



AST Automated Systems Comparison and Review

WCLN Antibiotic Resistance Conference - 2022
April 26, 2022

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Outline

- Brief Introductory Questions
- Beckman Coulter MicroScan System
- BD Phoenix System
- Biomeriux Vitek 2 System
- Questions and Discussion





Does your laboratory perform antibiotic susceptibility testing?

- a) Yes
- b) No





For those who perform susceptibility testing within your laboratory, what is your primary testing method?

- a) Beckman Coulter MicroScan
- b) BD Phoenix System System
- c) Biomerieux Vitek 2 System
- d) MIC Strips (ETest or LioFilChem MTS)
- e) Kirby-Bauer Disks





AST Automated Systems – Beckman Coulter MicroScan System

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Eric Beck, PhD, D(ABMM)
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Outline

- Beckman Coulter Background
- MicroScan System Background
- Available Testing Panels
- Methodology and workflow
- Pros and Cons
- Support
- Experience





Beckman Coulter

- Make products associated with all departments of laboratory medicine
- Microbiology Lab focus is on:
 - ID/AST testing
 - Microbiology Automation





MicroScan ID/AST Systems

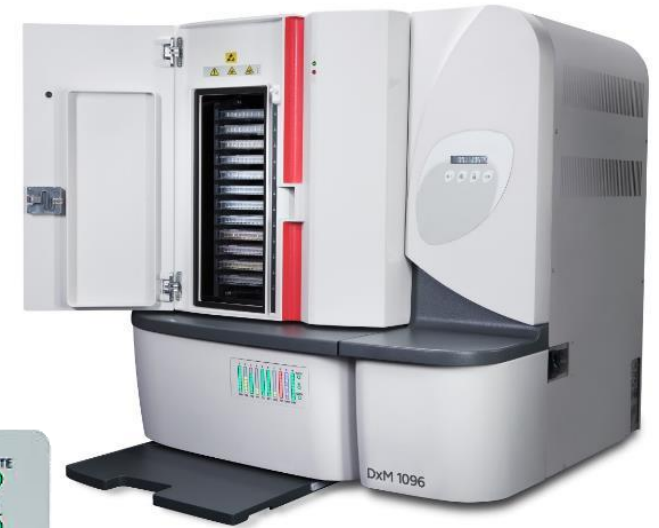
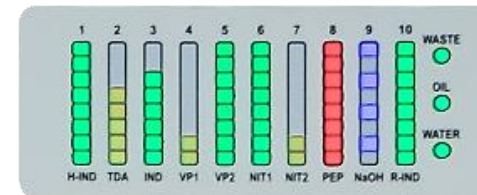
- MicroScan WalkAway ID/AST Systems
 - MicroScan WalkAway Plus
 - DxM MicroScan WalkAway
 - 40 plate capacity (< 500 panels/month)
 - 96 plate capacity (> 500 panels/month)
- MicroScan autoSCAN-4
 - Plate reader that connects with LabPro system
 - Useful if doing < 5 tests/day





MicroScan DxM

- Newest Version of the MicroScan WalkAway System
- Capable of performing
 - Rapid ID panels
 - Combination ID/AST panels
 - AST Only panels
- Top half of instrument = incubator
- Bottom half of instrument = reagent drawer





Types of Panels Available

- Panels include options for:
 - Identification + Sensitivity
 - Sensitivity only
- Combo panels
 - Wells dedicated to biochemical reactions
 - Utilize on board reagent inventory
- Fewer wells available for MIC testing
 - Generally fewer antibiotics
 - Smaller dilution ranges

MICROSCAN GRAM-POSITIVE PANELS OPTIONS FOR ROUTINE AND CRITICAL ISOLATE TESTING											
PANEL NAME	Pos Combo 33	Pos Combo 34	Pos Combo 43	Pos Combo 44	Pos Combo 45	Pos Combo 46	Pos MIC 29	Pos MIC 34	Pos MIC 38	Specialty MIC	
MICROSCAN CATALOG NUMBER	B1017-211	B1017-214	B1017-217	B1017-218	B1017-219	B1017-220	B1017-212	B1017-216	B1017-222	B1017-201	B1017-202
LANGUAGES	EN,ES,FR,PT	EN,ES,FR,PT	EN,ES,FR,PT	EN,ES,FR	EN,ES,FR,PT	EN,ES,FR,PT	EN,ES,FR,PT	EN,ES,FR,PT	EN,ES,FR,PT	EN,ES,FR,PT	EN,ES,FR,PT
Antimicrobial Agent	µg/mL	µg/mL	µg/mL	µg/mL	µg/mL	µg/mL	µg/mL	µg/mL	µg/mL	µg/mL	Abbr.
Amoxicillin/K Clavulanate	4/2	4/2	—	—	4/2	4/2	—	—	4/2	0.5/0.25-4/2	0.5/0.25-4/2
Ampicillin	2-8	2-8	2-8	2-8	2,8	2,8	2-8	2-8	2,8	0.06-4	0.06-4
Ampicillin/Sulbactam	8/4-16/8	8/4-16/8	—	8/4-16/8	8/4-16/8	—	8/4-16/8	—	8/4-16/8	—	—
Azithromycin	—	—	—	2-4	2-4	—	—	—	2-4	0.25-2	0.5-2
Cefaclor	—	—	—	—	—	—	—	—	—	—	0.5-4
Cefazolin	—	4-16	—	8-16	8-16	8-16	4-16	4-16	8-16	—	—
Cefepime	—	—	—	—	—	8-16	—	—	4-16	0.25-2	0.25-2
Cefotaxime	—	—	—	—	—	8-32	—	—	8-32	0.25-2	0.25-2
Cefoxitin Screen	4	4	4	4	4	4	4	4	4	—	—
Ceftaroline	—	—	0.5-4	0.5-2	0.5-2	1-2	—	0.5-4	0.5-4	—	—
Ceftroxone	8, 32	—	—	—	8-32	—	4-32	4-32	0.25-2	0.25-2	0.25-2
Cefuroxime	—	—	—	—	—	8-16	—	—	—	0.25-2	0.25-2
Cephalexin	—	—	—	—	—	—	—	—	8-16	—	—
Chloramphenicol	—	—	—	8-16	—	—	8-16	8-16	—	1-16	1-16
Ciprofloxacin	1-2	1-2	1-2	1-2	1-2	—	1-2	1-2	1-2	—	—
Clarithromycin	—	—	—	—	—	—	—	—	—	—	0.25-1
Clindamycin	0.5-4	0.5-4	0.5-4	0.25-0.5, 2	0.5-4	0.5-2	0.25-4	0.25-4	0.25-4	0.06-0.5	0.06-0.5
Daptomycin	0.5-4	0.5-4	0.5-4	1, 4	1, 4	0.5-4	0.25-4	0.25-4	0.5-4	—	—
Erythromycin	0.5-4	0.5-4	0.5-4	0.5-4	0.25-4	0.25-4	0.25-4	0.25-4	0.25-4	0.06-0.5	0.06-0.5
Gatifloxacin	—	—	—	—	—	—	—	—	—	0.12-2	—
Gentamicin	4-8	4-8	4-8	4-8	4-8	4-8	1-8	1-8	4-8	—	—
Gentamicin Synergy Screen	500	500	500	500	500	500	500	500	500	—	—
Imipenem	—	—	—	—	—	—	4-8	—	4-8	—	—
Inducible Clindamycin Test	4/0.5	4/0.5	4/0.5	4/0.5	4/0.5	4/0.5	4/0.5	4/0.5	4/0.5	—	—
Levofloxacin	1-4	1-4	1-4	1-4	1-4	1-4	0.5-4	0.5-4	1-4	0.25-4	0.25-4
Linezolid	1-4	1-4	1-4	2-4	2-4	2-4	0.5-4	0.5-4	1-4	—	0.5-4
Meropenem	—	—	—	—	4-8	4-8	2-8	—	2-8	0.06-0.5	0.06-0.5
Moxifloxacin	0.5-4	0.5-4	0.5-2, 4	0.5-1, 4	—	—	0.5-4	0.25-4	—	—	0.25-4
Nitrofurantoin	32-64	32-64	32-64	32-64	32-64	32-64	32-64	32-64	32-64	—	—
Oxacillin	0.25-2	0.25-2	0.25-2	0.25-1, 2	0.25-2	0.25-1, 2	0.25-2	0.25-2	0.25-2	—	—
Penicillin	0.03, 0.12-0.25, 2, 8	0.03, 0.12-0.25, 2, 8	0.03, 0.12-0.25, 2, 8	0.03, 0.12-0.25, 2, 8	0.03, 0.12-0.25, 2, 8	0.03, 0.12-0.25, 2, 8	0.03-8	0.03-8	0.03-2	0.03-4	0.03-4
Piperacillin/Tazobactam	—	—	—	—	4/4-8/4	—	—	—	8/4	—	—
Rifampin	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	—	—
Streptomycin Synergy Screen	1000	1000	1000	1000	1000	1000	1000	1000	1000	—	—
Synercid	0.5-2	1-2	1-2	0.5-2	—	1-2	0.25-2	0.25-2	0.5-2	—	—
Tetracycline	4-8	4-8	4-8	4-8	4-8	4-8	1-8	2-8	4-8	0.5-4	0.5-4
Tigecycline	—	—	0.25-1	—	—	0.25-0.5	—	0.12-1	0.25-1	—	—
Trimethoprim/Sulfamethoxazole	0.5/9.5-2/38	0.5/9.5-2/38	0.5/9.5-2/38	0.5/9.5-2/38	0.5/9.5-2/38	0.5/9.5-2/38	0.5/9.5-2/38	0.5/9.5-2/38	0.5/9.5-2/38	0.25/4.75-2/38	0.25/4.75-2/38
Vancocin	0.25-16	0.25-16	0.25-16	0.5-16	0.5-16	0.5-16	0.25-16	0.25-16	0.25-16	0.12-1	0.12-4
Total Antibiotic Tests/Panel	24	24	23	27	27	27	28	26	32	18	21

