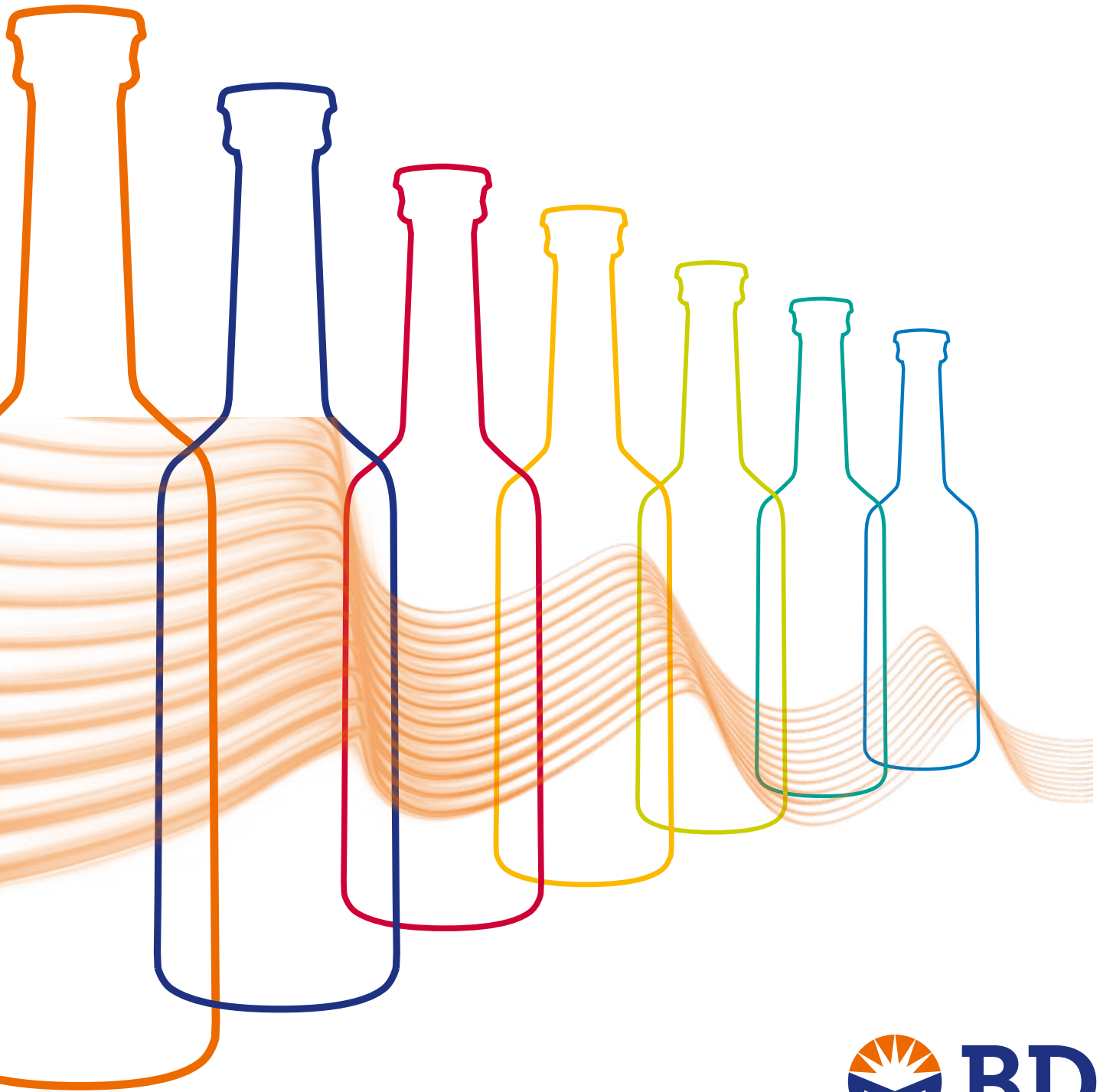


BD BACTEC™ Update

New Solutions in Blood Culture Diagnostics



BD

Helping all people
live healthy lives

BD BACTEC™ News

Strengthening the Gold Standard in Microbiological Sepsis Diagnosis

Sepsis, severe sepsis, and septic shock are increasingly common conditions and one of the most frequent causes of death in the intensive care unit. With 28–50% of sepsis patients dying within the first month of diagnosis, mortality rates remain unacceptably high¹.

Also alarming is the enormous impact of sepsis on health economy and resources with annual costs of €7.6 billion in Europe¹. Therefore, every effort should be taken to stop the devastating impact of sepsis on patients, their families, healthcare workers and health systems.

