T2Bacteria

- T2 Magnetic Resonance technology
- Whole blood (EDTA), fully automated, FDA-cleared
- PCR
- Hybridization to supramagnetic nanoparticles
- Amplicon-induced agglomeration of supramagnetic particle, Disruption of microscopic magnetic filed→measure

Target	Limit of Detection (CFU/mL)
E. faecium	5
E. coli	11
K. pneumoniae	2
P. aeruginosa	5
S. aureus	1

A. baumannii: RUO

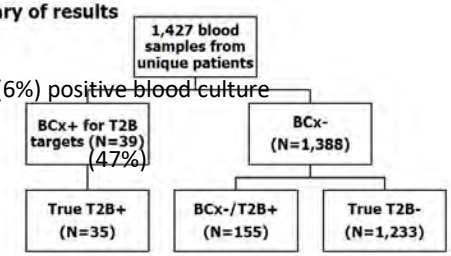
Clinical performance of T2Bacteria among patients with BSIs

Clinical performance of T2Bacteria among patients with bloodstream infections due to five common bacterial species

MH Nguyen, W Pasculle, PG Pappas, G Alangaden, G Pankey, B Schmitt, M Weinstein, R Widen, D Hernandez, D Wolk, TJ Walsh, J Perfect, CJ Clancy, E Mylonakis

University of Pittsburgh, University of Alabama at Birmingham, Henry Ford Hospital, Ochsner Health System, Indiana University School of Medicine, Robert Wood Johnson University Hospital, Tampa General Hospital, Geisinger Health System, Weill Cornell Medicine of Cornell University, New York Presbyterian Hospital, Duke University, Alpert Medical School of Brown University

Summary of results



T2B Target	Receipt of in vitro effective antibiotic on the day of paired BCx+/T2B+ draw
E. coli	20% (2/10)
E. faecium	0% (0/1)
K. pneumoniae	17% (1/6)
P. aeruginosa	20% (1/5)
S. aureus	46% (6/13)

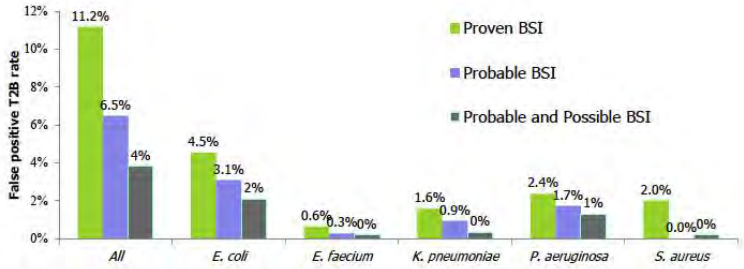
In vitro effective therapy was defined as receipt of ≥1 dose of an antibiotic that has *in vitro* activity against >70% of the BSI bacterium based on antibiogram from four medical centers

- Mean time of BC+: 51+/-43h (7.1-171h)
- Mean time to identification: 83.7 +/-47.6h (22.8-243.6h)
- Mean time to T2 results: 5.4+/-1.6h (3.6-10h)

ASM Microbe 2018

T2Bacteria

T2B Target	Sensitivity	95% CI
Overall	**90% (35/39)**	**75-97%**
E. coli	91% (10/11)	62-98%
E. faecium	100% (1/1)	21-100%
K. pneumoniae	100% (6/6)	61-100%
P. aeruginosa	100% (5/5)	57-100%
S. aureus	81% (13/16)	57-93%



- Discordant BCx-/T2B+ results were obtained in 11% (155/1,388) of samples

?previous antibiotic

ASM Microbe 2018

Xpert MTB/RIF Ultra

- **Recommended by WHO to replace the current Xpert MTB/RIF in March 2017**
- **Turn around time < 80 min**
- **Larger chamber for DNA amplification**
  - **50 µL vs. 25 µL**
- **Two additional molecular targets**
  - **IS*6110* and IS*1081***
- **Fully nested nucleic acid amplification, more rapid thermal cycling, improved fluidics and enzymes**
- **High, medium, low, very low, trace**
- **Improved ability of detect low number of bacilli 16 bacilli/mL vs. 114-131 bacilli/mL**
- **RIF resistance: melting temperature-based analysis with 4 probes instead of PCR**
  - **Differentiate silent mutation from resistance conferring mutation**

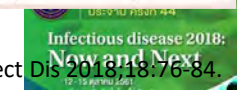
Xpert MTB/RIF Ultra for detection of *Mycobacterium tuberculosis* and rifampicin resistance: a prospective multicentre diagnostic accuracy study

