

Capacity Building and Strengthening of Hospital Infection Control to detect and prevent Antimicrobial Resistance in India

5th Principal Investigators meeting

Purva Mathur

20/11/2018

35 participating centres



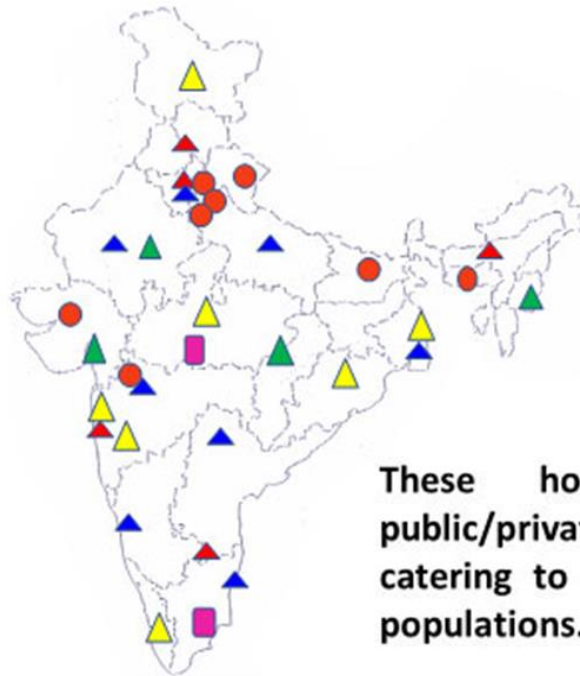
93 ICUs included



86 ICUs reporting in
surveillance

Participating Centers

- ICMR- AIIMS centres- 24
- NCDC centres- 6
- Centers trained under Swachhata Action Plan- 7



These hospitals are a mix of public/private/missionary/army hospitals, catering to a diverse category of patient populations.

Distribution of ICUs

Name of ICU	Number (Percentage)
Medical ICU	20 (21.5)
Neonatal ICU	13 (14.0)
Pediatric Medical ICU	13 (14.0)
Surgical ICU	13 (14.0)
Medical/Surgical ICU	10 (10.4)
Cardiothoracic Surgical ICU	4 (4.3)
Neurological ICU	4 (4.3)
Gastrointestinal ICU	3 (3.2)
Pediatric Medical/Surgical ICU	3 (3.2)
High Dependency Unit	2 (2.2)
Respiratory ICU	2 (2.2)
Burn ICU	1 (1.1)
Cardiac ICU	1 (1.1)
Oncologic Medical ICU	1 (1.1)
Oncologic Medical/Surgical ICU	1 (1.1)
Oncologic Surgical ICU	1 (1.1)
Trauma Surgical ICU	1 (1.1)
Total	93

Blood stream Infections

(May 2017-Sep 2018)

