Capacity Building and Strengthening of Hospital Infection Control to detect and prevent antimicrobial resistance in India

Workshop-cum-PI meeting

Purva Mathur

Participating Facilities
50

- ICMR- AIIMS Centers- 25
- NCDC Centers- 5
- Facilities under Swachhtta Action Plan - 6
- Voluntary Participated Centers-14

- More Centers being planned to be trained/ included

ICMR-AIIMS Facilities	Swacchhta Facilities	NCDC Facilities
P.D. Hinduja National Hospital and Medical Research Centre, Mumbai (Hinduja)	NIMHANS bangalore, Karnataka	Safdarjung hospital, Delhi
Christian Medical College & Hospital, Vellore	AIIMS Rishikesh, Uttarakhand	BJMC Ahmedabad, Gujrat
Assam Medical College, Dibrugarh	AIIMS Patna, Bihar	NEIGRIHMS Shillong, Meghalaya
All India Institute Of Medical Sciences, New Delhi	NITRD, Delhi	MGM Indore, MP
Postgraduate Institute of Medical Education and Research, Chandigarh	NEIGRIHMS Shillong, Meghalaya	Trichy Medical College, Tamil Nadu
Kasturba Medical College, Manipal, Karnataka	Safdarjung hospital, Delhi	
Tata Medical Center, Kolkata		
King George's Medical University, Lucknow		
Nizam's Institute of Medical Sciences, Hyderabad		
Mahatma Gandhi Institute of Medical Sciences, Sevagram		
All India Institute Of Medical Sciences, Jodhpur		
Apollo Hospital, Chennai		
Sir Ganga Ram Hospital, Delhi		
AIIMS Bhopal		
AIIMS, Bhuvneshwar		
IPGMER, Kolkata		
AFMC, Pune		
LTMS, Sion Mumbai		
SKIMS		
AIMS, Kochi		
Regional Institute of Medical Sciences, Imphal		
AIIMS, Raipur		
Govt. Medical College, Surat		

ICUs Included

- Total ICUs included in the surveillance – 102

- Training Provided to additional Centers

Total ICUs included in the surveillance

ICU Type	Number
Medical ICU	24
Neonatal ICU	15
Pediatric Medical ICU	14
Medical/Surgical ICU	12
Surgical ICU	11
Cardiothoracic Surgical ICU	5
Gastrointestinal ICU	3
Repiratory ICU	3
Trauma ICU	3
Pediatric Medical/Surgical ICU	3
High Dependency Unit	2
Neurosurgical ICU	2
Burn ICU	1
Cardiac ICU	1
Neurologic ICU	1
Oncologic Medical ICU	1
Oncologic Surgical ICU	1
Total ICU	**102**

Data from May, 2017 to May, 2019

Patient Days	**7,51,672**
Central Line Days	**2,34,544**
Urinary Catheter Days	**4,26,840**

May 2017-Sep 2018

S. No	Indicator	Number
1	Patient days	**345,426**
2	Central line days	**108,224**
3	Urinary catheter days	**197,160**

May, 2017 to May, 2019

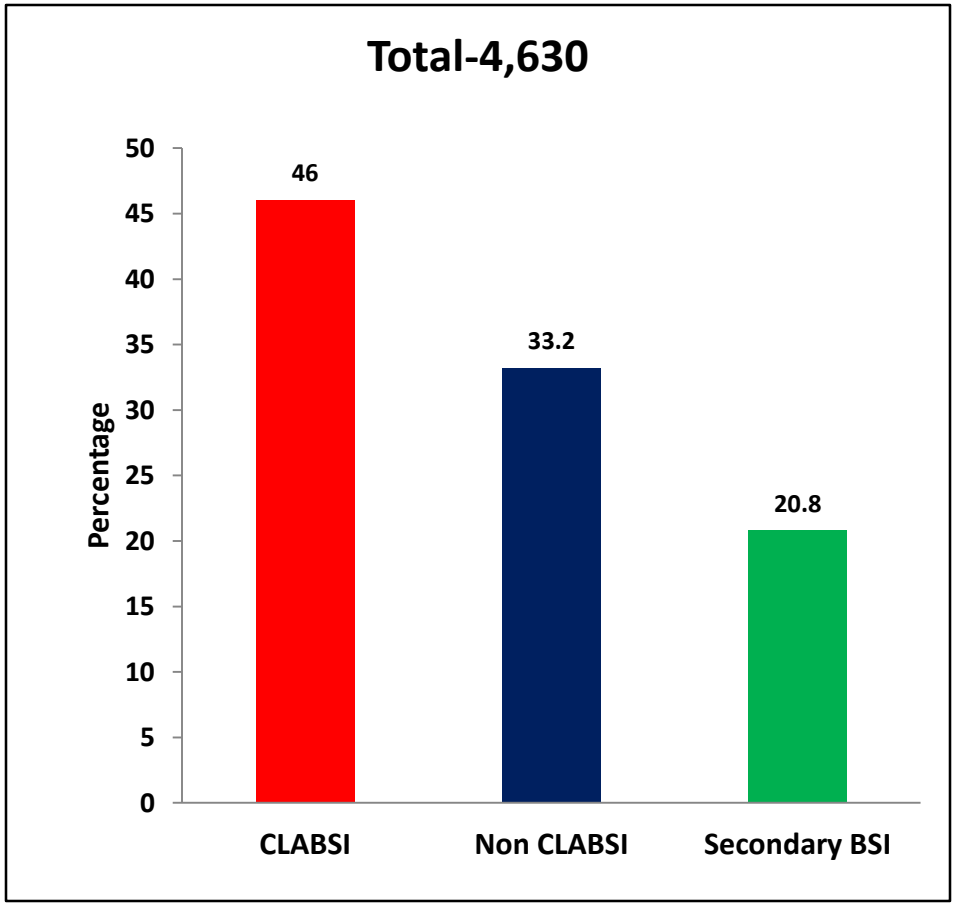
S. No	Indicator	Number
1	Patient days	**7,51,672**
2	Central line days	**2,34,544**
3	Urinary catheter days	**4,26,840**

Blood Stream Infections
BSIs

May, 2017 to May, 2019

Total	**4,630**

BSI Type	Number
CLABSI	2,129 (46%)
Non CLABSI	1,536 (33.2)
Secondary BSI	965 (20.8%)
Total	4,630



May 2017-Sep 2018

Type of BSI cases	No. of BSI cases (%)
CLABSI	987 (44.3)
Non-CLABSI	799 (35.9)
Secondary BSI	442 (19.8)
Total	**2,228**

May, 2017 to May, 2019

BSI Type	Number
CLABSI	**2,129 (46%)**
Non CLABSI	**1,536 (33.2)**
Secondary BSI	**965 (20.8%)**
Total	**4,630**

BSI Rates

Patient Days	7,51,672	Total BSI Rate	6.16
Central Line Days	2,34,544	CLABSI Rate	9.07
CLABSI	2,129 (46%)	Sec. BSI Rate	1.28
NON- CLABSI	1536 (33.2%)	Non-CLABSI Rate	2.04
Secondary BSI	965 (20.8%)		

BSI rates

May 2017-Sep 2018

Total BSI Rate	6.45
CLABSI Rate	9.12
Sec. BSI Rate	1.31
Non-CLABSI Rate	2.25

May, 2017 to May, 2019

Total BSI Rate	6.16
CLABSI Rate	9.07
Sec. BSI Rate	1.28
Non-CLABSI Rate	2.04

ICU- wise distribution of BSI

ICU Type	Number of BSI cases
Medical/Surgical ICU	986 (21.3)
Medical ICU	888 (19.2)
Neonatal ICU	854 (18.4)
Surgical ICU	425 (9.2)
Trauma ICU	543 (11.7)
Pediatric Medical ICU	327 (7.1)
Gastrointestinal ICU	149 (3.1)
Neurosurgical ICU	95 (2.1)
Cardiothoracic Surgical ICU	86 (1.9)
High Dependency Unit	84 (1.8)
Respiratory ICU	79 (1.7)
Pediatric Medical/Surgical ICU	38 (0.8)
Oncologic Medical ICU	27 (0.6)
Burn ICU	24 (0.5)
Neurologic ICU	13 (0.3)
Oncologic Surgical ICU	7 (0.2)
Cardiac ICU	5 (0.1)
Total BSI	4630

Basic demographics, Fatality and Length of stay

Gender	Number	Age range	Age median
Male	3,011 (65%)	- 4 to 95	34
Female	1619	- 3 to 95	48

Average length of stay *	24 days
Range of Stay *	3 to 1,703 days
Median*	21 days

14 day fatal outcome	1,736 (37.5%)
Final fatal outcome *	471 + 1,736= 2,207 (47.7%)

(* Episodes with pending final outcomes are excluded)

Distribution of BSI cases by duration of events

	Median	Range
Duration between date of admission and date of event	9	2 – 1,467

Duration of stay btw date of admission in unit and DOE (Days)	Number of patients	Duration of stay btw date of admission in unit and DOE (Days)	Number of patients
		35	5
3	405	36	2
4	187	37	2
5	155	38	3
6	145	39	8
7	129	42	3
8	89	43	1
9	89	44	1
10	63	45	2
11	54	46	2
12	42	47	1
13	36	48	3
14	39	49	3
15	17	50	1
16	21	51	4
17	22	53	1
18	18	55	2
19	15	56	1
20	11	57	2
21	18	59	1
22	14	60	2
23	6	61	1
24	12	62	1
25	11	68	1
26	10	74	1
27	12	77	1
28	6	83	1
29	8	85	1
30	9	90	3
31	7	96	1
32	5	102	1
33	3	146	1
34	4		

- Median and Range of Length between Central line insertion and development of CLABSI?
  - Preventive intervention…..
    - Insertion ?
    - Maintenance ?

BSI Case Report Form

Surveillance unit Number _____ Case Type _____ Patient Name _____ Medical record Number: _____		Case ID: _____
Hospital Name:		
Sex: □ Male □ Female	Date of Birth (DD/MM/YYYY): __ /__ /__ Age (Years): ____ □ Age/DOB (Unknown)	Birth weight: _____grams (NICU only)
Date of hospital admission: ____ /_____ /_____	Date of admission to surveillance unit: ____ /_____ /_____	
Location prior to hospital admission:	□ Home / Community □ Another hospital □ Unknown	
Linked Case ID **(autogenerated)** do not fill on Hard copy. **Only to be filled on software**		
1. BSI Details		
Type of laboratory-confirmed BSI	□ Recognized Pathogen □ Common Commensal (from ≥ 2 blood cultures)	
Date of event *(dd/mm/yyyy)*:	____ /_____ /_____	
Fill out culture results in Section 5, Organisms and Antibiotic Susceptibility		
2. Invasive Devices: Central Lines		
Did the patient have a central line in place at any time on • The date of event **or** • The day before the date of event?	□ Yes □ No*(skip to 3, Infections at Other Body Sites)*	
If **YES,** was the central line in place for >2 calendar days?	□ Yes □ No*(skip to 3, Infections at Other Body Sites)*	
What was the last date before the date of event that the patient did not has a Central Lines in place at any time during the calender day?	----/-----/------- DD/MM/YYYY	
How many times was the Central line changed during this period?		

