

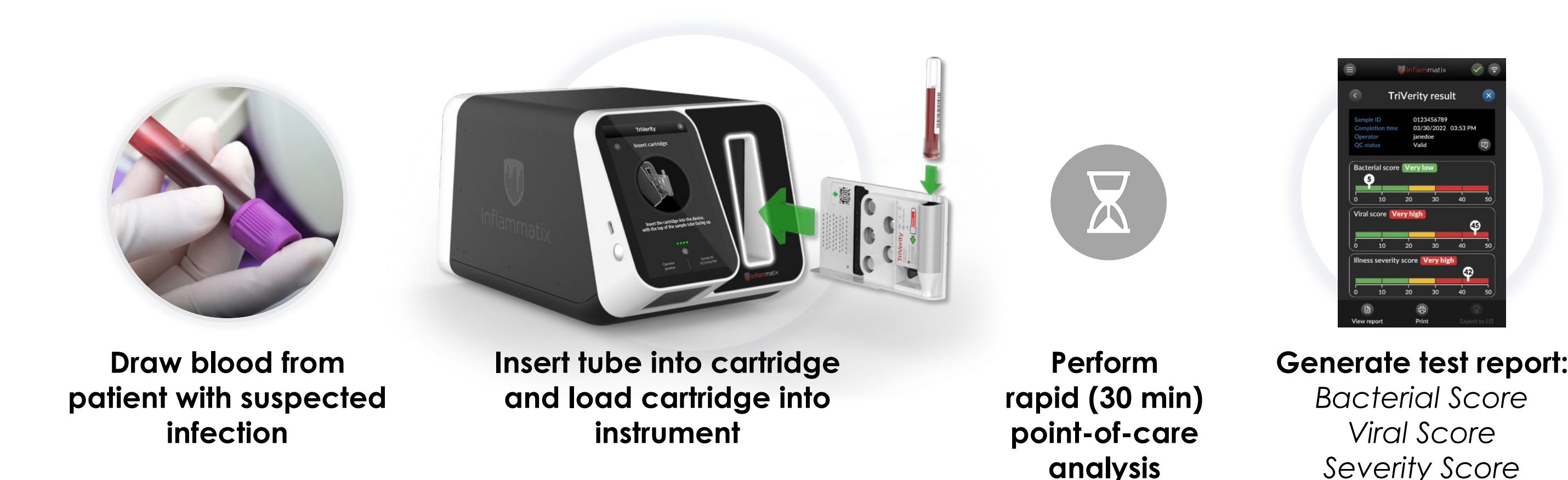
Background

The nonspecific presentation of emergency department (ED) patients with suspected infection and/or suspected sepsis, and limited diagnostic solutions with slow turnaround times and insufficient accuracy complicate patient management and antimicrobial stewardship. These limitations drive empiric antimicrobial treatment, resulting in adverse events or contributing to antimicrobial resistance. The TriVerity™ Test measures the expression of 29 host mRNAs on the proprietary Myrna™ Instrument (Fig. 1) from whole blood in PAXgene® Blood RNA tubes. The system integrates RNA extraction, LAMP gene amplification, and machine learning-driven IMX-BVN/SEV-4 classifiers. These interpret amplification results and generate bacterial, viral, and illness severity scores in five discrete and highly actionable interpretation bands (very low, low, moderate, high, very high) within ~ 30 minutes, including ~1 min hands-on time. We evaluated the accuracy of the TriVerity Acute Infection and Sepsis Test to diagnose bacterial and viral infections and predict illness severity in ED patients.