Denominator data

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

Types of BSI cases

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

**Total no. of BSI cases
(N – 2,228)**

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graph TD; A["Total no. of BSI cases  
(N – 2,228)"] --> B["Primary BSIs: 1,786  
(80.2)"]; A --> C["Secondary BSIs: 442  
(19.8)"]; B --> D["CLABSI:  
987 (44.3)"]; B --> E["Non-CLABSI:  
799 (35.9)"];
```

**Primary BSIs: 1,786
(80.2)**

**Secondary BSIs: 442
(19.8)**

**CLABSI:
987 (44.3)**

**Non-CLABSI:
799 (35.9)**

BSI rates

S. No.	Indicator		Rates
1	Total BSI rate (per 1,000 patient days)		6.45
2	Primary BSI rate (per 1,000 patient days)		5.14
3	3a	CLABSI rate (per 1,000 central line days)	9.12
	3b	Non-CLABSI rate (per 1,000 patient days)	2.25
4	Secondary BSI rate (per 1,000 patient days)		1.31

Distribution of BSI cases by ICUs

Type of ICUs	No. of BSI cases (Percentage)
Medical/ Surgical ICU	511 (22.9)
Neonatal ICU (NICU)	427 (19.2)
Medical ICU	404 (18.1)
Surgical ICU	289 (13.0)
Pediatric ICU (PICU)	205 (9.2)
Neurological ICU	109 (4.9)
Trauma ICU	91 (4.1)
Gastro-intestinal ICU	69 (3.1)
Cardiothoracic surgical ICU	44 (2.0)
Respiratory ICU	26 (1.2)
Oncologic medical ICU	22 (1.0)
Burn ICU	12 (0.6)
High dependency unit (HDU)	10 (0.5)
Oncologic surgical ICU	5 (0.2)
Cardiac medical ICU	4 (0.2)
Total	2,228 (100.0)

Distribution of BSI cases by gender and age

Gender	No. of BSI cases (%)
Males	1,467 (65.8)
Females	761 (34.2)
Total	2,228

	Median	Range
Age of males	33	0 – 95
Age of females	29	0 – 90

Distribution of BSI cases by duration of events

	Median	Range
Duration of stay in unit	17	2– 242
Duration between date of admission and date of event	8	2 – 146

Distribution of BSI cases by mortality

14 day outcome	No. of BSI cases (%)
Died	848 (38.1)
Still in surveillance unit	606 (27.2)
Transferred to other ward	426 (19.1)
Discharged	235 (10.6)
LAMA	79 (3.6)
Transferred to other hospital	17 (0.8)
Unknown	17 (0.8)
Total	2,228

Mortality at the time of final outcome was 51.5%

Organisms causing BSIs

May, 2017 to September, 2018

Distribution of organisms causing BSI

S. No.	Type of organisms	Number (%)
1	Gram negative organisms	1,712 (71.1)
2	Gram positive organisms	402 (16.7)
3	Fungi	294 (12.2)
Total		2,408

Total no. of organisms reported
(N – 2,408)

Gram
positive:
402 (16.7)

Gram
negative:
1,712 (71.1)

Fungi:
294 (12.2)

1. *Staphylococcus* sp.: 206 (51.2)
2. *Enterococcus* sp.: 191 (47.5)
3. *Streptococcus* sp.: 3 (0.7)
4. *Leuconostoc* sp.: 2 (0.5)

1. *Klebsiella* sp.: 564 (32.9)
2. *Acinetobacter* sp.: 504 (29.4)
3. *Pseudomonas* sp.: 161 (9.4)
4. *Escherichia* sp.: 124 (0.5)
5. *Enterobacter* sp.: 96 (5.6)

1. *Candida* sp.: 286 (98.7)
2. *Trichosporon* sp.: 2 (0.7)
3. *Cryptococcus* sp.: 1 (0.3)
4. Yeast: 1 (0.3)

Distribution of organisms causing BSI

S. No.	Name of organism	Number (%)
1	<i>Klebsiella sp.</i>	564 (23.4)
2	<i>Acinetobacter sp.</i>	504 (20.9)
3	<i>Candida sp.</i>	290 (12.0)
4	<i>Staphylococcus sp.</i>	206 (8.6)
5	<i>Enterococcus sp.</i>	191 (7.9)
6	<i>Pseudomonas sp.</i>	161 (6.7)
7	<i>Escherichia sp.</i>	124 (5.1)
8	<i>Enterobacter sp.</i>	96 (4.0)
9	<i>Burkholderia sp.</i>	91 (3.8)
10	<i>Citrobacter sp.</i>	38 (1.6)
11	Others	143 (5.9)
Total		2,408

Distribution of organisms (species level) causing BSI*

S. No.	Name of organism	Number (%)
1	<i>Klebsiella pneumoniae</i>	541 (22.5)
2	<i>Acinetobacter baumannii</i>	433 (18.0)
3	<i>Staphylococcus aureus</i>	163 (6.7)
4	<i>Pseudomonas aeruginosa</i>	127 (5.3)
5	<i>Escherichia coli</i>	124 (5.2)
6	<i>Enterococcus faecium</i>	123 (5.1)
7	<i>Burkholderia cepacia</i>	82 (3.4)
8	<i>Candida tropicalis</i>	80 (3.3)
9	Others	735 (30.5)
Total		2,408

May not be accurate as all centres are not speciating

