



Surveillance of healthcare-associated infections (HCAIs)

South Africa

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Healthcare-associated infection (HCAI)-related AMR surveillance

- Currently, in most public SA healthcare facilities (HCFs) where HCAI AMR surveillance is carried out, it is mainly laboratory-based
 - Many downfalls to this approach
- In some public HCFs (particularly academic, tertiary) approach is enhanced by laboratory-based surveillance with ward liaison (LBSWL)

Objectives of HCAI surveillance

- Reducing infection rates
- Establishing endemic baseline rates
- Identifying outbreaks
- Identifying risk factors
- Persuading medical personnel
- Evaluate control measures
- Satisfying regulators
- Document quality of care
- Compare hospitals' HCAI rates

The Surveillance Loop:

Health
care
system

Surveillance
centre

Event

Reporting

Data

Action

Information

Analysis,
interpretation

Feedback,
recommendations

THE MICHAEL EMMERSON

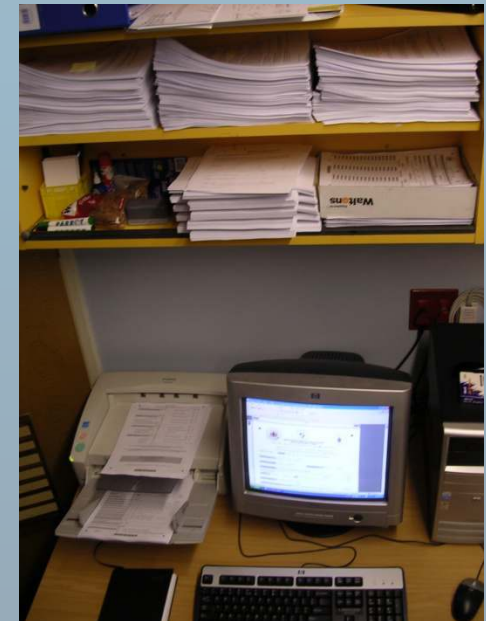
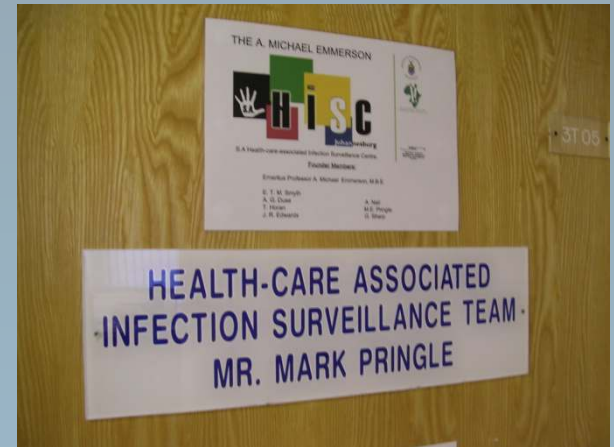


S.A. Health-care-associated Infection Surveillance Centre.

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The Gauteng Pilot Study 2005 Background: A First Step In SA Surveillance Using Standardized Methodology & HCAI Definitions

- Study performed over a 3-month period, between March 2005 – May 2005
- Two academic, 2 provincial, 2 private hospitals
- Four HCAIs surveyed: ¹ary BSIs, UTIs, LRTIs (pneumonia), SSIs
- Total number of beds surveyed = 2 672

Aims of project:

- To pilot a automated data entry tool using manual questionnaires and an optical scanner tool that could be used for a Gauteng Provincial/National Nosocomial Infection Prevalence Survey – Pilot Study 2005
- To determine realistic, prevalence rates of uniformly defined HCAs in South Africa's second most populated Province

And, ultimately (not done in this study, but being further developed):

- To profile the causative organisms of HCAs with regard to their aetiology and antimicrobial resistance patterns

Methodology:

