Issue 5, Published: March 2018

NEWS LETTER

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Prof. Deepak Malviya
DIRECTOR

Date : 27/02/2018

MESSAGE

I am glad to learn that our Department of Microbiology, Dr Ram Manohar Lohia Institute of Medical Sciences, Lucknow is organizing a CME "Fungal Sepsis: An Update" on 17th March 2018 and also releasing 5th Annual News Letter of the Department for the year 2017.

The theme of the CME is a very pertinent topic in view of management of Fungal sepsis in immune compromised patients in critical care settings.

The deliberations in the CME by reputed Microbiologists and Critical Care Specialists will aid our clinicians and will be an eye opener.

The News Letter published by the department of Microbiology, will help us in chosing appropriate empirical antibiotic therapy for specific infections in specific settings and formulating antibiotic policy of the institute.

I, am confident that the CME will be an important scientific event that most of us will remember in the times to come.

I, on behalf of Dr Ram Manohar Lohia Institute of Medical Sciences, extend a hearty welcome to the participants of the CME and wish the organizers a grand success.

(Prof. Deepak Malviya)
Director

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Ref. No.: 183
Date: 20/3/18

MESSAGE

It gives me immense pleasure to learn that the Department of Microbiology, Dr Ram Manohar Lohia Institute of Medical Sciences, Lucknow is releasing 5th Annual News Letter of the Department for the year 2017 on the occasion of a CME "Fungal Sepsis: An Update" on 17th March 2018.

Such academic events and publication of News Letter are very essential for the Institute, which now provides the Medical Undergraduate, Post Graduate &Super specialty teaching under the same umbrella.

I extend warm welcome & wish success to the Faculty members, Residents & Staff of the Department of Microbiology for organizing the CME & Inauguration of the News Letter.

(Mukul Misra)
Dean

Prof. Mukul Mishra
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Dr. RMLIMS, Lucknow

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Dr. Subrat Chandra
(M.D.)
Medical Superintendent

Message

It makes me happy to learn that the Department of Microbiology, Dr Ram Manohar Lohia Institute of Medical Sciences, Lucknow is releasing 5th Annual News Letter of the Department for the year 2017 on the occasion of a CME "Fungal Sepsis: An Update" on 17th March 2018.

Discussion in the CME on such an important topic and annual antibiogram data in the news letter is very relevant to our institute's patient care services which is a tertiary care super speciality teaching hospital and has made already a mark in field of health care in Uttar Pradesh & the Country.

I congratulate the Faculty members, Residents & Staff of the Department of Microbiology for organizing the CME & Inauguration of the News Letter.

Medical Superintendent

From Editor's Desk

I joined department of Microbiology in November of 2017 and I feel proud and privileged to be part of Dr. RMLIMS family. I am happy to bring out this issue of ***News Letter*** from the department. The news letter contains antibiograms for antibiotics and antifungals, based on data collected from January through December 2017; we have also put together some interesting case reports and data from Tuberculosis and Virology laboratories.

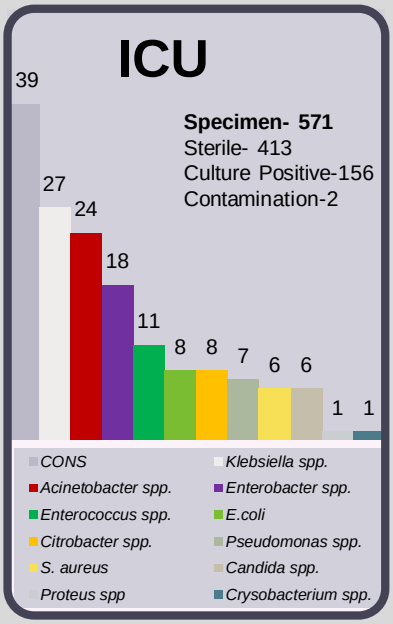
Release of news letter will take place as part of a half day CME on '***Fungal sepsis: an update***'. We often get overwhelmed with bacterial infections and fungal infections are overlooked. With advances in critical care medicine and introduction of broad-spectrum antibiotics, the incidence of invasive fungal infections in intensive care is on the rise, especially in patients with immune-suppression. While invasive candidiasis and candidemia are responsible for majority of cases; the epidemiology of *Candida* infections has changed in the last decade, with a gradual shift from *C. albicans* to non-albicans *Candida* strains which may be less susceptible to azoles. Mortality with mould infections could be as high as 50% as per literature, varying depending on the site, underlying disease and the use of antifungal agents such as echinocandins and voriconazole. Early accurate diagnosis allows prompt antifungal therapy. Besides this, we now have newer species of *Candida* associated with sepsis, which are multi drug resistant eg. *Candida auris*, which in some cases have proven to be resistant to all three classes of available anti fungal drugs. The first reported case of *C. auris* was in Japan in 2009 but it has now been found on five continents. Who better to discuss these issues than the doyen of Mycology in India ***Prof. Arunaloke Chakrabarti***, Head, Department of Microbiology, PGIMER Chandigarh. He would be the key note speaker at the CME.

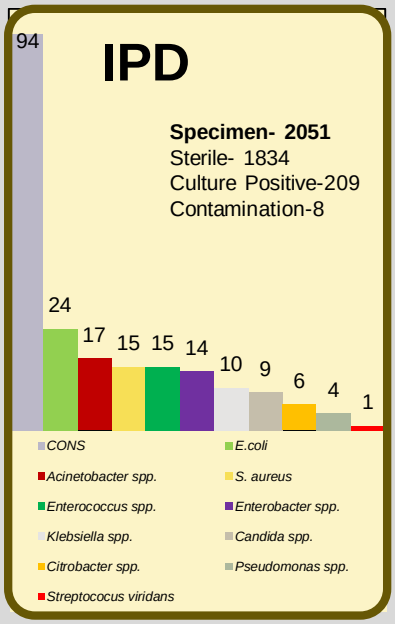
Lastly, I wish to thank all my faculty for their support; my team of subeditors and Dr. Gaurav Kumar, Dr. Shruti for helping me put this News Letter together. I sincerely hope his newsletter will be of help to clinicians in day to day patient management.

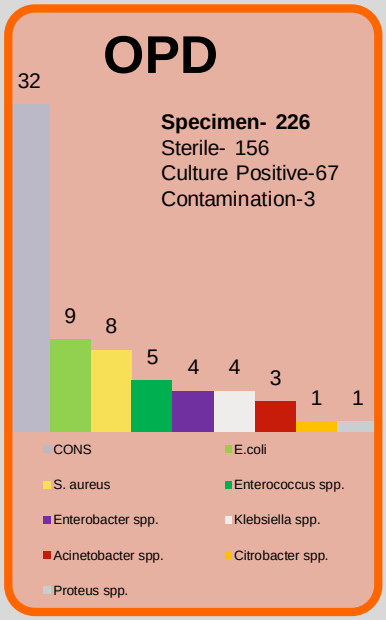
Dr. Jyotsna Agarwal
Professor & Head

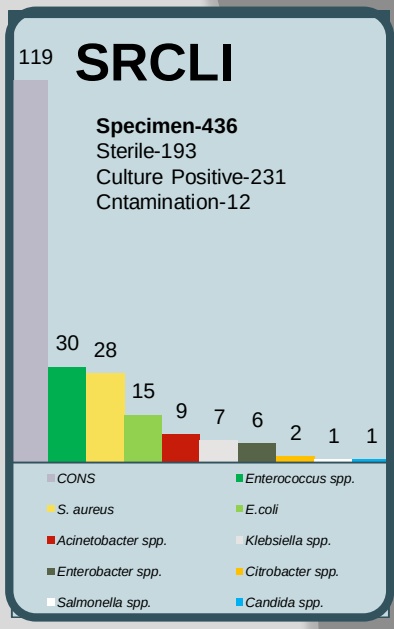
Blood (January- December 2017)

Total samples received= 3284; Culture positive= 663; Sterile= 2596; Contamination= 25 (growth of skin flora: diphtheroids, spore forming bacilli)



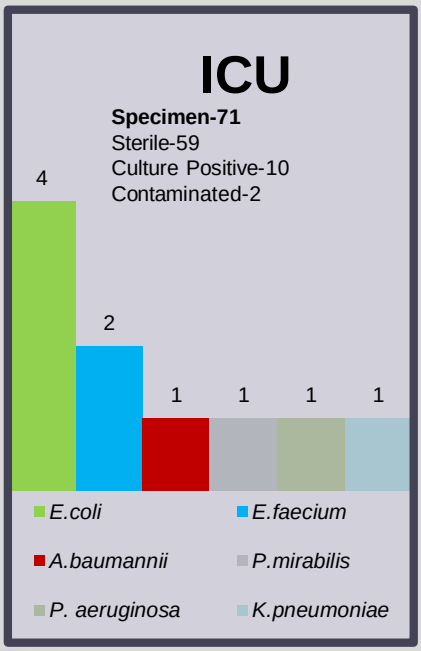


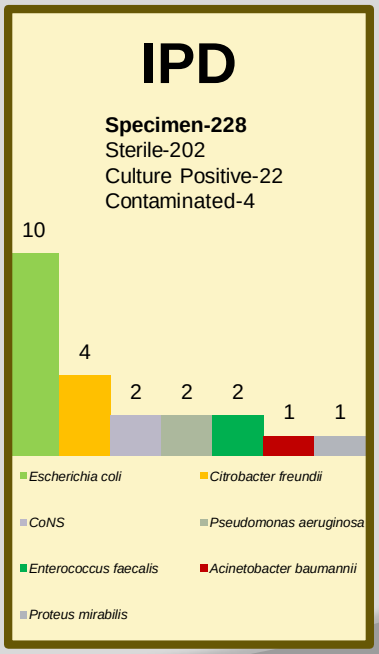


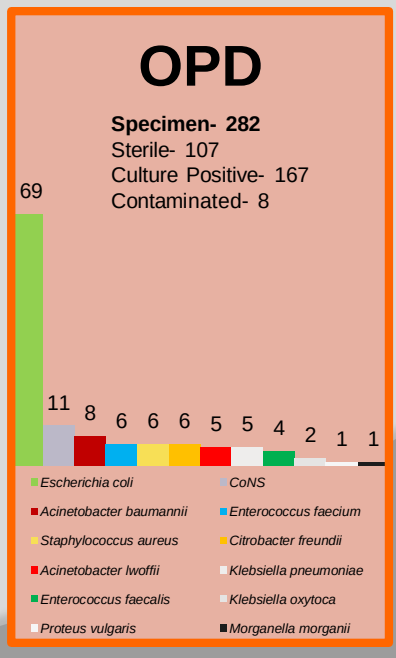


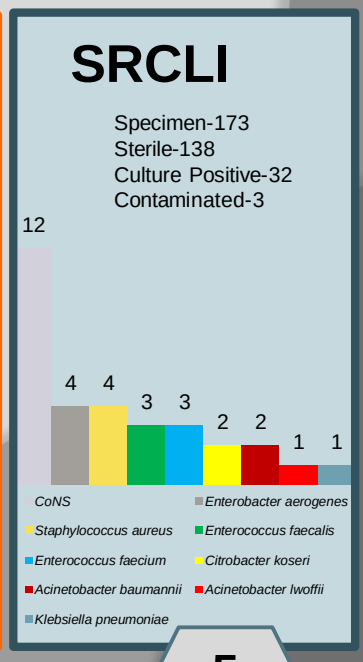
Body fluids (January- December 2017)

