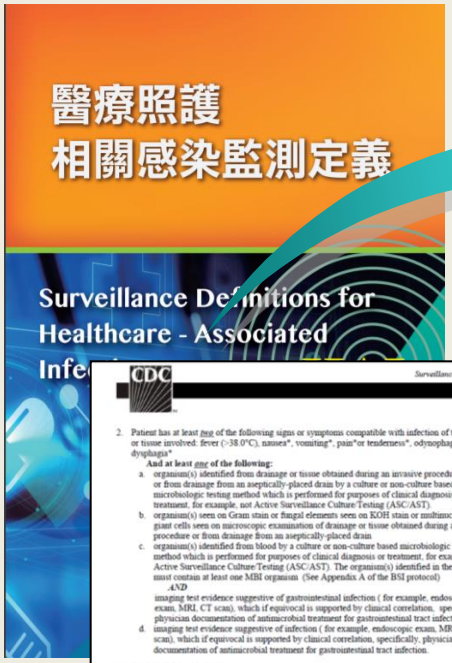
醫療照護相關感染監測系統傳統作業

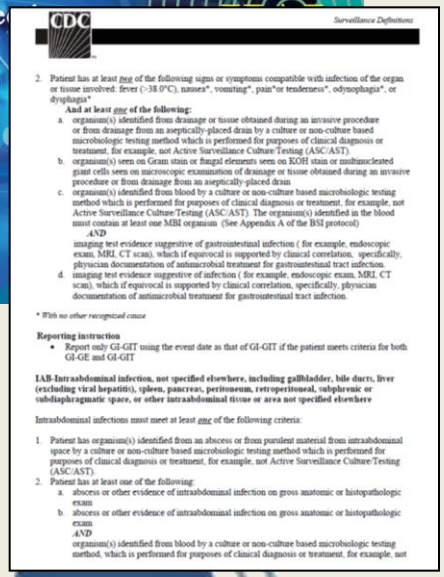
General architecture of the Web-based HAI surveillance and classification system

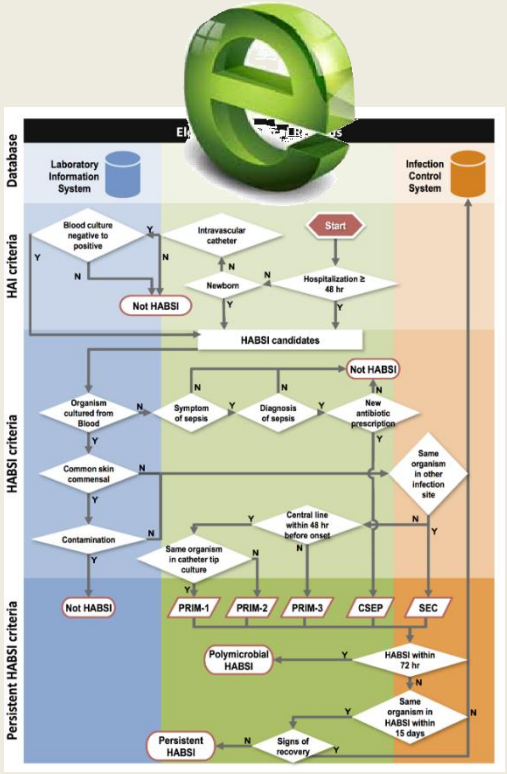


HAI, health care-associated infection; DB, database; HL7, Health Level Seven; SOA, service-oriented architecture.