Distribution of gram positive organisms causing BSI

S. No.	Name of organism	Number (%)
1	<i>Staphylococcus sp.</i>	206 (51.2)
2	<i>Enterococcus sp.</i>	191 (47.5)
3	<i>Streptococcus sp.</i>	3 (0.7)
4	<i>Leuconostoc sp.</i>	2 (0.5)
Total Gram Positive organisms		402

Distribution of Gram negative organisms causing BSI

S. No.	Name of organism	Number (%)
1	<i>Klebsiella sp.</i>	564 (32.9)
2	<i>Acinetobacter sp.</i>	504 (29.4)
3	<i>Pseudomonas sp.</i>	161 (9.4)
4	<i>Escherichia sp.</i>	124 (7.2)
5	<i>Enterobacter sp.</i>	96 (5.6)
6	<i>Burkholderia sp.</i>	91 (5.3)
7	<i>Citrobacter sp.</i>	38 (2.2)
8	<i>Stenotrophomonas sp.</i>	33 (1.9)
9	<i>Serratia sp.</i>	28 (1.6)
10	<i>Sphingomonas sp.</i>	10 (0.6)
11	Others	63 (3.7)
Total Gram Negative organisms		1,712

Distribution of Fungi causing BSIs

S. No.	Name of organism	Number (%)
1	<i>Candida tropicalis</i>	80 (27.6)
2	<i>Candida utilis</i>	46 (15.9)
3	<i>Candida parapsilosis</i>	39 (13.4)
4	<i>Candida albicans</i>	37 (12.8)
5	<i>Candida glabrata</i>	34 (11.7)
6	Other candida	54 (18.6)
7	<i>Trichosporon sp.</i>	2 (0.7)
8	<i>Cryptococcus sp.</i>	1 (0.3)
9	Yeast	1 (0.3)
Total fungi		290

CLABSIs

Distribution of CLABSI cases by location of central lines

Location of central line	No. of CLABSI cases (%)
Mentioned	981 (99.4)
Not mentioned	7 (0.6)
Total	987

Location of central line	No. of CLABSI cases (%)
Jugular	556 (56.2)
Subclavian	281 (28.4)
Umbilical	105 (10.6)
Brachial	18 (1.8)
Femoral	20 (2.0)
Hickman Line	1 (0.1)
Peripheral	5 (0.5)
Mid-arm (Basilic vein)	3 (0.3)
Total	989*

* Multiple central lines possible in a single patient

Distribution of organisms causing CLABSI

S. No.	Name of organism	Number (%)
1	Gram positive organisms	146 (14.8)
2	Gram negative organisms	712 (72.1)
3	Fungi	129 (13.1)
Total organisms		987

Distribution of organisms causing CLABSI (Overall distribution)

S. No.	Name of organism	Number (%)
1	<i>Acinetobacter sp.</i>	187 (18.9)
2	<i>Klebsiella sp.</i>	180 (18.2)
3	<i>Candida sp.</i>	127 (12.9)
4	<i>Enterococcus sp.</i>	83 (8.4)
5	<i>Pseudomonas sp.</i>	79 (8.0)
6	<i>Burkholderia sp.</i>	75 (7.6)
7	<i>Staphylococcus sp.</i>	62 (6.3)
8	<i>Enterobacter sp.</i>	54 (5.5)
9	<i>Escherichia sp.</i>	47 (4.8)
10	<i>Stenotrophomonas sp.</i>	26 (2.6)
11	Others	67 (6.8)
Total		987

Overall Species level Distribution of organisms causing CLABSI

S. No.	Name of organism	Number (%)
1	<i>Klebsiella pneumoniae</i>	174 (17.6)
2	<i>Acinetobacter baumannii</i>	163 (16.5)
3	<i>Burkholderia cepacia</i>	66 (6.7)
4	<i>Pseudomonas aeruginosa</i>	56 (5.7)
5	<i>Enterococcus faecium</i>	51 (5.2)
6	<i>Escherichia coli</i>	47 (4.8)
7	<i>Candida tropicalis</i>	47 (4.8)
8	<i>Staphylococcus aureus</i>	44 (4.5)
9	<i>Stenotrophomonas maltophilia</i>	26 (2.6)
10	Others	313 (31.7)
Total organisms		987

Distribution of gram positive organisms causing CLABSI

S. No.	Name of organism	Number (%)
1	<i>Enterococcus sp.</i>	83 (56.8)
2	<i>Staphylococcus sp.</i>	62 (42.5)
3	<i>Leuconostoc sp.</i>	1 (0.7)
Total Gram Positive organisms		146

Distribution of Gram negative organisms causing CLABSIs

S. No.	Name of organism	Number (Percentage)
1	<i>Acinetobacter sp.</i>	187 (26.3)
2	<i>Klebsiella sp.</i>	180 (25.3)
3	<i>Pseudomonas sp.</i>	79 (11.1)
4	<i>Burkholderia sp.</i>	75 (10.5)
5	<i>Enterobacter sp.</i>	54 (7.6)
6	<i>Escherichia sp.</i>	47 (6.6)
7	<i>Stenotrophomonas sp.</i>	26 (3.7)
8	<i>Citrobacter sp.</i>	18 (2.5)
9	<i>Serratia sp.</i>	12 (1.7)
10	<i>Chryseobacterium sp.</i>	7 (1.0)
11	<i>Sphingomonas sp.</i>	4 (0.6)
12	Others	23 (3.2)
Total Gram Negative organisms		712

Distribution of Fungi causing BSIs

S. No.	Name of organism	Number (%)
1	<i>Candida tropicalis</i>	47 (36.4)
2	<i>Candida parapsilosis</i>	21 (16.3)
3	<i>Candida albicans</i>	20 (15.5)