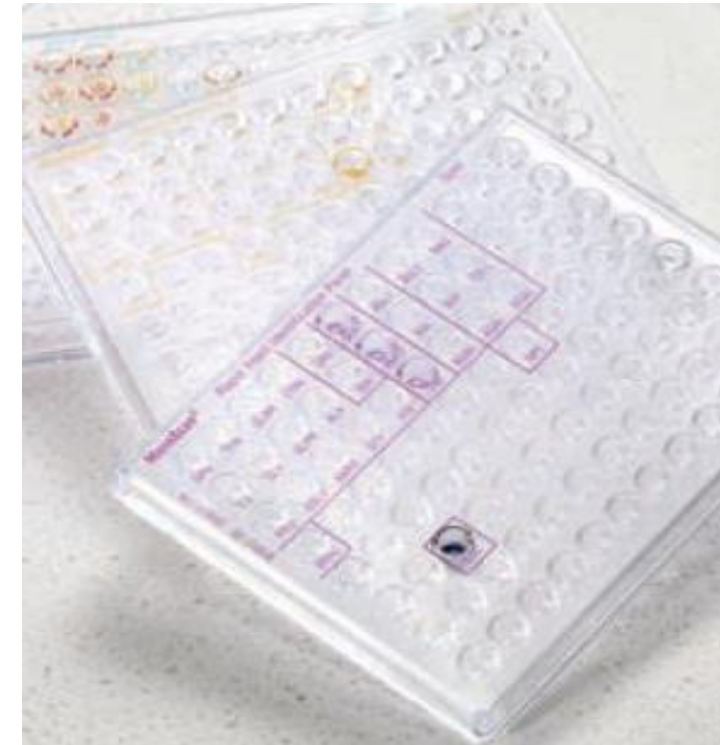
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Specialty ID Panels Available

- Specialty ID panels
 - Contain a series of biochemicals
 - Completed in about 4 hours
 - Options available for:
 - Yeast ID
 - *Haemophilus/Neisseria* ID
 - Anaerobe ID





Specialty AST Panels Available

- Specialty MIC panels
 - *Streptococcus* MIC Panel
 - Designed for *Streptococcus* sp.
 - ESBL Panel
 - Designed to identify/confirm ESBLs
- MDR Gram Neg Panel
 - Includes broad-spectrum, more powerful antibiotics such as:
 - Ceftazidime-avibactam
 - Ceftolozane-tazobactam
 - Colistin
 - Tigecycline





MicroScan Workflow

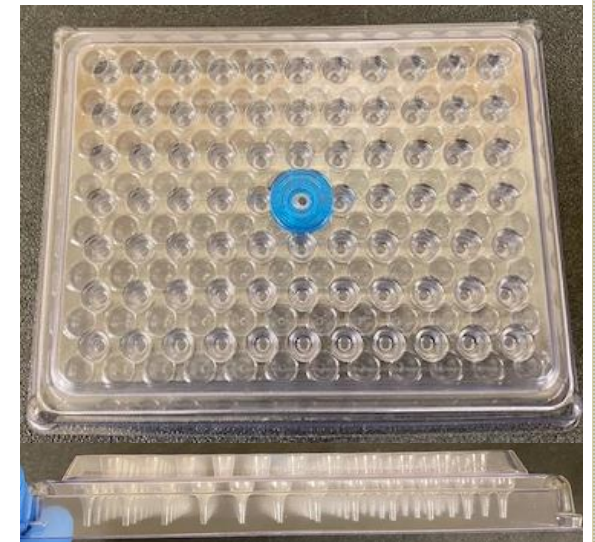
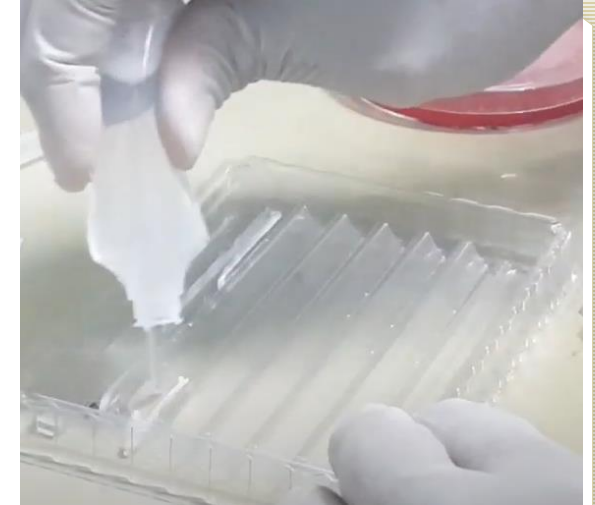
- Select isolated colonies using MicroScan Prompt inoculation wand
- Remove the collar on the inoculation wand and cap from water with pluronic surfactant
- Place wand into pluronic water bottle, close securely, shake to mix





MicroScan Workflow (cont'd)

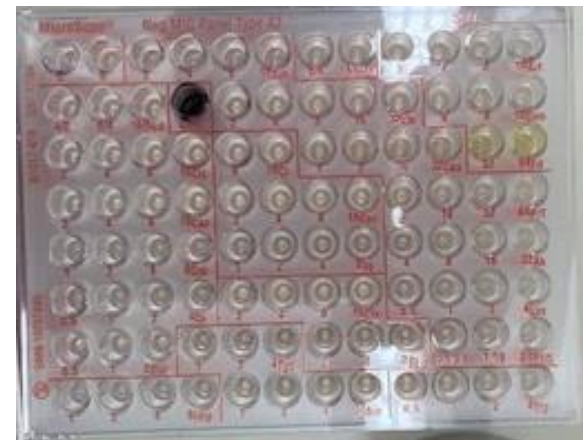
- Remove cap/wand and pour suspension into seed tray
- Place disposable inoculation cover on seed tray
 - Inoculation cover contains series of pipets





MicroScan Workflow (cont'd)

- Utilize MicroScan RENOK pipettor to aspirate bacterial suspension
- Using RENOK pipettor transfer bacterial suspension to MicroScan plate to rehydrate reagents
 - Same process for ID and sensitivity panels





MicroScan Workflow (cont'd)

- Plates are labeled with a unique barcode
- Plates are placed in instrument
 - They are inoculated for appropriate time (18-24 hours)
 - Instrument reads the plates
 - Based on growth vs. no growth



<https://www.youtube.com/watch?app=desktop&v=TZuc9IXRsRQ>





MicroScan Workflow (cont'd)

- LabPro System evaluates and interprets results
 - Reads endpoints; determines MIC value
 - Assigns interpretation