複雜的國際收案定義轉譯為程式邏輯







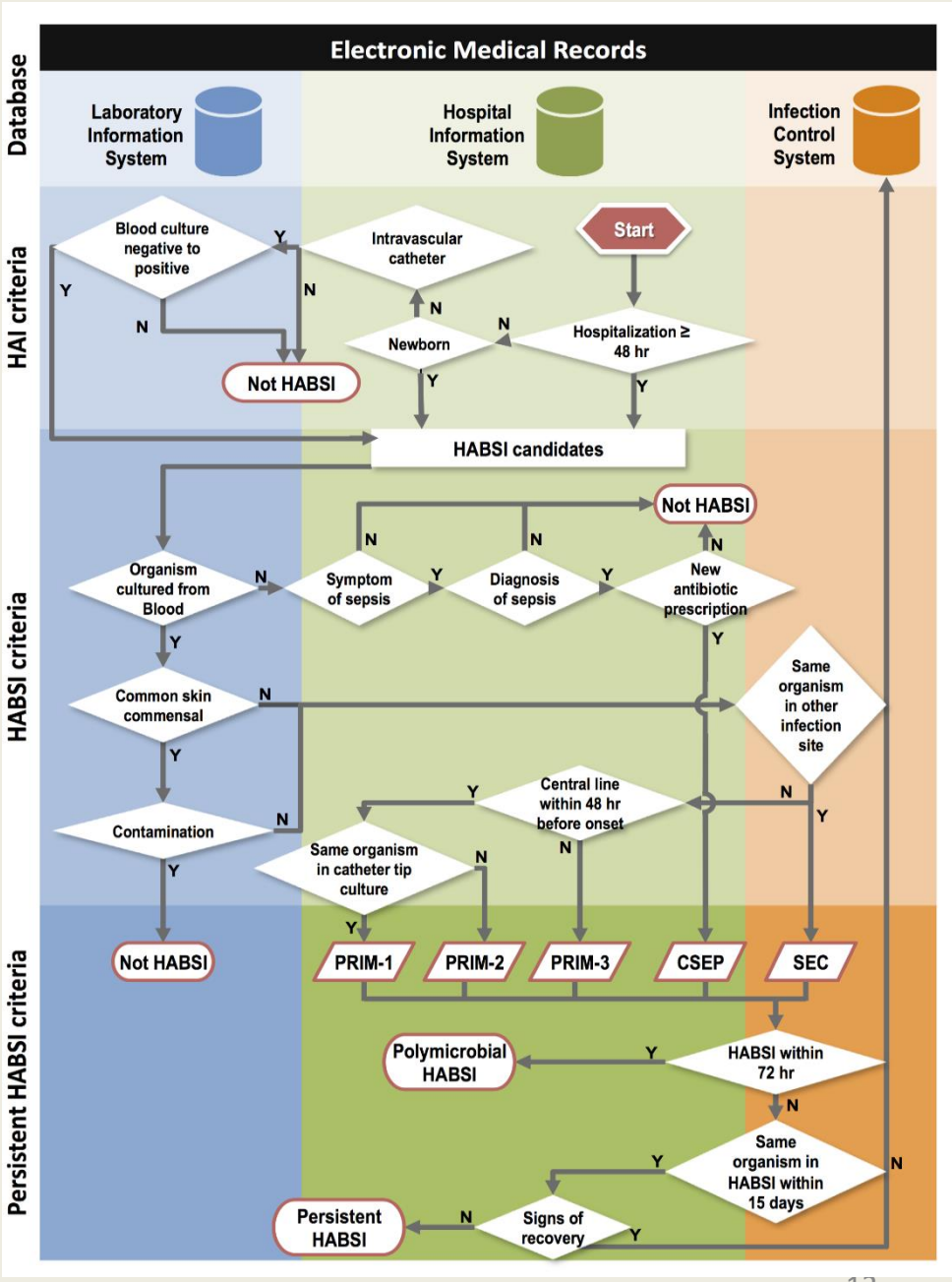
國際監測定義複雜度高
以2018年版為例
英文321頁
中文209頁

https://www.cdc.gov.tw/Category/ListContent/NO6oWHDwvVfwb2sbWzvHWQ?uaid=popWLaCWcalDpLY4ZW_t_g

國際收案定義轉譯為程式邏輯

程式每日自動篩選資料庫，進行判定

每日自動處理「資料整併」、「持續感染判定」，增加精確度



Abbreviation: HABSI, health care-associated bloodstream infection; HIS, hospital information system; LIS, laboratory information system. PRIM, primary HABSI; SEC, secondary HABSI; CSEP, clinical sepsis