4	<i>Candida glabrata</i>	11 (8.5)
5	Other candida	28 (21.7)
6	<i>Trichosporon sp.</i>	1 (0.8)
7	Yeast	1 (0.8)
Total fungi		129

Primary Non-CLABSI

Distribution of organisms causing Non-CLABSI

S. No.	Name of organism	Number (%)
1	Gram positive organisms	197 (24.7)
2	Gram negative organisms	481 (60.2)
3	Fungi	121 (15.1)
Total		799

Overall Distribution of organisms causing Non-CLABSI

S. No.	Name of organism	Number (%)
1	<i>Klebsiella sp.</i>	193 (24.2)
2	<i>Acinetobacter sp.</i>	138 (17.3)
3	<i>Candida sp.</i>	120 (15.0)
4	<i>Staphylococcus sp.</i>	115 (14.4)
5	<i>Enterococcus sp.</i>	81 (10.1)
6	<i>Escherichia sp.</i>	40 (5.0)
7	<i>Enterobacter sp.</i>	25 (3.1)
8	<i>Pseudomonas sp.</i>	24 (3.0)
9	<i>Citrobacter sp.</i>	17 (2.1)
10	<i>Burkholderia sp.</i>	9 (1.1)
11	Others	37 (4.6)
Total organisms		799

Species level distribution of Non-CLABSI cases

S. No.	Name of organism	Number (%)
1	<i>Klebsiella pneumoniae</i>	178 (22.3)
2	<i>Acinetobacter baumannii</i>	100 (12.5)
3	<i>Staphylococcus aureus</i>	97 (12.1)
4	<i>Enterococcus faecium</i>	54 (6.8)
5	<i>Candida utilis</i>	45 (5.6)
6	<i>Escherichia coli</i>	40 (5.0)
7	<i>Acinetobacter sp.</i>	22 (2.8)
8	<i>Candida glabrata</i>	20 (2.5)
9	<i>Pseudomonas aeruginosa</i>	16 (2.0)
10	Others	227 (28.4)
Total organisms		799

Distribution of gram positive organisms causing Non-CLABSI

S. No.	Name of organism	Number (%)
1	<i>Staphylococcus sp.</i>	115 (58.4)
2	<i>Enterococcus sp.</i>	81 (41.1)
3	<i>Streptococcus sp.</i>	1 (0.5)
Total Gram Positive organisms		197

Distribution of Gram negative organisms causing Non-CLABSIs

S. No.	Name of organism	Number (%)
1	<i>Klebsiella sp.</i>	193 (40.1)
2	<i>Acinetobacter sp.</i>	138 (28.7)
3	<i>Escherichia sp.</i>	40 (8.3)
4	<i>Enterobacter sp.</i>	25 (5.2)
5	<i>Pseudomonas sp.</i>	24 (5.0)
6	<i>Citrobacter sp.</i>	17 (3.5)
7	<i>Burkholderia sp.</i>	9 (1.9)
8	<i>Serratia sp.</i>	8 (1.7)
9	<i>Elizabethkingia sp.</i>	4 (0.8)
10	<i>Stenotrophomonas sp.</i>	3 (0.6)
11	<i>Chryseobacterium sp.</i>	3 (0.6)
12	Others	17 (3.5)
Total Gram Negative organisms		481

Distribution of Fungi causing BSIs

S. No.	Name of organism	Number (%)
1	<i>Candida utilis</i>	45 (37.2)
2	<i>Candida glabrata</i>	20 (16.5)
3	<i>Candida tropicalis</i>	15 (12.4)
4	<i>Candida albicans</i>	12 (9.9)
5	<i>Candida parapsilosis</i>	11 (9.1)
6	Other candida	17 (14.0)
7	<i>Trichosporon sp.</i>	1 (0.8)
Total fungi		121

Secondary BSIs

Distribution of organisms causing Secondary BSI

S. No.	Name of organism	Number (%)
1	Gram positive organisms	32 (7.2)
2	Gram negative organisms	391 (88.5)
3	Fungi	19 (4.3)
Total		442

Overall distribution of organisms causing Secondary BSI

S. No.	Name of organism	Number (%)
1	<i>Acinetobacter sp.</i>	159 (36.0)
2	<i>Klebsiella sp.</i>	148 (33.5)
3	<i>Pseudomonas sp.</i>	42 (9.5)
4	<i>Staphylococcus sp.</i>	19 (4.3)
5	<i>Escherichia sp.</i>	19 (4.3)
6	<i>Candida sp.</i>	18 (4.1)
7	<i>Enterococcus sp.</i>	12 (2.7)
8	<i>Enterobacter sp.</i>	6 (1.4)
9	<i>Serratia sp.</i>	6 (1.4)
10	<i>Morganella sp.</i>	3 (0.7)
11	Others	10 (2.3)
Total		442

Species level distribution of organisms causing Secondary BSI

S. No.	Name of organism	Number (Percentage)
1	<i>Acinetobacter baumannii</i>	153 (34.6)
2	<i>Klebsiella pneumoniae</i>	147 (33.3)
3	<i>Pseudomonas aeruginosa</i>	41 (9.3)
4	<i>Escherichia coli</i>	19 (4.3)
5	<i>Staphylococcus aureus</i>	17 (3.8)
6	<i>Candida tropicalis</i>	9 (2.0)
7	<i>Enterococcus faecium</i>	8 (1.8)
8	<i>Serratia marcescens</i>	6 (1.4)
9	<i>Acinetobacter sp.</i>	5 (1.1)
10	Others	37 (8.4)
Total		442 (100.0)

Distribution of gram positive organisms causing Secondary BSI

S. No.	Name of organism	Number (%)
1	<i>Staphylococcus sp.</i>	19 (59.4)
2	<i>Enterococcus sp.</i>	12 (37.5)
3	<i>Streptococcus sp.</i>	1 (3.1)