Total samples received= 754; Culture positive= 231; Sterile= 506; Contamination=17 (growth of skin flora: diphtheroids, spore forming bacilli)









Percentage sensitivity (Blood)

ICU	OPD
IPD	SRCLI

GPC	No. of isolates	PENI	CX	CFS	AMIKA	HLG/G	E	NETIL	CD	VA	TEICO	LZ	DOX	TET	CIPRO	LEVO	CHLOR
Enterococcus spp.	11	9	-	-	-	9	-	-	-	36	36	63	72	27	9	10	92
	15	67	-	-	-	53	-	-	-	86	78	86	73	67	28	28	95
	5	20	-	-	-	40	-	-	-	80	75	100	100	80	40	-	89
	30	34	-	-	-	54	-	-	-	85	87	100	80	70	40	43	95
CONS	39	8	8	36	86	32	11	89	26	95	92	81	81	82	13	32	48
	94	21	26	65	89	50	22	98	58	99	96	99	95	82	39	41	90
	32	13	13	52	72	34	9	93	28	97	97	64	93	87	19	28	93
	119	21	30	66	81	50	28	94	67	97	94	96	84	71	29	53	78
Staphylococcus aureus	6	0	0	33	83	33	0	83	0	100	100	83	50	33	0	0	40
	15	7	28	42	73	40	20	93	40	100	100	100	93	80	13	31	100
	8	25	62	75	100	62	37	87	62	100	100	100	87	87	50	62	86
	28	19	35	50	86	73	59	100	69	100	97	100	96	95	30	54	95

GNB	No. of isolates	AS	PIT	CTX	CX	CPM	CFS	IMI	MERO	ETP	DORI	AT	DOX	TET	GENTA	AMIKA	NETIL	TOBRA	COL	CIPRO	LEVO	OFLOX	PB
Acinetobacter spp.	24	A	29	0	-	4	40	8	18	-	28	-	25	17	12	12	31	24	-	4	22	-	-
	3	67	67	0	-	67	67	67	67	-	0	-	100	67	67	67	50	67	-	67	33	-	-
	17	31	41	0	-	25	64	52	52	-	21	-	64	31	41	52	47	64	-	43	47	-	-
	9	63	75	0	-	41	75	47	52	-	84	-	100	38	38	22	-	52	-	62	75	-	-
Citrobacter spp.	8	28	50	0	50	28	43	43	50	67		0	43	0	25	50		25		12	0	-	-
	0	-	-	-	-	-	-	-	-	-	-	--	-	-	--	-	-	-	-	-	--	-	---
	6	33	33	0	25	33	20	50	33	25		25	50	60	33	16		33		16	16	-	-
	2	50	50	50	0	0	0	0	0	50	-	0	50	0	50	50	-	50	-	50	50	-	--
Escherichia coli	8	14	28	0	0	28	50	57	57	42		0		0	25	87		14		0	0	-	-
	9	22	85	12	83	22	85	57	71	83		12	44	22	44	100		44		0	22	-	-
	24	22	69	10	47	9	60	73	83	76		5	45	33	45	69		31		13	20	-	-
	15	0	67	0	17	33	75	71	86	75	-	25	67	17	60	79		43		31	33	-	-
Enterobacter spp.	18	0	6	13	0	0	5	22	22	10		0	33	33	11	12		6		5	5	-	--
	4	0	25	0	0	25	25	25	25	25		25	25	25	50	0		0		33	33	-	-
	40	46	30	22	11	53	42	12	10	36		25	38	61	5	38		12		23	31	--	-
	6	0	33	17	0	0	0	17	17	17		0	67	17	0	59		0		49	67	-	-
Klebsiella spp.	27	0	4	0	0	4	8	11	4	8.3	-	8	25	33	11	28		0	-	8	8	-	-
	4	25	100	0	0	5	50	67	50	0	-	0	25	50	50	75		25	-	25	50	-	-
	10	33	60	55	40	66	55	70	60	60	-	60	66	55	55	44		55	-	50	62	-	-
	7	57	67	0	17	33	29	15	29	40	-	17	71	71	43	20		33	-	83	83	-	-
Pseudomonas spp.	7	-	57	-	-	28	50	17	14	-	43	0	-	-	42	50	0	40	71	42	42	33	71
	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4		75			75	75	66	75		75	50			50	75	75	25	100	25	25	0	100
	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Percentage sensitivity (Body Fluids)

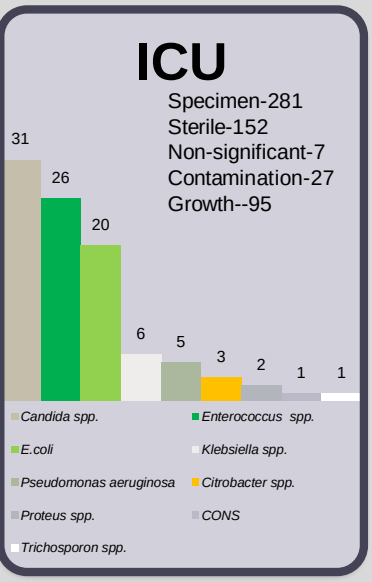
ICU | OPD | IPD | SRCLI

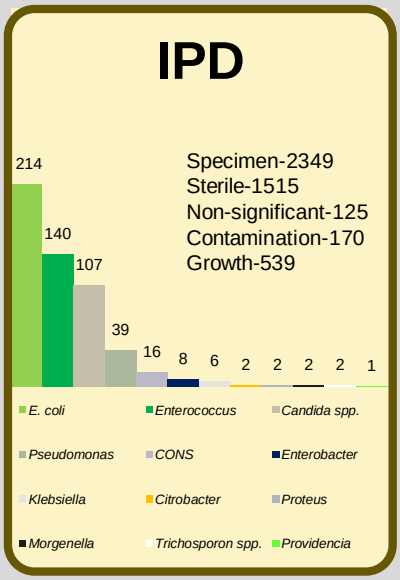
GPC	NO.OF ISOLATES	PENI	CX	CFS	AMIKA	GENTA	HLG	CD	E	VA	LZ	LEVO	CIPRO	DOX	TET	TEICO	CHLOR	NETIL
Staphylococcus aureus	6	0	67	100	83	67	--	100	17	100	100	67	50	100	100	100	100	83
	4	0	50	100	100	50	--	100	25	100	100	75	0	75	75	100	100	100
CONS	2	0	100	100	50	50	--	100	0	100	100	100	50	100	100	100	100	100
	11	27	45	91	91	45	--	45	36	91	91	64	27	91	73	91	100	100
	12	33	58	58	75	58	--	83	42	100	100	58	25	75	42	100	67	83
Enterococcus faecium	02	0	--	--	--	--	100	--	0	100	100	0	0	100	50	100	50	--
	06	17	--	--	--	--	34	--	34	100	100	34	17	50	34	100	83	--
	03	33	--	--	--	--	0	--	33	33	100	33	33	67	67	33	100	--
Enterococcus faecalis	02	0	--	--	--	--	0	--	0	50	50	50	0	100	50	50	50	--
	04	50	--	--	--	--	75	--	50	100	100	0	0	100	25	100	75	--
	03	100	--	--	--	--	67	--	100	100	100	67	33	100	67	100	100	--

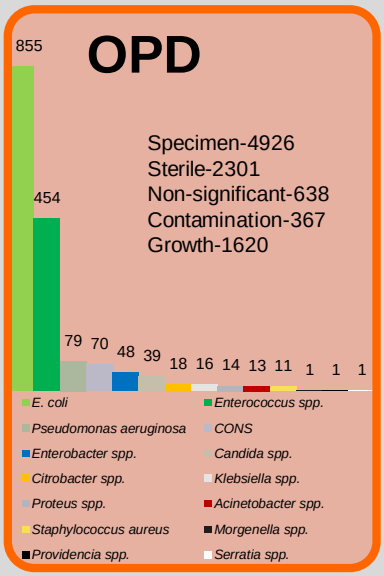
GNB	NO.OF ISOLATES	PIT	AS	CFS	CAZ	CX	CPM	CTX	AT	MERO	IMI	DORI	ETP	AMIK	GENTA	TOB	COL	LEVO	CIPRO	DOX	TET	NETIL
Acinetobacter baumannii	1	100	--	0	--	0	0	--	--	100	--	--	0	0	0	0	100	100	100	0	0	--
	1	0	0	0	0	0	0	0	0	0	0	---	0	0	0	0	100	0	0	0	0	--
	8	88	43	43	63	0	63	0	0	100	67	100	100	88	88	71	100	57	37	75	57	83
	2	100	100	100	50	--	0	--	--	--	100	100	--	100	100	100	100	100	100	100	100	100
Acinetobacter lwoffii	5	100	25	80	67	33	80	33	0	80	100	100	33	60	33	100	100	80	80	80	100	33
	1	100	100	100	100	--	100	--	--	--	100	100	--	100	100	100	100	--	--	100	100	100
Citro-bacter freundii	4	67	25	67	0	33	75	0	0	75	33	--	50	50	25	33	---	50	25	33	50	--
	6	67	0	40	0	20	17	0	50	--	50	--	40	50	20	60	--	50	40	20	17	--
Citro-bacter koseri	3	100	33	100	67	0	67	0	0	100	100	100	100	100	67	67	100	100	67	33	67	100
	2	100	100	100	---	100	100	100	--	100	100	100	100	100	100	100	--	100	100	100	100	100
Escherichia coli	4	75	50	75	0	33	0	0	0	100	50	--	67	50	50	75	--	25	25	0	25	--
	10	30	33	25	83	30	20	10	--	10	30	--	44	71	60	17	--	20	10	40	40	--
	69	38	18	53	10	27	21	11	14	67	71	100	57	72	48	39	100	25	19	37	33	33
Enterobacter aerogenes	9	78	78	14	14	63	44	25	25	100	78	100	50	67	56	100	56	33	22	56	38	100
	4	25	25	0	0	33	0	0	0		25	100	33	25	25	100	33	0	50	0	0	100
Klebsiella pneumoniae	01	0	0	0	0	0	0	0	0	--	100	--	0	0	0	--	0	0	0	0	--	--
	05	80	50	60	100	60	60	60	60	100	80	--	80	80	80	--	60	60	80	75	50	--
	01	100	100	100	100	100	100	100	100	100	100	--	100	100	100	--	100	100	100	100	100	--
Proteus mirabilis	01	100	100	100	0	--	0	0	100	100	100	--	--	0	0	--	0	0	0	0	0	0
	01	100	0	0	0	--	100	--	0	100	0	--	--	0	0	--	0	0	0	0	0	0
	01	--	0	--	0	--	0	--	--	0	100	--	--	100	100	--	100	100	100	100	100	0
Pseudomonas aeruginosa	01	0	0	--	0	--	0	--	0	--	0	--	--	0	0	--	0	0	--	--	--	--
	02	100	50	100	0	--	50	--	0	0	0	50	--	100	100	100	50	0	--	--	50	50
	26	68	50	40	38	67	55	67	47	70	41	68	100	72	75	100	54	50	50	75	58	72