14- day- Outcomes

14 day outcome	No. of BSI cases (%)
Died	**1736 (37.5)**
Still in surveillance unit	**1296 (28)**
Transferred to other ward	**958 (20.7)**
Discharged	**419 (9)**
LAMA	**159 (3.4)**
Transferred to other hospital	**46 (1)**
Unknown	**16 (0.3)**
Total	4,630

Mortality at the time of final outcome was 47.7%

Location of Central Line

Location of central line	Number (%)
Jugular	1828 (63.4)
Subclavian	649 (22.5)
Umbilical	264 (9.2)
Femoral	74 (2.6)
Brachial	32 (1.1)
Other	37 (1.3)
Total	2,884

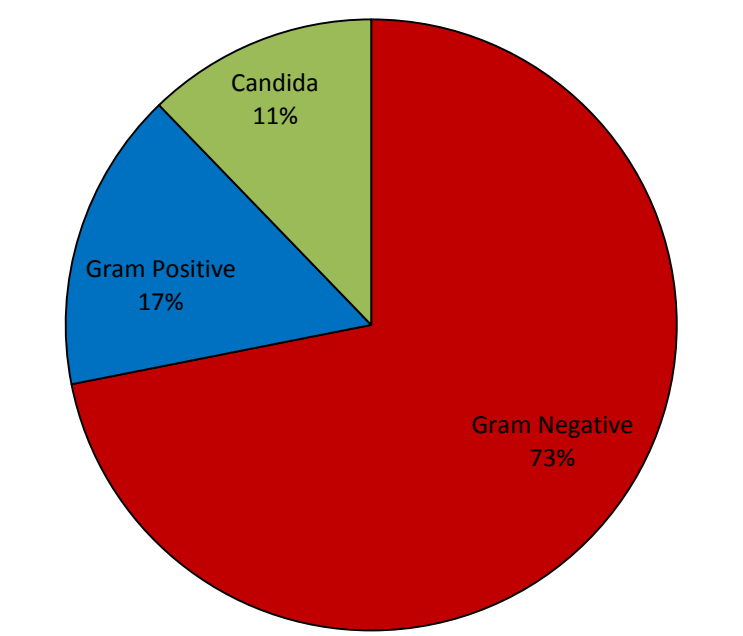
Distribution of CLABSI cases by location of central lines

Location of central line	No. of CLABSI cases (%)
Mentioned	2,145 (99.8)
Not mentioned	4 (0.2)
Total	2,149

Location of central line	No. of CLABSI cases (%)
Jugular	**1354 (63.1)**
Subclavian	**451 (21)**
Umbilical	**210 (9.8)**
Femoral	**71 (3.3)**
Branchial	**29 (1.4)**
Multiple	**30 (1.4)**
Total	2,145

Organisms causing BSI

Organism Type	Number
Gram Negative	3,651
Gram Positive	835
Candida	530
Total	**5,016**



Distribution of organisms

Distribution of organisms causing BSI

S. No.	Name of organism	Number (%)
1	***Acinetobacter sp.***	**1195 (24.6)**
2	***Klebsiella sp.***	**1165 (24)**
3	***Candida sp.***	**515 (10.6)**
4	***Staphylococcus sp.***	**422 (8.7)**
5	***Enterococcus sp.***	**404 (8.3)**
6	***Pseudomonas sp.***	**324 (6.8)**
7	***Escherichia sp.***	**259 (5.3)**
8	***Burkholderia sp.***	**212 (4.4)**
9	***Enterobacter sp.***	**186 (3.8)**
10	***Stenotrophomonas spp.***	**60 (1.2)**
11	***Citrobacter sp.***	**56 (1.2)**
12	***Serratia spp.***	**56 (1.2)**
13	**Others**	**162 (3.3)**
Total		5,016

Percentage distribution of Gram Negative Organisms causing BSI

Organisms	Number (%)
Acinetobacter spp.	1195 (33.7)
Klebsiella spp.	1165 (32.0)
Pseudomonas spp.	324 (8.9)
Escherichia coli	259 (7.1)
Burkholderia spp.	212 (5.8)
Enterobacter spp.	186 (5.1)
Stenotrophomonas spp.	60 (1.6)
Citrobacter spp.	56 (1.5)
Serratia spp.	56 (1.5)
Proteus spp.	23 (0.6)
Chryseobacterium spp.	15 (0.4)
Others	*101 (2.8)*
Total	3652

Organisms	Number (%)
Klebsiella pneumoniae	1118/1165 (96)
Burkholderia cepaciae	195/212 (92.0)
Pseudomonas aeruginosa	271/324 (83.6)
Acinetobacter baumannii	990/1195 (83.0)
Enterobacter cloacae	91/185 (49.1)
Citrobacter freundii	26/56 (46.4)
Citrobacter koseri	11/34 (32.4)
Enterobacter aerogenes	53/185 (28.6)

Percentage distribution of Gram Positive Organisms

Organisms	Number (%)
Staphylococcus spp.	422 (50.5)
Enterococcus spp.	404 (48.4)
Streptococcus spp.	6 (0.7)
Leuconostoc pseudomesenteroides	2 (0.2)
Weissella confusa	1 (0.1)
Total	835

Organism Name	Number (%)
Staphylococcus aureus	343/422 (81.3)
Enterococcus faecium	249/404 (61.6)
Enterococcus spp.	83/404 (20.5)
Staphylococcus spp.	79/422 (18.7)
Enterococcus faecalis	72/404 (17.8)

Percentage distribution of Candida

Organisms	Number (%)
Candida spp.	515 (97.2)
Trichosporon ashaii	4 (0.8)
Cryptococcus neoformans	4 (0.8)
Geotrichum capitatum	1 (0.2)
Kodamaea ohmeri	3 (0.6)
Yeast spp.	3 (0.6)
Total	530

Organisms	Number (%)
Candida tropicalis	138 (26.8)
Candida parapsilosis	77 (15)
Candida glabrata	76 (14.8)
Candida albicans	64 (12.4)
Candida auris	51 (9.9)
Candida utilis	47 (9.1)
Candida spp.	33 (6.4)
Candida pelliculosa	16 (3.1)
Non albican candida	7 (1.4)
Candida haemulonii	3 (0.6)
Candida lusitaniae	3 (0.6)
Total	515

CLABSI

S. No.	Organism	No. (%)
1	*Acinetobacter sp.*	504 (21)
2	*Klebsiella sp.*	480 (20)
3	*Candida sp.*	258 (10.8)
4	*Enterococcus sp.*	224 (9.3)
5	*Pseudomonas sp.*	180 (7.5)
6	*Burkholderia sp.*	182 (7.6)
7	*Staphylococcus sp.*	162 (6.7)
8	*Enterobacter sp.*	110 (4.6)
9	*Escherichia sp.*	108 (4.5)
10	*Stenotrophomonas sp.*	46 (1.9)
11	*Serratia sp.*	33 (1.4)
12	Others	117 (4.9)
Total		2404

Non-CLABSI

S. No.	Organism	No. (%)
1	*Klebsiella sp.*	344 (21.2)
2	*Acinetobacter sp.*	333 (20.6)
3	*Staphylococcus sp.*	225 (13.9)
4	*Candida sp.*	210 (13)
5	*Enterococcus sp.*	156 (9.6)
6	*Escherichia sp.*	98 (6)
7	*Enterobacter sp.*	68 (4.2)
8	*Pseudomonas sp.*	57 (3.5)
9	*Citrobacter sp.*	28 (1.7)
10	*Burkholderia sp.*	27 (1.7)
11	Others	74 (4.5)
Total		1620

Secondary

S. No.	Organism	No. (%)
1	Acinetobacter sp.	357 (36)
2	*Klebsiella sp.*	341(34.4)
3	*Pseudomonas sp.*	87(8.8)
4	*Escherichia sp.*	53(5.3)
5	*Candida sp.*	50(5)
6	*Staphylococcus sp.*	36(3.6)
7	*Enterococcus sp.*	24(2.4)
8	*Enterobacter sp.*	9(0.9)
9	*Serratia sp.*	9(0.9)
10	Others	26(2.6)
Total		992

AMR

Antimicrobials	*Klebsiella pneumoniae* 1,118	*E. coli* 259	*Enterobacter sp.* 187
Aminoglycoside	66.7	42.9	36.2
Quinolone	78.3	83.9	41.6
Third Gen Cephalosporin	91.2	90.5	71.4
Carbapenem	62.4	47.4	Mero 31.4 (58/170) Imipenem: 88.4 (63/164)
Tigecycline	26.9	3.1	7.3
Colistin			

Antimicrobials	*Acinetobacter baumannii* 990	*Pseudomonas aeruginosa* 271
Aminoglycoside	82.3	59.4
Quinolone	88.2	59.6
Third Gen Cephalosporin	92	64.4
Carbapenem	86	62.9
Tigecycline	11.4	
Colistin		
Piperacillin Tazobactam		44.4
Aztreonam		53.2

Colistin Resistance in BSI cases

Organism name	Number	%R
Acinetobacter baumanni	**20/614**	**3.26**
E. coli	**2/166**	**1.2**
Klebsiella pneumoniae	**57/701**	**8.13**
Pseudomonas aeruginosa	**4/167**	**2.39**
Burkholderia cepaceae	**24/26**	**92.3**
Enterobacter spp	**5/88**	**5.68**

Bulkholderia cepaciae; n= 195

Antibiotic name	Number	%R
Amikacin	36/39	92.3
Ceftazidime	11/159	6.9
Ciprofloxacin	12/29	41.4
Cefepime	16/32	50
Gentamicin	37/44	84.1
Imipenem	29/38	76.3
Levofloxacin	42/158	26.6
Meropenem	18/173	10.4
Minocycline	12/138	8.7
Trimethoprim/Sulfamethoxazole	30/148	20.3
Tigecycline	6/127	4.7
Piperacillin/Tazobactam	22/40	55

Intrinsic R should not be reported

Staphylococcus aureus; n= 344

Antibiotic name	Number	%R
Ciprofloxacin	129/192	67.2
Clindamycin	163/285	57.2
Daptomycin	2/61	3.3
Erythromycin	235/323	72.8
Cefoxitin	128/191	67.0
Gentamicin	86/235	36.6
Linezolid	9/273	3.3
Oxacillin	51/98	52.0
Rifampicin	12/51	23.5
Trimethoprim/Sulfamethoxazole	104/218	47.7
Teicoplanin	10/153	6.5
Tigecycline	4/67	6.0
Vancomycin	3/234	1.3

AMR ALERTS

Antimicrobials	*Enterococcus faecium* n= 249	*Enterococcus faecalis* n= 72
Gentamicin-High	84.2	66.7
Linezolid	9.4	3.8
Vancomycin	32.3	11.4