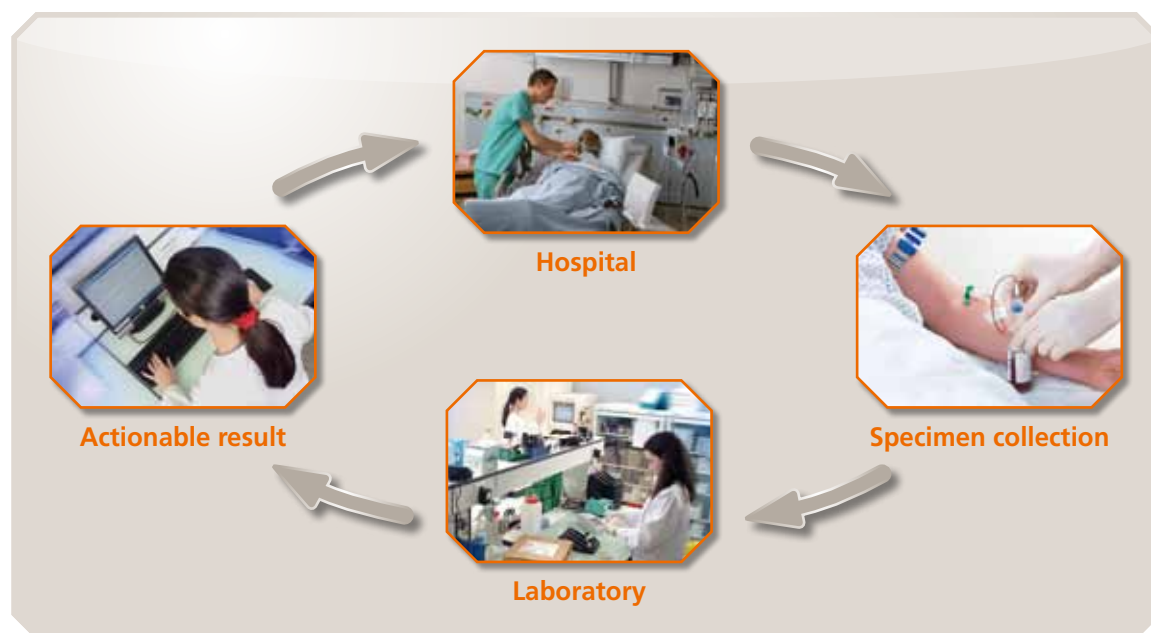
There are several key interventions in the fight against sepsis, amongst them are:

- Prevention of healthcare-associated infections (HAI)
- Optimal supportive care including antibiotic stewardship, in particular rapid and appropriate antimicrobial therapy followed – if needed – by subsequent de-escalation (antibiotic stewardship)

- **Rapid and accurate blood culture diagnosis which is the gold standard for the microbiological diagnosis of sepsis.**

Evidence-based blood culture testing is of utmost importance for patients with suspected sepsis. Knowledge of the causing bacteria or fungi and their susceptibility against antimicrobials enables the clinician to initiate an appropriate antimicrobial therapy. This has been shown to reduce mortality, ICU-stay and antibiotic overuse^{2,3}.

