

# Surveillance for HAI in Cairo University Hospital

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# Objectives

- Define the objectives of the surveillance program in CUH
- Identify the the surveillance methodology & case definitions
- Establish new components in the surveillance program:
  - SARI
  - TB among HCW
  - Preparedness for emerging infections: ebola
- Discuss the challenges

# Objectives of the Surveillance Program

- Support the hospital IPC program
- Establish the national surveillance for HAIs and AMR with NAMRU-3
- Describe microbiological profile & resistance pattern of pathogens causing HAIs to support antimicrobial stewardship
- Identify & implement evidence-based prevention measures to reduce rates of HAIs

# DAI in CUH

March 2009 through May 2010

- Applying NHSN/CDC case def
- A total of 1101 patients
- hospitalized for 10869 days ,
- had 4734 device days, and
- acquired 97 DAIs,
- overall rate of infection:  
20.5/1000 ICU days.
- VAP (88.7%) : 17 per 1000 DU
- CLABSIs (8.2%) : 9.1/ 1000 DU
- CAUTIs (3.1%): 2.9/1000 DU
- Excess mortality
  - for CAUTI was 48%
  - for VAP was 12.9%.
  - for CLABSI was 45.7%.
- A.baumannii (36.1%),
- Klebsiella pneumoniae (29.2%)
- P.aeruginosa (22.2%).
- High antimicrobial resistance rate