- Point-prevalence study
- NHSN definitions of HCAs used
- Steps:
 - Design and generation of uniquely serialized paper survey forms for each healthcare facility (HCF)
 - Training in, and filling in of, survey forms
 - Return of completed survey forms to a centralized data processing facility
 - Automated data entry by scanning of forms using a high-speed optical scanner
 - Capturing and cleaning of data using Formic software
 - Exporting of data into SPSS & analysis, interpretation & recommendations
 - Confidential feedback to surveyed HCF for further action

Process:

- Training of surveyors - January 25-27, 2005
- Validation: intra-, inter-, & external after 5d training
- “Start-up” talk at each participating facility; very NB for management “buy-in” – February 2005
- Delivery of questionnaires, commencement of survey & delivery of results – March – May 2005

Data collection form 1-

General parameters:

- Patient demographics
- Medical risk factors
- Surgical risk factors & other invasive procedures
- Device-related risk factors
- Antibiotic and non-antibiotic therapy during admission

Surveillance of Healthcare-Associated Infection In Intensive Care

Surveillance Manual (Version 1.1)
February, 2003

Developed by Infection Control Team
The Royal Hospitals
Belfast

The Royal Hospitals Trust
Belfast BT12 6BA

Hospital Infection Survey 2001

01/trh/01

Q1 Survey date D D / M M / Y Y Y Y <input type="text"/>		Q2 Directorate <input type="text"/>	Q3 Ward number <input type="text"/>	Patient's name	
Q4 Admission date to hospital D D / M M / Y Y Y Y <input type="text"/>		Q5 Hospital number <input type="text"/>		Q6 Gender <input type="checkbox"/> Male <input type="checkbox"/> Female	
Q7 Date of birth D D / M M / Y Y Y Y <input type="text"/>		Q8 Admission type <input type="checkbox"/> Elective <input type="checkbox"/> Emergency <input type="checkbox"/> Term labour <input type="checkbox"/> Newborn		Q9 Was patient transferred? <input type="checkbox"/> Yes, from another hospital <input type="checkbox"/> Yes, from another ward <input type="checkbox"/> No	
Q10 Admission diagnosis 1 choose from list <input type="text"/>		Q11 Admission diagnosis 2 choose from list <input type="text"/>		Q12 More than 2 diagnoses Yes <input type="checkbox"/> No <input type="checkbox"/>	
Q13 Medical Risk Factors Select all that apply <input type="checkbox"/> Major trauma <input type="checkbox"/> COAD <input type="checkbox"/> Stroke/paraplegia <input type="checkbox"/> Diabetes <input type="checkbox"/> Malnourished		<input type="checkbox"/> Obesity <input type="checkbox"/> Cancer <input type="checkbox"/> Smoking <input type="checkbox"/> Leukocytopenia <input type="checkbox"/> None		Q14 Urinary catheter <input type="checkbox"/> Suprapubic <input type="checkbox"/> Urethral closed <input type="checkbox"/> None	
Q15 Catheter duration (days) <input type="text"/>		Q16 Intravascular lines <input type="checkbox"/> Venous (periph) <input type="checkbox"/> Arterial (periph) <input type="checkbox"/> Central <input type="checkbox"/> PICC		Q17 >1 intravascular device Yes <input type="checkbox"/> No <input type="checkbox"/>	
Q18 Duration of peripheral line <input type="text"/>		Q19 Duration of central line <input type="text"/>		Q20 Duration of other vascular device <input type="text"/>	
Q21 Therapy this admission <input type="checkbox"/> Steroids <input type="checkbox"/> Blood <input type="checkbox"/> Chemotherapy <input type="checkbox"/> Cytotoxic		Q22 Antibiotics this admission <input type="checkbox"/> No <input type="checkbox"/> Prophylaxis <input type="checkbox"/> Therapy		Q23 Non-surgical break in skin Yes <input type="checkbox"/> No <input type="checkbox"/>	
Q24 Type of break <input type="checkbox"/> Vascular ulcer <input type="checkbox"/> Pressure sore <input type="checkbox"/> Vascular & pressure <input type="checkbox"/> Diabetic ulcer <input type="checkbox"/> Other		Q25 Has patient undergone any form of surgery? Yes <input type="checkbox"/> No <input type="checkbox"/>		Q26 Surgical drains in-situ? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Q27 Has pt undergone any other invasive procedure? Yes <input type="checkbox"/> No <input type="checkbox"/>		Q28 Other invasive procedures <input type="checkbox"/> ERCP <input type="checkbox"/> Percutaneous drainage procedure <input type="checkbox"/> Other endoscopy (excl. surgery but incl. gastrstomy insertion) <input type="checkbox"/> Other invasive procedure			