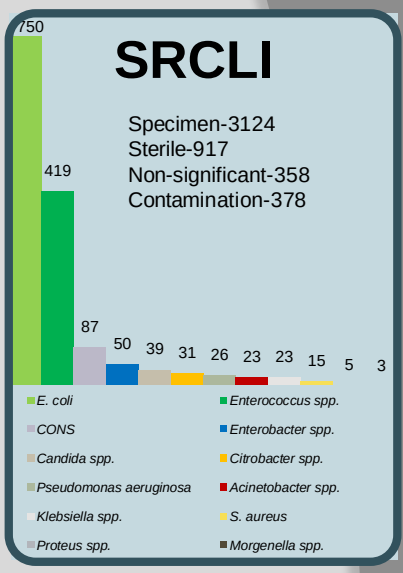
Urine (January- December 2017)

Total samples received=10680; Culture positive= 3725; Sterile=4885
Contamination=942; Non significant growth:=128



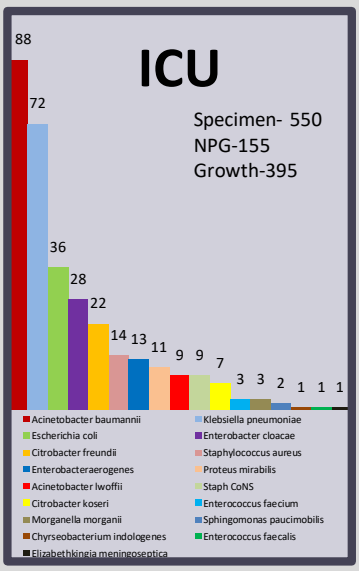


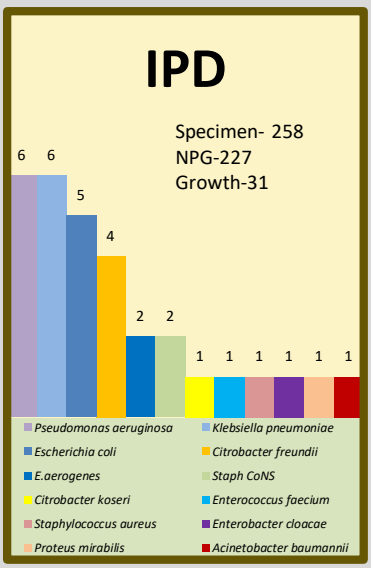


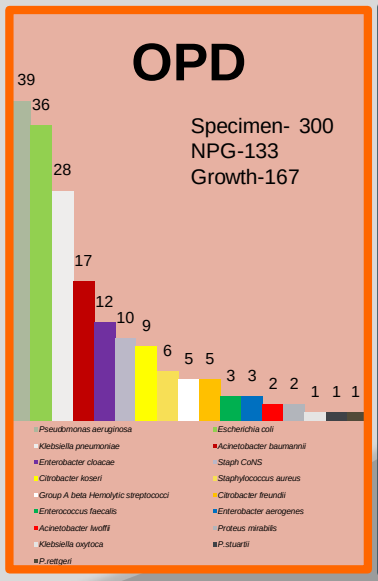


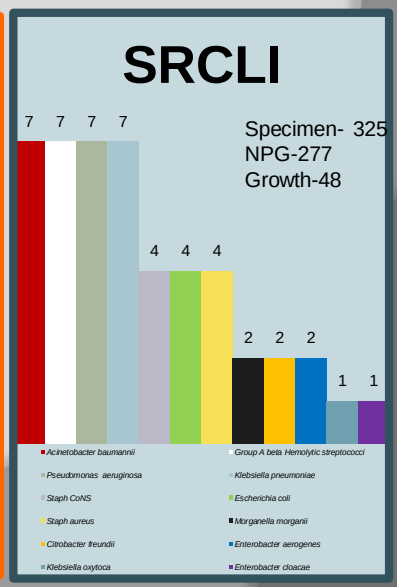
Respiratory specimens* (January- December 2017)

Total samples received=1456; Data analysed for 1433 samples (details for rest were missing); Culture positive=641; Non significant growth=792; from ICU & OPD: 19 & 13 samples were polymicrobial respectively









*Includes sputum, BAL, mini BAL, throat swab & tracheal aspirate

ICU | OPD
IPD | SRCLI

Percentage sensitivity (Urine)

GPC	No. of isolates	PENI	CFS	AMIKA	HLG	NETIL	FOSFO	VA	TEICO	LZ	DOX	TET	NF	NX
Enterococcus spp.	26	8	-	-	23	-	67	65	72	92	65	31	50	0
	140	55	-	-	37	-	89	91	90	95	51	19	76	12
	454	55	-	-	37	-	92	94	94	99	56	17	80	15
	419	72	-	-	54	-	96	97	97	97	50	16	89	17
CONS	1	0	-	100	0	100	-	100	100	100	0	0	100	0
	16	13	50	0	27	87	-	93	100	100	67	75	100	13
	70	19	76	81	48	94	-	99	98	100	77	52	86	19
	87	65	71	82	57	95	-	94	84	93	76	58	88	31
S. aureus	11	0	60	91	44	100	-	100	100	90	55	55	90	0
	15	7	64	93	40	93	-	87	80	87	64	40	92	8

GNB	No. of isolates	AS	PIT	CTX	CFS	CPM	AT	IMI	MERO	DORI	GENTA	AMIKA	NETIL	FOS	DOX	TET	TOB	COL	NX	OFFLOX	NF
Acineto-bacter spp.	13	50	69	33	69	62	-	67	77	-	69	64	-	-	62	55	62	-	62	-	31
	23	91	87	61	100	87	-	96	95	-	95	94	-	-	91	84	86	-	76	-	13
Citrobacter spp.	3	0	0	0	0	0	0	0	0	-	33	33	-	--	67	67	0	-	0	-	0
	2	0	50	0	50	50	0	0	50	-	0	50	-	-	0	0	0	-	50	-	50
	18	28	28	13	23	28	11	50	39	-	31	38	-	-	59	47	25	-	18	-	31
	31	57	77	61	74	76	61	74	78	-	67	76	-	-	69	70	72	-	65	-	65
E.coli	20	20	26	11	33	6	5	29	37	-	32	42	-	76	17	17	11	-	11	-	67
	214	35	61	17	64	34	24	61	75	-	47	69	-	81	45	37	39	-	18	-	77
	855	40	71	22	78	36	27	69.4	80	-	50	75	-	92	42	33	44	-	20	-	82
	750	57	83	38	82	60	44	82	91	-	65	84	-	91	48	36	59	-	40	-	85
Entero-bacter spp.	8	29	63	38	63	38	38	63	72		38	63			50	38	43		38		35
	48	38	65	41	67	47	51	68	72	-	56	66	-	-	64	61	49	-	46	-	55
	50	59	88	62	91	77	64	89	95	-	83	89	-	-	73	69	80	-	71	-	62
Klebsiella spp.	6	0	0	0	0	0	0	0	0	-	17	0	-	33	33	0	-	0	-	0	-
	6	33	60	0	100	33	0	67	60	-	25	20	-	33	67	0	-	0	-	20	-
	16	25	37	14	42	40	25	40	36	-	42	33	-	56	57	37	-	15	-	7	-
	23	35	73	48	84	65	44	81	86	-	67	75	-	59	62	52	-	65	-	64	-
Proteus spp.	2	0	100	0	0	50	0	0	100	-	0	0	-	0	0	0	-	0	-	-	-
	2	50	50	0	0	0	50	0	50	-	50	0	-	0	50	50	-	50	-	-	-
	14	51	71	55	64	50	50	21	78	-	75	50	-	30	18	50	-	25	-	-	-
	5	75	100	100	100	50	100	40	100	-	50	100	-	80	60	100	-	50	-	-	-
Pseudo-monas aeruginosa	5	-	20	-	40	40	25	20	20	20	20	20	20	-	-	20	80	0	33	-	100
	39	-	60	-	60	52	52	53	51	58	57	55	54	-	-	67	96	71	36	-	91
	79	-	66	-	66	54	57	55	95	64	56	48	52	-	-	48	98	40	35	-	95

Percentage sensitivity (Respiratory specimen)