# **Establishing National Surveillance Programs for HAI & AMR: 2010- 2014**

# National Surveillance of HAIs and AMR

## Process

### Panel of expert assembled:

10 National consultants

3 consultants from CDC

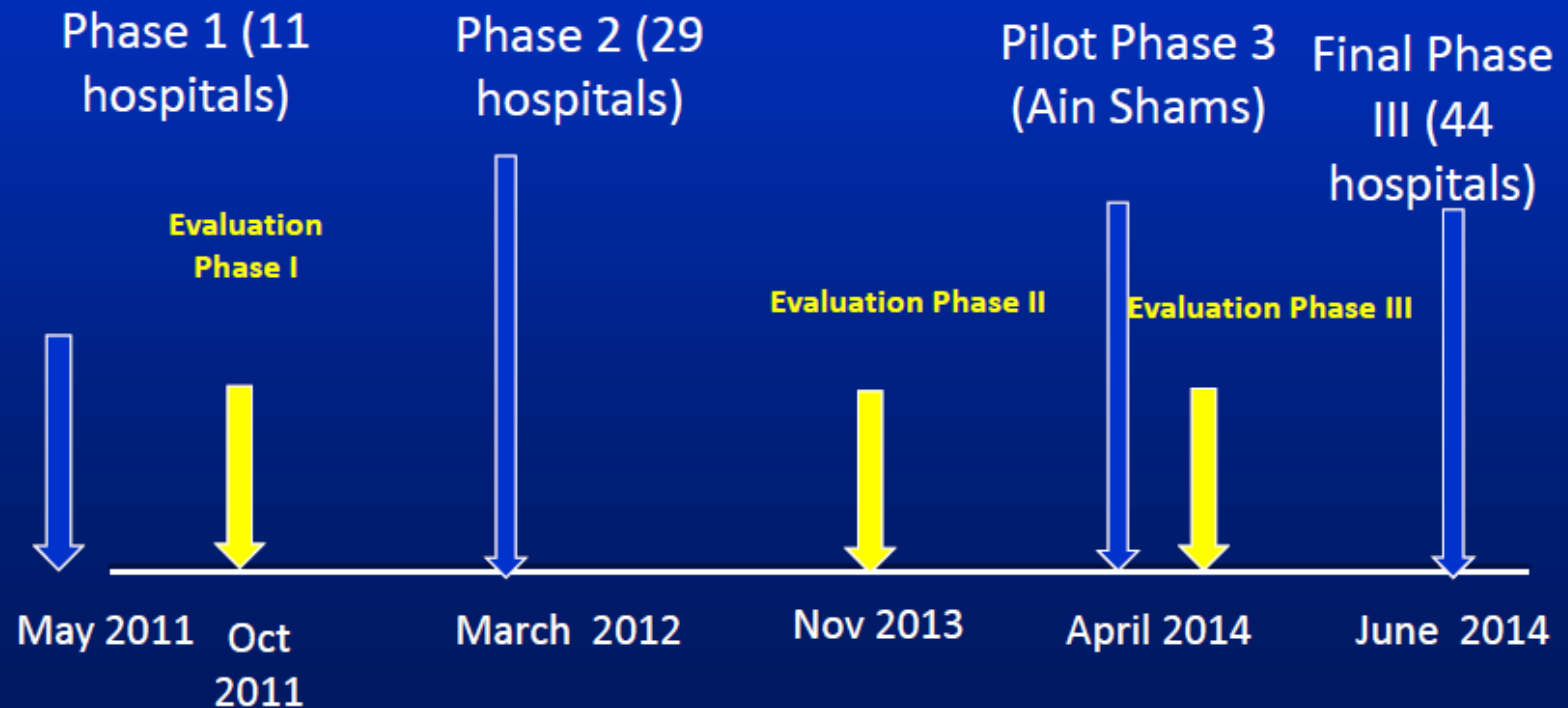
2 WHO/HQ/EMRO

1 Cornell University and NY Presbyterian Hospital



# National Program

## Surveillance Approach and Timeline



# Core Elements of Surveillance Strategy

- Active prospective surveillance
- Adapted CDC – NHSN case definitions
- Selection Criteria for participating hospitals
- Surveillance in intensive care units
- Implement surveillance in phases for potential improvements
- PDAs used: - data entry - decision support tool
- Electronic data reporting



# System Description



Surveillance  
Coordinators attend  
ICU rounds



Review Clinical,  
Lab, Radiology  
results

Denominator data  
collected manually:

- Pt days
- Device days

Suspect HAI?

Request more  
investigations

YES

Enter in PDA

Lab & x-rays  
results

PDA confirms one of  
43 HAIs coded



# Training to Implement Surveillance

- Surveillance training:
  - Epi & Surveillance
  - Clinical practice in identifying HAIs
  - Use of PDAs
- Microbiology Lab training standardized lab techniques:
  - Organism identification
  - Antimicrobial susceptibility testing
  - Training at NAMRU-3 labs



# Surveillance Phases

Phase I	Phase II	Phase III
44 types of HAIs studied	Surveillance limited to 4 HAI types (primary and secondary BSI, UTI, PNEU, SSI)	Same
NHSN Case Definitions Used	Updated NHSN case definitions	Same
Common commensal organisms need to be isolated from 2 blood cultures plus signs/symptoms	Common commensal organisms (coagulase-negative Staphylococcus) treated as pathogen when isolated from single blood culture	Same
Clinical sepsis included only for neonates	Clinical sepsis included for all patients	Same
PDA questions only available in English	PDA translated into Arabic	SSI added to PDA

# Evaluation of Surveillance (Phase I and II)

- **Division of Healthcare Quality and Promotion, CDC**
- **Chart review, interviews, case scenarios**
  - Estimate sensitivity and positive predictive value of the surveillance program for HAIs

# Lab Component

## **Phase 1 (May 2011- April 2012)**

### **Microbiology Lab Capacity**

- ❑ **A visit to evaluate Lab capacity & Interview staff**
  - Wide variation in the capacity of labs
- ❑ **Basic Lab Training**
- ❑ **Cultures in NAMRU lab**

## Phase 2 (June 2013- now)

### Microbiology Lab Capacity

- Isolates sent to NAMRU-3 labs:
  - Pathogen identification
  - Susceptibility testing
- Capacity Building of Hospital laboratories:
  - Regular training at N3 labs
  - Provision of supplies
- Quality Control Program developed
- Sites with 80% agreement in pathogen will participate in AST