Susan E Dorman, Samuel G Schumacher*, David Alland, Pamela Nabeta, Derek T Armstrong, Bonnie King, Sandra L Hall, Soumitesh Chakravorty, Daniela M Cirillo, Nestani Tukvadze, Nino Bablishvili, Wendy Stevens, Lesley Scott, Camilla Rodrigues, Mubin I Kazi, Moses Joloba, Lydia Nakiyingi, Mark P Nicol, Yonas Ghebrekristos, Irene Anyango, Wilfred Murithi, Reynaldo Dietze, Renata Lyrio Peres, Alena Skrahina, Vera Auchynka, Kamal Kishore Chopra, Mahmud Hanif, Xin Liu, Xing Yuan, Catharina C Boehme, Jerrold J Ellner, Claudia M Denkinger, on behalf of the study team†*

- 8 countries: South Africa, Uganda, Kenya, China, India, Georgia, Belarus, Brazil
- 1753 adults with symptoms of pulmonary TB

	Tuberculosis detection*					Detection of rifampicin resistance†	
	Sensitivity: all culture-positive (95% CI; n/N)	Sensitivity: smear-negative (95% CI; n/N)	Sensitivity: HIV-negative (95% CI; n/N)‡	Sensitivity: HIV-positive (95% CI; n/N)‡	Specificity (95% CI; n/N)	Sensitivity (95% CI; n/N)	Specificity (95% CI; n/N)
Xpert	83% (79 to 86; 383/462)	46% (37 to 55; 63/137)§	90% (84 to 94; 143/159)	77% (68 to 84; 88/155)	98% (97 to 99; 960/977)	95% (91 to 98; 167/175)	98% (96 to 99; 369/376)
Xpert Ultra	88% (85 to 91; 408/462)	63% (54 to 71; 86/137)§	91% (86 to 95; 145/159)	90% (83 to 95; 103/115)	96% (94 to 97; 934/977)	95% (91 to 98; 166/175)	98% (97 to 99; 370/376)
Difference (Xpert Ultra minus Xpert)	5·4% (3·3 to 8·0; 25/162)	17% (10 to 24; 23/137)	1·3% (-1·8 to 4·9; 2/159)	13% (6·4 to 21; 15/115)	-2·7% (-3·9 to -1·7; 36/977)	-0·6% (-3·2 to 1·6; 1/175)	0·3% (-0·7 to 1·5; 1/376)
Non-inferiority margin	Not predefined	-7%	Not predefined	Not predefined	Not predefined	-3%	-3%

Lancet Infect Dis 2018;18:76-84.



	Sensitivity		Specificity		
	All culture-positive (95% CI; n/N)	Smear-negative, culture-positive (95% CI; n/N)	All culture-negative (95% CI; n/N)	No history of tuberculosis (95% CI; n/N)	Any history of tuberculosis (95% CI; n/N)
Xpert	83% (79-86; 383/462)	46% (37-55; 63/137)	98% (97-99; 960/977)	98% (97-99; 715/727)	98% (95-99; 244/249)
Xpert Ultra	88% (85-91; 408/462)	63% (54-71; 86/137)	96% (94-97; 934/977)	96% (95-98; 701/727)	93% (89-96; 232/249)
Xpert Ultra, no trace*	86% (82-89; 395/462)	54% (45-63; 74/137)	98% (96-98; 953/977)	98% (96-99; 709/727)	98% (95-99; 243/249)
Xpert Ultra, conditional trace†	88% (85-91; 406/462)	61% (53-70; 84/137)	97% (95-98; 945/977)	96% (95-98; 701/727)	98% (95-99; 243/249)
Xpert Ultra, trace-repeat‡	87% (84-90; 404/462)	61% (52-69; 83/137)	97% (95-98; 944/977)	97% (96-98; 707/727)	95% (91-97; 236/249)

Sensitivity varied little by history of tuberculosis and did not vary systematically. Data on tuberculosis history were not available for one patient. *Study participants testing tuberculosis-positive based on a trace-positive Xpert Ultra result (n=32) were reclassified as tuberculosis-negative. †Study participants testing tuberculosis-positive based on a trace-positive Xpert Ultra result were reclassified as tuberculosis-negative only if they had a history of tuberculosis (n=13). ‡Study participants testing tuberculosis-positive based on a trace-positive Xpert Ultra result had Xpert Ultra testing on a subsequent sputum specimen: if the subsequent sputum Xpert Ultra result was negative for *M tuberculosis* then the participant was reclassified as tuberculosis-negative; if the subsequent Xpert Ultra result was positive for *M tuberculosis* (any semiquantitative threshold), then the participant was not reclassified and remained tuberculosis-positive (14 out of 32 participants tested tuberculosis-negative on sample 2 and were reclassified; 14 tested tuberculosis-positive on sample 2 and were not reclassified; and four were were non-determinate by Xpert Ultra on sample 2 and were not reclassified).

Dorman SE. Lancet Infect Dis 2018;18:76-84.