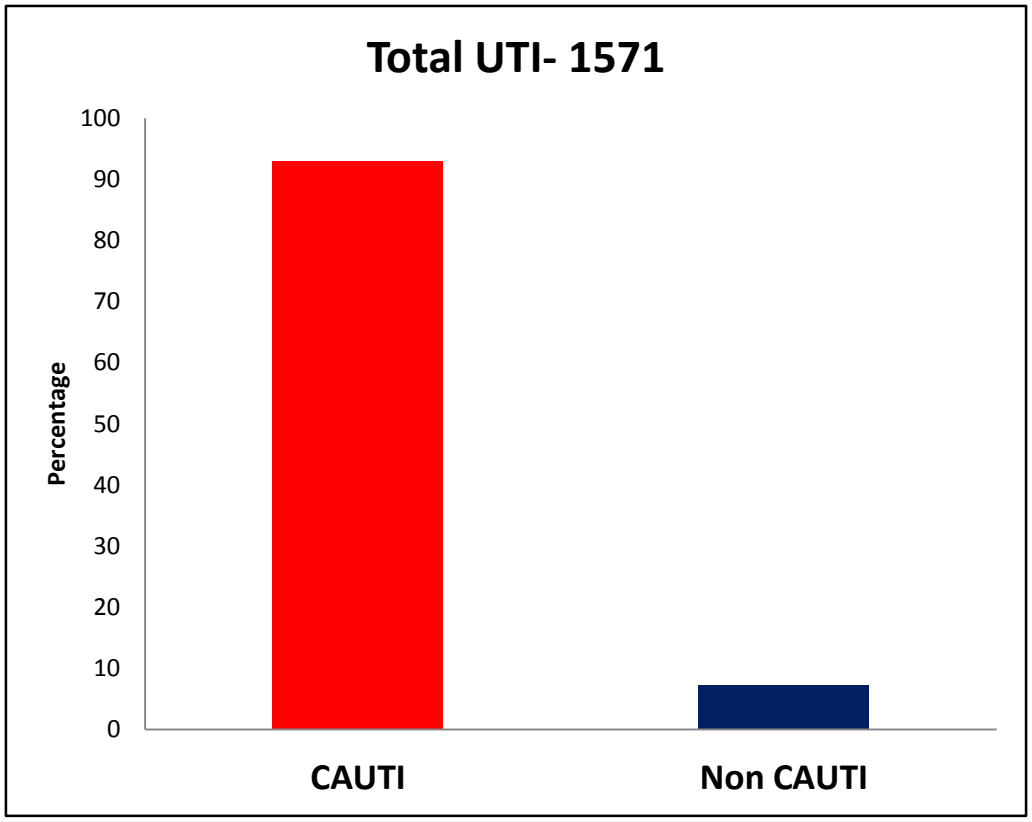
Candida spp.; n= 62

Antibiotic name	Number	%R
Caspofungin	5/35	14.3
Fluconazole	14/45	31.1
FLUCY	7/29	24.1
Voriconazole	4/46	8.7

UTI

Data from May, 2017 to May, 2019

UTI Type	Number
CAUTI	1456 (92.6%)
Non CAUTI	115
Total	1,571



UTI Rates

Patient Days	7,51,672
Urinary Catheter Days	4,26,840
CAUTI	1,456 (92.3%)
NON- CAUTI	115 (7.3%)

Total UTI Rate	2.09
CAUTI Rate	3.41
NON-CAUTI Rate	0.15

Type of UTI cases	No. of UTI cases (%)
CAUTI	625 (94.2)
Non-CAUTI	39 (5.8)
Total	**664**

CAUTI	**1456 (92.3%)**
NON- CAUTI	**115 (7.3%)**
Total	**1,571**

S. No.	Indicator	Rates
1	UTI incidence rate (per 1,000 patient days)	**2.03**
2	CAUTI rate (per 1,000 urinary catheter days)	**3.17**

Total UTI Rate	**2.09**
CAUTI Rate	**3.41**
NON-CAUTI Rate	**0.15**

Number of UTI cases- ICU wise

ICU Type	Number of UTI cases
Medical/Surgical ICU	362
Medical ICU	483
Surgical ICU	150
Pediatric Medical ICU	111
Neurosurgical ICU	23
Trauma ICU	207
Oncologic Medical ICU	23
Gastrointestinal ICU	20
High Dependency Unit	36
Neonatal ICU	21
Pediatric Medical/Surgical ICU	9
Neurologic ICU	13
Respiratory ICU	20
Oncologic Surgical ICU	7
Anaesthesia / Medicals	77
Cardiothoracic Surgical ICUs	9
Total	1,571

Gender	Number	Age Range	Age Median
Male	938 (59.7%	-1 to 95	40
Female	633	-1 to 90	39

Average length of stay in Unit *	33
Range of Stay*	3-213
Median of Stay*	23

14 day fatal outcome	369 (23.5%)
Final fatal outcome *	549 (34.9%)

(* = Episodes with pending final outcomes)
No. of episodes without final outcome= 190 (unknown and still in unit)

Duration of events

	Median	Range
Duration between date of admission and date of event	11	3 – 1217

Duration between DOA in unit and DEO (Days)	Patients	Duration between DOA in unit and DEO (Days)	Patients
		31	3
3	126	32	3
4	59	33	1
5	34	35	2
6	36	36	1
7	30	37	2
8	34	39	2
9	19	40	2
10	23	42	2
11	22	45	2
12	10	48	1
13	13	50	2
14	15	51	1
15	9	53	2
16	19	54	3
17	8	60	1
18	7	61	1
19	7	63	1
20	8	66	1
21	2	68	1
22	4	77	1
23	2	78	1
24	3	80	1
25	5	81	1
26	3	90	1
27	3	144	1
28	4	173	1
29	2	333	1
30	6		

Mortality

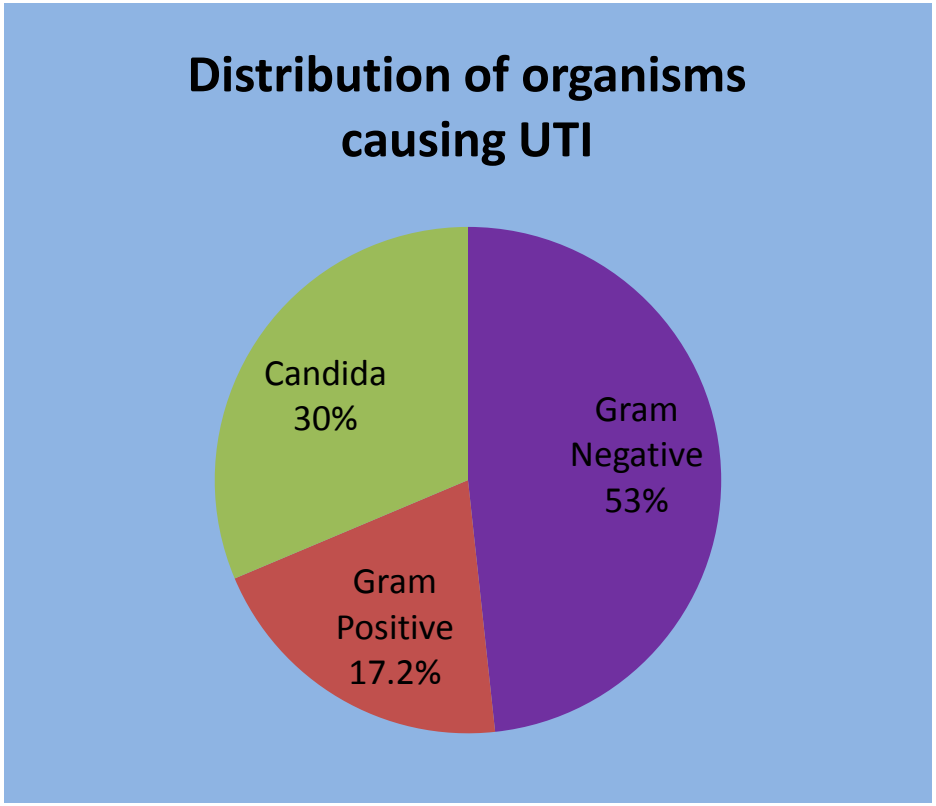
14 day outcome	No. of BSI cases (%)
Still in surveillance unit	534 (34)
Transferred to other ward	477(30.4)
Died	369(23.5)
Discharged	128(8.1)
LAMA	43(2.7)
Transferred to other hospital	11(0.7)
Unknown	10(0.6)
Total	1,571

Distribution of organisms causing UTI

S. No.	Organism	Number (%)
1	*Candida sp.*	478(29.2)
2	*Escherichia sp.*	286 (17.4)
3	*Enterococcus sp.*	269 (16.4)
4	*Klebsiella sp.*	233 (14.2)
5	*Pseudomonas sp.*	140 (8.5)
6	*Acinetobacter sp.*	84 (5.1)
7	*Enterobacter sp.*	20 (1.2)
8	*Proteus sp.*	33 (2)
9	*Providencia sp.*	33 (2)
10	*Citrobacter sp.*	14 (0.9)
11	*Staphylococcus sp.*	13 (0.8)
12	Others	35 (2.1)
Total		1,638

Organisms causing UTI

Organism Type	Number
Gram Negative	867
Candida	489
Gram Positive	282
Total	1,638



Gram Negative Organisms causing UTI

Organism Name (total - 1638)	Number (%)
Escherichia coli	286 (17.5)
Klebsiella spp.	233 (14.2)
Pseudomonas spp.	140 (8.5)
Acinetobacter spp.	84 (5.1)
Proteus spp.	33 (2.0)
Providencia spp.	33 (2.0)
Enterobacter spp.	20 (1.2)

Organism Name (Species level)	Number (%)
Klebsiella pneumoniae	203/233 (87.1)
Pseudomonas aeruginosa	120/140 (85.7)
Acinetobacter baumannii	70/84 (83.3)
Proteus mirabilis	29/33 (87.9)
Enterobacter aerogenes	4/20 (20.0)
Enterobacter cloacae	6/20 (30.0)

Gram Positive Organisms causing UTI

Organism Name	Number (%)
Enterococcus faecium	133 (47.2)
Enterococcus spp.	83 (29.4)
Enterococcus faecalis	53 (18.8)
Staphylococcus aureus	10 (3.5)
Staphylococcus spp.	3 (1.1)
Total	282

Distribution of Candida sp causing UTI

Organism Name	Number (%)
Candida spp.	139 (28.4)
Candida tropicalis	114 (23.3)
Candida albicans	120 (24.5)
Candida auris	15 (3.1)
Candida glabrata	26 (5.3)
Candida parapsilosis	15 (3.1)
Trichosporon ashaii	11 (2.2)
Candida utilis	5 (1.0)
Candida non-albicans	44 (9.0)
Total	489

AMR

Antimicrobials	*Klebsiella pneumoniae 203*	*E. coli 286*
Aminoglycoside	70	44.6
Quinolone	83.7	74.8
Third Gen Cephalosporin	95.1	88.5
Carbapenem	71.3	52.1
Tigecycline	23.2	1.3
Colistin		

Antimicrobials	*Acinetobacter baumannii* 70	*Pseudomonas aeruginosa* 120
Aminoglycoside	82	73.7
Quinolone	94.6	77.8
Third Gen Cephalosporin	97.1	80.9
Carbapenem	87	66
Tigecycline		
Colistin		
Piperacillin Tazobactam		55
Aztreonam		57.1

Antimicrobials	*Enterococcus faecium* n= 249	*Enterococcus faecalis* n= 72
Gentamicin-High	71.4	89.4
Linezolid	2.9	10.9
Vancomycin	17.3	46.6
Nitrofurantoin	35.1	61.4

Candida spp.; N= 139

Antibiotic name	Number	%R
Voriconazole	27/28	96
Caspofungin	3/24	13
Flucy	2/22	9
Fluconazole	2/28	7
Mica	1/21	5

CLABSI Prevention

- CLIP tool/ Maintenance compliance
  - AIIMS Bhubaneshwar
  - AIIMS Raipur
  - Amrita Institute of Medical Sciences, Kochi
  - GMC, Surat
  - Hinduja Hospital
  - IPGMER, Kolkata
  - KMC, Manipal
  - Nizam's, Hyderabad
  - PGI, Chandigarh
  - RIMS, Imphal
  - Sion Hospital
  - SKIMS, Kashmir
  - JPNA TC, AIIMS