# Central Lab Cairo University

## Round 2: 88%

ID	Date@1	ent Nam	Site	Source	Site res	ulture re	result	CultureDate	
8423	١٦-سبتمبر-١٣	44-	Fahd,	Blood	Staph	Staph	yes	١٤-أغسطس-١٣	88%
8424	١٦-سبتمبر-١٣	EG-023-44-000054	ER Malak Fahd, Cairo	Blood	A. baumannii	A. baumannii	yes	١٧-أغسطس-١٣	
8425	١٦-سبتمبر-١٣	EG-023-44-000055	ER Malak Fahd, Cairo	Blood	K. pneumoniae	K. pneumoniae	yes	١٧-أغسطس-١٣	
8439	١٦-سبتمبر-١٣	EG-023-44-200109	ER Malak Fahd, Cairo	Wound	P. aeruginosa	P. aeruginosa	yes	٠٤-أغسطس-١٣	
8440	١٦-سبتمبر-١٣	EG-023-44-200110	ER Malak Fahd, Cairo	Wound	K. pneumoniae	K. pneumoniae	yes	٢٣-أغسطس-١٣	
8471	١٦-سبتمبر-١٣	EG-023-44-300084	ER Malak Fahd, Cairo	LRT	K. pneumoniae	K. pneumoniae	yes	٠٣-أغسطس-١٣	
8472	١٦-سبتمبر-١٣	EG-023-44-300085	ER Malak Fahd, Cairo	LRT	K. pneumoniae	K. pneumoniae	yes	١٤-أغسطس-١٣	
8473	١٦-سبتمبر-١٣	EG-023-44-300086	ER Malak Fahd, Cairo	LRT	S. aureus	S. aureus	yes	١٤-أغسطس-١٣	
8474	١٦-سبتمبر-١٣	EG-023-44-300087	ER Malak Fahd, Cairo	Urine	P. aeruginosa	P. aeruginosa	yes	١٣-أغسطس-١٣	