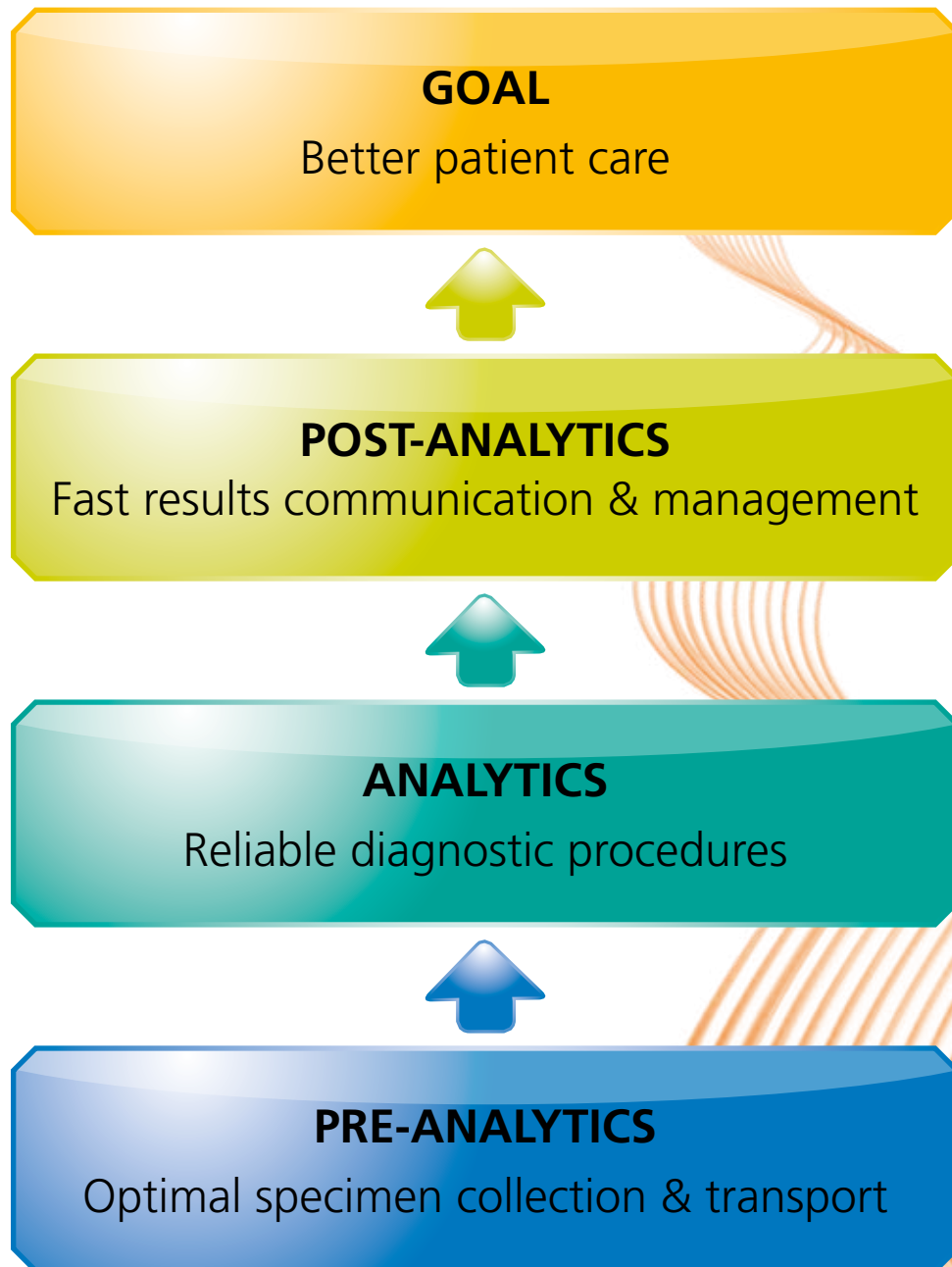
For almost half a century, BD has been committed to take a leading role in blood culture technology, instrumentation and media. We continue to provide your laboratory with new solutions to strengthen the speed and quality of your blood culture diagnostics, while taking into account the ever growing requirement of cost effectiveness.



BD – superior solutions in blood culture from specimen collection to actionable results.

BD Best Practices

Quality First: Optimal Solutions for Reliable Diagnostics



**A properly collected specimen is
the basis of reliable diagnostics.**

BD E-Learning Program and Services

Best Practices in Blood Culture Collection

Excellence is the standard.

Blood cultures are the most important evidence-based microbiological testing method in intensive care medicine. However, whereas microbiological laboratory practice has been highly standardized, shortfalls in the pre-analytic procedures have a significant effect on the diagnostic yield².

Poorly collected specimens will not only yield poor diagnostic results, they also generate significant unnecessary costs. For example, blood culture contamination is common, accounting for up to 50% of positive blood cultures. Blood culture contamination leads to unnecessary therapy, prolonged stay and additional costs (> 3,300 €/episode)⁴. High-quality blood culture collection can be achieved through use of guideline-based, proper sampling techniques and continuous medical staff education⁴.

BD, the leader in blood collection and pre-analytics for the last 60 years, is proud to launch a unique web-based program on best practices in blood culture collection.



BD E-Learning
Best Practices in Blood Culture Collection

Instructions for guideline* compliant blood culture collection

The E-Learning program

- Quickly and easily conveys knowledge about the diagnostic importance of blood cultures
- Interactively explains how to perform guideline-conform blood culture collection
- Solidifies and documents the acquired knowledge in a closing test (submitted for CME certification)

STOP SEPSIS
Save lives. Best Practices in Blood Culture Collection

BD Helping all people live healthy lives



The BD E-Learning tool ...

- is designed to give clinicians, nurses, and medical students guidance and recommendations on the optimal guideline-based* collection of blood cultures in order to ensure accurate and clinically relevant results, thereby helping to provide appropriate patient treatment.
- rapidly provides information on the clinical relevance and diagnostic value of blood cultures.
- confirms and documents the acquired knowledge with a final assessment.

