Inflammatix

HostDx™ Tests: Breakthroughs in the Diagnosis of Acute Infections and Sepsis

MEDIA FACT SHEET

Overview

Inflammatix's initial products – the HostDx™ Fever and HostDx™ Sepsis tests – **read a patient's immune system** to overcome the current challenges in diagnosing acute infections and sepsis. The tests will target a collective market of an estimated 100 million patient visits each year in the United States alone.[1–4]

Bacterial and viral infections are difficult to diagnose and current testing methods, which look for specific pathogens or nonspecific biomarkers, are inaccurate or too slow.[5,6] Determining when an infection progresses to sepsis, a life-threatening condition, is an imprecise and challenging process. These diagnostic challenges result in delayed or incorrect treatment, which harms patients and furthers the growing and costly global problems of antibiotic resistance and sepsis.

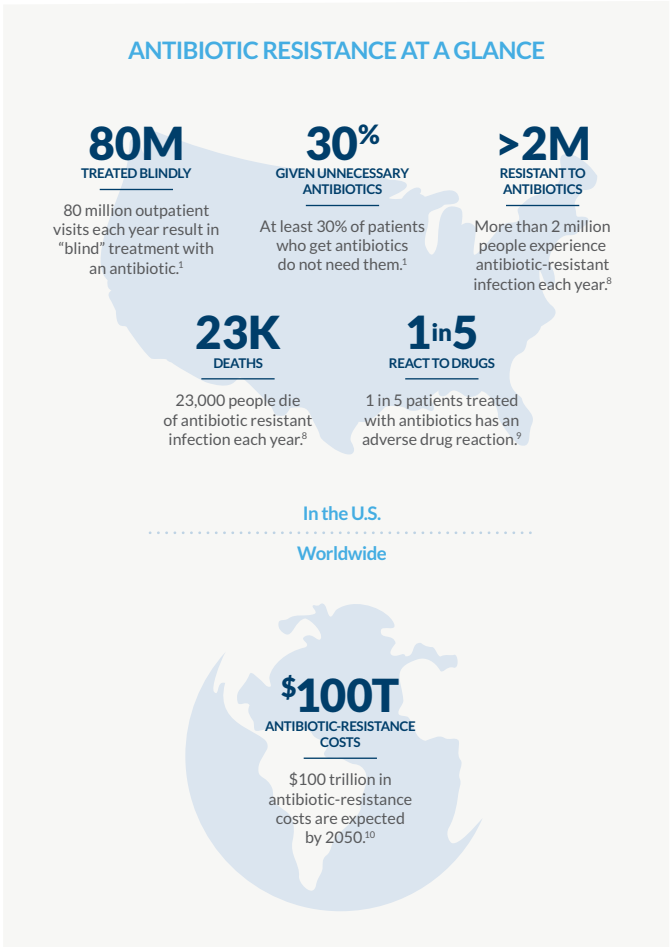
Our data-driven technology works by measuring the expression levels of multiple host immune genes. We then apply proprietary algorithms to produce clinically actionable results in patients with suspected infection and/or sepsis. This approach will enable physicians to quickly get the right treatments to the right patients, resulting in improved outcomes and reduced health system costs. Our tests, run on a standard blood draw, will be FDA-cleared and performed on sample-to-answer, PCR-based devices that are utilized at or near the point of care.

	HostDx FEVER	HostDx SEPSIS
Clinical Questions Answered	✓ Is the suspected infection bacterial or viral?	✓ Is a bacterial infection present? ✓ Is a viral infection present? ✓ Is the patient likely to have or develop sepsis?
Actionable Information Provided	✓ Whether or not the patient needs antibiotics	✓ Whether or not the patient needs antibiotics ✓ What level of care the patient needs
Intended Clinical Settings	✓ Outpatient settings, including primary care and pediatric offices ✓ Urgent care and walk-in clinics	✓ Emergency departments ✓ Intensive care and neonatal units, hospital wards
Target Patients	✓ Those with suspected infection	✓ Those with suspected infection ✓ Patients assessed for sepsis in the Emergency Room, ICU or hospital ward
Turnaround Time	✓ <30 minutes	✓ <60 minutes