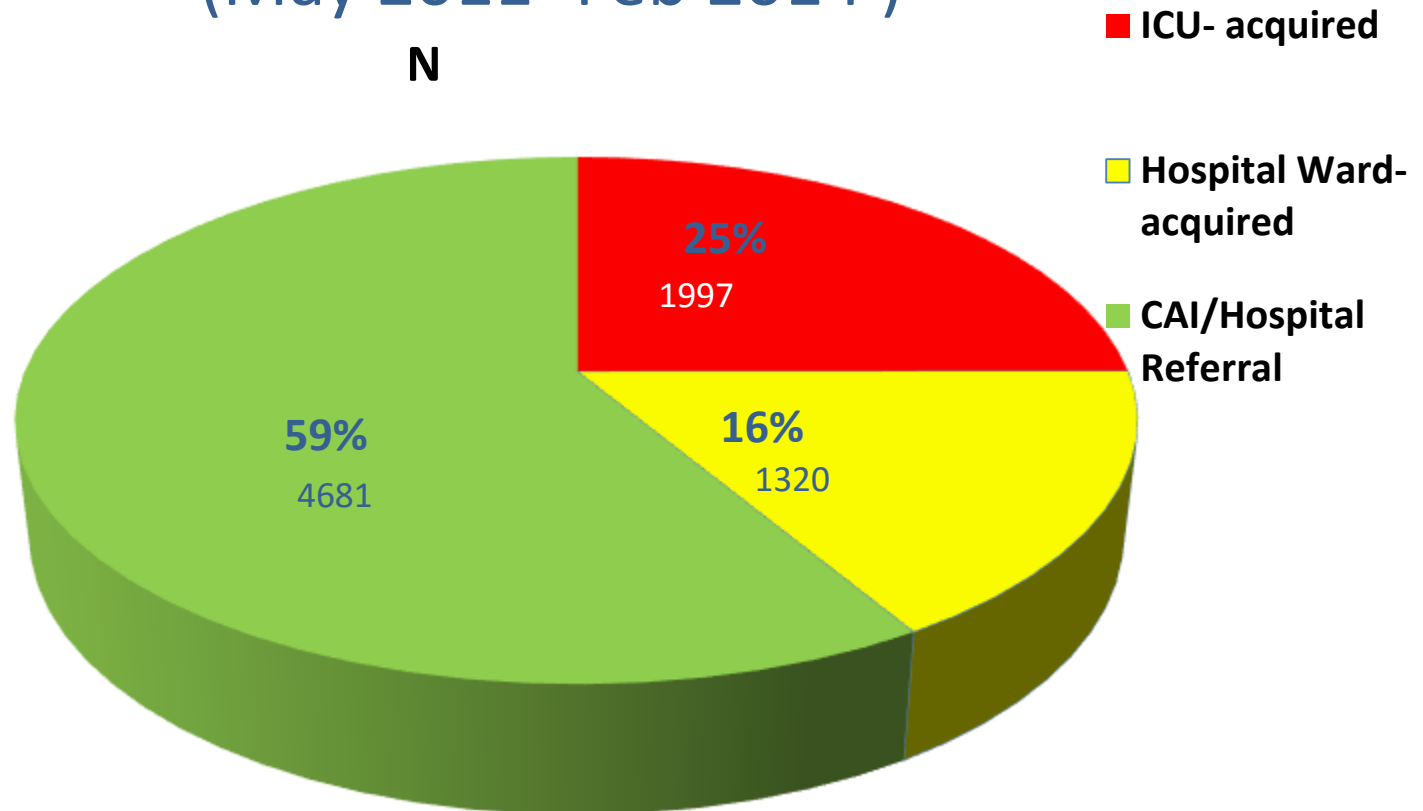
# Abu el Reesh At Monira Hospital: 80%

1	ID	Date@	Patient No	Site	Lab Name	Source	Site no.	Culture r	Result	Phase of	Exclud	Culture Date	Agreem
2	8246	٢٩-١٣-٢٠١١	E6-023-05-000149	Al Monira Pediatric Hospital Cairo U	Monira Lab, Cairo	LRT	Mixed culture	Mixed culture		Phase 2	yes	١١-١٣-٢٠١١	110/137 =80%
3	8247	٢٩-١٣-٢٠١١	E6-023-05-000150	Al Monira Pediatric Hospital Cairo U	Monira Lab, Cairo	LRT	A. baumannii	A. baumannii	yes	Phase 2		١١-١٣-٢٠١١	
4	8248	٢٩-١٣-٢٠١١	E6-023-05-000151	Al Monira Pediatric Hospital Cairo U	Monira Lab, Cairo	Blood	S. aureus	S. aureus	yes	Phase 2		١٦-١٣-٢٠١١	
5	8249	٢٩-١٣-٢٠١١	E6-023-05-000152	Al Monira Pediatric Hospital Cairo U	Monira Lab, Cairo	LRT	A. baumannii	A. baumannii	yes	Phase 2		١٦-١٣-٢٠١١	
6	8250	٢٩-١٣-٢٠١١	E6-023-05-000153	Al Monira Pediatric Hospital Cairo U	Monira Lab, Cairo	Blood	Candida	budding yeast	yes	Phase 2		١٨-١٣-٢٠١١	
7	8251	٢٩-١٣-٢٠١١	E6-023-05-000154	Al Monira Pediatric Hospital Cairo U	Monira Lab, Cairo	Blood	A. baumannii	A. baumannii	yes	Phase 2		٢٠-١٣-٢٠١١	
8	8252	٢٩-١٣-٢٠١١	E6-023-05-000156	Al Monira Pediatric Hospital Cairo U	Monira Lab, Cairo	Blood	K. pneumoniae	K. pneumoniae	yes	Phase 2		٠٩-١٣-٢٠١١	