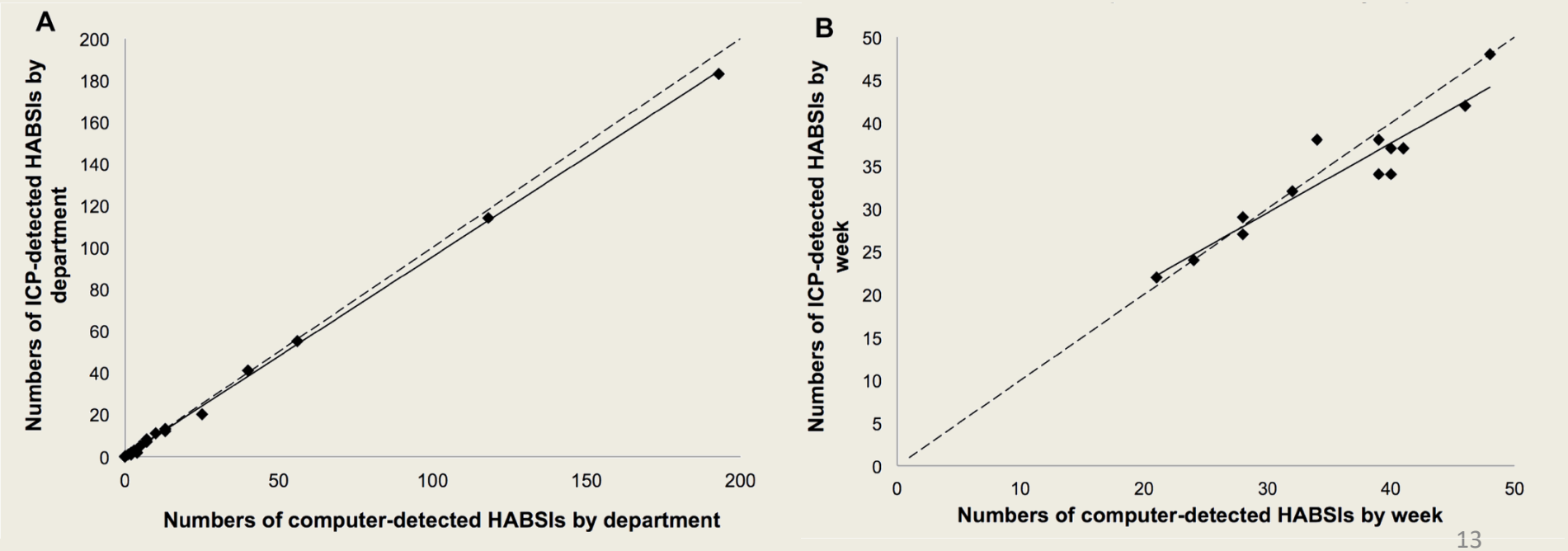
JMIR Medical Informatics 2015;3(3):e31

血流感染收案品質

電腦輔助收案與感管師收案一致

感染責任科部一致性分析
20個科部, Pearson correlation, r<.999, P<.001

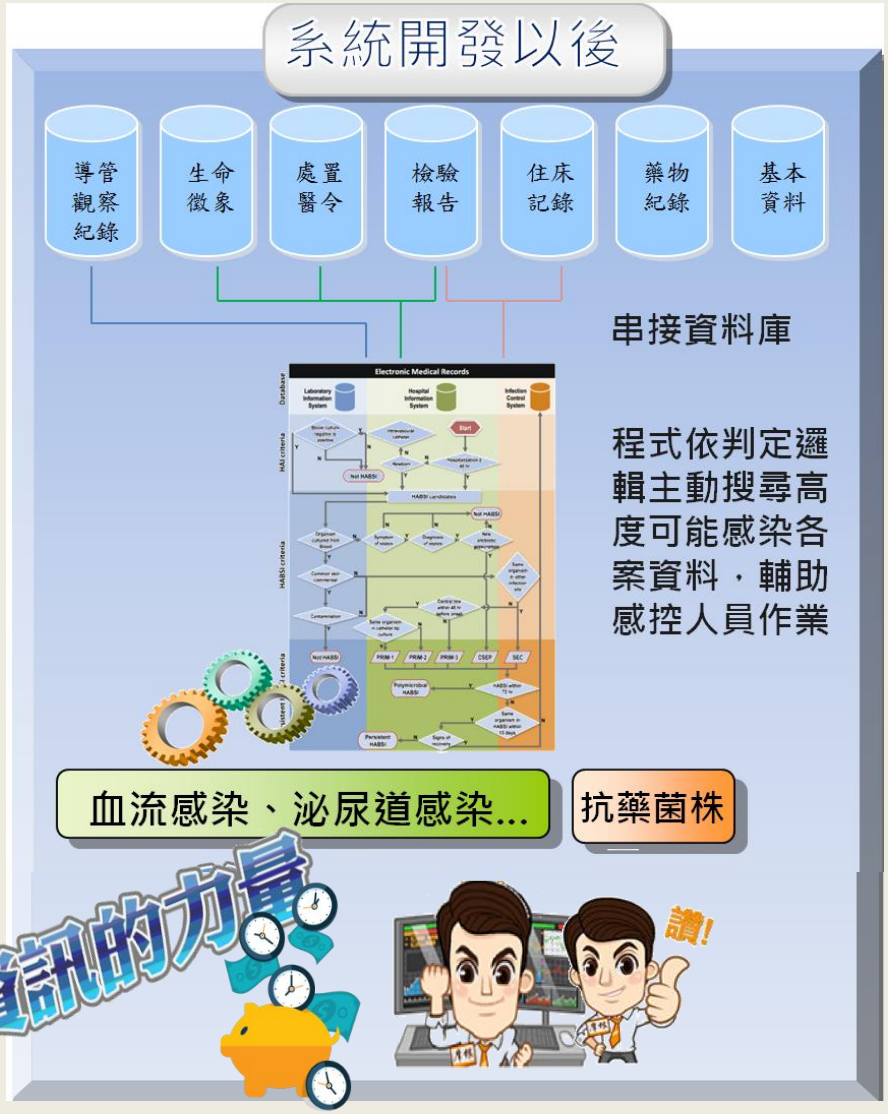
感染週分布
14週, Pearson correlation, *r*=.941, *P*<.001