The Diagnostic Challenge

Acute Infections

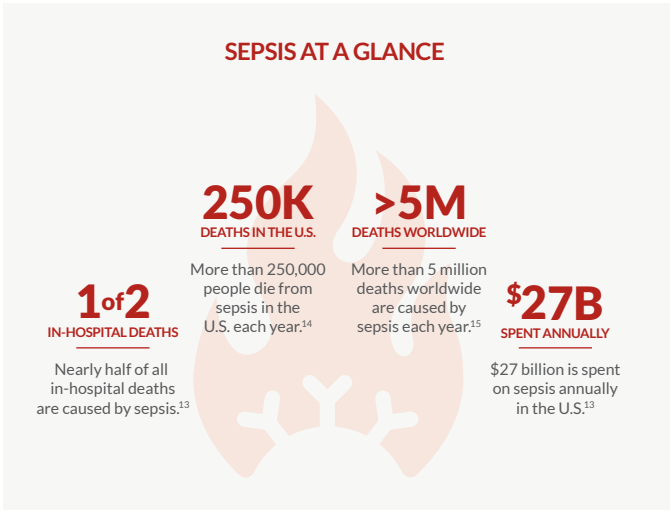
Bacterial and viral infections are diverse and challenging to diagnose. Bacterial infections need to be treated with antibiotics quickly in order to prevent disease progression including sepsis. Current "find the pathogen" testing approaches are limited because most infections never enter the bloodstream. Blood culture, for example, is the "gold standard" for diagnosing infections, but misses at least 70% of bacterial infections, **as the majority of infections do not enter the bloodstream.**[7] Current testing approaches are also too slow (e.g., culture takes >24 hours[5]). As a result, infections are often blindly – and incorrectly – treated with antibiotics. This practice can cause direct harm through antibiotic side effects, and also contributes to antibiotic resistance and increases costs. Conversely, bacterial infections, which require antibiotics, are sometimes missed.



Sepsis

Sepsis is a fast-progressing and life-threatening condition in which the body's immune system, already fighting a severe infection, becomes dysregulated and damages its own tissues and organs. Sepsis is a medical emergency that requires rapid administration of antibiotics and fluids. Data show that risk of death from sepsis increases by 7.6% with every hour of delay in beginning treatment.[11]

There is currently no single, definitive test for sepsis; rather, physicians typically rely on a battery of tests and clinical criteria – all with sub-optimal performance.[12] As a result, sepsis diagnoses are often delayed or missed, with potentially deadly consequences, while other patients without sepsis may be overtreated.



Sepsis: A Deeper Look

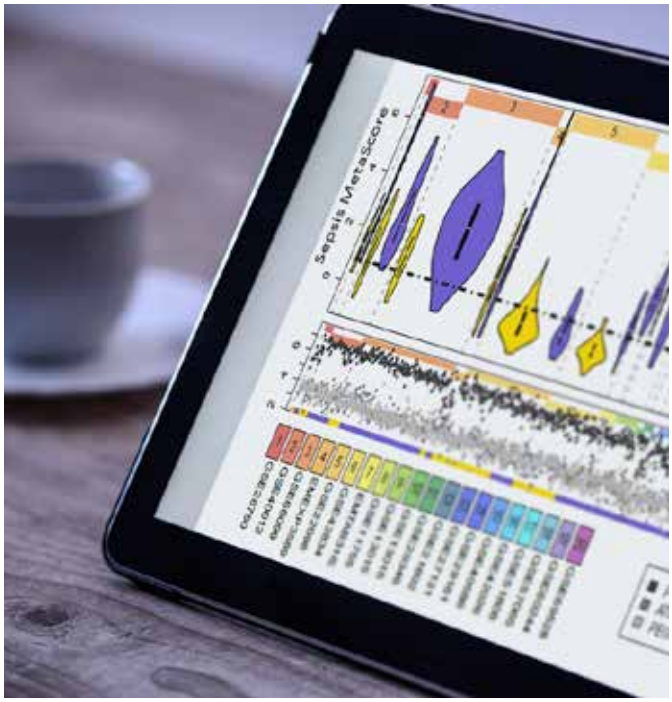
Sepsis is not a specific illness, but rather a syndrome whose underlying cause and processes are not well-understood. According to recently updated clinical guidelines, a sepsis diagnosis requires two factors: 1) presence of an infection; and 2) an increase of two or more points in a patient's Sequential Organ Failure Assessment (SOFA) score – a formula used to quantify illness severity. SOFA assigns points to a number of factors to collectively measure organ dysfunction and risk of mortality. A higher SOFA score is associated with an increased risk of death. A newer, abbreviated version, termed qSOFA (for quick SOFA), is also used

to provide simple criteria to identify patients with suspected infection who are likely to have poor outcomes.[12]