Cairo University Labs are the Best  
among all participating labs

# Distribution of Infections in Intensive Care Units at participating hospitals (May 2011- Feb 2014 )

**N**

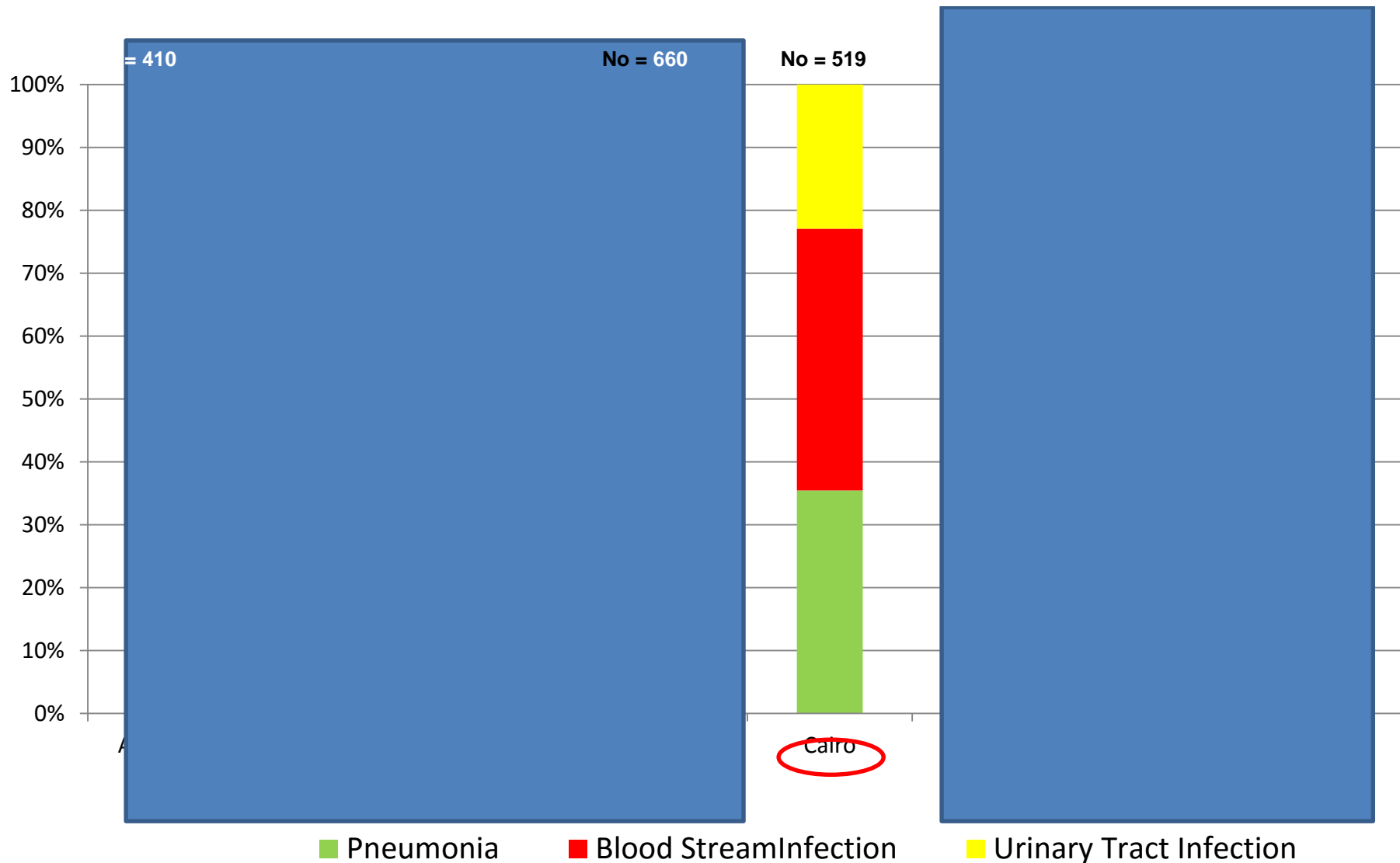


\*ICU -acquired infections: Infections acquired after three or more days of ICU admission