Tseng, et al. JMIR Med Inform 2015;3(3):e31

醫療照護相關感染監測系統

精準即時 品質指標強力後盾



以**血流感染**為例

可靠

自動收案與人工收案的週分布time (r=.941)和感染責任科部(r=.999)，皆高吻合

精準度高

敏感度98.16%
專一度99.96%
陽性預測值95.81%
陰性預測值99.98%

監測效能提升

上線前收案延遲90天
上線後10天

Tseng, et al. JMIR Med Inform 2015;3(3):e31

電腦輔助判定醫療照護相關感染個案卡

本系統持續運作！

機器判定的感染卡(藍)
經感染管制師確核後
轉為正式個案卡(綠)

個案基本資料
診斷
微生物訊息
用藥
手術紀錄
治療紀錄
收案理由

編輯中 | 10401352 | 10511151

機器判定的感染卡

姓名：溫ＯＯ　帳號：[redacted]45992　病歷號：[redacted]24　生日：[redacted]07/29　性別：F

感染單位：[redacted]A-26-03　轉進日：　轉出日：　就診日：

入院日：2016/10/04　出院日：　出院狀況：

感染判定日期：2016/11/13　主部位：UTI　次部位：SUTI-有症狀的泌尿道感染

誘	診斷日期	診斷名稱
	2016/09/09	Acute bronchitis, unspecified
	2016/10/03	Bronchopneumonia
	2016/10/03	Bronchopneumonia
	2016/10/05	Bronchopneumonia
	2016/08/20	Cerebrovascular accident
	2016/08/22	Cerebrovascular accident
	2016/08/22	Cerebrovascular accident
	2016/08/23	Cerebrovascular accident
	2016/09/13	Cerebrovascular accident
	2015/04/13	Compression fracture, pathological, spontaneous
	2015/04/27	Compression fracture, pathological, spontaneous

送檢日	(LogNo)檢體	檢查醫令	檢查結果	菌數	採檢日
1051114	(161113076139) RANDOM URINE	Urine culture	Klebsiella pneumoniae	>100,000	20161113 23:11
AM:R AMC:S AN:S CAZ:S CIP:S CMZ:S TZP:S CZ:S ETP:S FEP:S GM:S SXT:S CTX:S					

抗	用藥(起)	用藥(迄)	劑量途徑	學名	商品名
	20161003		1tab PO	Fexofenadine HCl	Allegra
	20140822		1tab PO	Atenolol	Ateol

主	刀房	手術醫令 vs 參與者
	Y0A008	1.Partial joint replacement - cup or hip prosthesis or unicompartment(部份關節置換術併整形術－只置換髖臼或股骨或半股關節或半肩關節) 2.麻醉前評估(麻醉前評估) 3.麻醉恢復照護費(麻醉恢復照護費) 4.Spinal anesthesia(脊髓麻醉) 5.BLOOD TRANSFUSION (ONE TIME)(一般輸血：一次)

手術耗時：1小時40分0秒　傷口分類：A-清潔　ASA：2　麻醉主治醫師：林ＯＯ

麻醉開始時間：2014/08/07 17:00　誘導結束時間：2014/08/07 17:05

手術開始時間：2014/08/07 17:25　手術結束時間：2014/08/07 19:05

無抗生素給藥時間

醫令名稱	使用起迄日	留置部位	執行人員
C.V.P. catheter in ubation(中央靜脈導管置入術)	2015/01/29-		
C.V.P. catheter in ubation(中央靜脈導管置入術)	2015/01/19-		
COLONOSCOPY-總院(內視鏡科)(大腸鏡檢查)	2016/11/02-		
UPPER G.I. PANENDOSCOPY-總院(內視鏡科)(上消化道泛內視鏡)	2016/11/02-		
3-Way Foley Catheter #20(三叉導尿管(親水性) 20Fr)	2016/10/29-		
2-Way Balloon Catheter #20(二叉導尿管 #20)	2016/11/12-		
2-Way Balloon Catheter #18(二叉導尿管 #18 雙)	2016/10/28-		
2-Way Balloon Catheter #18(二叉導尿管 #18 雙)	2015/01/28-		
2-Way Balloon Catheter #16(二叉導尿管 #16 雙)	2016/10/19-		
2-Way Balloon Catheter #16(二叉導尿管 #16 雙)	2016/10/05-		
2-Way Balloon Catheter #16(二叉導尿管 #16 雙)	2015/02/06-		

Predisposing factors

備註

Rule: 1.1, Symptom Info: 2016/11/14 , 上午 05:00 , BT=39.3, Foley Info: Order Code: 47014C00, DateTime: 2016/11/12 上午 11:28:19 ,,

刪除卡片　轉正式卡片(本來為機器自動建立)