Total Gram Positive organisms		32

Distribution of Gram negative organisms causing Secondary BSIs

S. No.	Name of organism	Number (%)
1	<i>Acinetobacter sp.</i>	159 (40.7)
2	<i>Klebsiella sp.</i>	148 (37.9)
3	<i>Pseudomonas sp.</i>	42 (10.7)
4	<i>Escherichia sp.</i>	19 (4.9)
5	<i>Serratia sp.</i>	6 (1.5)
6	<i>Enterobacter sp.</i>	6 (1.5)
7	<i>Morganella sp.</i>	3 (0.8)
8	<i>Burkholderia sp.</i>	2 (0.5)
9	<i>Stenotrophomonas sp.</i>	2 (0.5)
10	<i>Citrobacter sp.</i>	1 (0.3)
11	Others	3 (0.8)
Total Gram Negative organisms		391

Distribution of Fungi causing Secondary BSIs

S. No.	Name of organism	Number (%)
1	<i>Candida tropicalis</i>	9 (47.4)
2	<i>Candida parapsilosis</i>	3 (15.8)
3	<i>Candida albicans</i>	2 (10.5)
4	<i>Candida glabrata</i>	1 (5.3)
5	Other candida	3 (15.8)
6	<i>Cryptococcus sp.</i>	1 (5.3)
Total fungi		19

AMR
BSI

K. pneumoniae (N=541)

Name of antibiotic	No. of isolates tested	No. of resistant isolates	Percentage R
Ampicillin	93	92	98.9
Ampicillin-Sulbactam	66	58	87.9
Aztreonam	85	74	87.1
Piperacillin-tazobactam	541	398	73.6
Cefepime	541	376	69.5
Ciprofloxacin	541	365	67.5
Amikacin	541	338	62.5
Meropenem	541	338	62.5
Ceftriaxone	541	333	61.6
Imipenem	541	308	56.9
Cefuroxime	541	239	44.2
Cotrimoxazole	541	139	25.7
Tigecycline	541	102	18.9
Colistin	541	36	6.7

***E. coli* (N=124)**

Name of antibiotic	No. of isolates tested	No. of resistant isolates	Percentage R
Amikacin	124	53	42.7
Ampicillin	26	23	88.5
Ampicillin-Sulbactam	15	12	80.0
Ciprofloxacin	124	90	72.6
Aztreonam	17	12	70.6
Cefepime	124	76	61.3
Piperacillin-tazobactam	124	75	60.5
Ceftriaxone	124	67	54.0
Meropenem	124	58	46.8
Imipenem	124	55	44.4
Cefuroxime	124	41	33.1
Cotrimoxazole	124	35	28.2
Tigecycline	124	2	1.6
Colistin	124	2	1.6

***A. baumannii* (N=433)**

Name of antibiotic	No. of isolates tested	No. of resistant isolates	Percentage
Ceftriaxone	93	89	95.7
Aztreonam	48	44	91.7
Imipenem	433	338	78.1
Meropenem	433	322	74.4
Piperacillin-tazobactam	433	321	74.1
Ciprofloxacin	433	315	72.7
Ampicillin	10	7	70.0
Cefuroxime	10	7	70.0
Amikacin	433	264	61.0
Cefepime	433	251	58.0
Cotrimoxazole	433	243	56.1
Tigecycline	118	25	21.2
Ampicillin-Sulbactam	433	71	16.4
Colistin	433	11	2.5

P. aeruginosa (N=127)

Name of antibiotic	No. of isolates tested	No. of resistant isolates	Percentage
Cotrimoxazole	10	10	100.0
Tigecycline	16	15	93.8
Ceftazidime	127	72	56.7
Amikacin	127	71	55.9
Imipenem	127	64	50.4
Cefepime	127	61	48.0
Meropenem	127	56	44.1
Ciprofloxacin	127	54	42.5
Piperacillin-tazobactam	127	50	39.4
Aztreonam	127	25	19.7
Colistin	127	4	3.1

S. aureus (N=163)

Name of antibiotic	No. of isolates tested	No of resistant isolates	Percentage
Ampicillin	1	1	100.0
Cefotaxime	4	4	100.0
Erythromycin	159	110	69.2
Clindamycin	150	67	44.7
Ciprofloxacin	154	61	39.6
Cefoxitin	151	52	34.4
Amikacin	39	12	30.8
Oxacillin	147	27	18.4
Teichoplanin	150	3	2.0
Linezolid	156	3	1.9
Vancomycin	152	2	1.3
Daptomycin	147	1	0.7

E. faecium (N=123)

Name of antibiotic	No. of isolates tested	No. of resistant isolates	Percentage
Clindamycin	2	2	100.0
Erythromycin	52	46	88.5
Ciprofloxacin	123	70	56.9
Ampicillin	123	54	43.9
Vancomycin	123	34	27.6
Teichoplanin	123	24	19.5
Linezolid	123	4	3.3
Daptomycin	123	1	0.8

Urinary Tract Infections (UTI)

(May 2017-Sep 2018)

Types of UTI cases

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

UTI rates

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

Distribution of UTI cases by ICUs

Type of ICUs	No. of BSI cases (Percentage)
Medical/ Surgical ICU	146 (22.0)
Neonatal ICU (NICU)	8 (1.2)
Medical ICU	182 (27.4)
Surgical ICU	82 (12.3)
Pediatric ICU (PICU)	79 (11.9)
Neurological ICU	61 (9.2)
Trauma ICU	52 (7.8)
Gastro-intestinal ICU	7 (1.1)
Cardiothoracic surgical ICU	4 (0.6)
Respiratory ICU	8 (1.2)