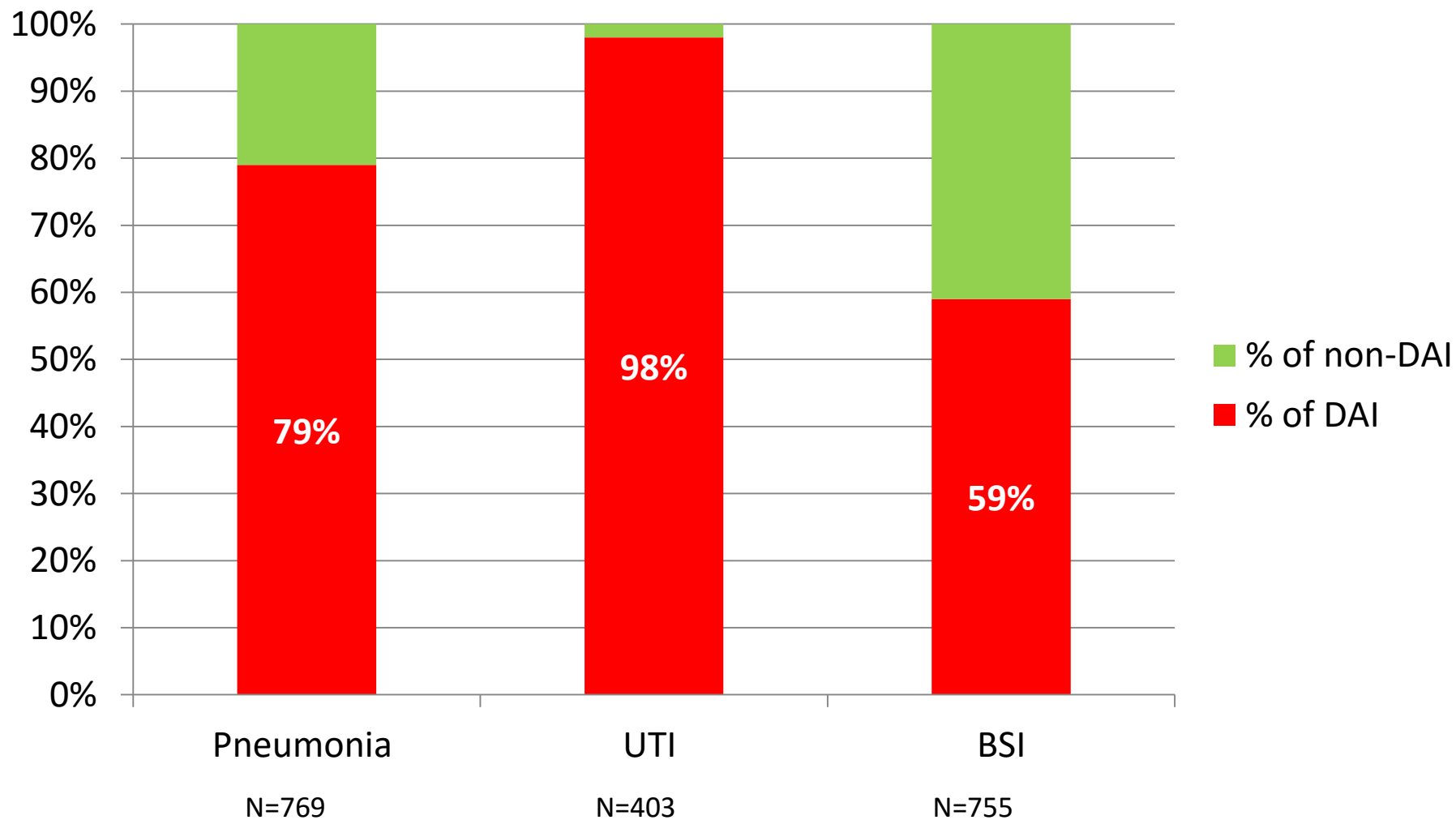
\*\*Ward-acquired infection: Infections attributed to hospital stay before ICU admission

\*\*\*CAIs/Hospital Referral : Infections acquired either in the community or referred from another hospital

# Type of ICU acquired Infections in Cairo Uni Hosp May 2011- Feb 2014



## Proportion of Device-associated Infections, at participating Hospitals, May 2011- Feb 2014



# Distribution of Pathogens Causing HAIs

Type of pathogens	N=841	(%)
<i>Klebsiella spp.</i>	175	20.8
<i>Acinetobacter spp.</i>	141	16.8
<i>Pseudomonas spp.</i>	94	11.2
<i>E.coli</i>	70	8.3
<i>S.aureus</i>	68	8.1
CONS	88	10.5
<i>Enterococcus spp.</i>	19	2.3
<i>Candida albicans</i>	100	11.9
Others	86	10.1