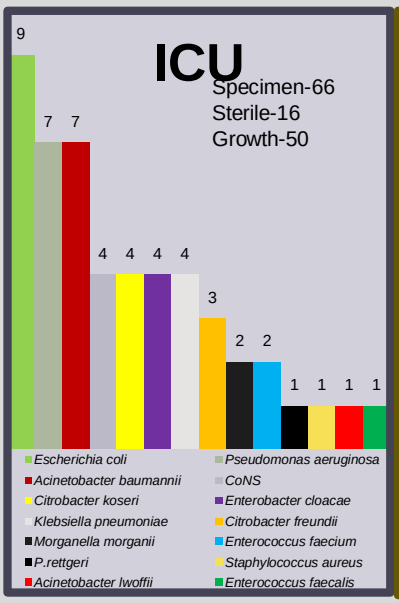
ICU | OPD | IPD | SRCLI

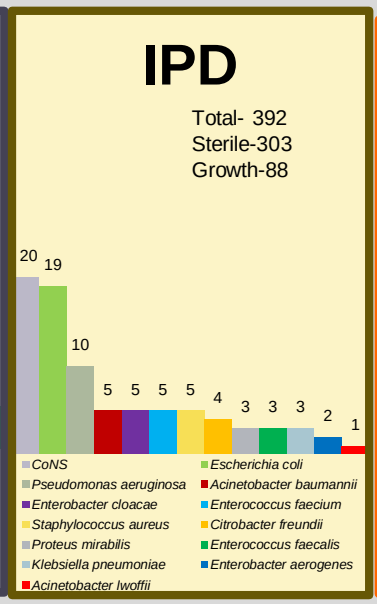
GPC	NO.OF ISOLATES	PENI	CX	CFS	AMIK	GENTA	HLG	CD	E	VA	LZ	LEVO	CIPRO	DOX	TET	TEICO	CHLOR	NETIL
Staphylo-coccus aureus	14	0	20	18	14	8	--	21	9	100	100	8	8	100	15	86	92	70
	1	0	0	0	0	0	--	0	0	100	100	0	0	100	0	100	100	100
	6	25	50	50	33	40	--	67	40	100	100	0	0	100	60	83	100	100
	4	33	67	67	75	33	--	33	0	100	100	0	0	67	50	100	100	75
CONS	9	0	0	14	88	11	--	38	0	100	100	0	0	67	50	100	100	100
	2	0	0	0	0	0	--	0	0	100	100	0	0	50	0	100	100	50
	10	25	33	33	70	40	--	50	33	90	100	44	25	55	40	90	90	100
	4	0	0	50	50	67	--	75	67	100	100	100	33	100	67	100	100	75
Entero-coccus faecium	3	0	--	--	--	--	0	--	0	100	100	0	0	67	33	100	100	--
	1	100	--	--	--	--	100	--	100	100	100	100	100	100	100	100	100	--
Entero-coccus faecalis	1	0	--	--	--	--	0	--	0	100	100	0	0	100	100	100	100	--
	3	67	--	--	--	--	33	0	0	100	100	33	0	100	100	100	100	--

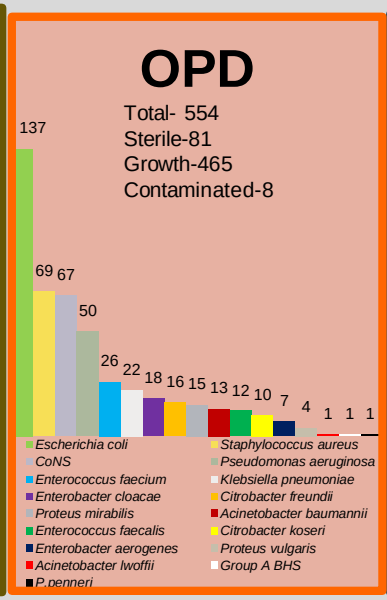
GNB	NO.OF ISOLATE	PIT	AS	CFS	CAZ	CX	CPM	CTX	AT	MERO	IMI	DORI	ETP	AMIKA	GENTA	TOB	COL	LEVO	CIPRO	DOX	TET	NETIL
Acinetobacter baumannii	88	7	13	25	3	--	4	0	6	11	9	17	15	7	7	7	81	9	5	21	5	12
	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	100	0	100
	17	19	23	29	13	20	13	0	0	12	18	40	20	18	18	20	100	20	13	35	24	20
	7	29	17	67	20	0	14	0	33	40	43	20	50	43	28	9	100	43	17	29	43	20
Acinet obact er lwoffii	9	14	14	33	0	33	38	0	0	33	0	33	50	33	44	22	60	25	11	38	38	17
	2	0	0	0	0	0	0	0	0	0	0	100	0	100	0	0	100	0	0	100	0	100
Citriobacter freundii	22	0	5	12	0	0	10	0	0	5	9	50	10	10	0	0	100	5	5	10	10	--
	4	25	0	0	0	33	0	0	0	25	25	--	33	25	0	0	100	33	0	50	33	--
	5	60	20	33	0	50	50	25	25	25	60	--	75	60	50	40	100	25	20	40	25	--
	2	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Escherichia coli	36	28	7	34	0	23	6	0	11	50	24	--	32	44	44	26	100	12	11	31	23	--
	5	40	0	75	0	75	20	0	0	60	60	--	75	60	20	0	100	0	0	0	0	--
	36	56	33	60	17	41	31	13	15	59	48	100	56	63	37	39	100	18	19	43	29	100
	4	100	67	67	0	75	33	25	25	75	50	--	75	50	25	25	--	50	33	25	75	--
Enterobacter aerogenes	13	25	33	0	0	13	0	0	33	18	25	--	11	0	17	0	100	20	0	10	0	--
	2	100	50	100	50	100	50	0	0	100	50	--	100	100	100	100	100	100	100	100	50	--
	3	100	33	100	0	50	100	0	0	100	100	---	100	50	67	100	--	67	50	100	100	--
	2	50	100	100	100	100	100	100	100	100	100	--	100	100	100	100	--	100	100	100	100	--
Enterobacter cloacae	28	11	0	8	7	4	7	8	9	15	18	50	8	7	11	11	100	4	7	50	32	--
	1	100	0	0	0	100	0	0	0	100	100	--	100	100	0	0	--	0	0	100	100	-
	12	36	10	42	9	36	42	9	9	66	60	100	45	27	33	33	100	50	42	36	50	--
	1	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	--
K. pneumoniae	72	11	6	9	4	7	5	0	3	13	18	50	11	25	23	10	100	17	10	34	35	40
	6	67	0	67	0	50	0	17	33	60	67	--	50	50	33	0	--	83	17	50	50	--
	28	59	46	80	33	44	67	25	36	60	50	67	58	67	50	39	100	46	44	67	63	--
	7	100	71	100	100	100	100	60	80	100	83	100	100	100	100	80	100	86	83	57	86	100
P.mirabilis	10	80	50	60	0	50	25	0	0	80	60	86	50	40	33	13	--	0	0	10	0	0
	1	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	--	100	100	100	100	100
	2	100	50	100	50	100	0	0	0	100	100	--	50	100	100	0	--	0	0	0	10	100
Pseudomonas aeruginosa	85	35	20	16	13	20	20	20	18	14	10	29	25	16	18	13	78	11	11	20	40	11
	6	80	100	100	100	--	100	100	100	80	80	100	100	83	67	83	100	100	83	--	100	60
	39	65	67	56	51	63	46	50	50	75	44	53	100	43	49	60	100	50	58	80	56	54
	7	86	--	86	62	--	62	--	80	62	86	86	--	86	62	86	100	57	30	--	--	50

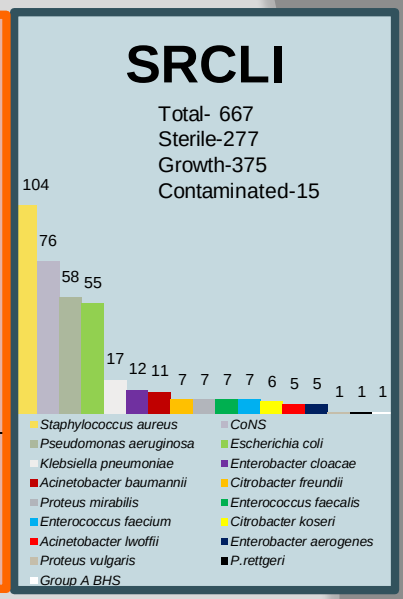
Pus (January- December 2017)

- Total pus samples received=1690; Data analysed for 1679 samples (details for rest were missing) Culture positive= 978; Sterile=677; Contaminated=23
- From OPD and SRCLI rerspectively 10 & 9 pus samples were polymicrobial
- Contamination indicates skin flora/ Non pathogenic organism









Abbreviations used

AS	Ampicilin-Sulbactam	AMIKA	Amikacin
AT	Aztreonam	AB	Amphotericin B
CAS	Caspofungin	CPM	Cefipime
CAZ	Ceftazidime	CFS	Cefoperazne- Sulbactum
CTX	Cefotaxime	CD	Clindamycin
CX	Cefoxitin	CIPRO	Ciprofloxacin
CHLOR	Chloramphenicol	COL	Colistin
DORI	Doripenem	DOX	Doxycycline
E	Erythromycin	ETP	Ertapenem
FLC	Fluconazole	FLU	Flucytosine
FOS	Fosfomycin	GENTA	Gentamicin
HLG	High level Gentamicin	IMI	Imipenem
LZ	Linezolid	LEVO	Levofloxacin
MYC	Micafungin	MERO	Meropenem
NF	Nitrofurantoin	NX	Norfloxacin
NETIL	Netilmicin	OFLOX	Ofloxacin
PENI	Penicillin	PIT	Piperacillin-Tazobactam
PB	Polymixin-B	TOB	Tobramycin
TOB	Tobramycin	TET	Tetracycline
TEICO	Teicoplanin	VA	Vancomycin
VRC	Voriconazole		

Percentage sensitivity (Pus)

ICU	OPD
IPD	SRCLI

GPC	NO.OF ISOLATES	PENI	CX	CFS	AMIKA	GENTA	HLG	CD	E	VA	LZ	LEVO	CIPRO	DOX	TET	TEICO	CHLOR	NETIL
Staphylococcus aureus	01	0	0	0	100	0	--	100	100	100	100	100	0	0	0	100	100	100
	05	20	40	40	60	40	--	60	60	100	100	60	20	80	60	100	100	100
	69	10	47	68	83	46	--	78	33	100	100	16	2	86	62	100	92	93
	104	9	58	86	81	49	--	81	51	100	97	31	2	89	76	93	94	92
CONS	04	0	0	0	75	0	--	50	25	100	100	75	33	75	50	75	33	100
	20	21	29	33	47	18	--	42	13	100	95	21	25	71	53	85	76	78
	67	11	21	50	73	34	--	65	25	98	98	46	16	71	69	97	81	92
	76	24	48	77	82	43	--	75	42	93	96	59	42	79	74	88	75	96
Enterococcus faecium	2	100	--	--	50	--	100	100	50	100	100	100	100	100	100	100	100	100
	5	0	--	--	50	--	0	50	0	80	100	40	20	75	67	75	100	100
	26	29	--	--	25	--	44	60	6	87	95	25	19	67	31	95	87	100
	7	57	--	--	--	--	43	--	29	100	100	67	43	86	43	100	100	100
Enterococcus faecalis	1	0	--	--	--	--	0	--	--	0	100	0	0	100	0	0	100	--
	3	33	--	--	--	--	33	--	33	33	33	0	0	100	67	33	67	--
	9	22	--	--	--	--	89	--	22	100	100	11	11	67	22	100	88	--
	5	100	--	--	--	--	100	--	75	60	80	75	50	80	60	60	100	--