Diagnostic accuracy of Xpert MTB/RIF Ultra for tuberculous meningitis in HIV-infected adults: a prospective cohort study

Nathan C Bahr, Edwin Nuwagira, Emily E Evans, Fiona V Cresswell, Philip V Bystrom, Adolf Byamukama, Sarah C Bridge, Ananta S Bangdiwala, David B Meya, Claudia M Denkinger, Conrad Muzoora, David R Boulware, on behalf of the ASTRO-CM Trial Team

- 129 HIV-infected patients with suspected TB meningitis, Uganda
- 0.5 mL centrifuged CSF; better if at least 6 mL

	Sensitivity vs composite endpoint (95% CI; n/N)	Sensitivity vs case definition (95% CI; n/N) Uniform Clinical Case Criteria	Assay error rate
Xpert Ultra	95% (77–99; 21/22)	70% (47–87; 16/23) NPV93%	2·3% (3/129)
Xpert	45% (24–68; 10/22)	43% (23–66; 10/23)	4·7% (6/129)
MGIT culture	45% (24–68; 10/22)	43% (23–66; 10/23)	1·6% (2/129)

All three tests were done in all 129 participants. Composite endpoint included any positive CSF Xpert Ultra, Xpert, or Bactec960 MGIT culture. Sensitivity vs uniform clinical case definition for definite (n=14) or probable (n=9) tuberculous meningitis excluded Xpert Ultra results in defining case status.[10] Error in culture reflects contamination with non-tuberculous mycobacterium growth. Xpert=Xpert MTB/RIF. MGIT=mycobacteria growth indicator tube. CSF=cerebrospinal fluid.

Lancet Infect Dis 2018;18:68-75.

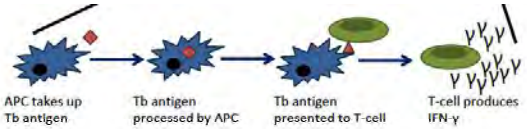
Xpert MTB/RIF Ultra

- **Evaluation of 1520 persons with signs and symptoms of TB, 10 study sites**
  - **More sensitivity: +5% especially in**
    - **smear-negative-culture-positive (+17%)**
    - **HIV (+12%)**
    - **pediatrics (71% vs. 47%)**
    - **extrapulmonary [CSF 95% vs. 43%]**
    - **At least good accuracy to detect rifampicin resistance (low sample size)**
  - **Decrease specificity (-3.2%, 94% vs. 96%)**
    - **Reference?**
    - **Non-viable, non-replicating? "trace call" in previously treated**

WHO meeting report 2017

Interferon-γ Releasing Assays

- IGRA
  - Indirect tests for infection with *M. tuberculosis*
  - Detect IFN-γ produced by MTb 'primed' T-cells following exposure to MTb antigen

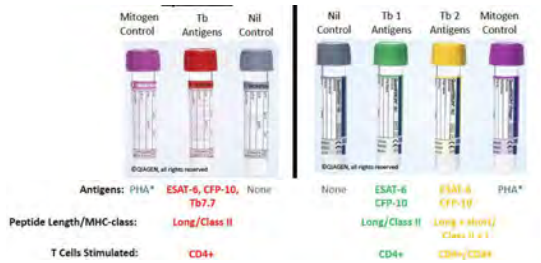


- 3 US FDA-cleared IGRA:
  - T.SPOT-TB (Oxford Immunotec)
  - QuantiFERON-TB Gold In-Tube (QFT-GIT; Qiagen- will be discontinued)
  - **QuantiFERON-TB Gold Plus (QFT-Plus; Qiagen)**

QuantiFERON Gold Plus

- US FDA-cleared in June 2017, use in Europe since 2015
- Developed with the goal to increase sensitivity for both LTBI and active disease-HIV-young children

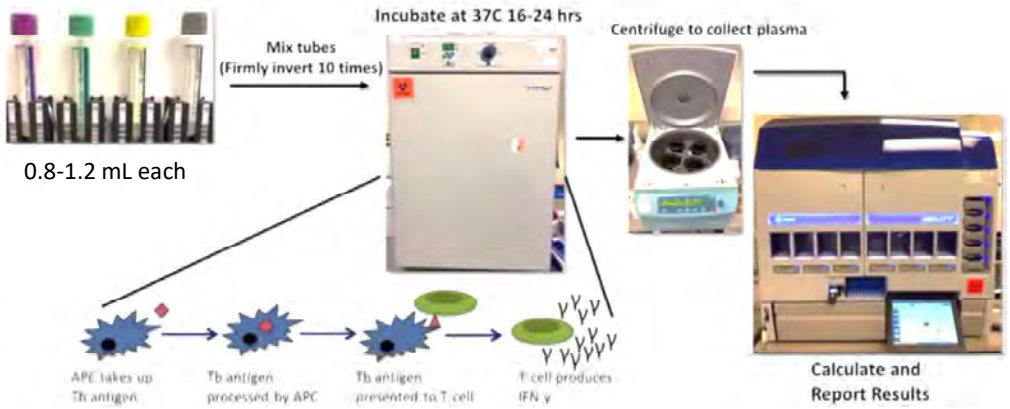
	QFT GIT	QFT Gold Plus
Tube	3	4
CD4	ESAT-6, CFP-10, TB7.7	ESAT-6, CFP-10
CD8	None	ESAT-6, CFP-10,Proprietery 6 MHC class I peptide