Query data for card 10511151 at 0:59
Got data from server.
Read Main Card body @ 11:00:59
Read diagnosis @ 11:00:59
Read germ @ 11:01:00
Read pharmacy @ 11:01:00
Read operation @ 11:01:02
Read order @ 11:01:03
Read factor @ 11:01:06
End @ 11:01:06
Start parsing at 1:7
end of parsing at 1:8
Diagnosis number : 113
Germ number : 1
Pharmacy number : 63
Operation number : 1
Treatment number : 622
Total processed item number : 800
End of procedure at 1:11

execution records of the system

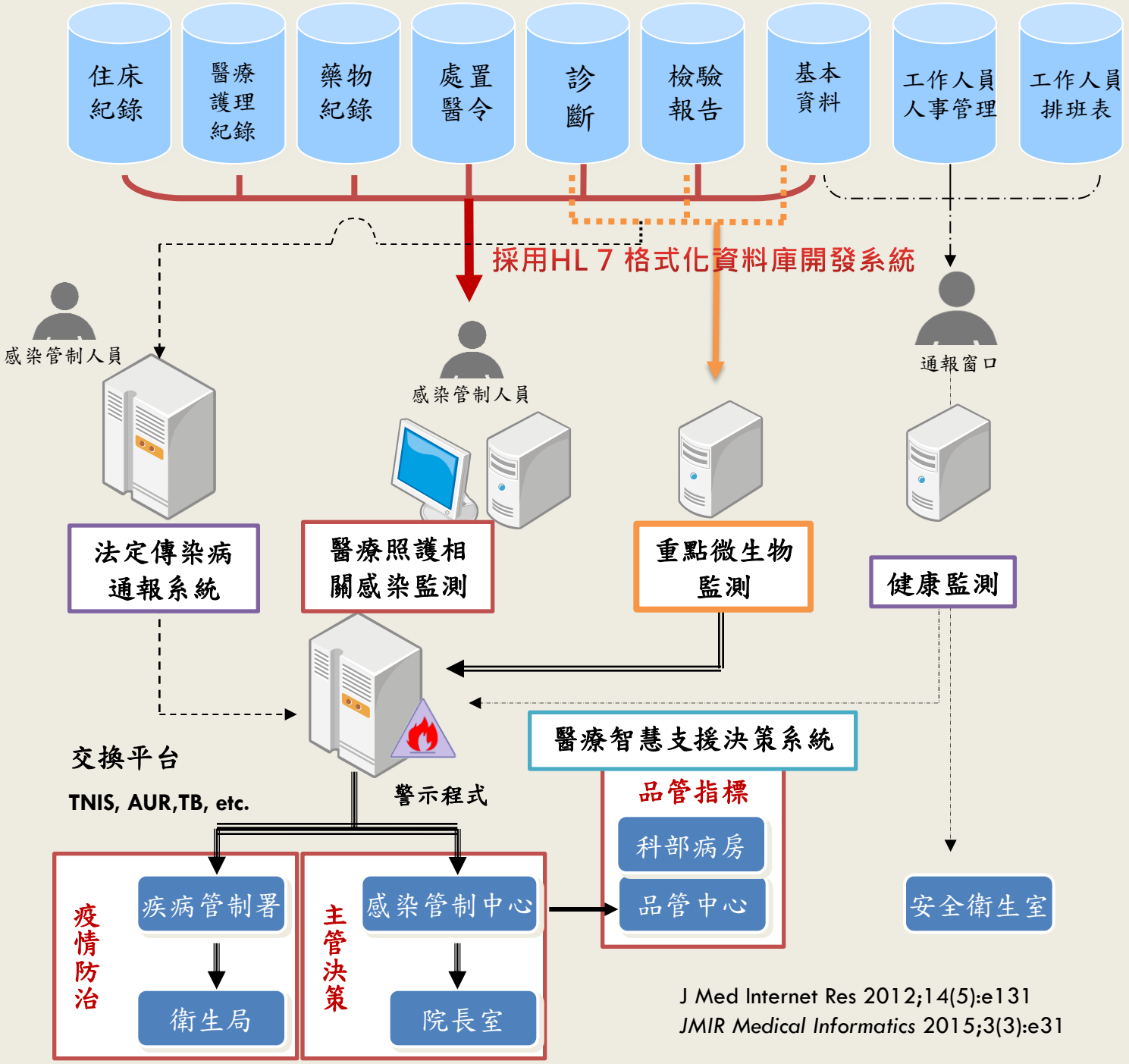
感染管制師確核鈕

新進感管護理師經系統操作訓練後上手時間

醫療智慧支援決策系統

依權限控管
院長室
一級主管
單位二級主管

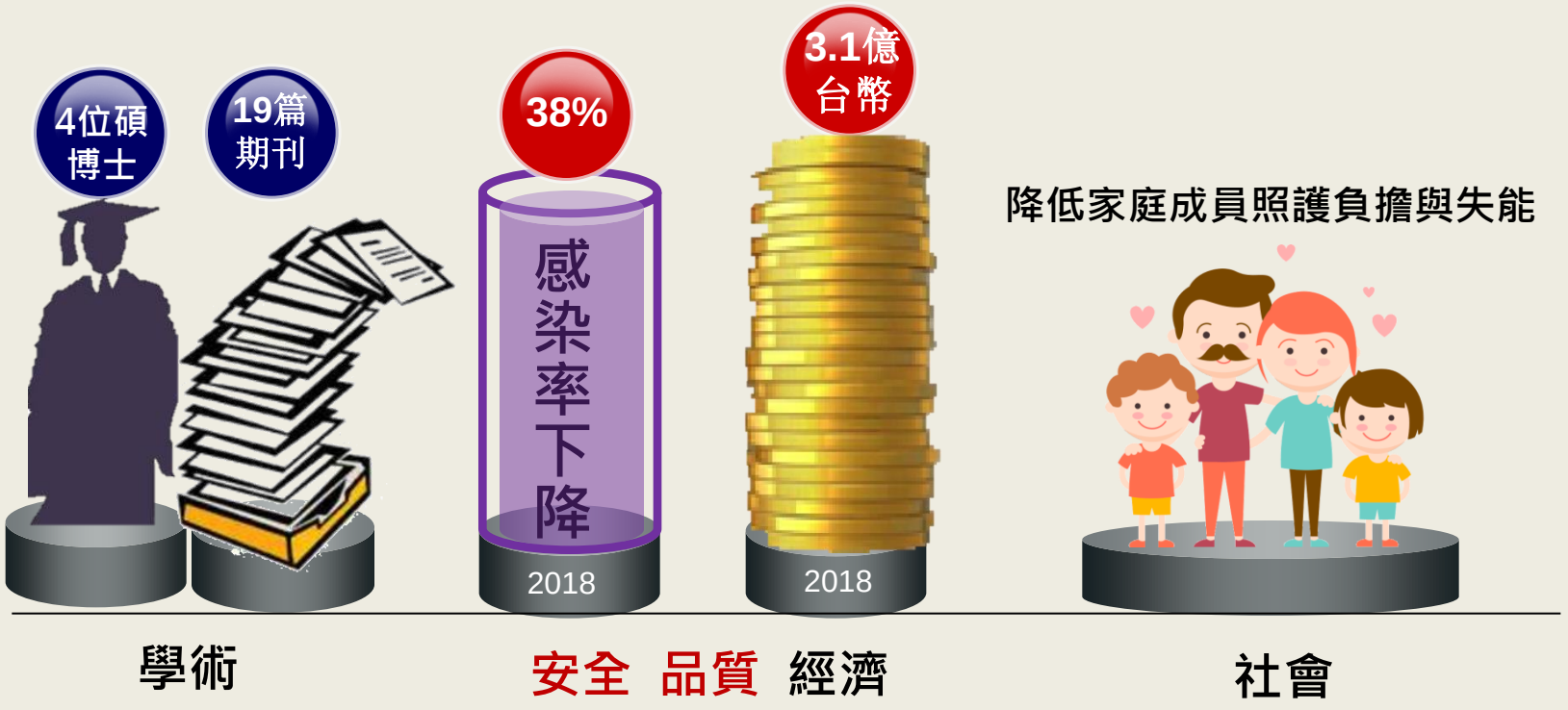
感染管制e智慧藍圖



J Med Internet Res 2012;14(5):e131