GNB	NO.OF ISOLATE	PIT	AS	CFS	CAZ	CX	CPM	CTX	AT	MERO	IMI	DORI	ETP	AMIKA	GENTA	TOB	COL	LEVO	CIPRO	DOX	TET	NETIL
Acinetobacter baumannii	7	14	0	20	0	0	0	0	0	0	0	0	0	16	0	0	60	0	0	14	14	0
	5	25	50	0	0	0	25	0	0	50	20	50	0	20	20	33	100	40	20	60	50	25
	13	27	30	25	10	0	25	20	50	100	17	58	75	39	39	45	100	39	39	50	64	20
	11	82	50	82	73	0	82	0	0	70	73	100	0	73	73	67	78	67	80	55	55	80
Acinetobacter lwoffii	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0
	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	100	0
	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5	25	20	25	0	0	20	0	0	25	50	75	50	60	0	20	67	80	0	50	60	40
Citrobacter freundii	3	100	100	50	100	50	100	100	100	100	100	--	100	100	67	100	--	100	67	100	67	--
	4	50	0	25	0	50	0	0	0	50	50	--	50	50	50	25	--	33	0	25	25	--
	16	27	22	38	13	20	20	10	18	20	36	--	18	36	27	30	--	22	10	10	40	--
	8	75	86	86	71	57	83	57	57	88	71	100	86	75	88	75	--	86	75	100	75	100
Citrobacter koseri	4	25	33	25	50	0	25	0	0	25	0	100	0	25	0	33	0	25	25	75	33	0
	3	33	0	50	0	0	67	50	33	33	67	--	33	33	33	33	--	50	33	33	0	--
	10	50	11	57	17	33	30	0	17	60	56	75	50	40	30	22	100	30	10	20	33	67
	6	25	40	40	0	0	50	50	50	50	50	100	75	50	50	80	100	33	33	50	17	100

Abbreviations used

IPD	In-Patient Department	OPD	Out-Patient Department
ICU	Intensive Care Unit	SRCLI	State Referral Centre for Laboratory Investigation

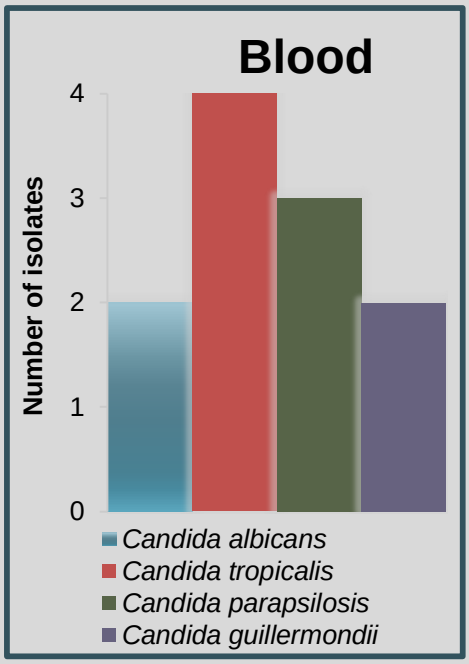
GPC	Gram Positive Cocci
GNB	Gram Negative Bacilli
CONS	Coagulase negative *Staphylococcus* species

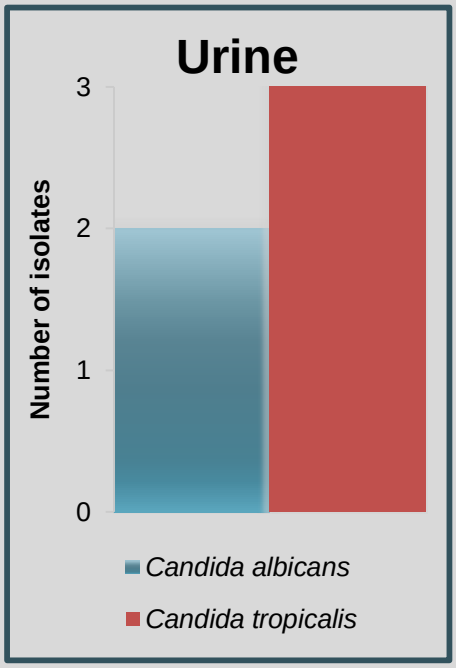
Percentage sensitivity (Pus)

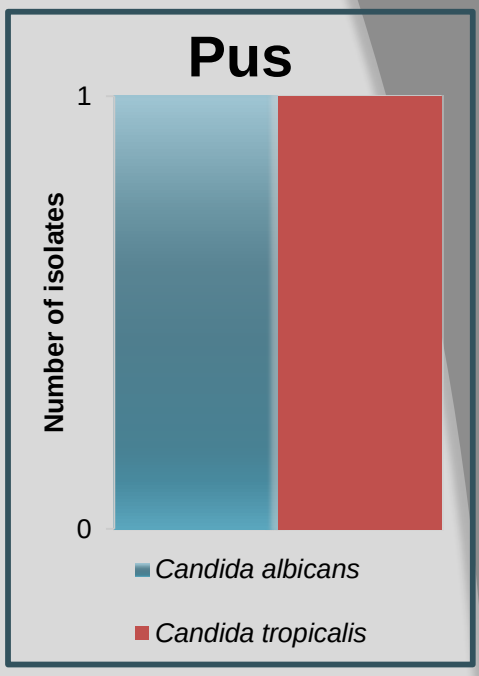
ICU	OPD
IPD	SRCLI

GNB	NO.OF ISOLATE	PIT	AS	CFS	CAZ	CX	CPM	CTX	AT	MERO	IMI	DORI	ETP	AMIKA	GENTA	TOB	COL	LEVO	CIPRO	DOX	TET	NETIL
Escherichia coli	9	33	25	38	0	33	11	0	13	67	56	--	67	67	33	11	--	25	11	22	--	--
	19	32	6	50	0	39	17	0	18	73	63	--	68	61	37	19	--	22	6	16	22	--
	137	47	29	46	18	37	27	15	20	63	58	--	54	65	41	35	--	18	15	38	34	--
	55	66	39	74	17	35	42	20	19	77	69	--	72	76	53	43	--	34	24	49	42	--
Enterobacter aerogenes	2	0	0	0	0	0	0	0	0	100	50	--	50	50	0	0	--	0	0	50	50	--
	7	86	60	50	33	33	50	20	20	83	50	100	83	67	57	50	100	50	33	71	17	100
	5	80	80	67	50	67	100	100	100	100	100	100	100	80	60	60	---	80	80	60	80	50
Enterobacter cloacae	4	25	25	25	33	0	0	0	0	25	25	50	0	33	0	0	100	0	0	0	25	0
	5	0	0	0	0	0	0	0	0	25	20	--	25	40	20	0	--	0	0	0	0	0
	18	47	33	54	8	28	29	0	0	67	56	100	38	56	39	28	100	33	28	71	44	100
	12	83	60	82	20	71	50	50	50	100	75	60	100	80	75	50	100	33	45	75	67	80
Klebsiella pneumoniae	4	0	25	0	0	0	0	0	0	0	50	0	0	25	25	0	--	0	0	25	50	0
	3	33	50	33	0	50	0	0	0	33	33	--	33	33	67	33	--	33	33	0	0	--
	22	41	40	35	33	16	29	11	13	40	24	100	32	48	24	28	100	29	32	35	62	50
	17	75	57	40	36	50	72	46	54	86	82	50	67	59	56	79	100	56	50	40	63	50
Morganella morgannii	2	100	100	0	50	--	100	0	--	50	0	100	--	0	0	0	100	50	100	100	0	0
	3	100	0	0	0	--	100	--	--	100	33	33	--	0	0	50	--	0	0	0	0	0
	2	100	50	50	0	--	50	--	--	100	100	50	--	100	50	50	--	50	50	50	50	50
Proteus mirabilis	3	100	67	100	50	0	100	100	100	100	100	100	100	100	67	33	--	67	67	33	33	--
	15	93	79	85	40	60	50	50	33	86	79	91	50	79	71	40	22	43	33	7	14	36
	7	83	50	57	33	--	45	--	--	60	67	67	--	50	33	0	25	14	17	17	33	0
Pseudomonas aeruginosa	7	0	0	14	0	0	0	50	0	17	17	0	0	0	17	20	100	14	17	100	50	14
	10	60	--	40	40	--	60	10	50	60	50	67	--	50	70	40	100	40	50	--	--	50
	50	74	40	74	67	40	61	75	73	68	63	76	50	65	63	66	94	59	64	67	--	59
	58	84	--	80	69	--	67	63	69	79	83	82	--	64	60	63	94	58	57	60	--	53

Antibiogram for Antifungals (January- December 2017)





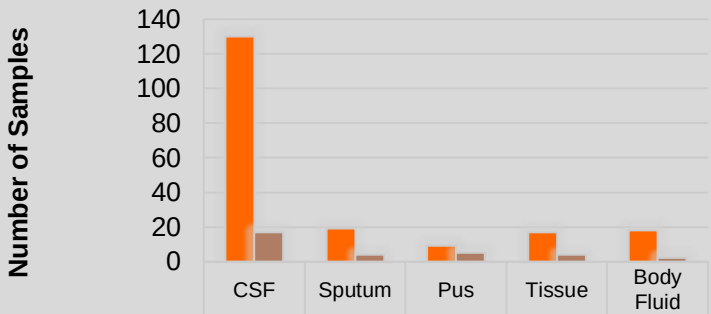


Sensitivity Result

sample	Fungal isolates	Number of isolates	FLC	VRC	CAS	MYC	AB	FLU
Blood	*C. albicans*	2	2	2	2	2	2	2
	C. tropicalis	4	1	1	1	1	1	4
	C. parapsilosis	3	3	3	3	3	2	3
	C. guillermondii	2	2	2	2	2	1	2
Urine	*C. albicans*	2	1	1	1	1	1	1
	C. tropicalis	3	2	3	3	2	3	3
Pus	*C. albicans*	1	1	1	1	1	1	1
	C. tropicalis	1	none	1	1	1	1	1