- Can collect in single Lithium-Heparin tube
  - RT 12h
  - 2-8^{0}C 16-48h

PHA: phytohemeagglutinin

QuantiFERON Gold Plus



QuantiFERON Gold Plus

QuantiFERON-TB Gold Plus: Results and Interpretation

Nil	TB1 - Nil	TB2 - Nil	Mitogen - Nil	Qualitative Result	Interpretation
≤8.0 IU/mL	≥0.35 and ≥25% of Nil	Any	Any	Positive	*M. tuberculosis* infection likely
	Any	≥0.35 IU/mL and ≥25% of Nil			
	<0.35 IU/mL OR ≥0.35 IU/mL and <25% of Nil		≥0.5 IU/mL	Negative	*M. tuberculosis* infection NOT likely
			<0.5 IU/mL	Indeterminate	Likelihood of *M. tuberculosis* infection cannot be determined
>8.0 IU/mL	Any				

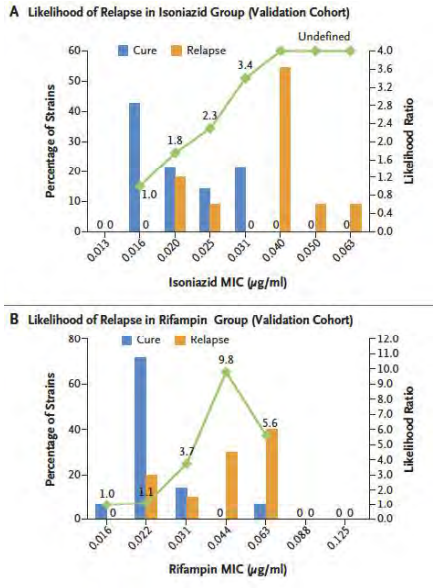
- Cutoff criteria identical to QFT
- QFT-Plus is considered positive if either one or both Tb Ag tubes are positive
- Data suggests non-inferior or similar performance between these two IGRAs [Sensitivity 89-96%, specificity 98-99%]
- **Additional studies are ongoing: active or recent infections (cut off?), children or immunocompromised patients, Thai?**

IGRA: Summary

Characteristic	QFT-GIT	QFT-Plus	T.SPOT.TB
A single visit is required	✔	✔	✔
Does not cross-react with BCG	✔	✔	✔
Can be collected into a single tube	✖	✔	✔
Can be separated and tested >24h after collection	✖	✔	✔
Test all forms of cellular immunity (CD4 and CD8)	✖	✔	✖
High sensitivity	✔	✔	✔
High specificity	✔	✔	✔
Use a standard inoculum	✖	✖	✔

McCormick-Baw C. CMN 2018;40:139-143.

TB MIC



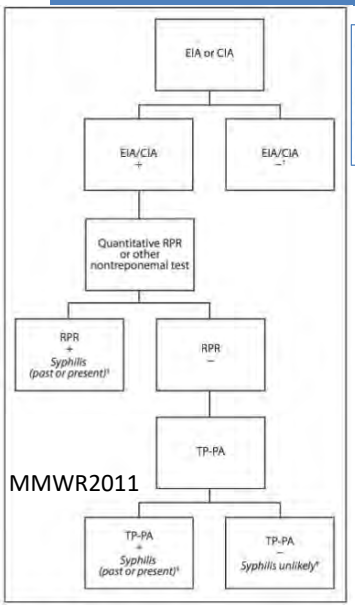
- TB MIC and relapse
  - Higher MIC of INH and RIF, albeit below break points (0.1 mg/L for I and 1 mg/L for R), increased risk of relapse

  Colangeli R. NEJM2018;379:823-33
- Dosage ofr Intermediate-SDD purposed by Monte-Carlo simulation
  - INH 0.0312-0.5 mg/L: 900mg/d
  - RIF 0.0625-0.25 mg/L: 1800mg/d
  - PZA 37.5-50 mg/L: 4 g/d

  Zur MA. CID2018.doi:10.1092/cid/ciy346.
- WGS to predict phenotypic susceptibility