JMIR Medical Informatics 2015;3(3):e31

系統開發深具效益

病人安全、品質、經濟、學術、社會



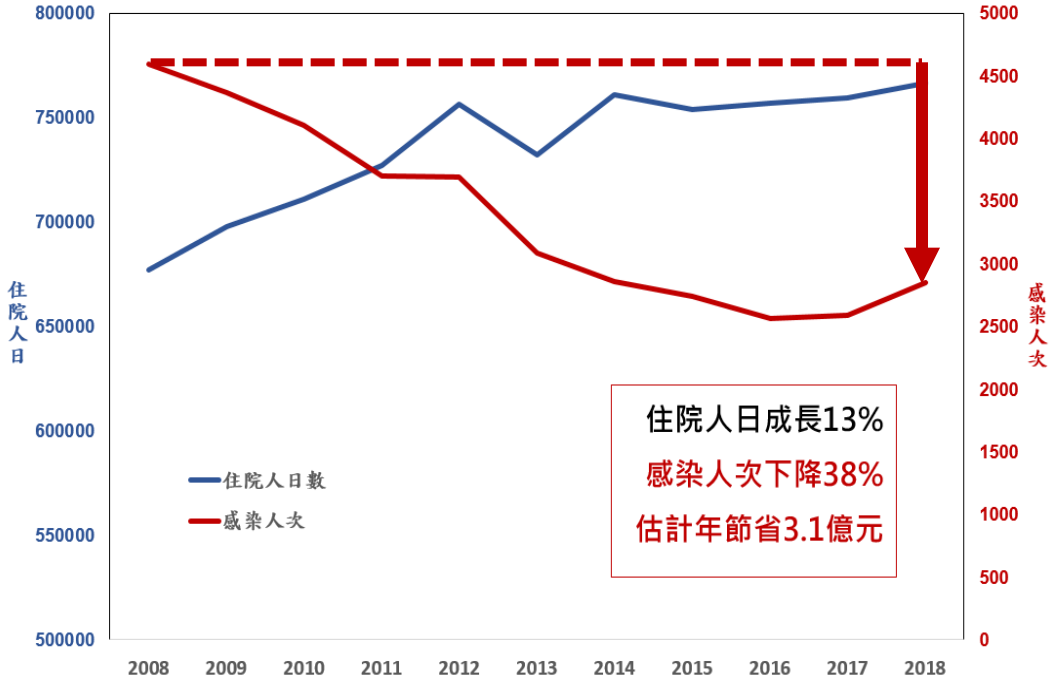
國際審查委員高度評價為優秀的成功案例

- **They have spent many years building their system, which is sophisticated in architecture and ability to integrate several data sources. They are to be congratulated on their technical accomplishments.**
- **The technology they have developed is advanced and impressive.**
- **They have incorporated data sources that are difficult to capture and interpret and they have linked re-hospitalization for patients.**
- **This is an example of the success that can be achieved through persistent and diligent work over many years.**

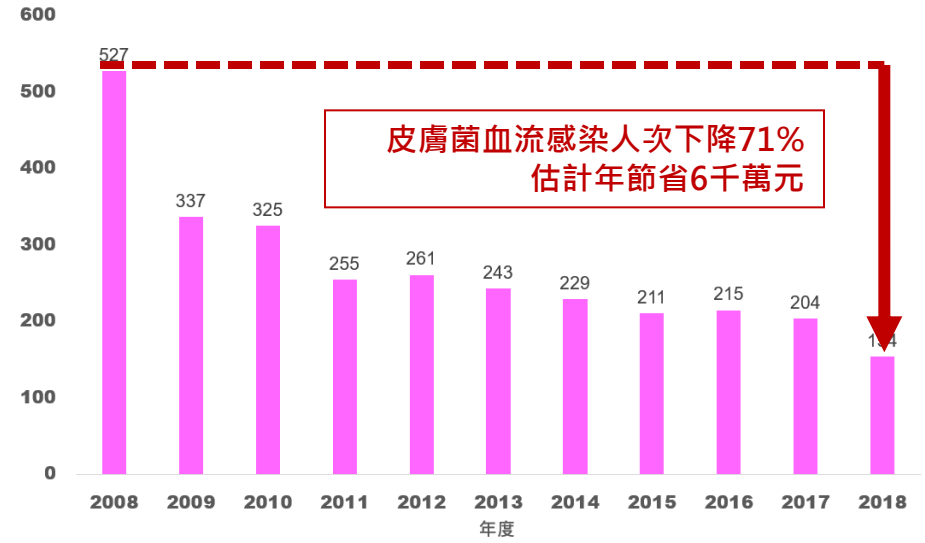