# Antimicrobial Resistance Profile of Gram Negative Pathogens causing HAIs in Egypt (n=480)

	<b>Klebsiella</b> n=175 n(%)	<b>Acinetobacter</b> n=141 n(%)	<b>E.coli</b> n=70 n(%)	<b>Pseudomonas</b> n=94 n(%)
Ceftazidime	138 (79)	132 (94)	51(73)	39(41)
Cefotriaxone	156 (89)	133 (94)	59(84)	79(84)
Ciprofloxacin	118 (67)	125 (89)	47(67)	79(84)
Amikacin	97 (55)	126 (89)	15 (21)	37 (39)
Gentamycin	92 (53)	113 (80)	25(36)	38(40)
Imipenem	50 (29)	113(80)	5(7.1)	37(39)

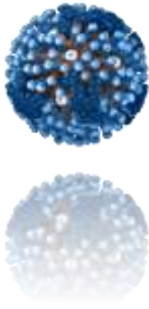
# Antimicrobial Resistance Profile of Pathogens causing HAIs in Egypt (n=87)

	<b>S.aureus</b> n=68 n(%)	<b>Enterococci</b> n=19 n(%)
Oxacillin	62(91)	NA
Gentamycin	52(76)	13(68)
Ciprofloxacin	44(65)	17(89)
Vancomycin	2(2.3)	5(26)



# Surveillance for HAI by Influenza & RSV

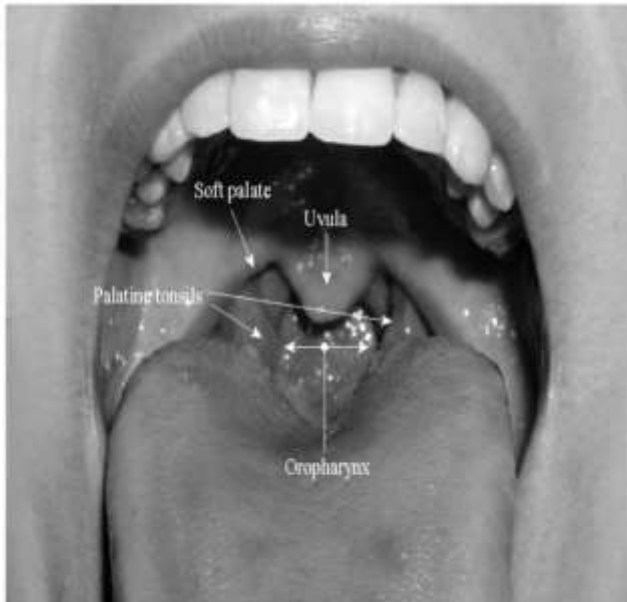
# Sample Collection



## Sample:

**NP/OP are obtained and put in the VTM, then refrigerated in -70C until processed**

- *Throat swabbing:*
  - *Nasopharyngeal swabbing*
- Measuring*



# Molecular Microbiology Lab

Working station for  
Master Mix



Laminar Flow for DNA  
extraction



# Real Time Biorad CFX Machine

1) In the main menu, click Protocol to open the Experiment Setup.

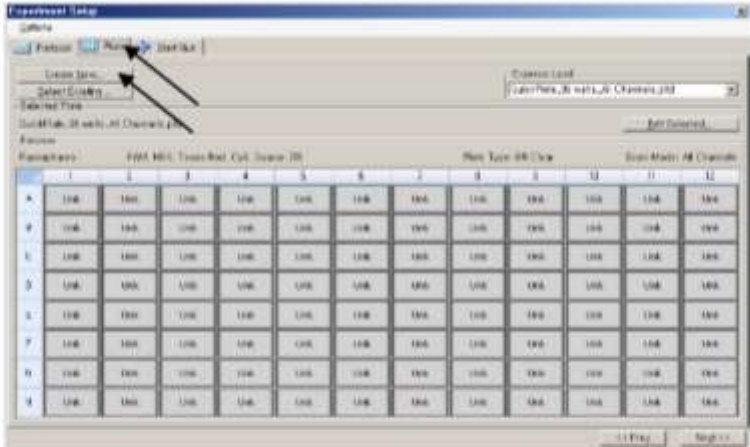
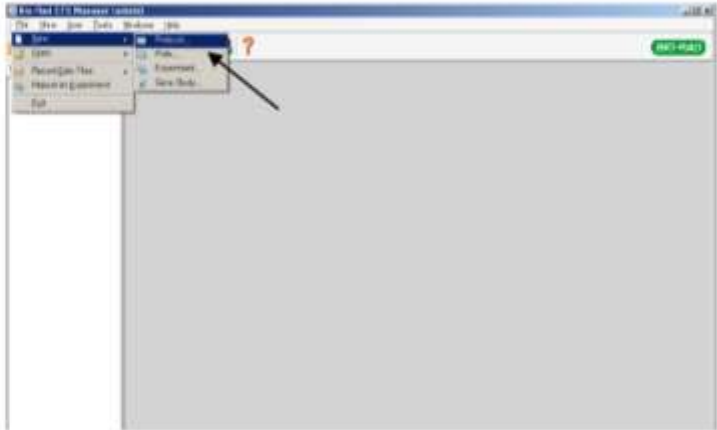