  CRyPTIC consortium and the 10000 genome project. NEJM2018; 379:1403-1415

Syphilis reverse algorithm: revisit



MMWR2011

Performance of Treponemal Tests for the Diagnosis of Syphilis

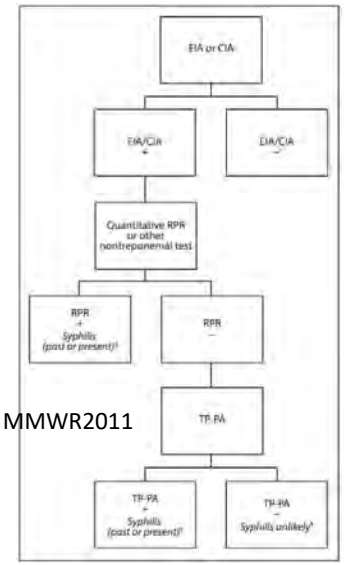
Ina U. Park, Yetunde F. Fakile, Joan M. Chow, Kathleen J. Gustafson, Heather Jost, Jeffrey M. Schapiro, Susan Novak-Weekley, Anthony Tran, Jim H. Nomura, Victor Chen, Manie Behoshti, Townson Tsai, Karen Hoover, and Gail Bolan

- A few studies comparing head-to-head performance of treponemal tests in clinically characterized sera
- Will help inform selection of the most appropriate second treponemal test

CID 2018.doi:10.1093/cid/ciy558

Laboratory Evaluation of a Commercially Available Rapid Syphilis Test

Lara E. Pereira, Joshua McCormick, Tandin Dorji, Joseph Kang, Yongcheng Sun, Mayur Shukla, Andre Hopkins, John Deutsch, Ellen N. Kersh, Kyle Bernstein, Yetunde F. Fakile



MMWR2011

- Syphilis Health Check: rapid treponemal test
- 1406 archived samples
- Sens. 88.7% Spec 93.1% compared with treponemal test;
- Sens. 66.7% in HIV

JCM2018;56:e00832-18.

Performance of Treponemal Tests for the Diagnosis of Syphilis

Ina U. Park,[1,2] Yetunde F. Fakile,[2] Joan M. Chow,[1] Kathleen J. Gustafson,[1] Heather Jost,[2] Jeffrey M. Schapiro,[3] Susan Novak-Weekley,[4] Anthony Tran,[5] Jim H. Nomura,[6] Victor Chen,[6] Manie Beheshti,[6] Townson Tsai,[6] Karen Hoover,[2] and Gail Bolan[2]

[1]Sexually Transmitted Disease Control Branch, Division of Communicable Disease Control, California Department of Public Health, Richmond; [2]Division of Sexually Transmitted Disease Prevention, Centers for Disease Control and Prevention, Atlanta, Georgia; and [3]Kaiser Permanente Northern California Regional Laboratory, Berkeley, [4]Southern California Permanente Medical Group Regional Reference Laboratory, North Hollywood, [5]San Francisco Department of Public Health, and [6]Southern California Permanente Medical Group, California

Assay	Sensitivity by Stage: Primary (n = 55)	Secondary (n = 98)	Early Latent (n = 41)	Late Latent (n = 68)	Overall Sensitivity (n = 262)	Overall Specificity (n = 403)
FTA-ABS	**78.2**[a] (65.0–88.2)	**92.8**[a] (85.7–97.0)	100 (90.7–100)	92.6 (83.7–97.6)	**90.8**[a] (86.7–94.0)	98.0 (96.1–99.1)
TPPA	94.5 (84.9–98.9)	100 (96.2–100)	100 (90.7–100)	**86.8**[b] (76.4–93.8)	95.4 (92.1–97.6)	100 (99.0–100)
Centaur CIA	94.5 (84.9–98.9)	100 (96.2–100)	100 (90.7–100)	94.1 (85.6–98.4)	97.3 (94.6–98.9)	99.5 (93.0–97.3)
Trep-Sure EIA	94.5 (84.9–98.9)	100 (96.2–100)	100 (90.7–100)	98.5 (92.1–99.9)	98.5 (96.1–99.6)	**82.6**[c] (78.4–86.1)
LIAISON CIA	96.4 (94.5–98.2)	100 (96.2–100)	97.6 (87.4–99.9)	92.6 (83.7–97.6)	96.9 (94.1–98.7)	94.5 (91.8–96.5)
Bioplex MBIA	96.4 (94.5–98.2)	100 (96.2–100)	95.1 (83.8–99.4)	94.1 (85.6–98.4)	96.9 (94.1–98.7)	96.7 (94.4–98.2)
INNO-LIA	96.4 (94.5–98.2)	100 (96.2–100)	100 (90.7–100)	91.1 (81.7–96.7)	96.9 (94.1–98.7)	98.5 (96.8–99.5)