Oncologic medical ICU	12 (1.8)
High dependency unit (HDU)	19 (2.9)
Oncologic surgical ICU	4 (0.6)
Total	664

Distribution of UTI cases by gender and age

Gender	No. of BSI cases (%)
Males	388 (58.4)
Females	276 (41.6)
Total	664

	Median	Range
Age of males	40	0 – 85
Age of females	40	0 – 85

Distribution of UTI cases by duration of events

	Median	Range
Duration of stay in unit	23	2 – 213
Duration between date of admission and date of event	9	2 – 213

Distribution of UTI cases by mortality

14 day outcome	No. of BSI cases (%)
Still in surveillance unit	222 (33.4)
Transferred to other ward	212 (31.9)
Died	152 (22.9)
Discharged	52 (7.8)
LAMA	14 (2.1)
Transferred to other hospital	4 (0.6)
Unknown	8 (1.2)
Total	664

Organisms causing UTIs

May, 2017 to September, 2018

Distribution of organisms causing UTI

S. No.	Name of organism	Number (Percentage)
1	Gram negative organisms	373 (51.2)
2	Gram positive organisms	136 (18.7)
3	Fungi	219 (30.1)
Total		728

Distribution of organisms causing UTI

S. No.	Name of organism	Number (%)
1	<i>Candida sp.</i>	212 (29.1)
2	<i>Enterococcus sp.</i>	134 (18.4)
3	<i>Escherichia sp.</i>	123 (16.9)
4	<i>Klebsiella sp.</i>	95 (13.0)
5	<i>Pseudomonas sp.</i>	55 (7.6)
6	<i>Acinetobacter sp.</i>	38 (5.2)
7	<i>Enterobacter sp.</i>	14 (1.9)
8	<i>Enterobacter sp.</i>	14 (1.9)
9	<i>Proteus sp.</i>	12 (1.6)
10	<i>Citrobacter sp.</i>	11 (1.5)
11	Others	20 (2.7)
Total		728

Distribution of organisms (species level) causing UTI*

S. No.	Name of organism	Number (%)
1	<i>Escherichia coli</i>	123 (16.9)
2	<i>Klebsiella pneumoniae</i>	84 (11.5)
3	<i>Enterococcus faecium</i>	72 (9.9)
4	<i>Candida spp.</i>	60 (8.2)
5	<i>Candida albicans</i>	52 (7.1)
6	<i>Candida tropicalis</i>	52 (7.1)
7	<i>Pseudomonas aeruginosa</i>	44 (6.0)
8	<i>Acinetobacter baumannii</i>	31 (4.3)
9	Others	210 (28.8)
Total		728

May not be accurate as all centres are not speciating

AMR
UTI

K. pneumoniae (N=84)

Name of antibiotic	No. of isolates tested	No. of resistant isolates	Percentage
Ampicillin	12	12	100.0
Ampicillin-Sulbactam	13	13	100.0
Aztreonam	20	20	100.0
Ciprofloxacin	84	56	66.7
Piperacillin-tazobactam	84	52	61.9
Amikacin	84	47	56.0
Imipenem	84	44	52.4
Meropenem	84	42	50.0
Cefepime	84	40	47.6
Ceftriaxone	84	33	39.3
Cotrimoxazole	84	32	38.1
Cefuroxime	84	25	29.8
Colistin	84	5	6.0
Tigecycline	84	3	3.6

***E. coli* (N=123)**

Name of antibiotic	No. of isolates tested	No. of resistant isolates	Percentage
Ampicillin	33	32	97.0
Aztreonam	19	16	84.2
Ampicillin-Sulbactam	20	15	75.0
Ciprofloxacin	123	90	73.2
Piperacillin tazobactam	123	74	60.2
Ceftriaxone	122	70	57.4
Cefepime	123	67	54.5
Imipenem	123	54	43.9
Cotrimoxazole	123	53	43.1
Amikacin	123	53	43.1
Meropenem	123	49	39.8
Cefuroxime	122	39	32.0
Tigecycline	122	1	0.8
Colistin	123	0	0.0

A. baumannii (N=31)

Name of antibiotic	No. of isolates tested	No. of resistant isolates	Percentage
Aztreonam	3	3	100.0
Ceftriaxone	12	11	91.7
Ciprofloxacin	26	20	76.9
Piperacillin-tazobactam	26	20	76.9
Imipenem	26	18	69.2
Amikacin	26	15	57.7
Meropenem	26	13	50.0
Cefepime	26	13	50.0
Cotrimoxazole	26	12	46.2
Ampicillin-Sulbactam	26	9	34.6
Colistin	26	1	3.8
Tigecycline	2	0	0.0

P. aeruginosa (N=44)

Name of antibiotic	No. of isolates tested	No. of resistant isolates	Percentage
Ceftazidime	44	34	77.3
Cefepime	44	28	63.6
Meropenem	44	27	61.4
Amikacin	44	27	61.4
Ciprofloxacin	44	27	61.4
Piperacillin-tazobactam	44	24	54.5
Imipenem	44	23	52.3
Tigecycline	2	1	50.0
Cotrimoxazole	2	1	50.0
Aztreonam	44	15	34.1
Colistin	44	0	0.0

E. faecium (N=72)

Name of antibiotic	No. of isolates testes	No of resistant isolates	Percentage
Amikacin	2	2	100.0
Clindamycin	2	2	100.0
Erythromycin	12	11	91.7
Ciprofloxacin	72	64	88.9
Ampicillin	72	50	69.4
Vancomycin	72	35	48.6
Teichoplanin	72	31	43.1
Linezolid	72	6	8.3