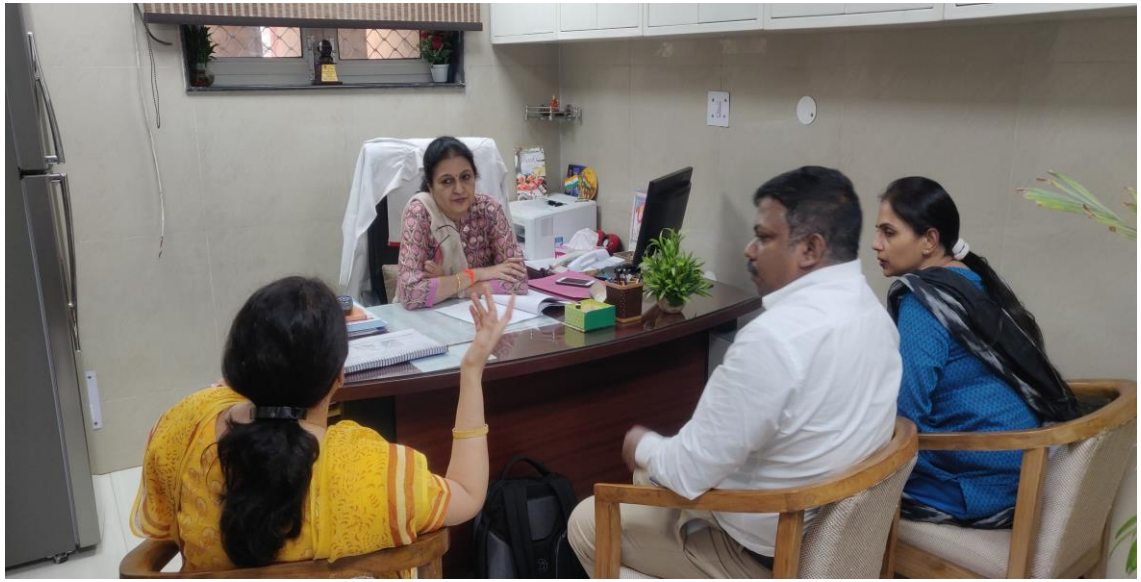
IPC Adherence (n-297)			
		Number	Percentage
1	Hand hygiene	282	94.4
2	Mask	247	83.2
3	Gown	214	72.1
4	Gloves	269	91
5	Cap	225	75.8
6	Drape	184	62
7	Skin Preparation Agent	290	97.6
8	Skin Dry	290	97.6

CLIP Tool maintenance (n- 139)			
1	Occupation of Inserter		Number (%)
		Intern/Resident	138 (99.3)
		Other Medical Staff	1 (0.7)
2	Reason of insertion		(0)
		New Indication of Central Line	135 (97.1)
		Replace malfunctioning	1 (0.7)
		Suspected Central Line	1 (0.7)
		Other	2 (1.4)
3	Insertion site		(0)
		Umbilical	47 (33.8)
		Jugular	49 (35.3)
		Femoral	9 (6.5)
		Subclavian	12 (8.6)
		Other	22 (15.8)
4	Insertion Completed		139 (100)
5	Inserter performed hand hygiene		132 (95)
6	Mask		120 (86.3)
7	Sterile Gown		103 (74.1)
8	Sterile Gloves		86 (61.9)
9	Cap		108 (77.7)
10	Full body drap		114 (82)
11	Skin prep. Agent		136 (97.8)
12	Skin prep. Agent dry		135 (97.2)

Was the central line reviewed for necessity (N-795)	**692 (87)**
Checked for soiling and loosening (N-792)	**672 (84.5)**
During Day Shift (N-726)	**574 (79.1)**
During Night Shift (N-709)	**550 (77.6)**

Site Support Visits

- New Tool
- Score will be generated
- Feedback



RML, New Delhi
Safdarjung Hospital

RIMS Imphal


Paul Malpiedi
Epidemiologist
CDC, Atlanta
Prof. Randeep Guleria
Director, AIIMS
Prof. Rajesh Malhotra
Chief, JPNATC, AIIMS

Thank you

PI meetings and Workshops organized

During the 3 years period, we have conducted 3 PI meetings and 6 Workshops.

S.No	Events	Dates	Venue
1	Ist PI Meeting	26th April 216	JPNATC, Committee room, first floor
2	II PI Meeting	14th October 2016	Ramalingam Swami board Room, AIIMS, New Delhi
3	Ist Workshop	25-26th July 2016	JPNATC, Seminar Room, first floor
4	II Workshop	14-15th December 2016	Magnolia Hall, Indian Habitat Centre, New Delhi
5	III Workshop	28th Feb-Ist March 2017	The Theater Hall, Indian Habitat Centre, New Delhi
6	3rd PI cum 4th Workshop	7-8th Sept 2017	The Ashok Hotel, New delhi
7	V Workshop	22nd -23rd January 2018	ATLS Basement, JPNATC, AIIMS
8	VI Workshop	18th – 19th Dec 2018	JPNATC, AIIMS, Delhi

Basic surveillance information

- Is there an introductory and ongoing training to staff participating in HAI surveillance?
  - No formal training in any center
  - 3/ 15 had some informal training (20%)

- Sustaining
- Horizontal expansion
- New staff

1. Case finding

- Surveillance team's routine (e.g., daily) process for receiving positive blood and urine culture data from the microbiology laboratory.

  - ICU: 5/15 (In two of these, the project staff only occasionally went to labs)
  - Laboratory: 3
  - Both: 7

- Is there a validation process to ascertain if surveillance team has received all positive blood/urine cultures from surveillance ICUs from the microbiology laboratory each month.
- Only three hospitals (20%)
  - Multiple cross checks
  - Use of LIS
  - Different cadres involved

Are we picking all cases?

Correctly?

- Do all surveillance ICUs send paired blood specimens for culture?
  - 3/15 (20%)

Reasons for not sending 12/15:

- Paid cultures: Three
- Lack of availability of culture bottles: Four
- Lack of Protocols/ practices: Five

- Does the surveillance team have access to positive cultures from all body sites for patients who meet the BSI case definition?

- 11/ 15 (73.3%)

- In the remaining
  - Staff had limited access to Micro Lab
  - Samples went to other labs
  - Staff did not go to labs

Are we picking all cases?

Correctly?

- Does the microbiology laboratory perform quantification (in CFU/mL) for all positive urine cultures?
  - 14/ 15 (93.3%)
  - Data from one lab had to be disregarded for UTI

- Availability of proper Microbiology Registers
  - 13/ 15 (86.6%)
  - Two of the 13 centers had multiple labs; access to all was not available

- Culturing practices
- Does the ICU perform surveillance cultures at regular intervals?
- Does the ICU collect a “fever pack” or other standard set of specimens for culture in patients with signs of infection?

  - 11 hospitals: sampling was done on clinician’s discretion
  - Three: Surveillance staff requested sampling
  - One: Twice a week + Clinical judgement
  - Formal Fever Packs: None

Section 3:
Case finding (application of definitions)

- Describe the surveillance team's routine process for determining whether a positive **blood** culture meets the BSI case definition.

- Was the PROJECT SATFF trained through workshops/ official trainings?
  - 7/ 15 (46.6%)

BSI

- Clarity of definitions
- Specific areas of BSI definition that were challenging
  - New CRF after Secondary BSI: 10/ 15 (66.6)
  - Section 3 of CRF: Tracing back Secondary sources: 7/15 (46.6%)
  - Secondary BSI attribution period Vs event time frame: 3/15 (20%)
  - DOE wrongly interpreted: 1/ 15 (5%)
  - Organisms from other samples: One
  - Common commensals: One

UTI Definitions

- Quantitative cultures
- Not done in one lab
- Eliciting Other Parameters: in 6 centers (40%)
  - Fever 101.4
  - Dysuria/ suprapubic tenderness etc
  - Most centers depended on fever
- Candiduria
- Colony counts less than 10^5/

Denominator data

- Clarity of process
- Which cadre of staff collect the information? data shared with the surveillance team?
- How is it collected on weekends and holidays?
- Cadre: Project HICN in 13 (two centers did not have HICs; other staff did the surveillance work)
- Clarity of process: 13/15 (86.6%)
- Weekends: Floor nurses : 13/ 15 (in two, project staff came even on weekends)

Section 5: Case report forms

- When does the surveillance team start a BSI or UTI CRF?

  - 14th Day: 8
  - Final Outcome: one
  - When case definition is met: one
  - Randomly/ not sure: 5

- Are completed paper CRFs reviewed for completeness and accuracy before entry into the electronic data system?
- 11/ 15 (73.3%)
- If Yes, who at the hospital performs this completeness and accuracy review?
  - PI/ Co PI: 7
  - Other project staff: 4

Section 6: Data entry and analysis

- Clarity of process: 15/15
- When is CRF entered into database
  - End of Month: 11 (73.3%)
  - 14 days: 4
- Who approves the CRFs?
  - PI/ Co-PI: 13 (86.6%)
  - Project staff: 2

- Does the surveillance team disseminate results from the HAI surveillance system to hospital stakeholders
  - Four: regularly
  - Three: Occasionally
  - Rest: Report not disseminated

? Data for action

Suggestions/ Challenges

- Clinicians not convinced
- Samples from other sites: Challenge (payment/ lack of agreement)
- Paired samples
- UTI definition
  - Candida UTI
- Amphotericin B in AST panels
- Microbiology-clinical coordination
- Project staff does lab work for the surveillance ICU samples
- Data entry into Microbiology registers
- Sampling practices suboptimal
- Urine sampling is especially suboptimal ? May be a cause for low UTI rates)

- AIIMS team sends back for review/ deletion: sites not clear
- Staff had limited access to Microbiology
- Two types of registers (Project/ routine; paid/ unpaid)
- Nurses not employed
- Outcomes often missed
- Permanent HICNs not involved; not clear of definitions
- Limited access to fever chart
- Some cases not reported (reasons for not reporting not clear)

- Source tracking limited: Other samples are paid; culturing practices
- Staff simply did not make the effort to trace other matching cultures (especially with manual registers, when patients were in some other wards)
- Samples going to other labs (very few CRF; inaccurate data)
- Cases missed in some centers because staff were not versed with protocols/did not see records and were filling CRFs randomly

Are samples sent when patients have fever?

- Blood
  - 23.5
  - 43%
  - 17%
  - 29
  - 86%
- Urine
  - 5.8%
  - 42
  - <10%
  - 13%

How many recognized pathogens were reported as CRFs/ excluded cases had thorough work-ups?