Methods

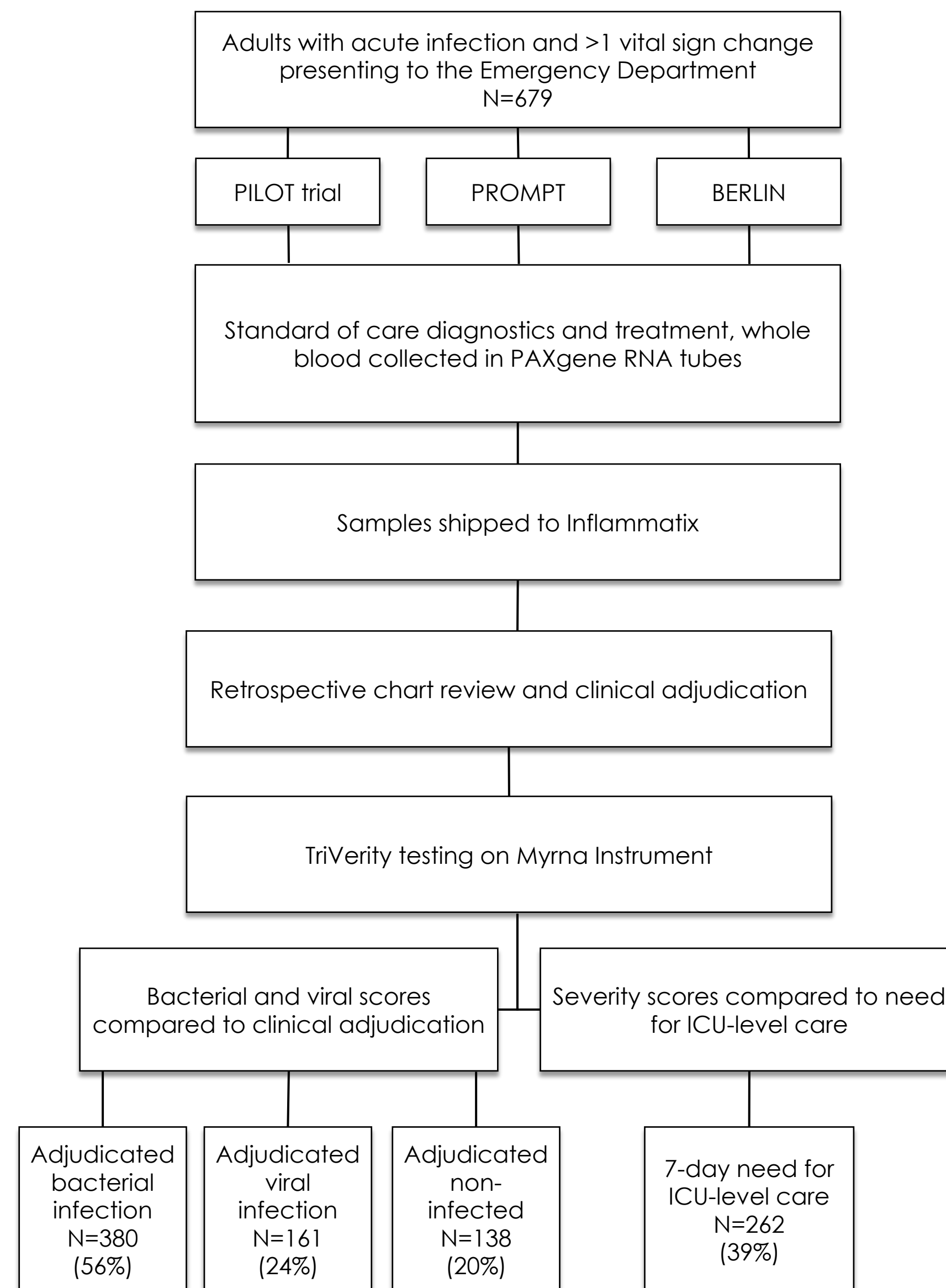
- ❖ 679 ED patients with suspected infection
- ❖ Three clinical studies (US, Germany, Greece)^{1, 2, 3}
- ❖ Standard of care diagnostics were performed with 30- and 90-day follow-up
- ❖ Whole blood was collected in PAXgene® Blood RNA tubes
- ❖ TriVerity test (BVN/SEV-4 classifier) was performed on the Myrna Instrument
- ❖ Bacterial and viral results were evaluated against true infection status or (“consensus clinical adjudication”)⁴
- ❖ Severity results were evaluated against the 7d need for mechanical ventilation, vasopressors, and/or renal replacement therapy (“ICU-level care”)

Figure 1. TriVerity Test System Workflow



The TriVerity System is in development, is not for sale, and does not have marketing approval or clearance from regulatory authorities in any jurisdiction. Features may change during the development process. TriVerity and Myrna are trademarks of Inflammatix, Inc.