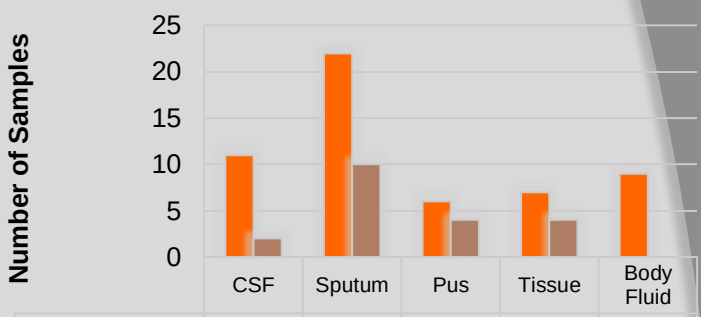
TB laboratory data (January-December, 2017)

Analysis of IPD Samples by Xpert MTB Assay (n=193)



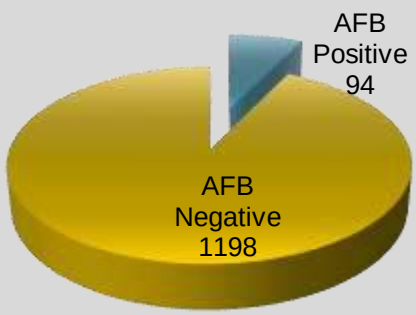
	CSF	Sputum	Pus	Tissue	Body Fluid
Total Samples	130	19	9	17	18
Positive samples	17	4	5	4	2

Analysis of OPD Samples by Xpert MTB Assay (n=55)

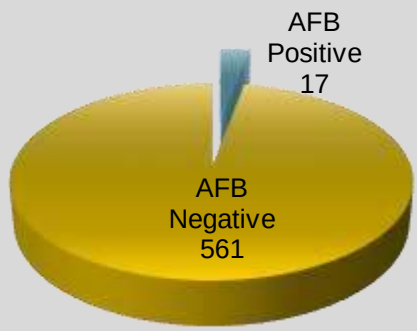


	CSF	Sputum	Pus	Tissue	Body Fluid
Total Samples	11	22	6	7	9
Positive samples	2	10	4	4	0

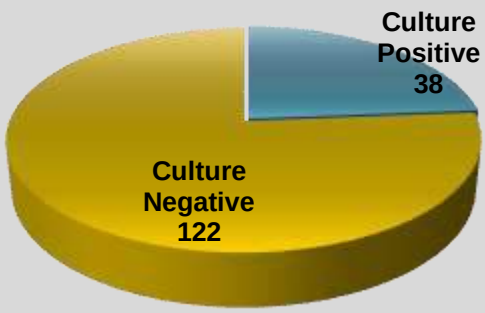
ANALYSIS OF OPD SAMPLE BY MICROSCOPY (n=1292)



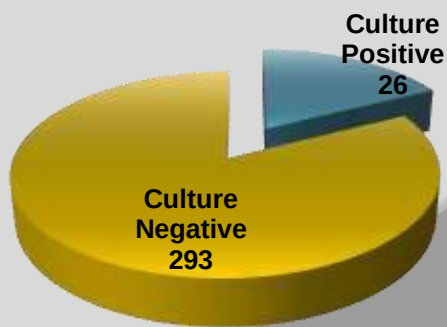
ANALYSIS OF IPD SAMPLE BY MICROSCOPY (n=578)



ANALYSIS OF OPD SAMPLE BY MGIT CULTURE (n=160)



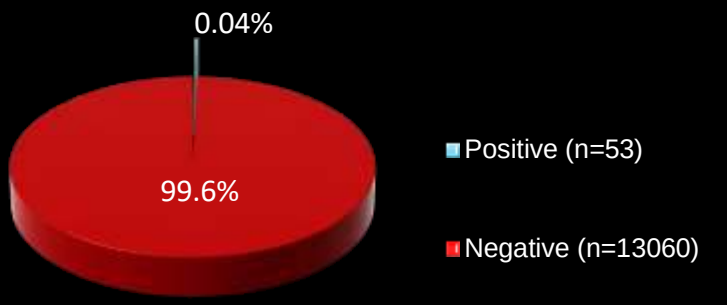
ANALYSIS OF IPD SAMPLE BY MGIT CULTURE (n=319)



Virology laboratory data (January-December 2017)

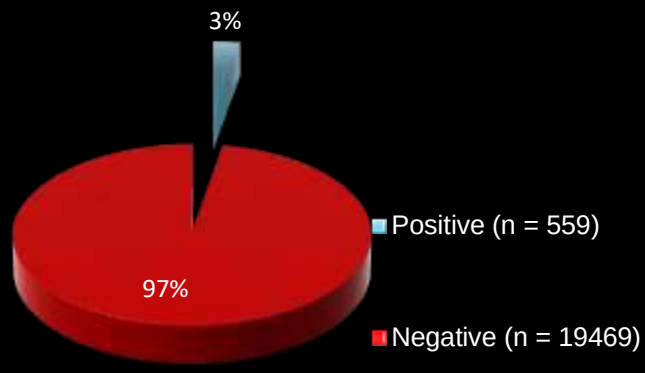
Anti HIV Antibody

Total samples received from January-December 2017
n=13113



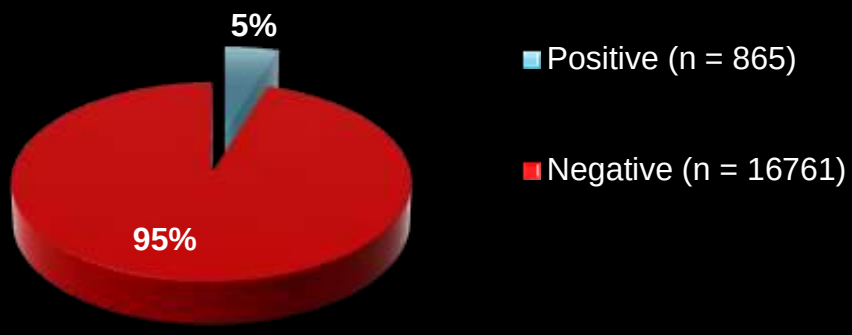
Anti HCV IgM Antibody

Total samples received from January-December 2017
n=20028



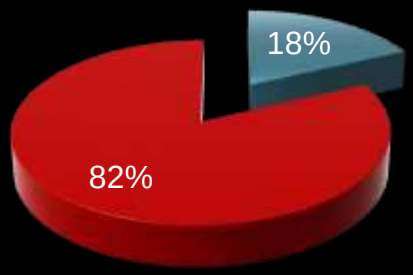
HBsAg

Total samples received from January-December 2017
n=17626



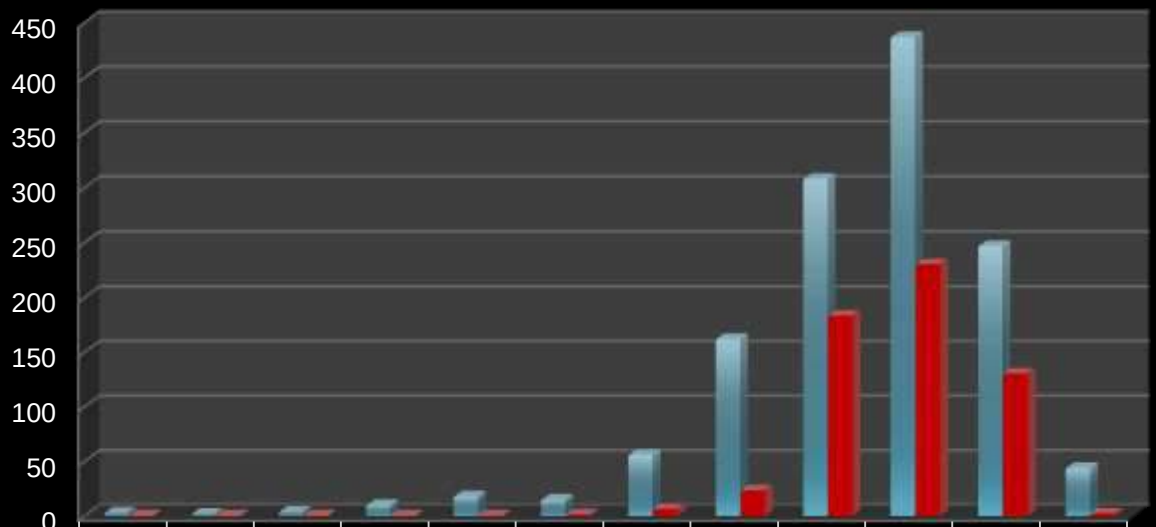
Dengue

Total samples received from January-December 2017 n=1543



Month wise Dengue case distribution for year 2017

- Positive includes all samples positive for NS1 or positive/equivocal for IgM or Both
- Maximum dengue cases appeared during September to November 2017



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total samples	3	2	4	10	18	15	56	162	308	437	247	44
Positive	0	0	0	0	0	1	6	23	183	230	130	2

New tests added in Departrment test list:

1. TPHA (*Treponema pallidum* haemagglutination); Rs 120/-
2. Chikungunya virus IgM capture ELISA (free of cost)

Test list along with quantity of sample & type of container is available at http://www.drrmlims.ac.in/hostipalservices.php.php in ***click here*** segment of Microbiology

Procalcitonin: clinical relevance

Dr. Jaya Garg, Associate Professor

Sepsis is one of the important reasons for Intensive Care Unit (ICU) admission and carries a high morbidity and mortality. Patients with systemic infection and organ dysfunction or shock are often difficult to distinguish from patients with similar clinical signs and lab finding, but without infection. Blood cultures are positive in less than 40% sepsis cases and the established biological markers of inflammation (leukocytes, C-reactive protein) and cytokine estimation (TNF-α, IL-1β, or IL-6) may often be influenced by parameters other than infection and may only be slowly released during progression of an infection. Since these common clinical and lab measurements lack sensitivity and specificity, other tests are needed to give an early marker of the infectious cause of a generalized inflammatory response to allow early diagnosis and for the use of specific treatment.