Microbiology Report						
Aurora Health Care-West Allis Memorial Hospital			West Allis, WI			
8901 Lincoln Ave.		Specimen	141169736	Status	Final	
Patient ID		Source	URINE	Status Date	4/13/2022	
Date of Birth		Ward of Use		Collected	4/11/2022	
Abst. Phys.				Req Phys	11:51	
1 Enterococcus faecalis						
2 Pseudomonas aeruginosa						
Status		Final	Status	Final	4/13/2022	
1 E. faecalis						
Drug		MIC	Interp	Drug	MIC	
Dapt		2	S	Dapt	<=8	
Penicillin		<=2	S	Cephalexin	>16	
Ampicillin		<=2	S	Cefazolin	>16	
Oxacillin		<=2	S	Ceftriaxone	16	
Cefazolin		<=2	S	Cefepime	<=2	
Ceftriaxone		<=2	S	Aztreonam	<=2	
Gentamicin		<=2	S	Doripenem	<=0.5	
Dapt. Synergy		<=1000	S	Ertapenem	2	
Strep. Synergy		<=1	S	Imipenem	<=1	
Ciprofloxacin		<=1	S	Meropenem	<=1	
Levofloxacin		<=0.25	S	Amikacin	<=4	
Moxifloxacin		2	S	Gentamicin	4	
Linezolid		2	S	Tobramycin	<=1	
Daptomycin		2	S	Ciprofloxacin	<=0.5	
Vancomycin		1	S	Levofloxacin	<=0.5	
Tetracycline		<=8	R	Tetracycline	8	
Nitrofurantoin		<=8	R	Nitrofurantoin	>16	
Chloramphenicol		<=8	R			
Rifampin		<=0.5	R			
Trimeth/Sulfa		<=0.5/9.5	S			
Only use these flags:						
S		1	Zone Susceptible	S	1	Zone Susceptible
R		1	Zone Resistant	S	2	Zone Susceptible
I		1	Intermediate	S	4	Zone Susceptible
D		1	Difficult to Interpret	S	8	Zone Susceptible
E		1	Epistaxis	S	16	Zone Susceptible
F		1	Fungus	S	32	Zone Susceptible
G		1	Gram Stain	S	64	Zone Susceptible
H		1	Hemolysis	S	128	Zone Susceptible
I		1	Inhibitory	S	256	Zone Susceptible
J		1	Intermittent	S	512	Zone Susceptible
K		1	Kidney	S	1024	Zone Susceptible
L		1	Liver	S	2048	Zone Susceptible
M		1	Mouth	S	4096	Zone Susceptible
N		1	Nose	S	8192	Zone Susceptible
O		1	Other	S	16384	Zone Susceptible
P		1	Pain	S	32768	Zone Susceptible
Q		1	Quadrant	S	65536	Zone Susceptible
R		1	Rectum	S	131072	Zone Susceptible
S		1	Stomach	S	262144	Zone Susceptible
T		1	Throat	S	524288	Zone Susceptible
U		1	Uterus	S	1048576	Zone Susceptible
V		1	Vagina	S	2097152	Zone Susceptible
W		1	Wound	S	4194304	Zone Susceptible
X		1	X-ray	S	8388608	Zone Susceptible
Y		1	Yeast	S	16777216	Zone Susceptible
Z		1	Zinc	S	33554432	Zone Susceptible
AA		1	Acid	S	67108864	Zone Susceptible
AB		1	Alkaline	S	134217728	Zone Susceptible
AC		1	Ammonia	S	268435456	Zone Susceptible
AD		1	Antibiotic	S	536870912	Zone Susceptible
AE		1	Aspartate	S	1073741824	Zone Susceptible
AF		1	Glucose	S	2147483648	Zone Susceptible
AG		1	Lactate	S	4294967296	Zone Susceptible
AH		1	Malate	S	8589934592	Zone Susceptible
AI		1	Pyruvate	S	17179869184	Zone Susceptible
AJ		1	Sucrose	S	34359738368	Zone Susceptible
AK		1	Tartrate	S	68719476736	Zone Susceptible
AL		1	Urea	S	137438953472	Zone Susceptible
AM		1	Valerate	S	274877906944	Zone Susceptible
AN		1	Xylose	S	549755813888	Zone Susceptible
AO		1	Yeast	S	1099511627776	Zone Susceptible
AP		1	Zinc	S	2199023255552	Zone Susceptible
AQ		1	Acid	S	4398046511104	Zone Susceptible
AR		1	Alkaline	S	8796093022208	Zone Susceptible
AS		1	Ammonia	S	1759218604416	Zone Susceptible
AT		1	Antibiotic	S	3518437208832	Zone Susceptible
AU		1	Aspartate	S	7036874417664	Zone Susceptible
AV		1	Glucose	S	14073748835328	Zone Susceptible
AW		1	Lactate	S	28147497670656	Zone Susceptible
AX		1	Malate	S	56294995341312	Zone Susceptible
AY		1	Pyruvate	S	112589990682624	Zone Susceptible
AZ		1	Sucrose	S	225179981365248	Zone Susceptible
BA		1	Tartrate	S	450359962730496	Zone Susceptible
BB		1	Urea	S	900719925460992	Zone Susceptible
BC		1	Valerate	S	1801439850921984	Zone Susceptible
BD		1	Xylose	S	3602879701843968	Zone Susceptible
BE		1	Yeast	S	7205759403687936	Zone Susceptible
BF		1	Zinc	S	14411518807375872	Zone Susceptible
BG		1	Acid	S	28823037614751744	Zone Susceptible
BH		1	Alkaline	S	57646075229503488	Zone Susceptible
BI		1	Ammonia	S	115292150459006976	Zone Susceptible
BJ		1	Antibiotic	S	230584300918013952	Zone Susceptible
BK		1	Aspartate	S	461168601836027904	Zone Susceptible
BL		1	Glucose	S	922337203672055808	Zone Susceptible
BM		1	Lactate	S	1844674407344111616	Zone Susceptible
BN		1	Malate	S	3689348814688223232	Zone Susceptible
BO		1	Pyruvate	S	7378697629376446464	Zone Susceptible
BP		1	Sucrose	S	14757395258752892928	Zone Susceptible
BQ		1	Tartrate	S	29514790517505785856	Zone Susceptible
BR		1	Urea	S	59029581035011571712	Zone Susceptible
BS		1	Valerate	S	118059162070023143424	Zone Susceptible
BT		1	Xylose	S	236118324140046286848	Zone Susceptible
BU		1	Yeast	S	472236648280092573696	Zone Susceptible
BV		1	Zinc	S	944473296560185147392	Zone Susceptible
BV		1	Acid	S	1888946593120370294784	Zone Susceptible
BV		1	Alkaline	S	3777893186240740589568	Zone Susceptible
BV		1	Ammonia	S	7555786372481481179136	Zone Susceptible
BV		1	Antibiotic	S	15111572744962962358272	Zone Susceptible
BV		1	Aspartate	S	30223145489925924716544	Zone Susceptible
BV		1	Glucose	S	60446290979851849433088	Zone Susceptible
BV		1	Lactate	S	120892581959703698866176	Zone Susceptible
BV		1	Malate	S	241785163919407397732352	Zone Susceptible
BV		1	Pyruvate	S	483570327838814795464704	Zone Susceptible
BV		1	Sucrose	S	967140655677629590929408	Zone Susceptible
BV		1	Tartrate	S	1934281311355259181858816	Zone Susceptible
BV		1	Urea	S	3868562622710518363717632	Zone Susceptible
BV		1	Valerate	S	7737125245421036727435264	Zone Susceptible
BV		1	Xylose	S	15474250490842073454870528	Zone Susceptible
BV		1	Yeast	S	30948500981684146909741056	Zone Susceptible
BV		1	Zinc	S	61897001963368293819482112	Zone Susceptible
BV		1	Acid	S	123794003926736587638964224	Zone Susceptible
BV		1	Alkaline	S	247588007853473175277928448	Zone Susceptible
BV		1	Ammonia	S	495176015706946350555856896	Zone Susceptible
BV		1	Antibiotic	S	990352031413892701111713792	Zone Susceptible
BV		1	Aspartate	S	1980704062827785402223427584	Zone Susceptible
BV		1	Glucose	S	3961408125655570804446855168	Zone Susceptible
BV		1	Lactate	S	7922816251311141608893710336	Zone Susceptible
BV		1	Malate	S	15845632502622283217787420672	Zone Susceptible
BV		1	Pyruvate	S	31691265005244566435574841344	Zone Susceptible
BV		1	Sucrose	S	63382530010489132871149682688	Zone Susceptible
BV		1	Tartrate	S	126765060020978265742299365376	Zone Susceptible
BV		1	Urea	S	253530120041956531484598730752	Zone Susceptible
BV		1	Valerate	S	507060240083913062969197461504	Zone Susceptible
BV		1	Xylose	S	1014120480167826125938394923008	Zone Susceptible
BV		1	Yeast	S	2028240960335652251876789846016	Zone Susceptible
BV		1	Zinc	S	4056481920671304503753579692032	Zone Susceptible
BV		1	Acid	S	8112963841342609007507159384064	Zone Susceptible
BV		1	Alkaline	S	16225927682685218015014318768128	Zone Susceptible
BV		1	Ammonia	S	32451855365370436030028637536256	Zone Susceptible
BV		1	Antibiotic	S	64903710730740872060057275072512	Zone Susceptible
BV		1	Aspartate	S	129807421461481740120114550145024	Zone Susceptible
BV		1	Glucose	S	259614842922963480240229100290048	Zone Susceptible
BV		1	Lactate	S	519229685845926960480458200580096	Zone Susceptible
BV		1	Malate	S	1038459371691853920960916401160192	Zone Susceptible
BV		1	Pyruvate	S	2076918743383707841921832802320384	Zone Susceptible
BV		1	Sucrose	S	4153837486767415683843665604640768	Zone Susceptible
BV		1	Tartrate	S	8307674973534831367687331209281536	Zone Susceptible
BV		1	Urea	S	16615349947069662735374662418563072	Zone Susceptible
BV		1	Valerate	S	33230699894139325470749324837126144	Zone Susceptible
BV		1	Xylose	S	66461399788278650941498649674252288	Zone Susceptible
BV		1	Yeast	S	132922799576557301882997299348504576	Zone Susceptible
BV		1	Zinc	S	265845599153114603765994598697009152	Zone Susceptible
BV		1	Acid	S	531691198306229207531989197394018304	Zone Susceptible
BV		1	Alkaline	S	1063382396612458415063978394788036608	Zone Susceptible
BV		1	Ammonia	S	2126764793224916830127956789576073216	Zone Susceptible
BV		1	Antibiotic	S	4253529586449833660255913579152146432	Zone Susceptible
BV		1	Aspartate	S	8507059172899667320511827158304292864	Zone Susceptible
BV		1	Glucose	S	17014118345799334641023654316608585728	Zone Susceptible
BV		1	Lactate	S	34028236691598669282047308633217171456	Zone Susceptible
BV		1	Malate	S	68056473383197338564094617266434342912	Zone Susceptible
BV		1	Pyruvate	S	136112946766394677128189234532868685824	Zone Susceptible
BV		1	Sucrose	S	272225893532789354256378469065737371648	Zone Susceptible
BV		1	Tartrate	S	544451787065578708512756938131474743296	Zone Susceptible
BV		1	Urea	S	1088903574131157417025513876262949486592	Zone Susceptible
BV		1	Valerate	S	2177807148262314834051027752525898973184	Zone Susceptible
BV		1	Xylose	S	4355614296524629668102055505051797946368	Zone Susceptible
BV		1	Yeast	S	8711228593049259336204111010103595892736	Zone Susceptible
BV		1	Zinc	S	17422457186098518672408222020207191785504	Zone Susceptible
BV		1	Acid	S	34844914372197037344816444040414383571008	Zone Susceptible
BV		1	Alkaline	S	69689828744394074689632888080828767142112	Zone Susceptible
BV		1	Ammonia	S	139379657488788149379265776161657534284224	Zone Susceptible
BV		1	Antibiotic	S	27875931497757629875853155232331506856848	Zone Susceptible
BV		1	Aspartate	S	55751862995515259751706310464663013713696	Zone Susceptible
BV		1	Glucose	S	111503725991030519503412620929326027427392	Zone Susceptible
BV		1	Lactate	S	223007451982061039006825241858652054854784	Zone Susceptible
BV		1	Malate	S	446014903964122078013650483717304109709568	Zone Susceptible
BV		1	Pyruvate	S	892029807928244156027300967434608219419136	Zone Susceptible
BV		1	Sucrose	S	178405961585648831205460193486916443883872	Zone Susceptible
BV		1	Tartrate	S	356811923171297662410920386973832887767648	Zone Susceptible
BV		1	Urea	S	713623846342595324821840773947665775535296	Zone Susceptible
BV		1	Valerate	S	1427247692685190649643681547895331551070592	Zone Susceptible
BV		1	Xylose	S	2854495385370381299287363095790663102141184	Zone Susceptible
BV		1	Yeast	S	5708990770740762598574726191581326204282304	Zone Susceptible
BV		1	Zinc	S	11417981541481525197149452383162652408564608	Zone Susceptible
BV		1	Acid	S	22835963082963050394298904766325304817129216	Zone Susceptible
BV		1	Alkaline	S	45671926165926100788597809532650609634258432	Zone Susceptible
BV		1	Ammonia	S	91343852331852201577195619065301219268516864	Zone Susceptible
BV		1	Antibiotic	S	182687704663704403154391238130602438537033728	Zone Susceptible
BV		1	Aspartate	S	365375409327408806308782476261204877074067456	Zone Susceptible
BV		1	Glucose	S	730750818654817612617564952522409754148134912	Zone Susceptible
BV		1	Lactate	S	14615016373096352252351299050448	