國內外期刊、研討會發表、碩博士論文共19篇

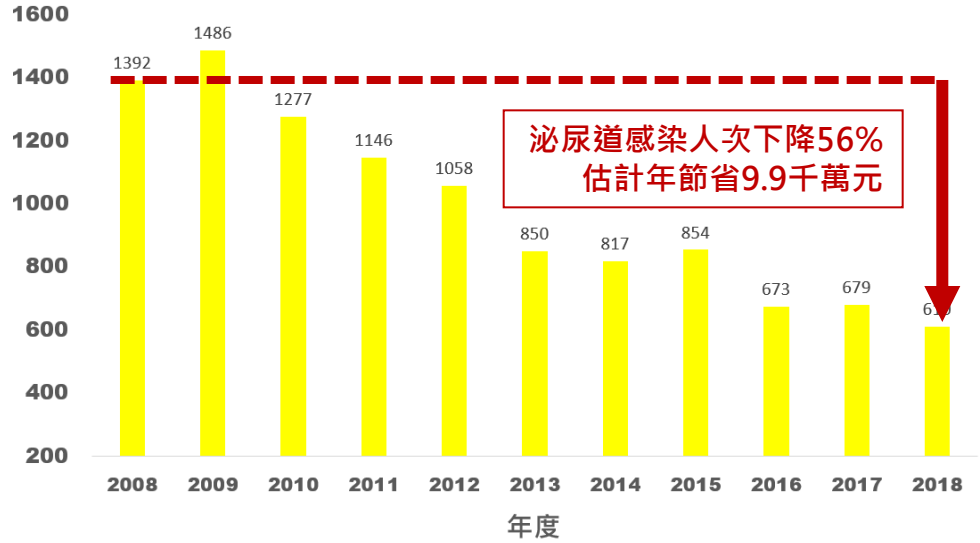
- ✓ Tseng YJ. JMIR Med Inform 2015;3:1-15
- ✓ Tseng YJ, et al. A Web-Based Multidrug-Resistant Organisms Surveillance and Outbreak Detection System with Rule-Based Classification and Clustering. J Med Internet Res 2012;14(5):e131 (2016, IF 5.175; Medical informatics 1/24=4%)
- ✓ Lin HC. The 30th International Congress of Chemotherapy and Infection Nov 24-27, 2017
- ✓ Tseng YJ. Stud Health Technol Inform. 2013;186:145-9
- ✓ Wu ZY. J Med Syst 2012; 36:2547–2555
- ✓ Wu JH. The 2009 International Conference on Bioinformatics & Computational Biology; July 13-16
- ✓ Huang BC. BMEiCON 2014 ; November 26-278