Several biomarkers have been studied in this regard; of them, Procalcitonin (PCT) seems promising. PCT is a peptide precursor of hormone C, the latter being involved with calcium homeostasis. It is composed of 116 amino acids and is produced by parafollicular cells (C cells) of the thyroid and by the neuroendocrine cells of the lung and the intestine.

The level of PCT in the blood stream of healthy individuals is below the limit of detection (0.01 µg/L) of clinical assays. The level of PCT rises in a response to a pro-inflammatory stimulus, especially of bacterial origin. In this case, it is produced mainly by the cells of the lung and the intestine. It does not rise significantly with viral or non-infectious inflammations. Hyper-procalcitonemia appears within 2-4 hrs in patients with infection, often reaches peak values in 8-24 h, and then persists as long as the inflammatory process continues. With recovery, PCT levels return to normal. It has been seen that decrease of serum PCT by at least 30% or its persistence at levels <0.25 ng/mL within the first 48 h since the onset of empirical antimicrobial treatment was an indicator of favourable survival outcome. In contrast, increased or stable PCT values indicated inappropriateness of the administered antimicrobials.

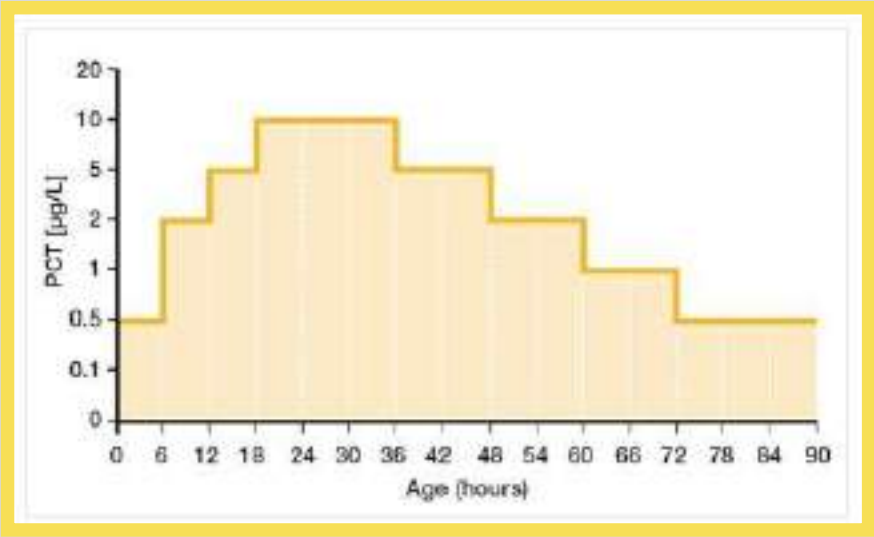
Table showing PCT Level clinical interpretation

S. no	PCT Level in µg/L	Interpretation	Disease Progression
1	< .05	Healthy Individual	Good
2	< .5	Sepsis Unlikely	Low risk of progression to sepsis
3	≥ 0.5 - <2.0	Sepsis Possible	Moderate risk of progression to sepsis
4	≥ 2.0 - <10	Sepsis likely	High risk of progression to sepsis
5	≥ 10	Severe Sepsis	Patient in severe sepsis

PCT reference range in neonates

PCT values of the newborn increase over the first 24 hours and stay elevated during the first 2-3 days of life . Therefore separate, well-defined reference ranges apply to new born infants at different hours of age during the first 48 hours of life which will help to identify early sepsis in newborn as PCT values are significantly higher than those of non-infected newborns. The adult reference range applies after day 3.

Figure: Age adjusted PCT cut-off values in newborns



There are a few situations described where PCT can be elevated by non-bacterial causes. These include, but are not limited to

1.Neonates < first 3 days of life (physiological elevation)
2.The first days after a major trauma, major surgical intervention, severe burns etc.
3.Patients with invasive fungal infections and acute attacks of plasmodium falciparum malaria
4.Patients with prolonged or severe cardiogenic shock and prolonged severe organ perfusion anomalies,
5.Small cell lung cancer, medullary C-cell carcinoma of the thyroid etc.

PCT is a helpful biomarker for early diagnosis of sepsis in critically ill patients. Nevertheless, the results of the test must be interpreted carefully in the context of medical history, physical examination, and microbiological assessment.

References

1. Becker, K. L et al, Crit. Care Med.2008. 36:941–952.
2. Joram N et al., Eur J Clin Microbiol Inf Dis 2011, Feb 12
3. Stocker et al., Neonatology 2010; 97: 165-174

Case Report: Ventilator associated Pneumonia due to *Chryseobacterium indologenes* in a patient with chronic bronchitis and acute renal injury

Dr. Shalini Trivedi, Dr. Sana Islahi, Dr. Manodeep Sen, Dr. Anupam Das

Introduction :

Chryseobacterium indologenes, formerly known as *flavobacterium indologenes* is an environmental organism which is usually an opportunistic nosocomial pathogen. *It* is a Gram-negative, aerobic, non-fermenting, non-motile, catalase-ve, oxidase-ve, and indole +ve bacillus. Patients with long term indwelling devices and prolonged exposure to broad spectrum antibiotics are at increased risk. *C. indologenes* is inherently resistant to many antimicrobial agents including carbapenem, aminoglycosides, and possess metallo beta lactamases.

Case Report :

A 76 yrs old male was admitted to our hospital on 10 November 2017 with complaints of altered sensorium, on and off fever, cellulitis of both lower limb, with Acute kidney injury with chronic bronchitis. Patient was intubated and put on ventilatory support. Routine bacteriological procedures and antimicrobial susceptibility were performed on samples like blood, urine and sputum as per standard guidelines. VITEK 2, an automated system was used for identification, characterization and antimicrobial pattern of this organism. Blood culture and urine culture were sterile. Sputum culture showed yellow colored colonies on Mueller Hinton which was Gram negative, non motile, oxidase and indole positive aerobic bacilli, identified as ***Chryseobacterium indologenes*** (Fig 1, 2). Antibiotic Susceptibility pattern from VITEK 2, showed susceptibility to colistin and resistance to all other drugs tested. After 15 days of intensive investigation and treatment unfortunately patient expired.

C. indologenes infection is an emerging nosocomial pathogen especially among immunocompromised patients. In hospital environment, these organisms exist in water systems and on wet surfaces of medical tools and equipments. In this case the patient was intubated and given ventilatory support which is likely to be the source and predisposing factor for *C. indologenes* infection.

References :

1.Hameed Aboobackar Shahul, et al .*Chryseobacterium indologenes* pneumonia in a patient with non-Hodgkin's lymphoma,.BMJ. 2014; 2014: bcr2014-204590.

2.Serkan Atıcı, et al. Ventilator-associated pneumonia caused by *Chryseobacterium indologenes*: a rare infant case and review of the literature. Springerplus. 2016; 5(1): 1741.

Figure 1: Colonies of *Chryseobacterium indologenes* on Mueller Hinton agar

Figure 2: Gram Negative Bacilli on Gram stain

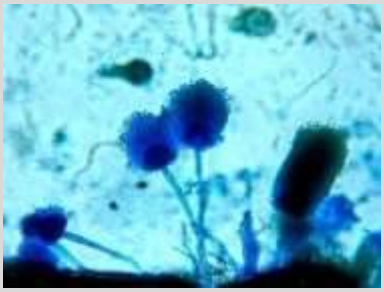
Case Report : Pulmonary aspergillosis caused by *Aspergillus terreus*

Dr Vikramjeet Singh, Dr Anupam Das

Pulmonary aspergillosis remains a significant cause of morbidity and mortality in immunocompromised patients. Timely and accurate diagnosis is essential but remains challenging because of non-specific clinical and radiological findings. An important impediment for timely diagnosis is the low yield of positive cultures from respiratory specimens. Furthermore, the positive cultures may not always be indicative of *Aspergillus* infection. Among the newly delineated species of *Aspergillus, A. terreus* is associated with severe life-threatening infections. We report a case of pulmonary aspergillosis due to *A. terreus* in a patient of chronic obstructive pulmonary disease.

Case Report

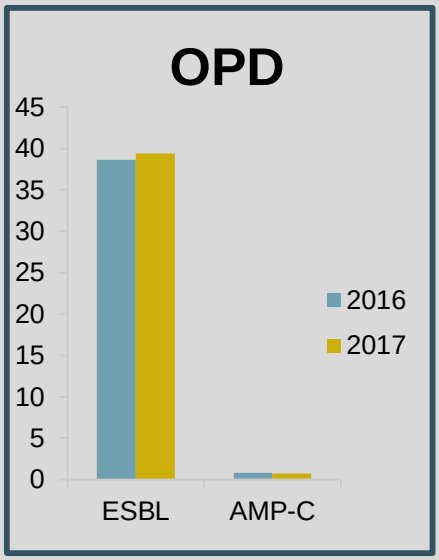
A 68 yr old diabetic and hypertensive female with chronic obstructive pulmonary disease was admitted in Intensive care unit with chief complaints of breathlessness and high grade fever. On diagnostic evaluation patient had high TLC (15,000/cu.mm) & deranged pulmonary function tests. On repeated endotracheal aspiration for bacterial culture sensitivity, polymicrobial microorganisms isolated. The bacterial isolates (*Pseudomonas aeruginosa, Klebsiella pneumoniae*, etc) were sensitive to carbapenem group of drugs and colistin. However, there was no improvement in patient's condition. She was then prepared for Bronchoalveolar lavage, 3 samples at an interval of 3 days were sent for fungal cause. After 5-7 days of aerobic incubation at 37 ℃ on Sabouraud dextrose agar, there was significant growth of mold. On the obverse mycelium growth was white to pale yellow, dense, in tufts. Conidia tan to light brown with a powdery texture turns media bright yellow. Reverse was reddish brown in appearance. There was presence of similar growth on 2nd and 3rd bronchoalveolar lavage samples from the patient. Patient was initially managed on the clinical suspicion of pulmonary mycosis using Amphotericin B but as soon clinicians were informed about *A. terreus* infection and its inherent resistance to Amphotericin B, the antifungal treatment was changed to voriconazole 200mg BD. Other supportive measures were continued with antimicrobials coverage. Repeat BAL culture after 3 weeks of voriconazole treatment was negative for aspergillosis. Gradually improvement in patient's condition was observed and she was discharged without any adverse events.