1	Enterococcus faecalis	Status: Final	4/13/2022		
2	Pseudomonas aeruginosa	Status: Final	4/13/2022		
<hr/>					
1 E. faecalis		2 P. aeruginosa			
Drug	MIC	Interps	Drug	MIC	Interps
Penicillin	2	S	Pip/Tazo	<=8	S
Ampicillin	<=2	S	Cephalothin	>16	
Oxacillin	>2		Cefoxitin	>16	
Cefazolin	>16		Cefotaxime	16	
Ceftriaxone	>32		Ceftazidime	<=2	S
Gentamicin	>8		Ceftriaxone	8	
Gent. Synergy	<=500	S	Cefepime	<=2	S
Strep. Synergy	<=1000	S	Aztreonam	<=2	S
Ciprofloxacin	<=1	S	Doripenem	<=0.5	S
Levofloxacin	1	S	Ertapenem	2	
Moxifloxacin	<=0.25		Imipenem	<=1	S
Linezolid	2	S	Meropenem	<=1	S
Daptomycin	2	S	Amikacin	<=4	S
Vancomycin	1	S	Gentamicin	4	S
Tetracycline	>8	R	Tobramycin	<=1	S
Nitrofurantoin	<=32	S	Ciprofloxacin	<=0.5	S
Chloramphenicol	<=8		Levofloxacin	<=0.5	S
Rifampin	>2	R	Tetracycline	8	
Trimeth/Sulfa	<=0.5/9.5		Nitrofurantoin	>64	



MicroScan Workflow (cont'd)

- Includes separate options for tracking QC results
 - Reads endpoints
 - Determines MIC value
 - Determines if results are appropriate

QC Panel Report
Aurora Health Care-West Allis Memorial Hospital
West Allis, WI

8901 Lincoln Ave.

Lot #: 2023-01-06
Panel Type: Pos MIC 34
Received Date: 2/17/2022

Isolate: 6
QC Strain: 29212 E. faecalis

Status: Complete
Status Date: 3/2/2022

Biochemicals and antimicrobics marked with an arrow (x) are considered out of control. "Variable" indicates that the expected value is positive or negative. N/A indicates that the result is not applicable and there is no expected value or range.

Biochemical	Tested	Expected	Antimicrobial	Tested	Expected
Thymidine Free Growth	Positive	Positive	Ampicillin	<=2	<=2
			Cefazolin	16	N/A
			Cefazolin Screen	>4	N/A
			Ceftriaxone	<=0.5	N/A
			Chloramphenicol	>32	N/A
			Ciprofloxacin	<=8	<=8
			Clindamycin	<=1	<=1
			Daptomycin	>4	4 - >4
			Erythromycin	2	1 - 4
			Erythromycin	1	1 - 4
			Gent. Synergy	<=500	<=500
			Gentamicin	8	4 - >8
			Inducible Clindamycin	<=4/0.5	N/A
			Levofloxacin	1	<=0.5 - 2
			Linezolid	2	1 - 4
			Moxifloxacin	<=0.25	<=0.25 - 0.5
			Nitrofurantoin	<=32	<=32
			Oxacillin	>2	>2
			Penicillin	2	0.5 - 2
			Rifampin	<=1	<=1
			Strep. Synergy	<=1000	<=1000
			Synercid	>2	2 - >2
			Tetracycline	8	4 - >8
			Teicoplanin	<=0.12	<=0.12
			Trimeth/Sulfa	<=0.5/9.5	<=0.5/9.5
			Vancomycin	2	1 - 4

Reagent: MT/KLP Lot #: _____ Reagent: _____ Lot #: _____

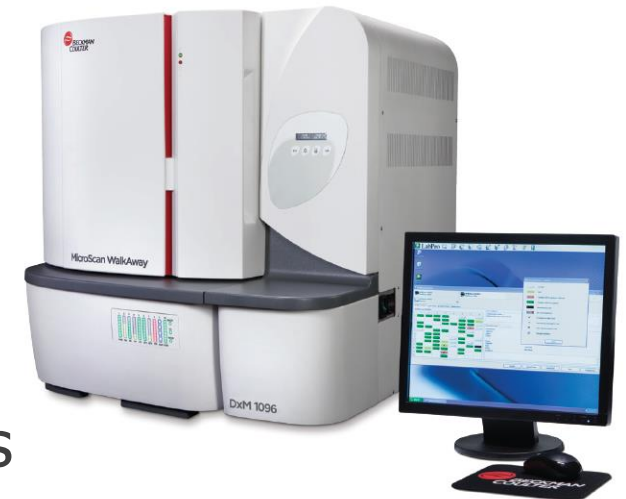
Reviewed by: MT/KLP
Printed 3/2/2022 01:40:27

Page 1 of 1
Date: MAR 02 2022



MicroScan System PROS

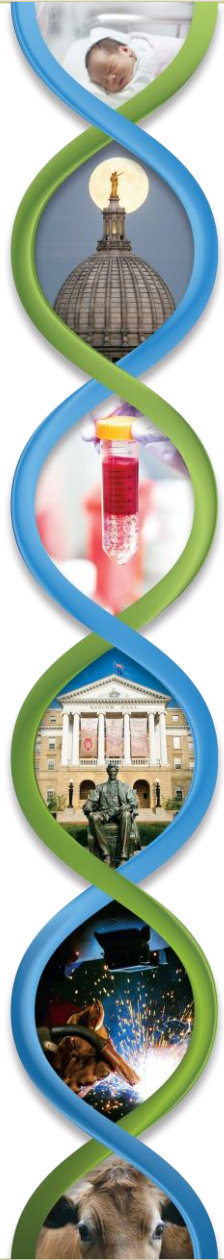
- The system provides a true MIC value
- Reagents are stored at room temperature
- Panels can be read without an instrument
 - Low volume settings
 - Instrument errors can be overcome
- LabPro system
 - Pre-loaded with FDA breakpoints
 - Customizable to load alternative breakpoints
 - Allows you to add notes/reminders under certain conditions





MicroScan System CONS

- Turnaround time – 18-24 hours
- Slow to adjust formulations
- Several panels don't accommodate new breakpoints
 - Ciprofloxacin with *Enterobacterales*
 - Breakpoints recently revised to: $\leq 0.25 = S$, $0.5 = I$, $\geq 1 = R$
 - Most microscan panels do not go below 0.5 mcg/mL
 - Similar issues with Levofloxacin
- A lot of disposable reagents required
- Manual barcoding of each plate





Support and Experience

- Support options include:
 - Weekday, business hours only
 - 24/7 service
- The instrument is highly reliable with very limited downtime
- Updates to system are painless
- Results are more accurate than other systems compared to reference methods