9/ 14 had records of ALL positives reported in a month

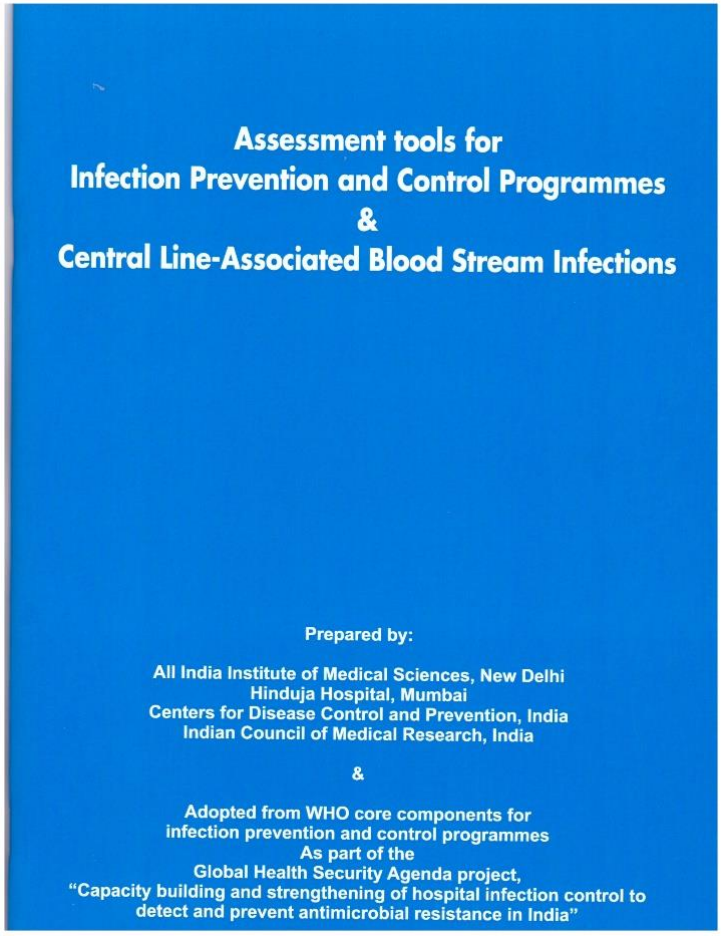
- BSI
- 48- 100%

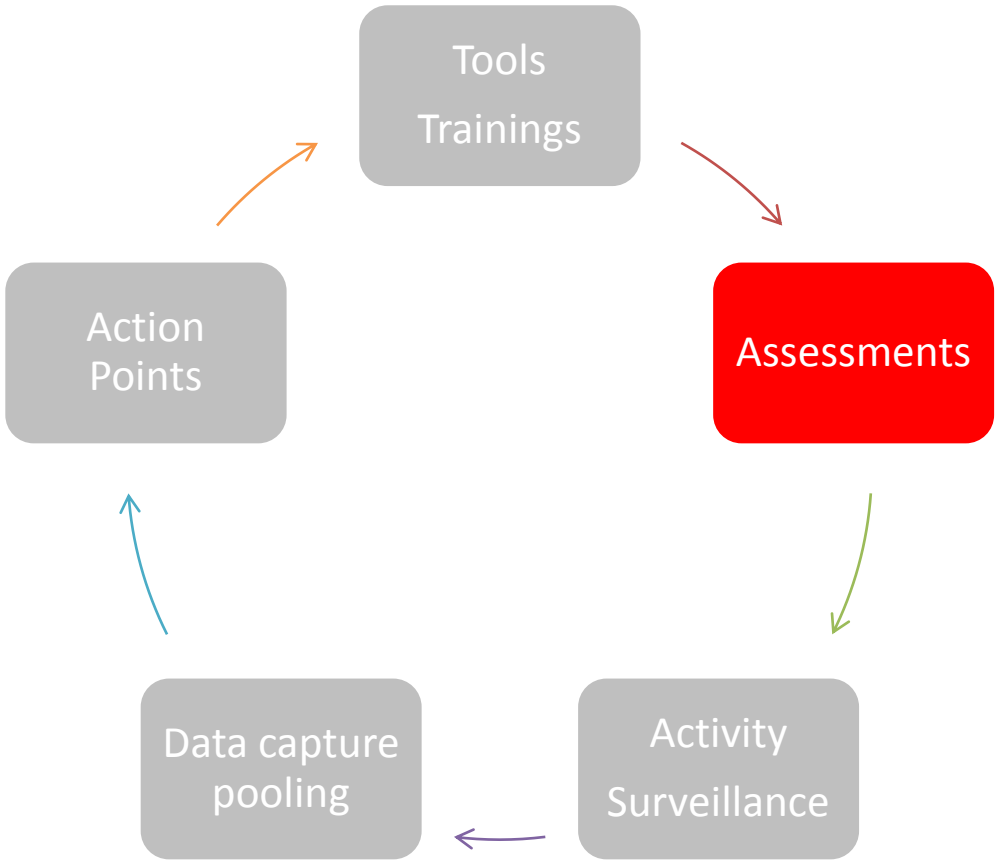
- UTI
- 0-100 %

Data entry errors

Variable of Interest	PERCENTAGE DISCREPENCY																					
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
Sex	0	0	0	0	0	0	0	0	0	0	0	0	12.5	0	0	0	16.7	11.1	0	0	0	4.3	0
Age	0	0	0	0	0	40	0	0	0	0	0	25	0	0	0	12.5	0	0	0	0	0	0	0
Event Data (BSI and UTI)																							
Date of hospital admission	0	0	0	0	0	0	0	0	0	0	0	12.5	0	0	0	0	0	0	0	0	10	0	0
Date of event	5.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.25	0	0	0	11.1	0	0	0
Outcome at end of 14 days	0	0	0	0	0	0	0	0	0	0	0	0	12.5	11.1	0	6.25	0	0	0	0	0	0	0
Outcome at end of hospitalization	0	0	0	0	0	0	0	0	0	0	0	0	37.5	0	0	0	0	0	0	0	0	0	40
Central line questions (for BSI)	11.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Urinary catheter questions (for UTI)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Microbiology – BSI																							
Name of organism(s) reported – blood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.25	0	0	0	0	0	0	0
Specimen collection date(s) - blood	0	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Name of organism(s) reported – other site	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Specimen collection date(s) – other site	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AST results*	100	100	0	100	0	100	100	100	100	100	100	100	0	100	0	100	0	100	0	100	100	100	0
Microbiology – UTI																							
Name of organism(s) reported – urine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Specimen collection date(s) – urine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AST results*	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	100	0	0	0	0	100	0	0

FINAL IPCAT-H
and
CLABSI Tool
approved




Tools
Trainings
Assessments
Activity
Surveillance
Data capture
pooling
Action
Points

- All Five participating Hospitals
  - One IPCAT H
  - Individual CLABSI assessments for each ICUs
- August 1
- All ICUs were given confidential codes

- As the network expanded in the second year, all newly enrolled centers were given codes
- Training in 2nd Workshop
- 20 hospitals: Filled the IPCAT H/ CLABSI tool

Components

- Organization of IPC programme
- Technical guidelines
- Human resources
- Surveillance of HAI
- Microbiology laboratory support
- Environment
- Monitoring & Evaluation
- Links with public health and other services

CHECKLIST FOR PREVENTION OF CENTRAL LINE-ASSOCIATED BLOOD STREAM INFECTIONS (CLABSIs)

This module should be completed by the head doctor or nurse for each clinical area in the assessment where central venous catheters (i.e., central lines) are used.

For each item, mark the answer that best describes your current situation by putting a check mark inside the brackets. Note that some questions ask for only one answer while others ask you to mark all answers that apply. Mark one answer unless specified otherwise.

What is the name of this unit? _____

Name of person conducting the questionnaire? _____

Name(s) of person(s) completing the questionnaire? _____

_____

General Information

1. What types of central lines are used? (Mark all that apply)
   [ ]0 Stiff
   [ ]1 Flexible

2. How are central lines obtained?
   [ ]1 Purchased commercially
   [ ]0 Prepared locally

3. Are CLABSI prevention "bundle" supplies (e.g., in a kit) readily available for use?
   [ ]0 No
   [ ]1 Yes

4. Do clinicians have access to checklists for practices related to CLABSI prevention?
   [ ]0 No
   [ ]1 Yes

5. Does the facility provide reoccurring education sessions on central line insertion, handling, and maintenance?
   [ ]0 No
   [ ]1 Yes

Assessment section total: _____ Possible section total: 5

Insertion Practices

6. Is hand hygiene performed before insertion of central lines?
   [ ]0 No
   [ ]1 Yes

7. What barriers are used for central line insertion? (Mark all that apply)
   [ ]1 Mask
   [ ]1 Hair cover (cap)
   [ ]1 Sterile gloves
   [ ]1 Gown (sterile or non-sterile)
   [ ]1 Large sterile drape (such as used in surgery)

8. What type of skin antiseptic is used for inserting central lines? (Mark one answer)
   [ ]0 None (skip question 9)
   [ ]2 Chlorhexidine containing antiseptic
   [ ]1 Iodophore containing antiseptic
   [ ]1 Alcohol containing antiseptic
   [ ]0 Other

9. How often is there a sufficient supply of skin antiseptic for use during central line insertion procedures? (Mark one answer)
   [ ]0 Never
   [ ]0 Rarely
   [ ]0 About 50% of the time
   [ ]1 Most of the time
   [ ]2 Always

10. Are femoral insertion sites typically avoided?
    [ ]0 No
    [ ]1 Yes

11. How often are central lines inserted by cut-down? (Mark one answer)
    [ ]2 Never
    [ ]1 Rarely
    [ ]0 About 50% of the time
    [ ]0 Most of the time
    [ ]0 Always

12. What type of dressing is most commonly used to cover the central line insertion site? (Mark one answer)
    [ ]0 None
    [ ]0 No dressing used; tape only
    [ ]1 Sterile gauze or sterile, transparent, semipermeable dressing

Assessment section total: _____ Possible section total: 14

The data are entered directly onto the worksheets, and the user interface is shown in Fig. 1. The title of a core component and the resulting score for the whole component are in row 1, and the headings of the main fields are in row 2. In row 3 you can see the section title typeset in bold, and examples of indicators are in rows 4-5.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	3	**Human resources**								62%						
2		Components for assessment								Score		Comments			Verifiers	Examples
3		**3.1**	**Training on IPC of all health care personnel**							**67%**						
4		3.1.1	Initial training in IPC for all newly recruited health care personnel is provided							1					Curricula,	Induction t
5		3.1.2	Periodical basic training in IPC for all health care personnel is provided regularly							0					Curricula,	Periodic re

Figure 1. Screenshot of the IPCAT interface

A negative answer automatically highlights the element in red for easy reference (see example as shown in Row 5). Evaluation scores are calculated automatically for every subcomponent (see the example in cell J3) and every core component in total (see cell J1 in Fig.1). There is also a field for comments (columns K-N on the figure above), a field with verifiers (column O), and a field with definitions and examples (column P).

The content of the cells with verifiers (column O) and examples/definitions (column P) cannot be seen in full until the cell is selected. Once the cell is selected (as in cell P6 in Fig. 2), the full text can be viewed in the formula bar.

P6 — The Infection Control Committee is comprised of members from a variety of disciplines within the HCF. Representation may incluc representatives from e.g. surgery, ICU, microbiology, pharmacy, central sterilization, environmental services, etc. The goal of this individuals with expertise in different areas of healthcare and ensure involvement of the senior management

	A	B														
1	1	**Organization of IPC programme**								56%						
2		Components for assessment								Score		Comments			Verifiers	Examples
3		**1.1**	**Designated qualified IPC leadership is established**							**50%**						
4		1.1.1	There is an IPC Team							1					Document s	The HCF has
5		1.1.2	Authority has been delegated by the administration or equivalent							1					Document s	Person(s) in
6		1.1.3	There is an Infection Control Committee or an equivalent							0					Document	The Infectio
7		1.1.4	The IPC programme responsibilities, goals and functions are clearly defined							0					An official d	

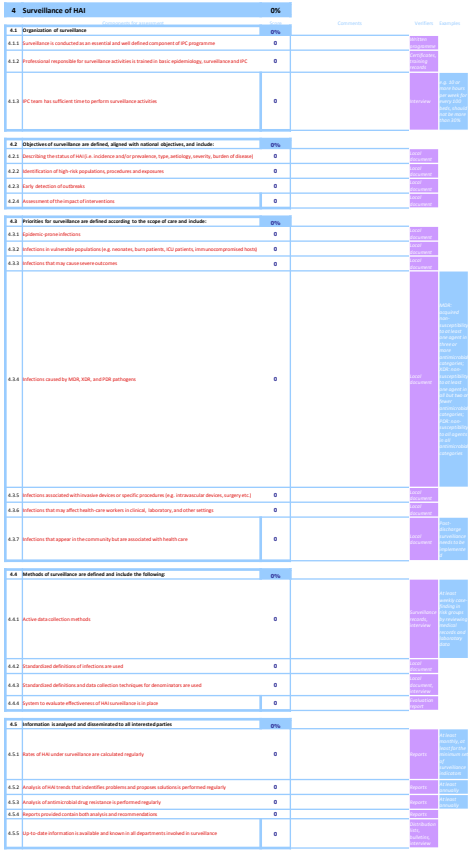
Figure 2. Screenshot of the IPCAT interface with the full text of an example provided in the formula bar

The assessment measurements are summarized for all core components and major subcomponents on a separate Summary page. The data are provided in tables and visualized in the bar and radar charts: see example in Fig.3 below.