Survey : 50



Serial : 2



Page : 1



Infection Control, The Royal hospitals, Belfast BT12 6BA

Data collection forms 2 & 3:

- HCAI-specific information
- Isolate information including AMR

Why automated data entry (ADE) using manual questionnaires & optical scanning?

- System accessible to all HCFs – once questionnaires completed, sent to centralized data processing unit -> cost effective; rapid feedback
- Patient-based, not isolate-based
- ICN at cold interface; not in office / laboratory
- Improved speed & accuracy of data entry; substantial cost savings [[Infect Control Hosp Epidemiol. 1997 Jul; 18\(7\):486-491](#)]
 - 22-fold productivity increase cf. manual data entry (MDE) with validation
 - Saving of \$ 0.63 [~ R 4.12] per questionnaire in clerical time
 - After validation, error rate of < 0.2 errors / 1000 responses (ADE) vs. 12.4 errors / 1000 responses (MDE)

Active Infections (# 2672 patients)

- Surgical site infection
 - 3.0%
- Bloodstream infection
 - 5.01%
- Urinary tract infection
 - 1.53%
- Respiratory tract infection
 - 2.88%

Overall prevalence rate for the 4 surveyed infections: 9.73% (260/2672)

	BSI rate	UTI rate	RTI rate	SSI- all	SSI- surgical	Prevalence rate for 4 active infections surveyed
Hospital #1 (731 beds surveyed)	6.7	1.1	1.2	0.8	1.4	9.05
Hospital #2 (593 beds surveyed)	4.9	3.0	4.4	1.7	2.9	11.17
Hospital #3 (376 beds surveyed)	10.4	0.5	3.2	1.9	2.8	15.73
Hospital #4 (532 beds surveyed)	1.5	0.8	0.6	2.3	1.7	5.08
Hospital #5 (214 beds surveyed)	1.9	3.7	10.7	0.9	1.5	15.42
Hospital #6 (226 beds surveyed)	2.2	0.4	1.8	0.4	0.9	4.02

Service groups and infection rates:

	BSI rate	UTI rate	RTI rate	SSI- all	SSI- surgical	Prevalence rate for 4 active infections surveyed
Medical	4.7	3.0	1.6	0.3	0.5	8.7
Surgical	4.1	0.9	2.2	2.7	3.5	8.4
Intensive Care	12.5	4.5	17.9	1.8	2.3	28.6
Gynaecology and Obstetrics	0.6	0.6	0.9	1.7	3.3	3.5
Paediatrics	10.2	1.1	4.9	0.2	0.3	16.5
Other services	2.2	0.4	1.8	0.4	0.9	4.02

Risk factors: 63.9% (1695/2652) of patients had 1/> listed risk factors

- Urinary catheter: 19.9% of patients
 - Median duration of catheter = 4 days
 - 4.2% of patients with urinary catheter developed a UTI
 - 0.8% of patients without urinary catheter developed a UTI
- Peripheral vascular catheter: 52.9% of patients
 - Median duration of PVC = 3 days
 - 6.4% of patients with PVC developed BSI
 - 3.4% without PVC developed BSI
- Central intravascular catheter: 7.85%
 - Median duration of CVC = 5 days
 - 15.9% of patients with CVC developed BSI
 - 4.1% without CVC developed BSI