- EIA, CIA, MBIA, TPPA would be preferred for confirming RPR using traditional algorithm
- TPPA is preferred to adjudicate cases of discordant reverse sequence algorithm
  - INNO-LIA would be an acceptable alternative
  - Centaur CIA and Bioplex MBIA: alternative in high prevalence

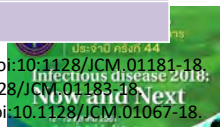
- **ADVIA Centaur CIA-IgG, Bioplex-aMBIA IgG,** INNO-LIA-mannual line immunoassay IgG, FTA-ABS:manual IFA IgG IGM, **LIAISON-CIA IgG IgM, Trep-Sure-EIA IgG IgM**

CID 2018.doi:10.1093/cid/ciy558

Revised taxa: Communication is The Key

Previous taxa	Revised taxa
• ***Enterobacter aerogenes***	• ***Klebsiella aerogenes* !!!**
• ***Enterobacteriaceae* and 7 new families**	• ***Enterobacterales ord. nov.***
• ***Propionibacterium acnes, P. avidum, P. granulosum***	• ***Cutibacterium***
• ***Propionibacterium propionicum***	• ***Pseudopropionibacterium***
• ***Clostridium difficile***	• ***Clostridioides difficile***
• ***Borellia burgdorferi***	• ***Borreliella***
• ***Emmonsia pasteurianus***	• ***Emergomyces* (together with *E. africanus, E. cannadensis, E. europaeus, E. orientalis*)**
• ***Emmonsia parva***	• ***Blastomyces parvus***
• ***Balantidium coli***	• ***Neobalantidium coli***
• ***Diphyllobothrium latum***	• ***Dibothriocephalus latus***

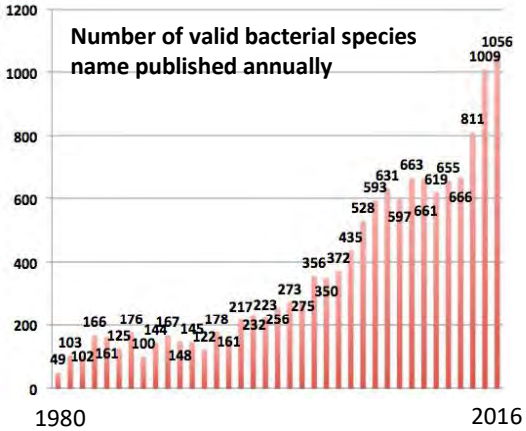
Munson E, Carroll KC. JCM. Sept2018.doi:10.1128/JCM.01181-18.
Warnock DW. JCM. Sept2018.doi:10.1128/JCM.01183-18.
Mathison BA, Pritt BS. JCM. Oct2018.doi:10.1128/JCM.01067-18.



Modern Taxonomy Clinical Significant?

"Species proliferation"

- **Total number of published bacterial species (as of May 2017) = 15,626**



- **<10% of newly proposed nomenspecies isolated form clinical specimens (mostly from environment, single strain)**

https://www.bacterio.net
Janda JM. CMN. Apr2018;40(7):51-57.

UK case of *Neisseria gonorrhoeae* with high-level resistance to azithromycin and resistance to ceftriaxone acquired abroad
Health Protection Report Volume 12 Number 11

UK case of *Neisseria gonorrhoeae* with high-level resistance to azithromycin and resistance to ceftriaxone acquired abroad

- The first global report of HLAziR (MIC >256 mg/L, which also resistant to ceftriaxone (MIC 0.5 mg/L)
  - Followed by 2 cases in Australia in April
- A heterosexual male, one regular UK partner and sexual contact in SEA 1 month prior
- Positive culture after 1 g ceftriaxone and subsequently with spectinomycin
- Ertapenem MIC 0.032 mg/L

CRO MIC
EUCAST R >0.125
CLSI R >0.5
AZT MIC
EUCAST R >0.5
ECV NWT ≥2

Clostridium innocuum is a vancomycin-resistant pathogen that may cause antibiotic-associated diarrhoea

J.-H. Chia [1,4,5,*], T.-S. Wu [2,*], T.-L. Wu [1,4,*], C.-L. Chen [3], C.-H. Chuang [7,8], L.-H. Su [1,4], H.-J. Chang [2], C.-C. Lu [9], A.-J. Kuo [1,4], H.-C. Lai [4,*], C.-H. Chiu [3,6,**]