3 Human resources

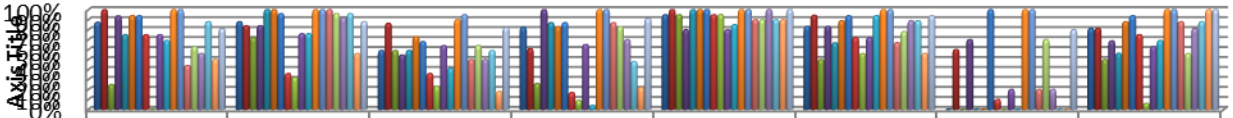
Elements	Score
All staff IPC training	67%
Training for IPC Team	100%
Staffing ratios	33%
Biological risks	86%
Immunization	33%

Figure 3. Screenshot of the IPCAT worksheet with the data visualization

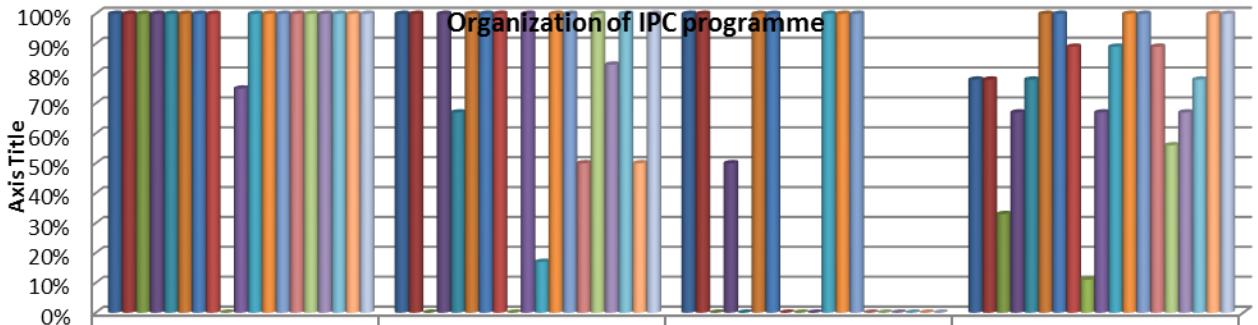


Organization	Technical guidelines	Human Resource	Surveillance	Micro Lab support	Environment	Monitoring & Eval	Links With Public health
IPC Leadership	Guideline devpmnt	Staff IPC Training	Surv Structure	Service availability	Hand Hygiene facility	M& E Framework	Links with Ext Service
Scope of IPC	Standard precautions	IPC team training	priorities	IPC lab interaction	Ventilation	M& E Indicators	Events of interest for PH
Budget	Additional precautions	Staffing ratio	methodology	ID of pathogens	Patient placement	Reporting	Links with internal service
Administrative support	Site specific HAI	Biological Risk	Analysis & reporting	AST	Waste management		
	Use of antimicrobials	Immunization		Sample collection	Other Requirement		

Evaluation summary

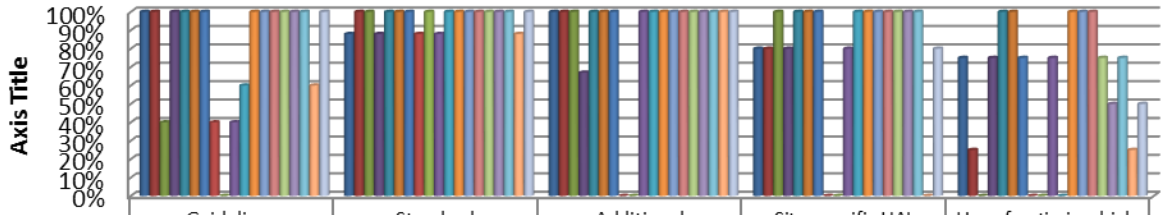


	Organization of IPC programmes	Technical guidelines	Human resources	Surveillance	Microbiology laboratory support	Environment	Monitoring and evaluation	Links with public health
1	88%	88%	59%	83%	95%	83%	0%	81%
2	100%	84%	86%	61%	100%	94%	60%	81%
3	25%	72%	59%	26%	95%	50%	0%	50%
4	94%	84%	55%	100%	80%	83%	70%	69%
5	75%	100%	59%	87%	100%	67%	0%	56%
6	94%	100%	73%	83%	100%	89%	0%	88%
7	94%	96%	68%	87%	100%	94%	100%	94%
8	75%	36%	36%	17%	95%	72%	10%	75%
9	0%	32%	23%	9%	95%	56%	0%	6%
10	75%	76%	64%	65%	80%	72%	20%	63%
11	69%	76%	41%	4%	85%	94%	0%	69%
12	100%	100%	90%	100%	100%	100%	100%	100%
13	100%	100%	95%	100%	100%	100%	100%	100%
14	44%	100%	50%	87%	90%	67%	20%	88%
15	63%	96%	64%	83%	90%	78%	70%	56%
16	56%	92%	50%	70%	100%	89%	20%	81%
18	88%	96%	59%	48%	90%	89%	0%	88%
19	50%	56%	18%	22%	90%	56%	0%	100%
20	81%	88%	82%	91%	100%	94%	80%	100%



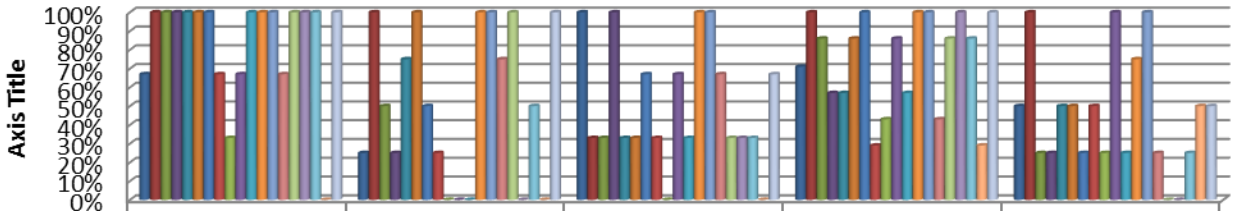
	IPC leadership	Scope of IPC programme	Budget	Administrative support
1	100%	100%	100%	78%
2	100%	100%	100%	78%
3	100%	0%	0%	33%
4	100%	100%	50%	67%
5	100%	67%	0%	78%
6	100%	100%	100%	100%
7	100%	100%	100%	100%
8	100%	100%	0%	89%
9	0%	0%	0%	11%
10	75%	100%	0%	67%
11	100%	17%	100%	89%
12	100%	100%	100%	100%
13	100%	100%	100%	100%
14	100%	50%	0%	89%
15	100%	100%	0%	56%
16	100%	83%	0%	67%
18	100%	100%	0%	78%
19	100%	50%	0%	100%
20	100%	100%	0%	100%

Technical guidelines



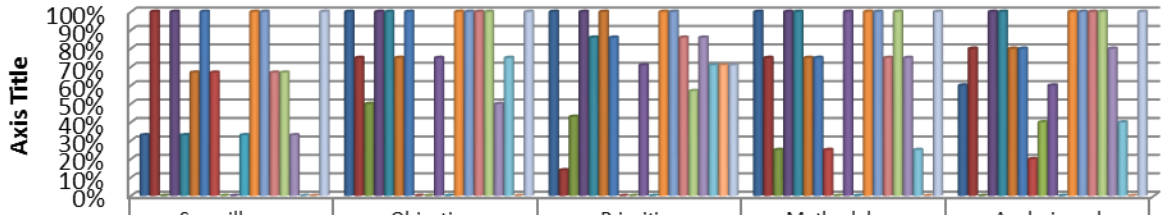
	Guidelines development	Standard precautions	Additional precautions	Site specific HAI	Use of antimicrobials
1	100%	88%	100%	80%	75%
2	100%	100%	100%	80%	25%
3	40%	100%	100%	100%	0%
4	100%	88%	67%	80%	75%
5	100%	100%	100%	100%	100%
6	100%	100%	100%	100%	100%
7	100%	100%	100%	100%	75%
8	40%	88%	0%	0%	0%
9	0%	100%	0%	0%	0%
10	40%	88%	100%	80%	75%
11	60%	100%	100%	100%	0%
12	100%	100%	100%	100%	100%
13	100%	100%	100%	100%	100%
14	100%	100%	100%	100%	100%
15	100%	100%	100%	100%	75%
16	100%	100%	100%	100%	50%
18	100%	100%	100%	100%	75%
19	60%	88%	100%	0%	25%
20	100%	100%	100%	80%	50%

Human resources



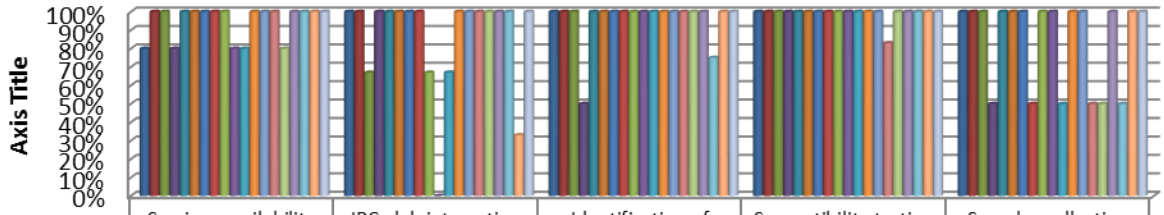
	All staff IPC training	Training for IPC Team	Staffing ratios	Biological risks	Immunization
1	67%	25%	100%	71%	50%
2	100%	100%	33%	100%	100%
3	100%	50%	33%	86%	25%
4	100%	25%	100%	57%	25%
5	100%	75%	33%	57%	50%
6	100%	100%	33%	86%	50%
7	100%	50%	67%	100%	25%
8	67%	25%	33%	29%	50%
9	33%	0%	0%	43%	25%
10	67%	0%	67%	86%	100%
11	100%	0%	33%	57%	25%
12	100%	100%	100%	100%	75%
13	100%	100%	100%	100%	100%
14	67%	75%	67%	43%	25%
15	100%	100%	33%	86%	0%
16	100%	0%	33%	100%	0%
18	100%	50%	33%	86%	25%
19	0%	0%	0%	29%	50%
20	100%	100%	67%	100%	50%

Surveillance



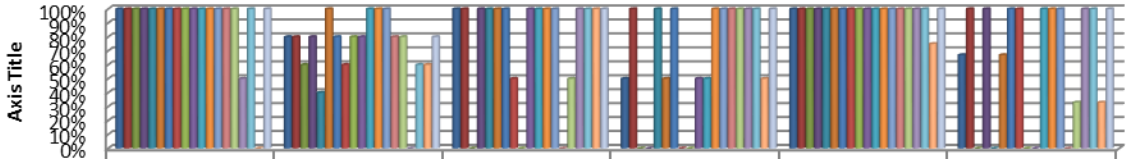
	Surveillance structure	Objectives	Priorities	Methodology	Analysis and reporting
1	33%	100%	100%	100%	60%
2	100%	75%	14%	75%	80%
3	0%	50%	43%	25%	0%
4	100%	100%	100%	100%	100%
5	33%	100%	86%	100%	100%
6	67%	75%	100%	75%	80%
7	100%	100%	86%	75%	80%
8	67%	0%	0%	25%	20%
9	0%	0%	0%	0%	40%
10	0%	75%	71%	100%	60%
11	33%	0%	0%	0%	0%
12	100%	100%	100%	100%	100%
13	100%	100%	100%	100%	100%
14	67%	100%	86%	75%	100%
15	67%	100%	57%	100%	100%
16	33%	50%	86%	75%	80%
18	0%	75%	71%	25%	40%
19	0%	0%	71%	0%	0%
20	100%	100%	71%	100%	100%