監測與品質促進緊密結合



- Chen YC, et al. Effectiveness and limitations of hand hygiene promotion on decreasing healthcare–associated infections. PLoS One. 2011;6:e27163
- Lai CC, et al. Implementation of a national bundle care program to reduce catheter-associated urinary tract infection in high-risk units of hospitals in Taiwan. J Microbiol Immunol Infect 2017 ;50:464.
- Lai CC, et al. Implementation of a national bundle care program to reduce central line-associated bloodstream infections in intensive care units in Taiwan. J Microbiol Immunol Infect 2018;51:666





建立完整線上感染管制監測系統為亞洲先鋒

American Journal of Infection Control 43 (2015) 600-5

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Major article

Data elements and validation methods used for electronic surveillance of health care-associated infections: A systematic review

Kenrick D. Cato PhD, RN [a,*], Bevin Cohen MPH [a,b], Elaine Larson PhD. FAAN. RN. CIC [a,b]

[a] School of Nursing, Columbia University, New York, NY
[b] Department of Epidemiology, Mailman School of Public Health, Columbia Unive

Journal of Hospital Infection 99 (2018) 1–7

Available online at www.sciencedirect.com

Journal of Hospital Infection

journal homepage: www.elsevier.com/locate/jhin

Review

Impact of electronic healthcare-associated infection surveillance software on infection prevention resources: a systematic review of the literature

P.L. Russo [a,b,c,*], R.Z. Shaban [c,d,e], D. Macbeth [c,d], A. Carter [b], B.G. Mitchell [b,c]

[a] School of Nursing and Midwifery, Faculty of Health, Centre for Quality and Patient Safety Research — Alfred Health Partnership, Deakin University, Victoria, Australia
[b] Avondale College of Higher Education, Faculty of Arts, Nursing and Theology, New South Wales, Wahroonga, Australia
[c] Griffith University, School of Nursing and Midwifery, Nathan, Queensland, Australia
[d] Gold Coast Health, Gold Coast University Hospital, Southport, Queensland, Australia
[e] Menzies Health Institute Queensland, Griffith University, Southport, Queensland, Australia

建立世界先驅的線上感染管制監測系統

監測範圍最大、項目最完整、學術價值高、使用友善度高、持續運作&續航開發

醫院	作者	年份	範圍	床數	研究設計	項目	Web-based	儀錶板 、警訊
Mayo Clinic, Rochester, MN	Herasevich et al.	2010	加護單位	204床	Prospective	BSI	Y	Y，警訊為個別檢驗項次之異常值
Mayo Clinic, Jacksonville, FL	Nuckchadyet et al.	2015	加護單位	214床	Retrospective	VAE	N	N
National Taiwan University hospital, Taiwan	Wu et al. Tseng et al.	2009 2012	全院	2,200床	Prospective	MDRO 68 items	Y	Y，運用管制圖(SPC)依使用者點選的時間地點，線上產生9種定義的警訊
	Tseng et al.	2010 2015	全院	2,200床	Prospective	BSI	Y	
	Huang et al.	2014	全院	2,200床	Retrospective	SSI	N	
	Lin et al.	2017	全院	2,200床	Prospective	UTI	Y	
	Chou et al.	2018	全院	2,338床	Prospective	Device-days	Y	

NHSN: National Healthcare Safety Network; SPC: statistical process control; BSI: bloodstream infection; VAE: ventilator-associated events; SSI: surgical site infection; MDRO: multi-drug resistant organisms; UTI: urinary tract infection

總 結

- 跨專業領域整合，導入資訊科技，多年持續努力，自行開發建構精準、即時、穩定、 持續運作的主動式感染管制資訊監測系統
- 解決系統性問題，從感染管制、病人安全、品質促進，至學術成就，創造多贏


感謝關心
此議題