Daptomycin	72	0	0.0

Data Quality Assessment

Site support visits

New Tool

15 sites

Seven months













MGH, Jaipur



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)

- AllMS 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 DISCREPANCY																						
	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	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	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	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	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
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

Microbiology – BSI

Name of organism(s) reported – blood	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	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	
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	
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	
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	
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

Surveillance of Healthcare Associated Infections (HAI) in India - Quarterly Report (Q2 -2018)							
Project	Capacity Building and Strengthening of Hospital Infection Control to Detect and Prevent Antimicrobial Resistance in India						
Model agency	AIIMS-ICMR HAI Surveillance Network - GSHA AMR capacity building Project, All India Institute Of Medical Sciences (AIIMS), New Delhi						
Reported by	Dr Purva Mathur, Professor and Head, Department of Microbiology, JaiPrakash Narayan Apex Trauma Centre (JPNATC), AIIMS, New Delhi						
Data source	HAI surveillance online reporting system managed from JPNATC, AIIMS, New Delhi						
Reporting period	From	1-Apr-18	to	30-Jun-18			
HAIs under surveillance	Blood Stream Infections (BSI), Urinary Tract Infection (UTI), Central Line Associated Blood Stream Infection (CLABSI), Catheter Associated Urinary Tract Infection (CAUTI)						
Medical device utilisation under surveillance	Central line catheters, Foley's urinary catheter						
Total number of sites enrolled	37	Government	27	Private	8	Quasi - Public	2
Region	State	Health Facility	Health Facility Type	Affiliated National Network	Swachhta Action Plan Site	Total ICUs Enrolled	Remarks
North	Delhi	JPNATC Delhi	Public	AIIMS- ICMR	Yes	2	
	Delhi	AIIMS Delhi	Public	AIIMS- ICMR	Yes	2	
	Delhi	Sir Ganga Ram Hospital, New Delhi	Private	AIIMS- ICMR	Not Applicable	2	
	Delhi	Safdarjung Hospital, New Delhi	Public	NCDC	Yes	3	
	Delhi	LHMC, New Delhi	Public	NCDC	Yes		ICUs are being identified
	Delhi	Ram Manohar Lohia	Public	NCDC	Yes		ICUs are being identified
	Delhi	Chacha Nehru bal chikitsalaya	Public	Others	Yes		ICUs are being identified
	Delhi	NTRI, New Delhi	Public	Not Affiliated	Yes		ICUs are being identified
	Uttarakhand	AIIMS Bishkek	Public	Not Affiliated	Yes		ICUs are being identified
	Uttar Pradesh	King George's Medical University, Lucknow	Public	AIIMS- ICMR	No		4
Chandigarh	PGIMER Chandigarh	Public	AIIMS- ICMR	Yes		3	
Jammu & Kashmir	Sheh-e- Kashmir Institute of Medical Sciences, Kashmir	Public	AIIMS- ICMR	No		4	
Telangana	NIMS Hyderabad	Quasi-Public	AIIMS- ICMR	No		3	
South	Tamil Nadu	CMC Vellore	Private	AIIMS- ICMR	Not Applicable	3	
	Tamil Nadu	Apollo Hospital Chennai	Private	AIIMS- ICMR	Not Applicable	1	
	Tamil Nadu	ICAI.P.V. gov't medical college	Public	NCDC			ICUs are being identified
	Karnataka	Kasturba Medical College, Manipal	Private	AIIMS- ICMR	Not Applicable	2	
	Karnataka	NIMHANS Bengaluru	Public	Not Affiliated	Yes		ICUs are being identified
North East	Kerala	Amritha Institute of Medical Sciences, Kochi	Private	AIIMS- ICMR	Not Applicable	3	
	Manipur	RIIMS Imphal	Public	AIIMS- ICMR	Yes	4	
	Assam	Assam Medical College Hospital, Dibru	Public	AIIMS- ICMR	No	3	
	Assam	NEIGRIMS, Shillong	Public	NCDC	Yes	1	ICUs are being identified