Risk factors: 63.9% (1695/2652) of patients had 1/> listed risk factors

- Mechanical ventilation: 4.2% of patients
 - 20.5% of patients on ventilators developed a LRTI
 - 2.0% without developed LRTI
- Others:
 - Immunodeficiency: 12.1% of patients
 - Parenteral nutrition: 2.8% of patients
 - Neutropaenia: 2.7% of patients
 - Non-surgical skin breaks: 13.3% of patients
 - Non-surgical invasive procedures: 14.7% of patients
- Antibiotics: 56.8% (1494/2630) of patients received antimicrobials during this admission
 - Indication: Specific 16.6%; Empirical: 67.8%; Surgical prophylaxis: 9.7%; Other: 5.9%

Future Directions of The Michael Emmerson SA-HISC

- Adding to paper survey forms direct web entry of data onto surveillance questionnaires
- Changing focus, in targeted settings from prevalence to incidence surveillance

Web Forms

Advantages of Web Forms (1)

- **Improved accuracy from validation**
- **Timeliness of Results**
- **Increase response rates**
- **Gives a good impression of the organisation**
- **Longer forms**
- **Edit and Modify**

Advantages to both survey administrators and respondents

Advantages of Web Forms (2)

- **Reduce time to fill out**
- **Accessibility**
- **Access Restriction**
- **Eliminate paper and printing costs**
- **Eliminate mailing**
- **Eliminate data entry from paper**
- **Eliminate disposal of paper**

Web Forms – Home Page

Formic Web Forms - Microsoft Internet Explorer

Address: http://localhost/webforms/

+Web Forms

Not Logged In

Login

Register

Projects

please select a project from the list below:

- > Formic Fitness
- > Formic Training Feedback
- > Fusion Mortgages
- > Guest Feedback
- > Hospital Admission Survey

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Done

Web Forms

General

Home Page

- Display the projects contents list on the home page
- Display the Tag Name entry inputs on the home page

Logins

- Enable login functionality in the browser
- Allow users to self-register through the browser.
- Allow users to self assign themselves to groups using group codes in the browser
- Allow users access to change their registration properties in the browser

Skins

Use the default Formic skin

Skin Name: default

The skin name is the sub directory in the styles directory that contains the screen.css style sheet. i.e. styles/<Skin Name>/screen.css

OK Cancel Apply

Formic Web Forms - Microsoft Internet Explorer

Address: http://localhost/webforms/

+Web Forms

Not Logged In

Login

If you have already been provided with a username and password then please login here.

[Login](#)

Registration

To register please select a new username and password.

* Required Fields

Choose your username

* Username: DavidEary

This will be your login name.

User details

Full Name: David Eary

Choose your password

* Type password: *****

no characters minimum

* Repeat password: *****

Register Cancel

Web Form Security

- Access via secure website
- Each project can have different access restrictions
- Password protected
- Restrict project to specified groups

The screenshot shows a dialog box titled "Feedback Survey - Web Forms" with three tabs: "General", "Security", and "Advanced". The "Security" tab is active. Under the "Security" heading, there are two radio buttons: "Allow everyone access to this project - No Restrictions" (unselected) and "Restrict access to this project" (selected). Below these, there are two checked checkboxes: "Require users to enter a password before being allowed to access this project" and "Only allow access to members of the selected web groups". A "Password:" label is followed by a text input field containing "XXXXXXXX". Below that, a "Web Groups:" label is followed by a list box containing "PSUK". To the right of the list box are "Add..." and "Remove" buttons. At the bottom of the dialog, there is a note: "Note: Web users belonging to the listed groups will not be required to enter the project password." and three buttons: "OK", "Cancel", and "Apply".

Submitting Web Forms

- Save partially completed forms
- Reload previously submitted forms and make them editable
- Restrict number of forms submitted for a project
- Restrict the number of forms an individual can submit

The screenshot shows a configuration window titled "Feedback Survey - Web Forms" with three tabs: "General", "Security", and "Advanced". The "General" tab is selected. The window is divided into two main sections: "Partially Completed Forms" and "Completion Restrictions".