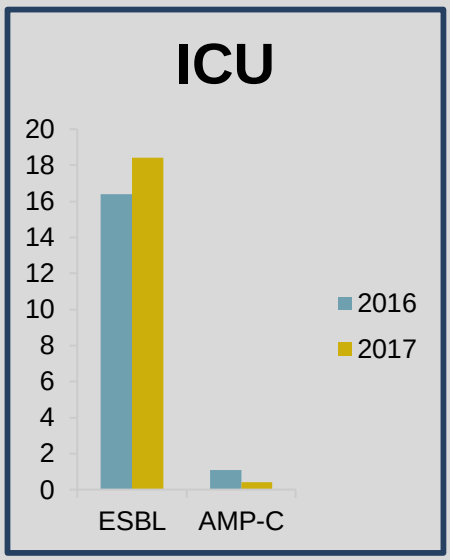
Conclusion: In this case initial treatment with antifungals showed remarkable improvement, which was due to early diagnosis. Isolation of *Aspergillus terreus* from multiple sets of BAL culture proves the pathogenic nature of the isolate, and should never be neglected**.**

Resistance trend for antibiotics amongst Gram negative rods isolated at our Institute in last two years

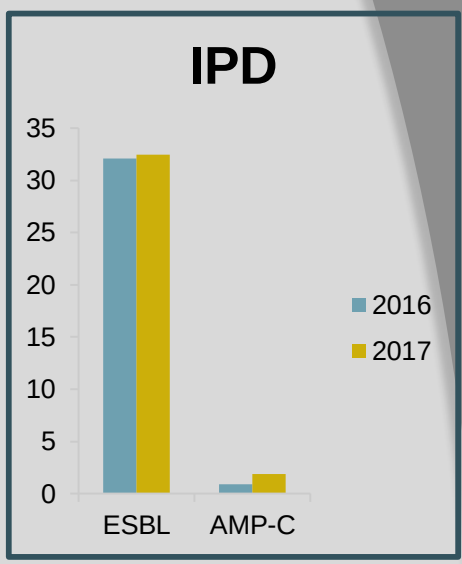
Dr. Gaurav Kumar, Dr. Manodeep Sen



- Slight increase in ESBL producing isolates from 38.6% to 39.4%
- Slight decrease in Amp-C producing isolate from 0.8% to 0.7%



- Increase in ESBL producing isolates from 16.4% to 18.4%
- Decrease in Amp-C producing isolate from 1.1% to 0.4%



- Slight increase in ESBL producing isolates from 32.1% to 32.5%
- Increase in Amp-C producing isolate from 0.9% to 1.9%

The prevalence of MBL producing isolates from OPD, ICU & IPD patients are 24.6%, 60.6%, & 37.6% respectively in the year 2017. According to various studies, the prevalence of MBLs range from 7.5% to 71% in India

Risk factors for the acquisition of MBLs are:

1. Hospital stay >8 days
2. Treatment in ICU, haematology, burn units
3. Catheterization
4. IV line
5. Previous antibiotic use
6. Mechanical ventilation

Judicious use of antimicrobial agent, proper infection control practices, surveillance, reduce, eliminate, and prevent establishment of antibiotic-resistant organisms as the predominant nosocomial flora to prevent cross-contamination amongst hospitalised patients. (ref: Kumar.S *et al* Lab Physicians. 2012 Jan-Jun; 4(1): 39–42)

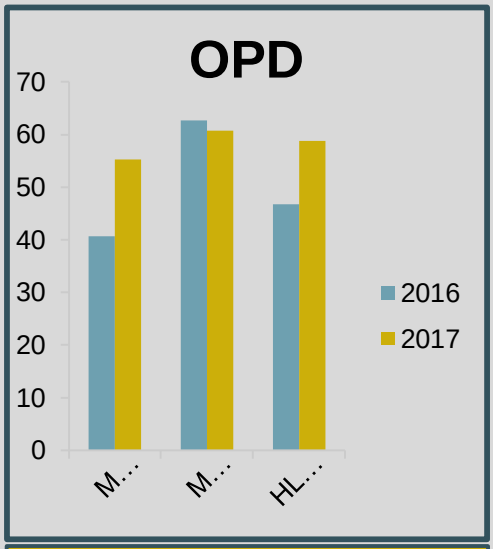
Extended Spectrum Beta Lactamase: ESBL are beta Lactamase capable of conferring bacterial resistance to the penicillins; first , second and third generation Cephalosporin; and Aztreonam (but not the cephamycins like cefoxitin and cefotetan or carbapenems) by hydrolysis of these antibiotics. They are inhibited by beta Lactamase inhibitors such as clavulanic acid.

Metallo Beta Lactamase: MBL: producers are not only resistant to carbapenems but also to other beta- Lactam antibiotics.

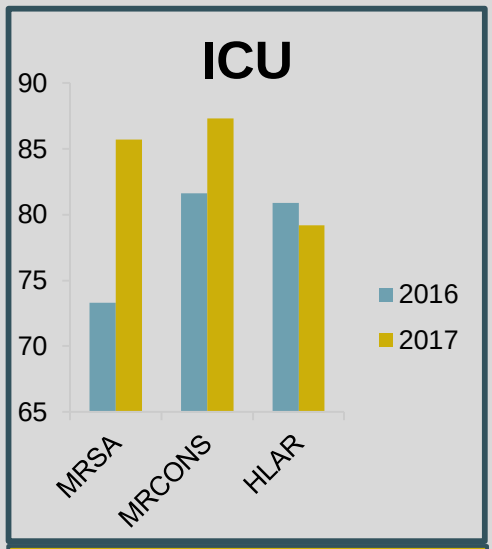
AmpC Producer: Have resistance to a wide variety of beta-lactam antibiotics including cefoxitin or cefotetan, cefotaxime, ceftazidime, ceftriaxone, monobactam. They are not inhibited by clavulanic acid, therefore Beta-Lactma/Beta Lactamase inhibitor combinations will be clinically ineffective against treatment of such infections.

Resistance trend for antibiotics amongst Gram positive cocci isolated at our Institute in last two years

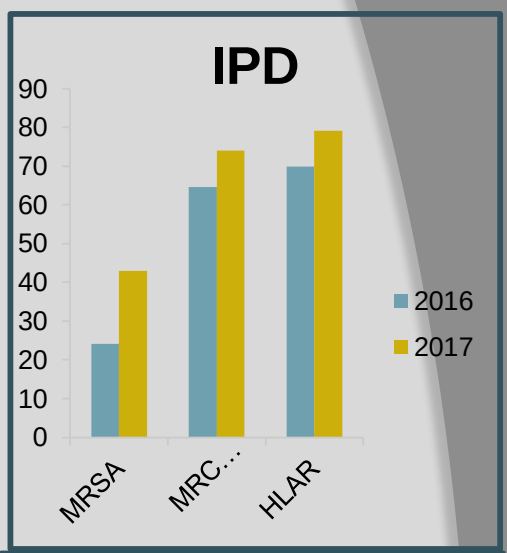
Dr. Rachana, Dr. Manodeep Sen



- Increase in MRSA from 40.7% to 55.3%
- Decrease in MRCONS isolate from 62.7% to 60.7%
- Increase in HLAR isolate from 46.7% to 58.8%



- Increase in MRSA isolates from 73.3% to 85.7%
- Increase in MRCONS isolate from 81.6% to 87.3%
- Slight decrease in HLAR isolate from 80.9% to 79.2%



- Increase in MRSA isolates from 24.1% to 42.9%
- Increase in MRCONS isolate from 64.6% to 74.1%
- Increase in HLAR isolate from 69.9% to 79.1%

Vancomycin Resistant Enterococci (VRE): The prevalence of VRE isolates from OPD, ICU & IPD patients are 6.9%, 39.6%, & 21% respectively at our hospital. According to various studies, the prevalence of VRE range from 0% to 30% in India. CDC has established guidelines to prevent the spread of Vancomycin resistance. The principle recommendations advocated are:

1) Prudent use of Vancomycin
2) An on-going education program for all hospital staff about the threat of VRE
3) A cooperative effort between health care providers and hospital microbiology laboratory personnel that will allow VRE to be promptly and accurately detected
4) The implementation of appropriate infection-control measures to prevent person-to-person spread of VRE
5) Screening of health care workers in order to identify carrier rates
6) Surveillance cultures in high prevalence areas such as intensive care units and operation

Methicillin Resistant Staphylococcus aureus (MRSA): Cefoxitin is tested as a surrogate marker for susceptibility to Oxacillin /Methicillin. Staphylococci isolates that resistant by Cefoxitin disk are reported as Oxacillin /Methicillin resistant. Methicillin Resistant Staphylococcus aureus (MRSA) is intrinsically resistant to all betalactams and their derivatives.

Methicillin Resistant Coagulase negative Staphylococcus (MRCoNS): Cefoxitin is tested as a surrogate marker for susceptibility to Oxacillin /Methicillin. Staphylococci isolates that are resistant by Cefoxitin disk susceptibility testing are reported as Oxacillin /Methicillin resistant. Methicillin Resistant Coagulase negative Staphylococcus **(**MRCoNS) are intrinsically resistant to all betalactams and their derivatives.

High Level Aminoglycoside Resistance (HLAR) Enterococci: Aminoglycosides will not have synergistic effect with cell wall active agent.(eg. Ampicillin, Penicillin and Vancomycin) against this isolate

First Foundation Course Module on *'Specimen Collection & Hand Hygiene'* for First year Residents, Feb 2018

VISITOR

Dr Fatma Levent, M.D.
Associate Professor, Pediatric Infectious Diseases
Department of Paediatrics, Texas Tech University Health Sciences Center

CME on occasion of WHO- Antibiotic Awareness Week, Nov 2017

New year celebration, Jan 1st 2018

Department Faculty & Residents

Standing from left to right: Dr Vikramjeet Singh, Dr Gaurav Kumar, Dr Sana Islahi, Dr Rachana Kanaujia, Dr Shalini Trivedi, Dr Kriti Maurya, Dr Peetam Singh, Dr Amit Kumar Singh. Seated from left to right: Dr Jaya Garg, Dr Manodeep Sen, Dr Jyotsna Agarwal, Dr Vineeta Mittal, Dr Anupam Das

Congratulations

Department of Microbiology wishes *Happy Married Life* to two of our postgraduate residents Dr. Kriti Maurya (married to Dr. Amit Anand) and Dr. Amit Kumar Singh (married to Dr. Jeetika Singh)

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