AST Automated Systems - BD Phoenix™ System

WCLN Antibiotic Resistance Conference - 2022
April 26, 2022

Tim Block, MT(ASCP)
Laboratory Manager
Froedtert West Bend Hospital



Phoenix ID/AST Systems

BD Phoenix™ M50 instrument





Phoenix ID/AST Systems

BD Phoenix™ M50 instrument

- 50 panel capacity (49)
- Ability to “stack” two analyzers for 100 panel capacity



BD Phoenix™ AP instrument

- Automated dilutions





Phoenix - Types of Panels Available

- Panels include options for:
 - Identification + Sensitivity (Combo)
 - 45 wells dedicated to ID
 - 84 wells for sensitivity
 - Sensitivity only
 - ID side is empty
 - Same AST dilution profile as combo panels
 - Emerge™ panel
 - Both sides utilized for AST
 - Allows for more antibiotics and extended dilutions





Types of Panels Available

BD Phoenix™ Gram negative panels

Rapid and accurate detection of antimicrobial resistance

BD Phoenix™ Gram negative panels

Combination panels	Name	NMIC/ID-307	NMIC/ID-308
	Cat. no.	449289	449282
AST only panels	Name	NMIC-307	NMIC-308
	Cat. no.	449283	449065
Antibiotic	MIC test range (µg/ml)		
CPO Detection	Yes	Yes	
CPO Classification	-	-	
Confirmatory ESBL	Yes	Yes	
Amikacin	8 - 32	8 - 32	
Amoxicillin/Clavulanate (CLSI)	-	4/2 - 16/8	
Ampicillin	4 - 16	4 - 16	
Ampicillin/Sulbactam	1/0.5 - 16/8	-	
Aztreonam	2 - 16	2 - 16	
Cefazolin	1 - 16	1 - 16	
Cefepime	1 - 16	1 - 16	
Cefoxitin	-	-	
Ceftaroline	-	-	
Ceftazidime	2 - 16	2 - 16	
Ceftazidime/Avibactam	-	-	
Ceftolozane/Tazobactam	-	1/4 - 8/4	
Ceftriaxone ¹	1 - 32	1 - 32	
Cefuroxime	-	-	
Ciprofloxacin	0.25 - 2	0.25 - 2	
Ertapenem	0.25 - 1	0.25 - 1	
Gentamicin	2 - 8	2 - 8	
Imipenem	-	-	
Levofloxacin	0.5 - 4	0.5 - 4	
Meropenem	0.5 - 8	0.5 - 8	
Meropenem/Vaborbactam	-	-	
Minocycline	-	1 - 8	
Moxifloxacin	-	-	
Nitrofurantoin	16 - 64	-	
Piperacillin/Tazobactam	2/4 - 64/4	2/4 - 64/4	
Tetracycline	2 - 8	-	
Tigecycline	-	-	
Tobramycin	2 - 8	2 - 8	
Trimethoprim/Sulfamethoxazole	0.5/9.5 - 2/38	0.5/9.5 - 2/38	

BD Phoenix™ Gram negative Emerge™ panels

Name	NMIC-305	NMIC-306	NMIC-311
Cat. no.	449294	449292	449452
Antibiotic	MIC test range (µg/ml)		
CPO Detection	Yes	Yes	-
CPO Classification	Yes	Yes	-
Confirmatory ESBL	Yes	Yes	Yes
Amikacin	8 - 32	8 - 32	8 - 32
Amoxicillin/Clavulanate (CLSI)	-	4/2 - 16/8	4/2 - 16/8
Ampicillin	2 - 16	4 - 16	4 - 16
Ampicillin/Sulbactam	-	1/0.5 - 16/8	1/0.5 - 16/8
Aztreonam	1 - 16	2 - 16	2 - 16
Cefazolin	1 - 16	1 - 16	1 - 16
Cefepime	0.5 - 16	1 - 16	0.5 - 16
Cefoxitin	4 - 16	4 - 16	4 - 16
Ceftaroline	0.25 - 1	0.25 - 1	0.25 - 1
Ceftazidime	1 - 16	2 - 16	2 - 16
Ceftazidime/Avibactam	0.25/4 - 8/4	0.25/4 - 8/4	0.25/4 - 8/4
Ceftolozane/Tazobactam	0.5/4 - 8/4	1/4 - 8/4	1/4 - 8/4
Ceftriaxone ¹	1 - 32	1 - 32	1 - 32
Cefuroxime	4 - 16	4 - 16	4 - 16
Ciprofloxacin	0.25 - 2	0.25 - 2	0.25 - 2
Ertapenem	0.25 - 2	0.25 - 2	0.25 - 1
Gentamicin	2 - 8	2 - 8	2 - 8
Imipenem	0.25 - 8	-	0.25 - 8
Levofloxacin	0.25 - 4	0.5 - 4	0.25 - 4
Meropenem	0.5 - 8	0.5 - 8	0.5 - 8
Meropenem/Vaborbactam	2/8 - 16/8	2/8 - 16/8	2/8 - 16/8
Minocycline	1 - 8	1 - 8	1 - 8
Moxifloxacin	-	1 - 4	1 - 4
Nitrofurantoin	16 - 64	16 - 64	16 - 64
Piperacillin/Tazobactam	2/4 - 64/4	2/4 - 64/4	2/4 - 64/4
Tetracycline	-	2 - 8	2 - 8
Tigecycline	0.5 - 8	1 - 8	1 - 8
Tobramycin	2 - 8	2 - 8	2 - 8
Trimethoprim/Sulfamethoxazole	0.5/9.5 - 2/38	0.5/9.5 - 2/38	0.5/9.5 - 2/38

- Ideal for use in conjunction with BD Bruker MALDI Biotyper® System
- Additional drugs
- Additional dilutions





Types of Panels Available

BD Phoenix™ Gram positive panels

Rapid and accurate detection of antimicrobial resistance

BD Phoenix™ Gram positive panels

Combination panels	Name	PMIC/ID-106	PMIC/ID-107	PMIC/ID-108	PMIC/ID-109
	Cat. no.	448606	448607	448608	448609
AST only panels	Name	PMIC-106	PMIC-107	PMIC-108	PMIC-109
	Cat. no.	448416	448417	448418	448419

Antibiotic	MIC test range (µg/ml)			
Inducible macrolide resistance test (iMLSb)	Yes	Yes	Yes	Yes
Ampicillin	0.0625 - 8	0.125 - 8	0.125 - 8	0.125 - 8
Ampicillin/Sulbactam	-	2/1 - 16/8	-	2/1 - 16/8
Cefazolin	2 - 16	2 - 16	2 - 16	-
Cefoxitin	4 - 16	4 - 16	4 - 16	4 - 16
Ceftaroline	-	-	-	-
Chloramphenicol	-	-	-	-
Clindamycin	0.5 - 2	0.5 - 2	0.5 - 2	0.5 - 2
Daptomycin	1 - 4	1 - 4	1 - 4	1 - 4
Doxycycline	0.5 - 8	-	-	-
Erythromycin	0.5 - 4	0.5 - 4	0.5 - 4	0.5 - 4
Gentamicin	2 - 8	2 - 8	1 - 16	1 - 8
Gentamicin/Synergy	500	500	500	500
Levofloxacin	0.5 - 4	1 - 4	1 - 4	1 - 4
Linezolid	0.5 - 4	1 - 4	1 - 4	1 - 4
Meropenem	-	-	-	2 - 16
Minocycline	-	1 - 8	1 - 8	-
Moxifloxacin	0.5 - 2	0.5 - 4	0.5 - 2	0.5 - 4
Nitrofurantoin	16 - 64	16 - 64	16 - 64	16 - 64
Norfloxacin	-	-	-	-
Oxacillin	0.25 - 2	0.25 - 2	0.25 - 2	0.25 - 2
Penicillin	0.0625 - 1	0.125 - 8	0.125 - 8	0.125 - 8
Quinupristin/Dalfopristin	0.5 - 2	-	0.5 - 2	0.5 - 2
Rifampin	0.5 - 2	0.5 - 2	0.5 - 2	0.5 - 2
Streptomycin/Synergy	1000	1000	1000	1000
Tetracycline	0.5 - 8	0.5 - 8	0.5 - 8	0.5 - 8
Tigecycline	-	-	-	-
Trimethoprim/Sulfamethoxazole	1/19 - 4/76	0.5/9.5 - 2/38	0.5/9.5 - 2/38	0.5/9.5 - 2/38
Vancomycin	0.5 - 16	0.5 - 16	0.5 - 16	0.5 - 16

BD Phoenix™ Gram positive Emerge™ panel

Name	PMIC-110
Cat. no.	449036

MIC test range (µg/ml)
Yes
0.125 - 8
2/1 - 16/8
2 - 16
4 - 16
0.125 - 4
1 - 32
0.5 - 4
0.5 - 4
0.5 - 16
0.25 - 4
1 - 8
500
1 - 4
1 - 4
2 - 16
1 - 8
0.5 - 4
16 - 64
1 - 16
0.25 - 4
0.0625 - 16
0.5 - 2
0.25 - 2
1000
0.5 - 8
0.125 - 2
0.5/9.5 - 2/38
0.5 - 32

- Ideal for use in conjunction with BD Bruker MALDI Biotyper® System
- Additional drugs
- Additional dilutions