Microbiology laboratory support



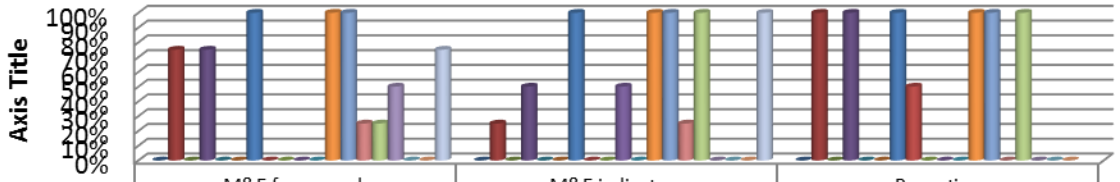
	Services availability	IPC - lab interaction	Identification of pathogens	Susceptibility testing	Samples collection
1	80%	100%	100%	100%	100%
2	100%	100%	100%	100%	100%
3	100%	67%	100%	100%	100%
4	80%	100%	50%	100%	50%
5	100%	100%	100%	100%	100%
6	100%	100%	100%	100%	100%
7	100%	100%	100%	100%	100%
8	100%	100%	100%	100%	50%
9	100%	67%	100%	100%	100%
10	80%	0%	100%	100%	100%
11	80%	67%	100%	100%	50%
12	100%	100%	100%	100%	100%
13	100%	100%	100%	100%	100%
14	100%	100%	100%	83%	50%
15	80%	100%	100%	100%	50%
16	100%	100%	100%	100%	100%
18	100%	100%	75%	100%	50%
19	100%	33%	100%	100%	100%
20	100%	100%	100%	100%	100%

Environment



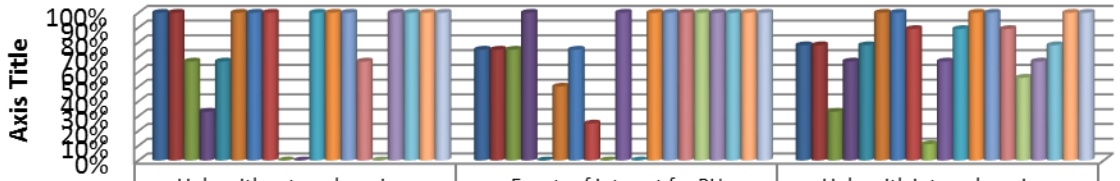
	Clean water	Hand hygiene facilities	Ventilation	Patient placement	Waste management	Other requirements
1	100%	80%	100%	50%	100%	67%
2	100%	80%	100%	100%	100%	100%
3	100%	60%	0%	0%	100%	0%
4	100%	80%	100%	0%	100%	100%
5	100%	40%	100%	100%	100%	0%
6	100%	100%	100%	50%	100%	67%
7	100%	80%	100%	100%	100%	100%
8	100%	60%	50%	0%	100%	100%
9	100%	80%	0%	0%	100%	0%
10	100%	80%	100%	50%	100%	0%
11	100%	100%	100%	50%	100%	100%
12	100%	100%	100%	100%	100%	100%
13	100%	100%	100%	100%	100%	100%
14	100%	80%	0%	100%	100%	0%
15	100%	80%	50%	100%	100%	33%
16	50%	0%	100%	100%	100%	100%
18	100%	60%	100%	100%	100%	100%
19	0%	60%	100%	50%	75%	33%
20	100%	80%	100%	100%	100%	100%

Monitoring & Evaluation



	M&E framework	M&E indicators	Reporting
1	0%	0%	0%
2	75%	25%	100%
3	0%	0%	0%
4	75%	50%	100%
5	0%	0%	0%
6	0%	0%	0%
7	100%	100%	100%
8	0%	0%	50%
9	0%	0%	0%
10	0%	50%	0%
11	0%	0%	0%
12	100%	100%	100%
13	100%	100%	100%
14	25%	25%	0%
15	25%	100%	100%
16	50%	0%	0%
18	0%	0%	0%
19	0%	0%	0%
20	75%	100%	

Links with public health



	Links with external services	Events of interest for PH	Links with internal services
1	100%	75%	78%
2	100%	75%	78%
3	67%	75%	33%
4	33%	100%	67%
5	67%	0%	78%
6	100%	50%	100%
7	100%	75%	100%
8	100%	25%	89%
9	0%	0%	11%
10	0%	100%	67%
11	100%	0%	89%
12	100%	100%	100%
13	100%	100%	100%
14	67%	100%	89%
15	0%	100%	56%
16	100%	100%	67%
18	100%	100%	78%
19	100%	100%	100%
20	100%	100%	100%

Summary

The core components with the lowest number of fully implemented activities were:

- Monitoring and evaluation
- Human resources
- Surveillance
- Organization of IPC

- Gaps Addressed through this work???
  - *Monitoring and evaluation*
  - *Human resources*
  - *Surveillance*
  - *Organization of IPC*

IPCAF: 16

Core Component1: IPC program

- **Do you have an IPC programme?**
  - **75%: Yes, with clearly defined objectives AND annual activity plan**
  - **25%: Yes, but without clear objectives**

- **Is the IPC programme supported by an IPC team comprising of IPC professionals?**
  - **15/16: Yes**
  - **1: Only a focal person**
- **Does the IPC team have at least one full-time IPC professional or equivalent (nurse or doctor working 100% in IPC) available?**
  - **No IPC professional: 12.5%**
  - **Part time: 18.7%**
  - **Yes, 1/>250 beds: 31.2%**
  - **Yes, per < 250 beds: 37.5%**

- **Does the IPC team or focal person have dedicated time for IPC activities?**
- **75% yes**

- **Does the IPC team include both doctors and nurses?**
- **15/16**

- **. Do you have an IPC committee5 actively supporting the IPC team?**
- **15/16**

- **Are any of the following professional groups represented/included in the IPC committee?**
- 7.1 Senior facility leadership (for example, administrative director, chief executive officer [CEO], medical director): 14/16 (87.5%)
- 7.2 Senior clinical staff (for example, physician, nurse):15/16 (93.7)
- 7.3 Facility management (for example, biosafety, waste, and those tasked with addressing water, sanitation, and hygiene

- **8. Do you have clearly defined IPC objectives (that is, in specific critical areas)?**
  4: Yes, IPC objectives only
- **5: IPC objecives and measurable outcome indicators**
- **7: IPC objective, Measurable outcome indicators and set future targets**

- **9. Does the senior facility leadership show clear commitment and support for the IPC programme:**
- 9.1 By an allocated budget specifically for the IPC programme (that is, covering IPC activities, including salaries)?: 13/16
- 9.2 By demonstrable support for IPC objectives and indicators within the facility (for example, at executive level meetings, executive rounds, participation in morbidity

- **10. Does your facility have microbiological laboratory support (either present on or off site) for routine day-to-day use?**
  Choose one answer
- **15: Yes, and delivering results reliably**
- **1: Yes, but not delivering results reliably**

Core component 2: Infection Prevention and Control (IPC) guidelines

- **1. Does your facility have the expertise (in IPC and/or infectious diseases) for developing or adapting guidelines? : 16/16**
- 2.1 Standard precautions?
- 2.2. Hand hygiene?
- 2.3 Transmission-based precautions?
- 2.4 Outbreak management and preparedness?
- 2.5 Prevention of surgical site infection?
- 2.6 Prevention of vascular catheter-associated bloodstream infections?
- 2.7 Prevention of hospital-acquired pneumonia ([HAP]; all types of HAP, including (but not exclusively) ventilator-associated pneumonia)?
- 2.8 Prevention of catheter-associated urinary tract infections?
- 2. 9 Prevention of transmission of multidrug-resistant (MDR) pathogens?
- 2.10 Disinfection and sterilization?
- 2.11 Health care worker protection and safety
- 2. 12 Injection safety?
- 2.13 Waste management?
- 2.14 Antibiotic stewardship?

15/16 for all te above

- **3. Are the guidelines in your facility consistent with national/international guidelines (if they exist)? 15/16**
- **4. Is implementation of the guidelines adapted10 according to the local needs and resources while maintaining key IPC standards? 15/16**
- **5. Are frontline health care workers involved in both planning and executing the implementation of IPC guidelines**

- **6. Are relevant stakeholders (for example, lead doctors and nurses, hospital managers, quality management) involved in the development and adaptation of the IPC guidelines in addition to IPC personnel? 14/16**
- **7. Do health care workers receive specific training related to new or updated IPC guidelines introduced in the facility? 14/16**
- **8. Do you regularly monitor the**

Core component 3: Infection Prevention and Control (IPC) education and training

- 1. Are there personnel with the IPC expertise (in IPC and/or infectious diseases) to lead IPC training? Yes: 16/16
- 2. Are there additional non-IPC personnel with adequate skills to serve as trainers and mentors (for example, link nurses or doctors, champions)? 15/16
- 3. How frequently do health care workers receive training regarding IPC in your facility?
- 1: Newly employed orientation only
- 6: New orientation and regular training, but not mandatory
- 9: New orientation and least annual mandatory training
  4. How frequently do cleaners and other personnel directly involved in patient care receive training regarding IPC in your facility?
  Choose one answer
- 1: Never or rarely
- 7” New employee oreientation, but not mandatpry
- 8: Madndatory regular trainings

- **5. Does administrative and managerial staff receive general training regarding IPC in your facility?**
  9/16: yes
- **6. How are health care workers and other personnel trained?**
  Choose one answer

7: Using written informations and /or oral instruction and or e learning

9: Includes additional interactive trainings

- **7. Are there periodic evaluations of the effectiveness of training programmes (for example, hand hygiene audits, other checks on knowledge)?**
- **1: No**
- **6: Yes, not regularly**
- **9: Yesregularly**
- **.**

- **Is IPC training integrated in the clinical practice and training of other specialties (for example, training of surgeons involves aspects of IPC)?**
  Choose one answer
- **4: No**
- **8: Yes, in some disciplines**
- **4: In all disciplines**

- **Is there specific IPC training for patients or family members to minimize the potential for health care-associated infections (for example, immunosuppressed patients, patients with invasive devices, patients with multidrug-resistant infections)? Yes 10/16**
- **10. Is ongoing development/education offered for IPC staff (for example, by regularly attending conferences, courses)? 13/16**

Core component 4: Health care-associated infection (HAI) surveillance

- **Organization of surveillance**

- **1. Is surveillance a defined component of your IPC programme? 15/16**
- **2. Do you have personnel responsible for surveillance activities?15/16**
- **3. Have the professionals responsible for surveillance activities been trained in basic epidemiology, surveillance and IPC (that is, capacity to oversee surveillance methods, data management and interpretation)?14/16**
- **4. Do you have informatics/IT support to conduct your surveillance (for example, equipment, mobile technologies, electronic health records)?10 yes, 4 no, one not marked**