Partially Completed Forms:

- Allow users to save partially completed forms.
Note: These forms will not appear in the project database until submitted by the user.
- Allow users to reload previously submitted forms.
 - Make previously submitted forms re-editable

Completion Restrictions:

- Restrict the number of forms that can be submitted via Web Forms for this project.
 - Maximum: 150
 - Current count: 0
 - Buttons: [Reset]
- Restrict the number of forms an individual web user can submit.
 - Maximum: 2
 - Buttons: [Reset]

At the bottom of the window are three buttons: "OK", "Cancel", and "Apply".

Validating Fields

- Each question has a field associated with it
- If validation rule not met error message appears
- Form cannot be submitted until errors are corrected
- Validation examples
 - Mandatory field (cannot be bypassed)
 - Validate a field by comparing other fields
 - “No” to SSI cannot give “Date of SSI”
 - “Date of SSI” cannot be before “Date of admission” and cannot be before “Date of surgery”
 - Validate a field, against pre-set criteria
 - “Male” cannot have “caesarean section”
 - “Date of surgery” cannot be after current date or before start date of project
 - Use entries in an external search list or internal code list to validate responses
 - Create ‘fixed list of possible responses
 - List of surgical procedures; microorganisms; antimicrobials

Validation rules in action

Formic webforms - Google Se... Formic Web Forms - [Neu... x

+Web Forms

Neurosurgery WEB 2010

HSC Public Health Agency

Page 1 of 4

Surveillance of Surgical Site Infections following Neurosurgery pt ID **Completion Errors** Page One (3) - HC number Mandatory Field Error: (HC_number) - Gender Mandatory Field Error: (Gender) - addate Mandatory Field Error: (addate) Page Two (3) Healthcare number *mandatory entry - - Date of birth *mandatory entry / / Infants - gestational age at birth weeks Gender *mandatory entry Male Female Date of admission *mandatory entry / / Reason for operation Primary operation Completion errors from built-in validation rules. Must be corrected before submission

Internal codes - Picklist

Formic Web Forms - [Neurology WEB 2010 - Page 3 of 4] - Windows Internet Explorer

http://10.210.18.24/Webforms/WebForm.aspx?ID=A067D86A548849888421FD48E158DA61

File Edit View Favorites Tools Help

Formic webforms - Google Se... Formic Web Forms - [Neu... X

+Web Forms Neurology WEB 2010

Project Navigation

- NEXT PAGE
- PREVIOUS PAGE
- CANCEL
- CLEAR
- SAVE
- SUBMIT

Completion Errors

- Page One (3)
- Page Two (3)

Healthcare number [] - [] - [] DOB 14 / 05 / 11 Page 3 of 4

AREA - maximum of 2 responses

Cranial Spinal CSF Peripheral nerve Other - Chest, Neck, Abdominal wall

Cranial procedure details

Cranial site Supratentorial
 Infratentorial
 Transsphenoidal
 ENT

Cranial implant Cranioplasty - artificial

Cranial procedure OPCS code

Spinal

Spinal site

Spinal approach

Spinal implant

Spinal procedure OPCS code

CSF

A01.1 Hemispherectomy for epilepsy
A01.2 Temporal lobectomy for epilepsy
A01.8 Lesionectomy for epilepsy
A02.1 Craniotomy for lesion of frontal lobe
A02.2 Craniotomy for lesion of temporal lobe
A02.3 Craniotomy for lesion of parietal lobe
A02.4 Craniotomy for lesion of occipital lobe
A02.5 Craniotomy for lesion of cerebellum
A02.8 Craniotomy for lesion of brain tissue - other site

Posterior only

Internal code list of Neurosurgery OPCS codes

Opportunities?

- Collaborative surveillance activities with GARP-participating partners
 - In Africa ?
 - Or even broader ?
- Let's talk! Adriano.Duse@wits.ac.za and agdduse@icon.co.za

THANK YOU!