Fig. 4. Plate Editor. Create a new plate or load an existing plate for the experiment.

# SARI: nosocomial spread

- Influenza H1N1 in Pediatric CTS: cluster of 4
- RSV: 3 clusters

# Preparedness for MERS-CoV

- Workshop in CUH:
  - Policy and case definition
  - Training
  - Scenarios
  
  - No cases detected

# Preparedness for Ebola

- Workshop in CUH:
  - Policy
  - Training
  - Scenarios
- Meeting with SCU



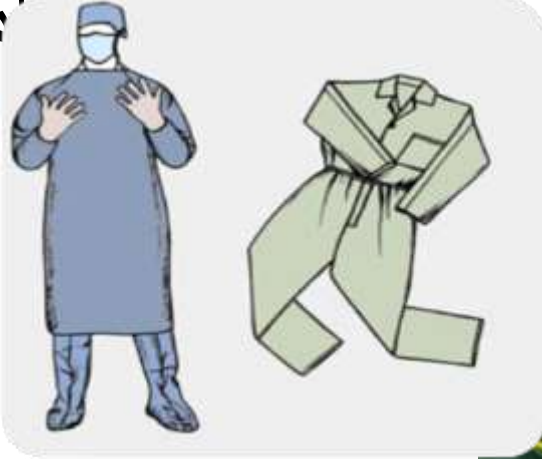
# معا لمواجهة ايبولا فى الجامعات





# الفئة المستهدفة: مقدمى الخدمة الصحية فى

المعدات



# الاهداف

- 1-التعريف بفيروس الايبولا ,طرق انتقال العدوى, فترة الحضانة
- 2-تعريف الحالة المشتبه بها
- 3-تحديد اجراءات مكافحة العدوى مع الحالة المشتبه فيها داخل المدن الجامعية ومستشفيات او عيادات الطلبة
- 4-سرد اجراءات كيفية نقل المريض
- 5-التعريف بكيفية تطهير غرفة العزل وسيارة نقل الحالة

# Challenges

# Challenges When Conducting Surveillance of HAIs and AMR

## Surveillance for HAIs:

- **Case Definitions for HAIs - Complex**
- **Clinical standards of practice**
  - Limitation in requesting lab investigations
- **Information - Medical Records not well maintained**
- **Human Resources**
  - Labor intensive
  - Hospital epidemiologists



# Challenges When Conducting Surveillance of HAIs and AMR

- **ICU physicians**
  - Limited awareness on diagnosis and treatment of HAIs
  - Not motivated to participate in surveillance
  - No transparency for reporting infections
  - **No trust in hospital lab results (no growth)**
  - Limited awareness on the burden of AMR
- **Use of PDAs**
  - Highly supportive
  - Spying device



# Challenges When Conducting Surveillance of HAIs and AMR

- **Laboratory**
  - **Limited laboratory capacity (infrastructure, reagents, technical staff, logistics)**
  - **Lack of communication between clinicians and lab staff**
- **Politics and culture/ Confidentiality of data**
- **sustainability**

# Success stories after implementing HAI surveillance in Cairo University

# Positive Impact of surveillance activity on CUH



- Implement prevention activities to reduce HAIs
- Study antibiotic use and consumption and implement interventions to reduce antibiotic use in PAP
- Building capacity of IC teams
- Improve link between ICUs & lab



# Acknowledgments

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