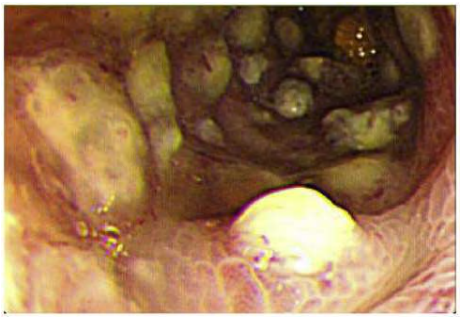
- *C. innocuum*: intrinsic low-level vancomycin resistance
  - Colony may resemble *C. difficile,* negative for *C.difficile* toxin A/B
  - *racemase* gene and $ddl_{c.innocuum}$: synthesis of a peptidoglycan precursor terminating in serine
  - Bacteremia, endocarditis in immunocompromised, empyema, IAI, pelvic abscess, recurrent diarrhea in patients with prior CDI
- 136 isolates (5.5%) from 2471 stool culture for *C.difficile*; 103 patients, Taiwan: MIC90: metronidazole 0.5 mg/L, vancomycin 16 mg/L
- Watery diarrhea (61.2%), mucous in stool (9.7%), bloody diarrhea (27.2%), pseudomembranous colitis (1.9%)

CMI 2018. doi:10.1016/j.cmi.2018.02.015

Clostridium innocuum is a vancomycin-resistant pathogen that may cause antibiotic-associated diarrhoea

J.-H. Chia [1,4,5,*], T.-S. Wu [2,*], T.-L. Wu [1,4,*], C.-L. Chen [3], C.-H. Chuang [7,8], L.-H. Su [1,4], H.-J. Chang [2], C.-C. Lu [9], A.-J. Kuo [1,4], H.-C. Lai [4,*], C.-H. Chiu [3,6,**]

- 89% received antibiotics within 2 weeks
  - Cephalosporins (63)
  - penicillins (36)
  - aminoglycosides (33)
  - glycopeptides (30)
  - fluoroquinolones (29)
  - carbapenems (17)
  - clindamycin (14)
- Treatment failure with vancomycin 125 mg q 6 h
  - 40% in severe colitis and 11.8% in diarrhea group
- 13.6% mortality rate, 50% in severe colitis



- Cytotoxicity to Vero cells and HT-29, Apoptotic change and cell death
- Tissue damages, necrotic changes and edema in mouse ileal loop
- Virulence factor: unknown; bound to cell surface envelope?

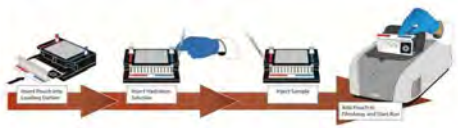
Chai JH. CMI 2018. doi:10.1016/j.cmi.2018.02.015

FDA-cleared Panels: Positive blood culture

Assay	Company	Method	Instrument required?	# of targets	Organism	Resistance gene	TAT
Xpert® MRSA/SA	Cepheid	RT-PCR	Yes	2	*S. aureus*	**mecA**	1 h
BD Max™ StaphSR	BD	RT-PCR	Yes	2	*S. aureus*	**mecA**	~ 1.5 h
PNA FISH®, *Quick*FISH™, *mecA Xpress*FISH™	AdvanDx	PNA-FISH	No (Fluorescent microscope)	2 - 5	*S. aureus* Other panels	**mecA**	20 min
Staph ID/R	Great Basin Scientific	HDA	Yes	4	*S. aureus, S. lugdunensis,* other CoNS	**mec A**	~ 2 h
Verigene® BC-GP, and BC-GN	Luminex	Microarray	Yes (2 parts)	15 per panel	Gram positives Gram negative	**mecA, vanA/B, CTX-M, IMI, VIM, KPC, NDM, OXA**	2.5 hrs
FilmArray® BCID	BioFire Diagnostics	Nested PCR	Yes	27	Gram positive, Gram negative, Yeast	**mecA, vanA/B, KPC**	1 h
Pheno System	Accelerate	FISH +	Yes	16	Gram positive, Gram negative, Yeast	**NA Phenotypic AST**	1 h; 7 h

Multiplex assays from positive blood cultures

- **Array-based method, no amplification**
- **2.5h TAT; BC-GP 15 targets, BC-GN 14 targets**



- **Multiplex- Nested PCR with melting curve analysis**
- **2 min hand-on time, 1 h TAT; 27 targets**
- **Limit sensitivity for polymicrobial infection**
- **Sensitivity for *vanA/B, KPC* 100%; *mecA* 98.4%**

Verigene BC-GP/ BC-GN	Filmarray BCID *includes 5 *Candida*
S. aureus	*S. aureus*
S. epidermidis	
S. lugdunensis	
S. anginosus group	
S. agalactiae	*S. agalactiae*
*S. pneumoniae**	*S. pneumoniae**
S. pyogenes	*S. pyogenes*
E. faecalis	*Enterococcus* spp.
E. faecium	
Staphylococcus spp.	*Staphylococcus* spp.
Streptococcus spp.	*Streptococcus* spp.
Listeria spp.	*L. monocytogenes*
mecA, vanA, vanB	*mecA, vanA/B*
*E. coli**	*E. coli**
K. pneumoniae	*K. pneumoniae*
K. oxytoca	*K. oxytoca*
P. aeruginosa	*P. aeruginosa*
Acinetobacter spp.	*A. baumannii*
Citrobacter spp.	
Enterobacter spp.	*E. cloacae* complex
Proteus spp.	*Proteus* spp.
	Enterobacteriaceae
	H. influenzae
	N. menigitidis
CTX-M, IMP, KPC, OXA, VIM, NDM	KPC