BD Phoenix™ Strep panels

Combination panel	Name	SMIC/ID-101
	Cat. no.	448802
AST only panel	Name	SMIC-101
	Cat. no.	448803
Antibiotic	MIC test range (µg/ml)	
Amoxicillin	0.25 - 4	
Cefepime	0.0625 - 2	
Cefotaxime	0.0625 - 2	
Ceftriaxone	0.0625 - 2	
Clindamycin	0.03125 - 2	
Erythromycin	0.03125 - 4	
Levofloxacin	0.5 - 4	
Linezolid	0.5 - 4	
Meropenem	0.0625 - 2	
Moxifloxacin	0.25 - 2	
Penicillin	0.03125 - 8	
Tetracycline	0.25 - 8	
Trimethoprim/Sulfamethoxazole	0.25/4.75 - 2/38	
Vancomycin	0.25 - 16	

BD Phoenix™ ID panels

	Gram Negative	Gram Positive	Yeast
Name	NID	PID	Yeast ID
Cat. no.	448007	448008	448316



Panel Technology

- Identification
 - Conventional biochemical
 - Chromogenic biochemical reactions
 - Fluorogenic biochemical reactions
 - Available for Gram positive, Gram negative, Streptococcus sp, and yeast
- AST
 - Broth based micro dilution
 - Utilizes a redox indicator and turbidity to detect growth
 - Available for Gram negative, Gram positive, and Streptococcus





Specialty AST Testing

CPO Detect

- Carbapenemase detection and classification
- Growth-based algorithms for detection
- Enterobacterales, *P. aeruginosa*, *A. baumannii*

ESBL Test

- Based on CLSI procedure
- *E. coli*, *K. pneumoniae*, and *K. oxytoca*

Inducible Macrolide Resistance

- Based on CLSI procedure (D-test)
- *Staphylococcus* species





Phoenix Workflow

- Create 0.5 McFarland suspension of organism.
 - Select isolated colonies and suspend in BD Phoenix ID broth
 - Vortex, read on nephelometer
- Add drop of AST indicator to AST broth
- Transfer 25 μ L of suspension from ID tube to AST tube
- Pour both ID and AST broth into respective side of panel





Phoenix Workflow (Alternate)

- Phoenix™ AP
- Create suspension
- AP adjusts suspension to correct McFarland equivalent
- AP adds AST indicator and pipettes suspension to AST broth
- Manually pour both ID and AST broth into respective side of panel





Phoenix Workflow, (cont'd)

- Cap panels
- Load panel onto instrument
- Instrument takes initial read on panel, then every 20 minutes for up to 16 hours.





Phoenix Workflow, (cont'd)

■ EpiCenter

- Evaluates and interprets results
- Reads endpoints; determines MIC value
- Assigns interpretation
 - FDA guidelines
 - Custom

Isolate Number:		1					Final
Organism Name:		Escherichia coli					
Isolate Classification:		Significant / Unknown					
Isolate AST Results							
Antimicrobial	MIC or Concentration	Interp	Expert SIR	Final SIR	Rule Number	Drug Test Group	
Amikacin	<=8	S		S		B	
Ampicillin	>16	R		R		A	
Ampicillin-Sulbactam	>16/8	R		R		B	
Aztreonam	<=2	S		S		B	
Cefazolin	4	S		S		A	
Cefepime	<=1	S		S		B	
Ceftazidime	<=2	S		S		B	
Ceftriaxone	<=1	S		S		B	
Ciprofloxacin	<=0.25	S		S		B	
Ertapenem	<=0.25	S		S		B	
Gentamicin	<=2	S		S		A	
Levofloxacin	<=0.5	S		S		B	
Meropenem	<=0.5	S		S		B	
Nitrofurantoin	32	S		S		U	
Piperacillin-Tazobactam	<=2/4	S		S		B	
Tetracycline	<=2	S		S		B	
Tobramycin	<=2	S		S		A	
Trimethoprim-Sulfamethoxazole	<=0.5/9.5	S		S		B	



Phoenix Workflow (cont'd)

- EpiCenter
 - Applies standard and custom rules

Isolate Number: 1 **Final**

Organism Name: Staphylococcus simulans
Isolate Classification: Significant / Unknown

Isolate AST Results

Antimicrobial	MIC or Concentration	Interp	Expert SIR	Final SIR	Rule Number	Drug Test Group
Ampicillin			R	R	132	N
Cefazolin	<=2		R	R	132	N
Cefoxitin	<=4		R	R	132	N
Clindamycin	<=0.5	S	R	R	1470	O
Daptomycin	<=1	S		S		B
Doxycycline	<=0.5	S		S		B
Erythromycin	>4	R	X	X	140	N
Gentamicin	<=2	S		S		B
Gentamicin-Syn					1597	N
Levofloxacin	>4	R		R		B
Linezolid	1	S		S		B
Moxifloxacin	>2	X		X		N
Nitrofurantoin	<=16	S		S		U
Oxacillin	>1	R		R		A
Penicillin G	>1	R		R		A
Quinupristin-dalfopristin	1					N
Rifampin	<=0.5	S		S		B
Streptomycin-Syn					1597	N
Tetracycline	<=0.5	S		S		B
Vancomycin	<=0.5	S		S		B

Resistance Markers

Rule 1506	BLACT	<input checked="" type="checkbox"/>	Beta-lactamase producing Staphylococcus
Rule 1530	MRS	<input checked="" type="checkbox"/>	Methicillin Resistant Staphylococcus
Rule 1547	STAIML	<input checked="" type="checkbox"/>	Staphylococcus Inducible MLSb Phenotype



Quality Control

- QC panels loaded in QC mode
 - Determines MIC value
 - Tracks biochemical results
 - Determines if results are appropriate





Phoenix System PROS

- No biochemical reagents
- Mechanically reliable
 - Minimal moving parts
- Epicenter
 - Pre-loaded with FDA breakpoints
 - Ability to customize alternative breakpoints
 - Ability to build custom rules
 - Sensitivity changes
 - Allows you to add notes/reminders under certain conditions





Phoenix System PROS (cont'd)

- No off-line tests
- Low inoculum option (0.25 McFarland)
- Compatible with Bruker MALDI-TOF





Phoenix System CONS

- Turnaround time – 16 hours
- Slow to adjust formulations and breakpoints
- Manual labeling/inoculation of each panel
- Cannot be read manually
- Manual set up is time consuming
- Automated set up is space consuming





Phoenix System CONS (cont'd)

Panel Limitations

■ Gram positive

- Overall of SXT resistance on *S. aureus* isolates

• Erythromycin:	<i>Enterococcus</i> species other than <i>E. faecalis</i> and <i>E. faecium</i>
• Nitrofurantoin:	<i>Enterococcus faecium</i>
• Levofloxacin:	<i>Enterococcus</i> species other than <i>E. faecalis</i> and <i>E. faecium</i>
• Rifampin:	All <i>Enterococcus</i> species
• Trimethoprim/Sulfamethoxazole:	<i>Staphylococcus</i> species other than <i>S. aureus</i>
• Vancomycin:	<i>Enterococcus casseliflavus</i> , <i>Enterococcus gallinarum</i> , and <i>Enterococcus casseliflavus/gallinarum</i>

■ Gram negative

- CPO Detect reliability is questionable

• Ampicillin-sulbactam	<i>Proteus vulgaris</i> and <i>Proteus penneri</i>	• Piperacillin-tazobactam	<i>Acinetobacter</i> species and <i>Stenotrophomonas maltophilia</i>
• Ciprofloxacin	<i>Stenotrophomonas maltophilia</i>	• Tobramycin	<i>Providencia stuartii</i>
• Gentamicin	<i>Providencia stuartii</i>	• Trimethoprim-sulfamethoxazole	<i>Serratia marcescens</i>
• Meropenem	<i>Proteus mirabilis</i>		

■ Strep

• Cefepime:	<i>Streptococcus parasanguinis</i>
• Erythromycin:	<i>Streptococcus viridans</i> group except <i>Streptococcus bovis</i> group



Support and Experience

- Support options include:
 - Tech Support hotline
 - Service agreements
- Highly reliable





AST Automated Systems – bioMerieux Vitek System

WCLN Antibiotic Resistance Conference - 2022
April 26, 2022

Thomas Novicki, PhD, D(ABMM)
Clinical Laboratory Scientist – Microbiology
Marshfield Labs



Then and Now

The OG (Original Gadget)



The Vitek 2





A Short History Lesson

- Vitek AMS ID & AST instrument
 - Designed for space by McDonnell-Douglas and NASA.
 - Introduced commercially in 1979.
 - Acquired by bMx in 1988.
- Vitek 2
 - Introduced in the USA in 2003.
 - Built on the Vitek AMS:
 - More automation.
 - A rapid, dynamic AST system.
 - Novel five step Advanced Expert System (AES).
 - Two platform designs with capacities of 15-120 cards.