Inflammatix's HostDx Sepsis test is uniquely designed to determine both factors in sepsis diagnosis: whether an infection is present and the severity of infection (i.e., degree of dysregulated immune system response). Data suggest that the test is more accurate than SOFA in identifying patients likely to have or develop sepsis (based on risk-of-mortality measurements).[16]

HostDx Test Development and Validation

Our HostDx tests are being developed using advanced bioinformatics that integrate multiple clinical cohorts, representing a broad spectrum of disease. Our scientific approach has been validated in 38 retrospective cohorts (N=2,452) and 6 prospective cohorts (N=1,833) are enrolled. Results have been published in leading peer-reviewed journals such as *Science Translational Medicine and Nature Communications*.[16–18] This heterogeneity of patient data provides confidence that **HostDx test results are accurate and generalizable** – regardless of infection type, patient population and setting.



Inflammatix is a molecular diagnostics company developing rapid tests that read the immune system to resolve major clinical and public health challenges.

HostDx FEVER

Figure 1

Indication	Sensitivity	Specificity
Bacterial Infection*	**94%**	76%

HostDx Fever Test – This test helps determine **whether a suspected infection is likely bacterial or viral.** In a pooled analysis of 1,040 patient samples from 24 validation study cohorts of patients with a suspected infection, the test demonstrated high accuracy in distinguishing between bacterial and viral infections (Figure 1).[16] The test's performance was consistent regardless of the subtype of infection in the study cohort, which is important because infection types fluctuate in different clinical settings and times of year (e.g., viral infection rates increase during flu season).

HostDx Sepsis	Non-Flu Season			Flu Season		
Infection Type	Estimated Prevalence	NPV	PPV	Estimated Prevalence	NPV	PPV
Bacterial Infection	35% Bacterial / 65% Viral	**97%**	69%	20% Bacterial / 80% Viral	**99%**	50%

* bacterial infection is the "case"; viral infection is the "control"

HostDx SEPSIS

Figure 2

Indication	Sensitivity	Specificity
Bacterial Infection	**94%**	60%
Viral Infection	53%	**91%**
30-day mortality (sepsis)	**95%**	64%

HostDx Sepsis Test – This test helps diagnose sepsis by **detecting the presence of a bacterial and/or viral infection and its severity.** The test's ability to identify infections was validated in 20 cohorts of 1,057 patients.[17] The test's performance was demonstrated in five cohorts of 189 patients diagnosed with sepsis at the time of hospital admission and four cohorts of 282 patients with hospital-acquired sepsis.[18] See Figure 2 for performance summary of the HostDx Sepsis test.

Inflammatix continues to conduct clinical studies to demonstrate the performance of its HostDx tests in a variety of clinical settings.

HostDx Sepsis	Non-Flu Season			Flu Season		
Infection Type	**Estimated Prevalence**	**NPV**	**PPV**	**Estimated Prevalence**	**NPV**	**PPV**
Bacterial Infection	30%	**96%**	50%	15%	**99%**	30%
Viral Infection	50%	66%	**86%**	75%	40%	**95%**
Sepsis	25%	**98%**	47%	20%	**98%**	40%

Regulatory Clearance and Commercialization

Inflammatix is working with molecular diagnostic instrument partners to functionalize the HostDx tests on their platforms. HostDx Fever and HostDx Sepsis tests can achieve regulatory clearance (510(k) in the U.S.) via non-interventional clinical methods comparison, significantly reducing their time to market. Once cleared, interventional clinical utility studies will be conducted to demonstrate that with HostDx tests, physicians can better diagnose (and confidently rule out) acute infections and sepsis—thus improving patient care and lowering healthcare costs.

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