Priorities for surveillance - defined according to the scope of care

- **5. Do you go through a prioritization exercise to determine the HAIs to be targeted for surveillance according to the local context (that is, identifying infections that are major causes of morbidity and mortality in the facility)?**

- **6. In your facility is surveillance conducted for:**

6.1. Surgical site infections? 12
6.2. Device-associated infections (for example, catheter-associated urinary tract infections, central line-associated bloodstream infections, peripheral-line associated bloodstream infections, ventilator-associated pneumonia)? 12
6.3. Clinically-defined infections (for example, definitions based only on clinical signs or symptoms in the absence of microbiological testing)? 8
6.4.Colonization or infections caused by multidrug-resistant13 pathogens according to your local epidemiological situation? 8 yes; 3 partial
6.5. Local priority epidemic-prone infections (for example, norovirus, influenza, tuberculosis [TB], severe acute respiratory syndrome [SARS], Ebola, Lassa fever)? 13
6.6. Infections in vulnerable populations (for example, neonates, intensive care unit, immunocompromised, burn patients)? 12
6.7. Infections that may affect health care workers in clinical, laboratory, or other settings (for example, hepatitis B or C, human immunodeficiency virus [HIV], influenza)? 12

- **7. Do you regularly evaluate if your surveillance is in line with the current needs and priorities of your facility? 10/16 yes**

- **8. Do you use reliable surveillance case definitions (defined numerator and denominator according to international definitions [e.g. CDC NHSN/ECDC]15 or if adapted, through an evidence-based adaptation process and expert consultation? 13/ 16 yes**

- **9. Do you use standardized data collection methods (for example, active prospective surveillance) according to international surveillance protocols (for example, CDC NHSN/ECDC) or if adapted, through an evidence-based adaptation process and expert consultation? 12/16 yes**

- **10. Do you have processes in place to regularly review data quality (for example, assessment of case report forms, review of microbiology results, denominator determination, etc.)? 13/16 Y**

- **11. Do you have adequate microbiology and laboratory capacity to support surveillance? 6: Yes, can reliably identify pathogens**
- **10: Yes, can reliably identify pathogens and AMR pattern**

Information analysis and dissemination/data use, linkage, and governance

- **12. Are surveillance data used to make tailored unit/facility-based plans for the improvement of IPC practices? 12/16 Yes**
- **13. Do you analyze antimicrobial drug resistance on a regular basis (for example, quarterly/half-yearly/annually)? 16 yes**

14. Do you regularly (for example, quarterly/half-yearly/annually) feedback up-to-date surveillance information to:

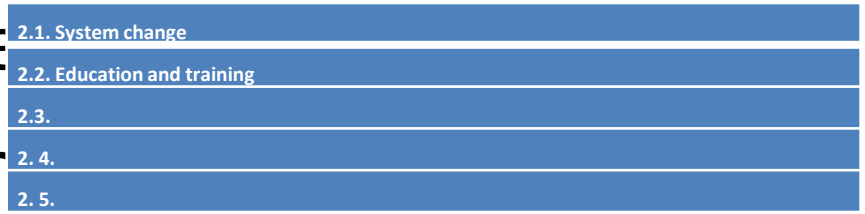
14.1. Frontline health care workers (doctors/nurses)? 13/16
14.2. Clinical leaders/heads of department 14/16
14.3. IPC committee 15/16
14.4. Non-clinical management/administration (chief executive officer/chief financial officer)? 13/16

- **15. How do you feedback up-to-date surveillance information? (at least annually)**
- **4: By written/oral information only**
- **12: By presentation and interactive problem oriented solution finding**

Core component 3. Multimodal strategies for implementation of infection prevention and control (IPC) interventions

- 1. Do you use multimodal strategies to implement IPC interventions? 11/16 Y

- **2. Do your multimodal strategies include any or all of the following elements: Choose one answer (the most accurate) per element**
- 2.1. System change
- 4: elements not include
- 3 Inteventions to ensur infrastructure and continuous availability of suppliesin place
- 9 Inteventions to ensure necessary infrastructure and continuous availability of



- 2.2. Education and training
- 2: Noot included
- 5 written/oral/ eleraning
- 9 additional interactive sessions

- Monitoring and feedback
- 3: Not included
- 3: Monitoring compliance with process r outcome indicators
- 10: Monitoring compliance and giving feedbacks

- Communications and reminders
- 4: Not included
- 5: reminders/ posters/ other advocacy
- 7: Additional methids (feedback rounds/ case conferences)

- Safety climate and culture change
- 3: Not included
- 9: Leadership shows visible support
- 4: Additionally, teams and individuals are empowered to perceive ownership

- **3. Is a multidisciplinary team used to implement IPC multimodal strategies? 10/16 Y**

- **4. Do you regularly link to colleagues from quality improvement and patient safety to develop and promote IPC multimodal strategies? 12/16 Y**

- **5. Do these strategies include bundles or checklists? 13/16 Y**

Core component 6: Monitoring/audit of IPC practices and feedback

- **1. Do you have trained personnel responsible for monitoring/audit of IPC practices and feedback? 13/16 Y**

- **2. Do you have a well-defined monitoring plan with clear goals, targets and activities (including tools to collect data in a systematic way)?**
- **13/16 Y**

- **3. Which processes and indicators do you monitor in your facility?**
  Tick all that apply
- **Multiple selections**

- **4. How frequently is the WHO Hand Hygiene Self-Assessment Framework Survey21 undertaken?**
  1: Never
- **4: Periodically, not regular**
- **11: at least annually**

- **5. Do you feedback auditing reports (for example, feedback on hand hygiene compliance data or other processes) on the state of the IPC activities/performance?**
  Tick all that apply
- **Multiple selections**

- **6. Is the reporting of monitoring data undertaken regularly (at least annually)?**
- **14 Yes**

- **7. Are monitoring and feedback of IPC processes and indicators performed in a “blame-free” institutional culture aimed at improvement and behavioural change? 13/16 Y**

- **8. Do you assess safety cultural factors in your facility (for example, by using other surveys such as HSOPSC, SAQ, PSCHO, HSC22) 10/16 Y**

Core component 7: Workload, staffing and bed occupancy

- **Staffing**
- **1. Are appropriate staffing levels assessed in your facility according to patient workload using national standards or a standard staffing needs assessment tool such as the WHO Workload indicators of staffing need24 method? * yes**
- **2. Is an agreed (that is, WHO or national) ratio of health care workers to patients25 maintained across your facility? 5: No**
- **3: Yes, for staff in leass than 50% units**
- **4: tes, for staff in > 50% units**
- **4: For all**

- **3. Is a system in place in your facility to act on the results of the staffing needs assessments when staffing levels are deemed to be too low? 13 Y**

- **Bed occupancy**
- **4. Is the design of wards in your facility in accordance with international standards26 regarding bed capacity?**
  Choose one answer
- **12: Yess but only in few depts**
- **4; Yes for all units**
- **5. Is bed occupancy in your facility kept to one patient per bed?**
- **1: No**
- **5: Yesbut only in few depts**
- **4; Yes for all units**
- **Choose one answer**
- **6. Are patients in your facility placed in beds standing in the corridor outside of the room (including beds in the emergency department)?**
  Choose one answer
- **1: More than twice weekly**
- **5: Less than twice weekly**
- **10: No**

- **7. Is adequate spacing of > 1 meter between patient beds ensured in your facility?**
  Choose one answer
- **1: No**
- **10: Yes, but only in few depts**
- **5: For all depts**

- **8. Is a system in place in your facility to assess and respond when adequate bed capacity is exceeded?**
  Choose one answer
- **2: No**
- **1: Yes, responsibility of HOD**
- **13: Yes, responsibility of hosp admin**

Core component 8: Built environment, materials and equipment for IPC at the facility level

- **Water**
- **1. Are water services available at all times and of sufficient quantity for all uses (for example, hand washing, drinking, personal hygiene, medical activities, sterilization, decontamination, cleaning and laundry)?**
  Choose one answer
- **2: Yes, available on average> 5 days/ week but not sufficient quantity**
- **14: yes and sufficient**
- **2. Is a reliable safe drinking water station present and accessible for staff, patients and families at all times and in all locations/wards?**
  Choose one answer
- **3: Sometimes or only some places**
- **13: All times in all places**

- **Hand hygiene and sanitation facilities**
- **3. Are functioning hand hygiene stations (that is, alcohol-based handrub solution or soap and water and clean single-use towels) available at all points of care?**
  Choose one answer
- **5: Yes stations present, but supplies not reliably present**
- **11: Yes, with reliable availability**
- **4. In your facility, are ≥ 4 toilets or improved latrines available for outpatient settings or ≥ 1 per 20 users for inpatient settings?**
  Choose one answer
- **5: Less than required numbers**
- **2: Sufficient numbers but not all functioning**
- **9: suffient and functioning**

- **Power supply, ventilation and cleaning**
- **5. In your health care facility, is sufficient energy/power supply available at day and night for all uses (for example, pumping and boiling water, sterilization and decontamination, incineration or alternative treatment technologies, electronic medical devices, general lighting of areas where health care procedures are performed to ensure safe provision of health care and lighting of toilet facilities and showers)?**

- **6. Is functioning environmental ventilation (natural or mechanical) available in patient care areas? 15/16 Y**

- **7. For floors and horizontal work surfaces, is there an accessible record of cleaning, signed by the cleaners each day?**
  Choose one answer
- **2: No records of floors/ surface cleaned**
- **7: records exist, but not completed/ signed**
- **7: Complete and signed records**

- **8. Are appropriate and well-maintained materials for cleaning (for example, detergent, mops, buckets, etc.) available? Choose one answer**
- **5: Yes available, but ot well maintained**
- **11: available and maintained**

- **Patient placement and personal protective equipment (PPE) in health care settings**
- **9. Do you have single patient rooms or rooms for cohorting patients with similar pathogens if the number of isolation rooms is insufficient (for example, TB, measles, cholera, Ebola, SARS)?**
  Choose one answer
- **2: No**
- **4: No single rooms; cohorting done**

- **10. Is PPE available at all times and in sufficient quantity for all uses for all health care workers?**
  Choose one answer
- **5: Yes but not continuously available in sufficient quantities**
- **11: continuous and sufficient quantitu available**

- **Medical waste management and sewage**
- **11. Do you have functional waste collection containers for non-infectious (general) waste, infectious waste and, sharps waste in close proximity to all waste generation points?**
  Choose one answer yes: 16
- **12. Is a functional burial pit/fenced waste dump or municipal pick-up available for disposal of non-infectious (non-hazardous/ general waste)?**
  Choose one answer
- **1: No pit or other disposal method used**
- **15: Yes**

- **. Is an incinerator or alternative treatment technology for the treatment of infectious and sharp waste (for example, an autoclave) present (either present on or off site and operated by a licensed waste management service), functional and of a sufficient capacity?**
- **1: No**
- **15: Yes**

- **14. Is a wastewater treatment system (for example, septic tank followed by drainage pit) present (either on or off site) and functioning reliably?**
  Choose one answer
- **3: no**
- **1: Yes, but not functioning reliable**
- **12: yes and functioning**

- **Decontamination and sterilization**
- **15. Does your health care facility provide a dedicated decontamination area and/or sterile supply department (either present on or off site and operated by a licensed decontamination management service) for the decontamination and sterilization of medical devices and other items/equipment? Choose one answer**
- **2: yes, but not functioning reliably**

- **16. Do you reliably have sterile and disinfected equipment ready for use? Choose one answer**
- **16: yes, available every day and ofsufficient quantity**

- **17. Are disposable items available when necessary? (for example, injection safety devices, examination gloves)**
  Choose one answer
- **Yes continuously available: 16**