Vitek 2

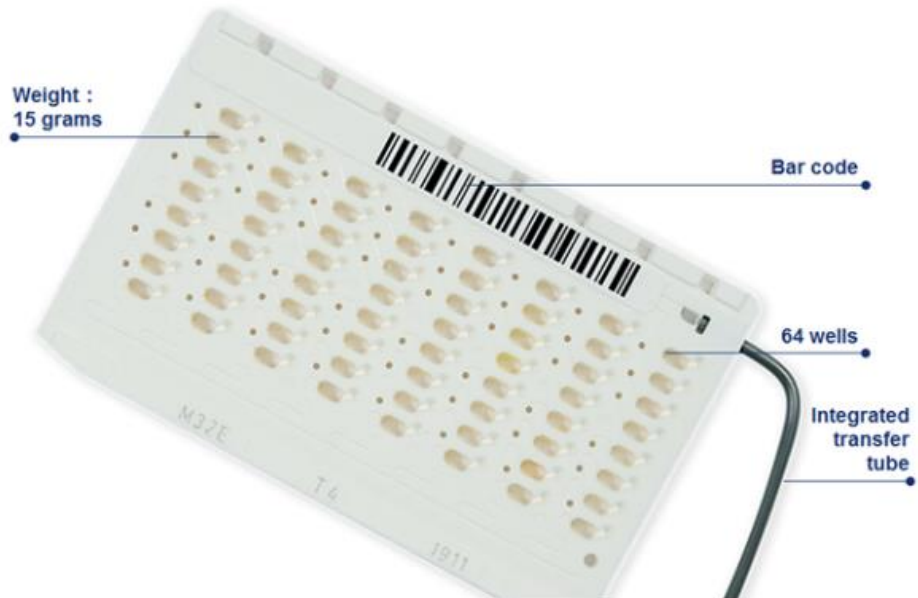
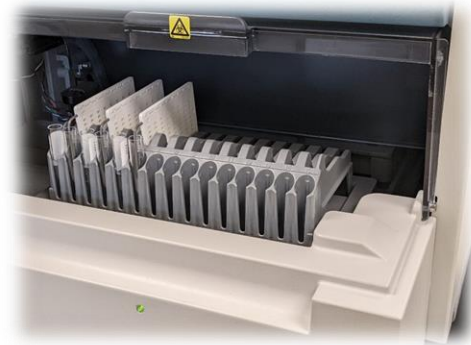


Figure 1: VITEK® 2 AST Card

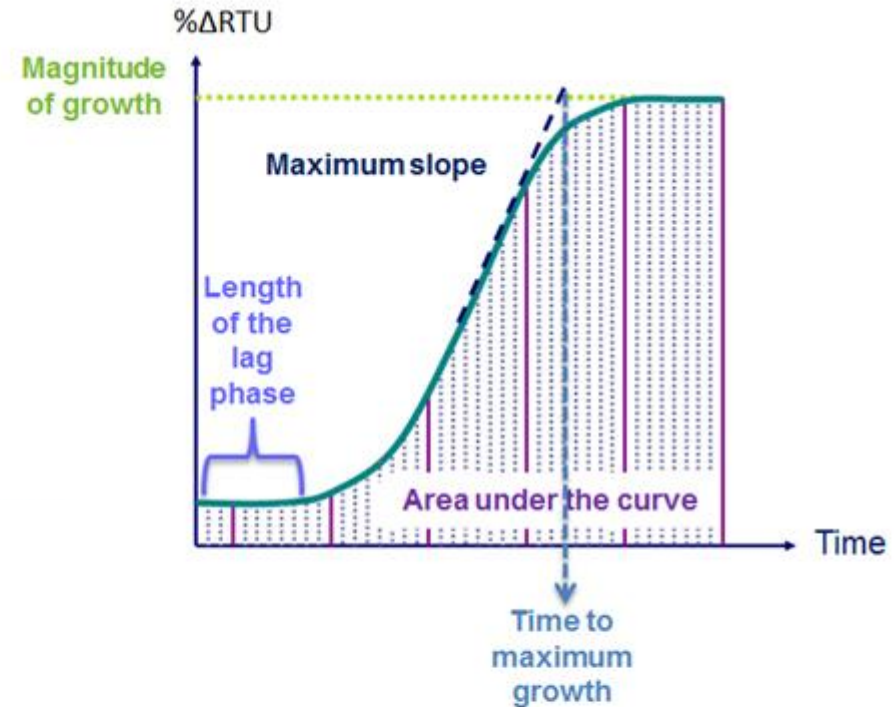
<https://www.biomerieux-microbio.com/>





Rapid AST – That Old Black Magic

- Standard AST: end-point method.
- Vitek 2: dynamic, calculation-based.
 - Growth rate & AUC for each drug.
 - Data compared to >3,000 reference strains to calculate MICs.



Magnitude of growth = Maximum percent change of the transmittance signal (RTU)

Maximum slope = maximum rate of growth during exponential growth phase

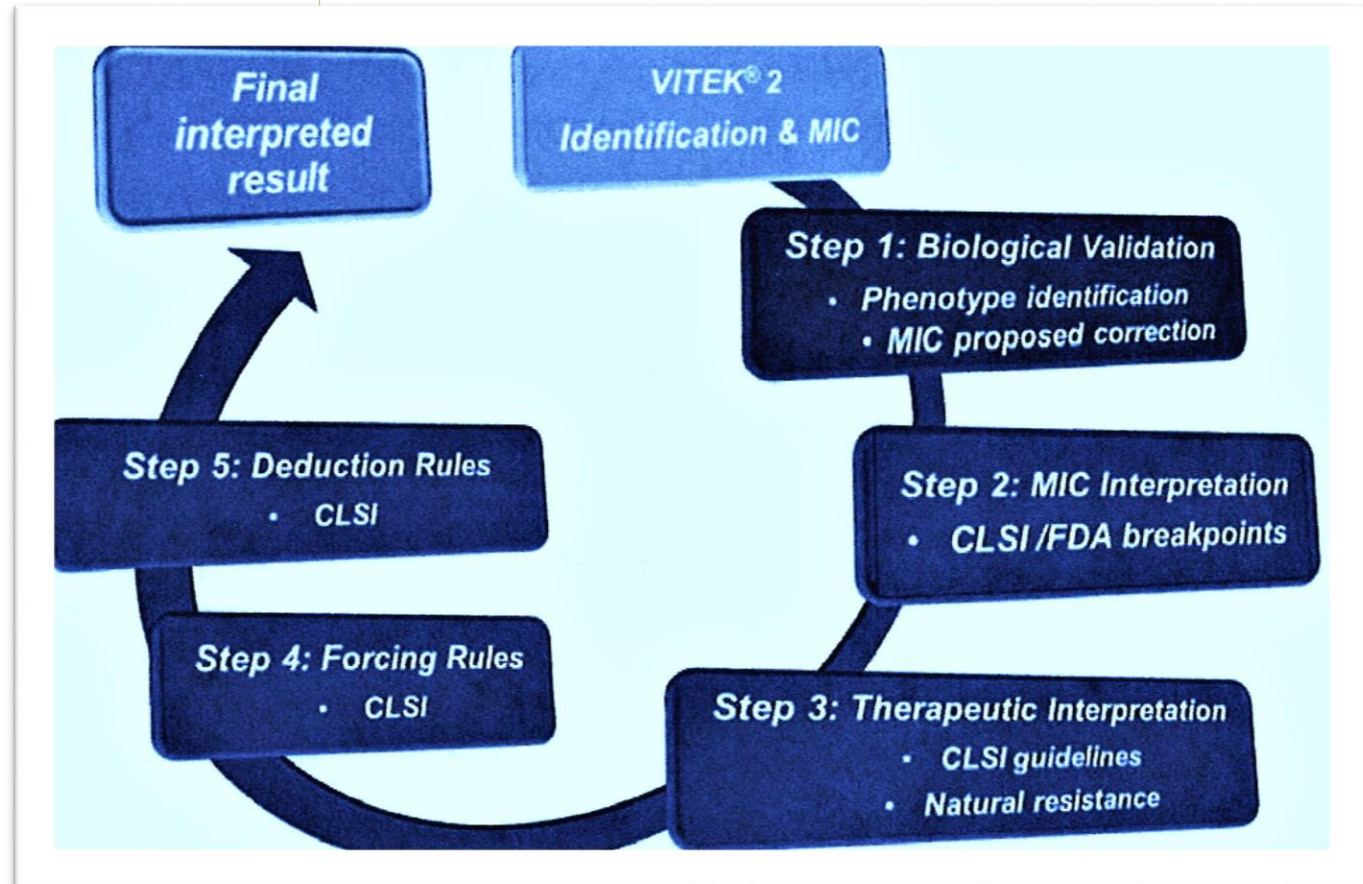
<https://www.biomerieux-microbio.com>



Advanced Expert System

Not Your Grandma's Rules-based Expert System

- AES: a five-step expertization process.
- Fundamentally different from, and more complex than, standard bug/drug expert rules systems.



Source: bioMerieux University Advanced AES training manual



AES Step 1. Biological Validation

Approach:

- Looks at the entire drug class phenotype, not bug/drug.
- Phenotypes based on known drug resistance mechanisms (e.g. ESBL, KPC).
- Phenotypic data from >100,000 references and in-house testing.
- AES DB continually updated.



Isolate Detail

1 of 23

Accession ID [REDACTED]

Organism Origin MYLA®

Organism Citro.freundii

AES Findings ■ Inconsistent

Phenotypes Selected for Review

Observed results do not match any phenotype in the AES knowledge base. Verify organism identification and check isolate purity. Retest if deemed necessary.

Card Comments:

Advanced Reporting Tool Comments:

Internal Comments:

Confirm organism purity and Identification (Repeat ID. If first ID'd manually then repeat using MS). Print lab report and consult.
IF isolate is INCONSISTENT the Vitek AES will not apply intrinsic resistance. EATS pop-up reminders may not be activated. Consult with doctoral microbiologist and review for any intrinsic resistance. (67)
Review results, send to cerner, manually add Amp as R (115).
Review results, Send to Cerner, Change CAZ and CRO to Resistant and add BLRETEST (non-bloods) or RI CONSULT (bloods) comment to report. (116)

AST-GN81!