FDA-cleared multiplex gastrointestinal tests

	BD MAX Enteric Bacterial Panel	BioFire Filmarray GI Panel	Luminex xTAG GPP	Nanosphere Verigene Enteric Pathogen Panel	Prodesse/Hologic SSCS
Specimen types	Stool Cary-Blair Stool	Cary-Blair Stool	Stool	Stool	Cary-Blair or Para-Pak C&S Stool
Campylobacter	X	X	X	X	X
C. difficile		X	X		
E. coli O157	[X]	X	X	[X]	[X]
EAEC, EPEC		X			
ETEC		X	X		
Plesiomonas shigelloides		X			
STEC	X	X	X	X	X
Salmonella	X	X	X	X	X
Shigella [EIEC]	X	X	X	X	X
Vibrio		X		X	
Yersinia enterocolitica		X		X	
Adenovirus 40/41 Astrovirus, Sapovirus		X			
Norovirus GI/GII		X	X		
Rotavirus		X	X		
Giardia		X	X		
Cryptosporidium		X	X		
Entamoeba histolytica, Cyclospora		X			

FDA-cleared multiplex respiratory virus tests

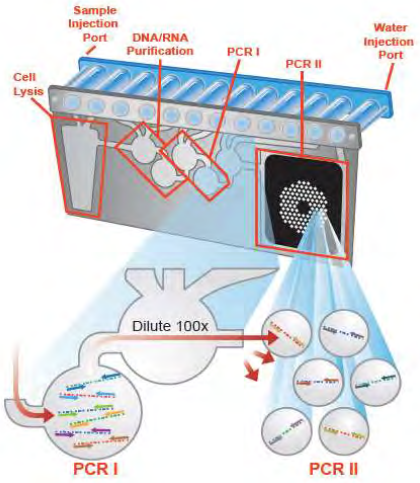
	BioFire Filmarray RPP*	Luminex xTAG RVP	GenMark eSensor RVP	GenMark ePlex RPP
INF A	X H1, H3, H1/09	X H1, H3	X H1, H3, H1/09	X H1, H3, H1/09
INF B	X	X	X	X
RSV	X	X A and B	X A and B	X A and B
PIV 1	X	X	X	X
PIV 2	X	X	X	X
PIV 3	X	X	X	X
PIV 4	X			X
MPV	X	X	X	X
RHV	X	X	X	X
EV	[X]	[x]		[X]
CoV	X HKU1, NL63, 229E, OC43			X HKU1, NL63, 229E, OC43
ADENO	X	X	X B, C and E	X
Off board extraction	No	Yes	Yes	No
No. of steps	1	5	4	1
Hands-on time	3 min	70 min	55 min	minimal
Instrument time	1.1 h	6.6 h	6 h	<2 h
Total time to results	1.17 h	7.75 h	7.25 h	<2 h

*also includes *B. pertussis, C. pneumoniae, M. pneumoniae*

** also includes *C. pneumoniae, M. pneumoniae*

FilmArray Meningitis/Encephalitis Panel

- Syndromic testing
- Approved March 2016
- 200 µL, TAT~1h, 2 min hands-on time
- 14 analytes
- Bacteria
  - *E.coli* K1, GBS, *L. monocytogenes, N.meningitidis, H. influenzae, S. pneumoniae*
- Viruses
  - HSV-1, HSV-2, EVs, Human parechovirus, VZV, CMV, HHV-6
- Yeast
  - *C. neoformans/gattii*




Clinical Infectious Diseases
MAJOR ARTICLE

Clinical Impact of a Multiplex Ga
Polymerase Chain Reaction Panel
Gastroenteritis

Clinical Infectious Diseases
MAJOR ARTICLE

Giardia/Cryptosporidium QUIK CHEK Assay Is More Specific Than Quantitative Polymerase Chain Reaction for Rapid Point-of-care Diagnosis of Cryptosporidiosis in Infants in Bangladesh

Clinical Microbiology and Infection

Letter to the Editor

Culture-confirmed cryptococcal meningitis not detected by *Cryptococcus* PCR on the Biofire meningitis/encephalitis panel®

BRIEF REPORT

Misdiagnosis of *Bordetella bronchiseptica* Respiratory Infection as *Bordetella pertussis* by Multiplex Molecular Assay

- CIDT
- No susceptibility
- Cost effectiveness

Thank you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ประจำปี ครั้งที่ 44
Infectious disease 2018:
Now and Next