Figure 2. Flowchart of study workflow



Results

Table 1. Diagnostic Accuracy of TriVerity Bacterial Results (N=679)

Bacterial Interpretation Band	Clinical consensus adjudication: Bacterial infection		TriVerity Test Performance Characteristics per Band				
	Yes	No	Sensitivity (%)	Specificity (%)	LR [80% CI]	% in Band	PPV (%)
Very High	135	14	36	95	7.59 [5.61, 11.49]	22	91
High	145	53	38	82	2.15 [1.82, 2.61]	29	73
Moderate	50	58	13	81	0.68 [0.54, 0.85]	16	46
Low	42	93	89	31	0.36 [0.28, 0.44]	20	31
Very Low	8	81	98	27	0.08 [0.04, 0.12]	13	9
	380	299				Prevalence 56%	

Table 2. Diagnostic Accuracy of TriVerity Viral Results (N=679)

Viral Interpretation Band	Clinical consensus adjudication: Viral Infection		TriVerity Test Performance Characteristics per Band				
	Yes	No	Sensitivity (%)	Specificity (%)	LR [80% CI]	% in Band	PPV (%)
Very High	104	35	65	93	9.56 [7.76, 12.15]	25	75
High	18	50	11	90	1.16 [0.81, 1.59]	9	26
Moderate	15	86	9	83	0.56 [0.38, 0.77]	10	15
Low	16	144	90	28	0.36 [0.25, 0.48]	31	10
Very Low	8	203	95	39	0.13 [0.07, 0.19]	25	4
	161	518				Prevalence 24%	

Table 3. Prognostic Accuracy of TriVerity Severity Results (N=262)

Severity Interpretation Band	Clinical Outcome (7-day ICU level care)		TriVerity Test Performance Characteristics per Band				
	Yes	No	Sensitivity (%)	Specificity (%)	LR [80% CI]	% in Band	PPV (%)
Very High	8	7	24	97	7.66 [3.97, 15.33]	6	53
High	10	36	29	84	1.86 [1.20, 2.72]	18	22
Moderate	7	32	21	86	1.47 [0.80, 2.25]	15	18
Low	7	70	79	31	0.67 [0.37, 1.00]	29	9
Very Low	2	83	94	36	0.16 [0.00, 0.32]	32	2
	34	228				Prevalence 13%	

LR: Likelihood Ratio, PPV: Positive Predictive Value

Conclusions

- ❖ TriVerity (currently under development) utilizes host response genes to aid in the diagnosis of bacterial and viral infections and prediction of illness severity in ~30 minutes with minimal hands-on time.
- ❖ Bacterial and viral TriVerity results identified bacterial and viral infections with high rule-in specificity and rule-out sensitivity.
- ❖ TriVerity severity results accurately predicted the need for 7-day ICU-level care.
- ❖ Diagnostic and prognostic accuracy may result in improved management of patients with suspected infections by contributing to antimicrobial stewardship and assisting in disposition decisions.

References

1. <https://clinicaltrials.gov/study/NCT03744741>
2. Safarikia A, Wacker JW, Katsaros K, et al. A 29-mRNA host response test from blood accurately distinguishes bacterial and viral infections among emergency department patients. *Intensive Care Med Exp*. 2021;9(1):31. Published 2021 Jun 18. doi:10.1186/s40635-021-00394-8
3. Bauer W, et al., A novel 29-messenger RNA host-response assay from whole blood accurately identifies bacterial and viral infections in patients presenting to the emergency department with suspected infections: A prospective observational study. *Critical Care Medicine*, 2021.
4. Whitfield N, et al., A standardized protocol using clinical adjudication to define true infection status in patients presenting to the emergency department with suspected infections and/or sepsis. *Submitted*.

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