Antibiotic	MIC	INT	Antibiotic	MIC	INT	Antibiotic	MIC	INT
<input checked="" type="checkbox"/> Ampicillin			<input type="checkbox"/> Cefepime	≤1	S	<input type="checkbox"/> Ciprofloxacin	≤0.25	S
<input type="checkbox"/> Amoxicillin/ Clavulanic Acid	≥32	R	<input checked="" type="checkbox"/> Ertapenem	≤0.5	S	<input type="checkbox"/> Levofloxacin	1	I
<input type="checkbox"/> Piperacillin/ Tazobactam	32	I	<input type="checkbox"/> Meropenem	≤0.25	S	<input type="checkbox"/> Tetracycline	≤1	S
<input type="checkbox"/> Cefazolin	≥64	R	<input checked="" type="checkbox"/> Amikacin	4	S	<input type="checkbox"/> Nitrofurantoin	256	R
<input type="checkbox"/> Ceftazidime	≥64	R	<input type="checkbox"/> Gentamicin	≤1	S	<input type="checkbox"/> Trimethoprim/ Sulfamethoxazole	≤20	S
<input type="checkbox"/> Ceftriaxone	≥64	R	<input type="checkbox"/> Tobramycin	8	I	<input checked="" type="checkbox"/> Ceftazidime	≥64	R

Patient Name: [REDACTED]

Analysis Status: 7.71 hr - Final

Analysis Messages:

The following antibiotic(s) are suppressed from analysis:
Ampicillin,

Setup Tech: Scott Vesely (veselys)

Organism Quantity:

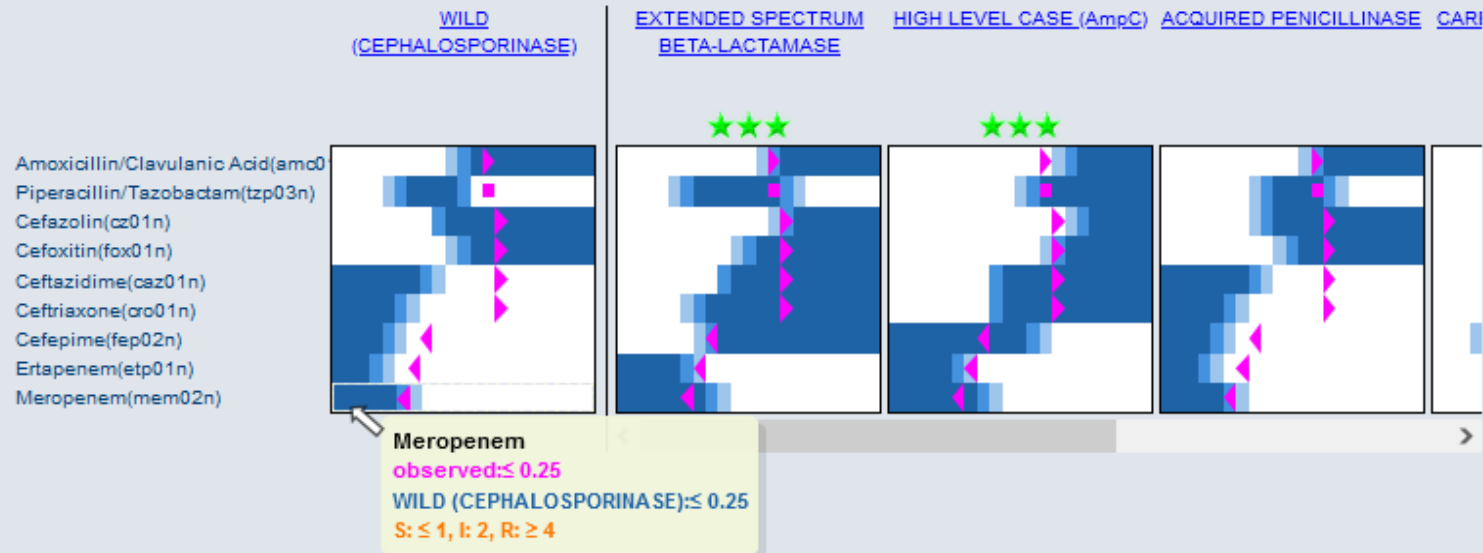
Supplemental Tests:

Contraindicating Tests:



Phenotype Graphical Representation

Organism:
Species with phenotypes:
Antibiotic families:



★★★★ Best phenotype
★★★ Recognized phenotype
★ Possible phenotype

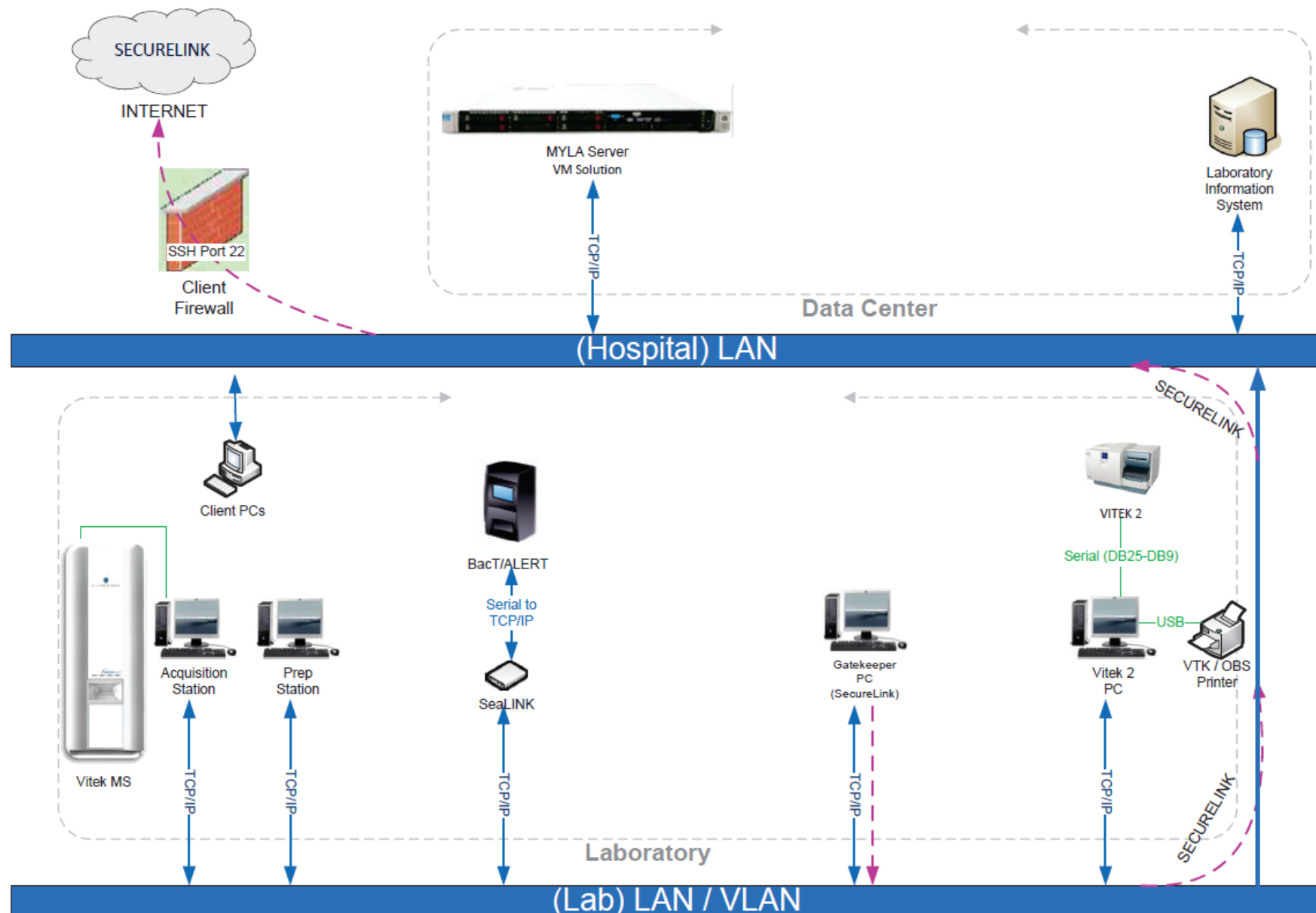
Very Typical
Typical
Not Very Typical

AES Analysis Results

- Green*: Consistent
- Yellow*: Consistent with correction
- Red**: Inconsistent
- Purple**: No phenotypes available

* All other AES steps done

** S/I/Rs only





Conclusions

Pros

- Reliable operation, efficient workflow, & great tech support.
- Wide range of AST & ID cards.
- Rapid AST results vs endpoint methods.
- Seamless pairing with Vitek MS.
- Integrates with LIS, other bMx instruments, tech workstations over network.
 - Extends to off-site labs.
- Competitive cost-per-test pricing.

Cons

- AES isn't practical, and whose worth isn't clear to me.
- Positioning of Myla on a network server brings in an extra IT layer.
 - Biggest impact was at start-up for us.



QUESTIONS??