EAST	West Bengal	IPGIMER SSKM Hospital, Kolkata	Public	AIIMS- ICMR	No	3	
	Odisha	AIIMS, Bhubaneswar	Public	AIIMS- ICMR	Yes	3	
	Chhattisgarh	AIIMS, Raipur	Public	AIIMS- ICMR	Yes	4	
	Madhya Pradesh	AIIMS, Bhopal	Public	AIIMS- ICMR	Yes	4	
	Madhya Pradesh	MGMHC Indore	Public	NCDC			ICUs are being identified
	West Bengal	Tata Medical Centre, Kolkata	Private	AIIMS- ICMR	Not Applicable	3	
West	Bihar	AIIMS Patna	Public	Not Affiliated	Yes		ICUs are being identified
	Maharashtra	Sion Municipal Hospital Mumbai	Public	AIIMS- ICMR	No	4	
	Maharashtra	AFMC, Pune	Public	AIIMS- ICMR	No	5	
	Maharashtra	P. D Hinduja Hospital Mumbai	Private	AIIMS- ICMR	Not Applicable	3	
	Maharashtra	Sewagram Wardha	Quasi-Public	AIIMS- ICMR	No	4	
	Rajasthan	AIIMS Jodhpur	Public	AIIMS- ICMR	Yes	3	
	Rajasthan	MGMHC Hospital, Jaipur	Private	AIIMS- ICMR	Not Applicable	5	
	Gujarat	Government Medical College, Surat	Public	AIIMS- ICMR	No	3	
Gujarat	B.M.C. Ahmedabad	Public	NCDC	No			ICUs are being identified

HAI Surveillance Report

Blood Stream Infections (BSI)								
ICU type	Total ICUs Reported*	Total BSI Reported	Central Line Associated BSI (CLABSI)	Patient Days Observed	Central Line Days	BSI rate per 1,000 Patient Days	CLABSI rate per 1,000 Central Line Days	Central Line Utilisation Ratio
Adult Medical	36	161	100	36608	12664	4.4	7.9	0.35
Adult Surgical	20	138	96	16813	9498	8.2	10.1	0.56
Pediatric Medical	26	137	27	20367	2621	6.7	10.3	0.13
*Total ICUs Reported = Total number of ICUs which reported HAI surveillance data to AIIMS in any month of reporting quarter								
Urinary Tract Infections (UTI)								
ICU type	Total ICUs Reported*	Total UTI Reported	Catheter Associated UTI (CAUTI)	Patient Days	Urinary Catheter Days	UTI Rate per 1,000 Patient Days	CAUTI rate per 1,000 Urinary Catheter Days	Urinary Catheter Utilization ratio
Adult Medical	36	60	60	36608	29055	1.6	2.1	0.79
Adult Surgical	20	56	55	16813	14170	3.3	3.9	0.84
Pediatric Medical	26	25	16	18559	2692	1.3	5.9	0.15
*Total ICUs Reported = Total number of ICUs which reported HAI surveillance data to AIIMS in any month of reporting quarter								
Network sites trained in January 2018 (Yet to report data)								

Expansion of network

- Horizontal
- Vertical
- Other Sites
 - SAP sites
 - NCDC site
 - Non-funded sites
- Training, hand holding, data quality/ support

TOT WORKSHOP- 7th-8th August, 2018



1. BSI- Blood Stream Infection-surveillance
2. LCBI: Laboratory Confirmed Blood Stream Infections
3. Primary BSI
 1. CLABSI: Central Line Associated Blood Stream Infection
 2. Primary BSI but not CLABSI
 3. Secondary BSI- Primary HAI
4. Date of Event (DOE)
5. Window Period- 3 days on either side of DOE
6. Event Time Frame: 14 day
7. Secondary BSI Attribution Period: 20 days
8. HAI or HCAI: Health Care Associated Infection
9. Present on Admission
10. Recognized Pathogen OR Common Commensal
11. Central Lines
12. Case Record Form
13. CLABSI incidence rate
14. Device Utilization Ratio
15. Denominator Data
16. Calendar days
17. Present on Admission

AIIMS, Bhubaneswar



AIIMS, Bhopal



AIIMS, Raipur



SKIMS Visit



New Centers?

CITY (STATE)
Puducherry
Rohtak (Haryana)
New Delhi
Mumbai (Maharashtra)
Jalandhar (Punjab)
Pune (Maharashtra)
Agra, Uttar Pradesh

Centers under Swacchhta facilities

HOSPITAL NAME	CITY (STATE)
All India Institute of Medical Sciences	Rishikesh (Uttarakhand)
NIMHANS	Bangalore (Karnataka)
All India Institute of Medical Sciences	Patna (Bihar)
NITRD	Delhi
NEIGRIHMS	Shilong (Meghalaya)
Safdarjung hospital	Delhi

Training of Staff and Nurses JPNA Trauma Center

5-day training

Seven Centers:

LHMC, SKIMS, RIMS, GMC Surat,
MGIMS, PGI, AIIMS Raipur

JPNATC TRAINING











Planned:

II Workshop in December, 2018

More Site Visits

CLABSI Prevention









Thank you