In addition, BD offers its vast pre-analytical expertise and leading solutions in blood collection at on-site trainings. Contact BD and ask us for our support!



Stop Sepsis – start with Best Practices in blood culturing.

* 1st revision of the S-2k guidelines of the German Sepsis Society (GMS German Medical Science 2010, Vol. 8, ISSN 1612-3174); Surviving Sepsis Campaign; Baron et al. Blood Cultures IV; CUMITECH. ASM Press 2005



BD BACTEC™ Blood Volume Monitoring

Automatic Determination of Blood Volumes Collected in BD BACTEC™ PLU

More or less really matters.

CAUTION:
overfilling

Optimal blood
fill volumes
8-10 ml

min. 3-8 ml

CAUTION:
reduced
sensitivity

- Optimal blood fill volumes critically determine the diagnostic yield of your blood cultures. Each ml of blood, up to 10 ml, can increase the sensitivity of the blood culture by 3–5%^{5, 6}. While overfilling of bottles may cause false-positivity, underfilling reduces the sensitivity of blood cultures.
- Laboratories should routinely monitor the volume of blood cultured as a quality assurance activity and provide feedback to clinical staff to insure an adequate volume of blood is drawn for blood culturing.
- However, manual blood volume monitoring is time consuming and tedious, therefore not commonly done.

S Aerobic Bottles

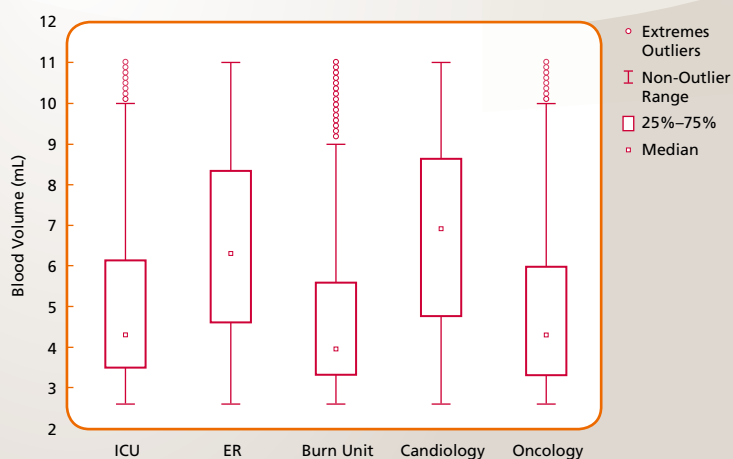


Figure A:

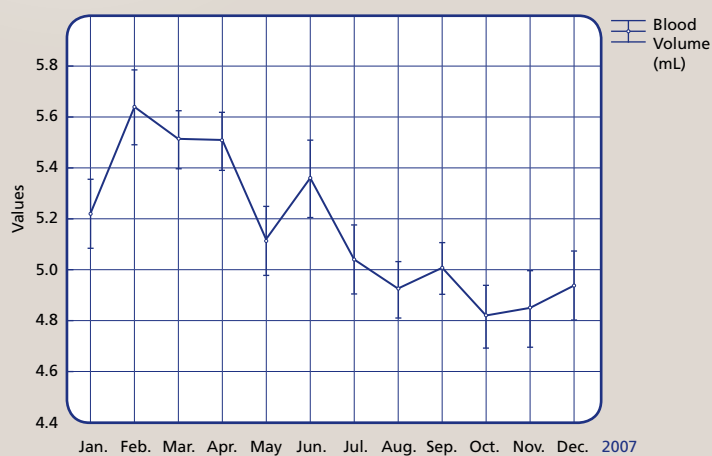


Figure B:

BD now offers you the BD BACTEC™ Blood Volume Monitoring which is a new and unique tool on BD EpiCenter™ (V6.0) in conjunction with BD BACTEC™ FX.

Using highly sensitive algorithms, the BD BACTEC™ Blood Volume Monitoring concept is based on the ability to derive the starting volume of blood in a sample by measuring the initial background signal from the blood culture bottle. Blood volume data is available for negative bottles that complete protocol and are viewed in aggregate (N = 25).



Optimal blood fill volumes matter. Now you can automatically monitor blood volumes collected in your BD BACTEC™ blood cultures.

BD BACTEC™ FX & BD EpiCenter™

Prompt Incubation: The Result of Satellite Blood Culturing

An hourglass with red beads falling from the top bulb to the bottom bulb. A red pulse line, resembling a heart rate monitor trace, is superimposed on the right side of the hourglass. The text '6 HOURS', '12 HOURS', and '24 HOURS' is displayed in a red, digital, seven-segment font. The '6 HOURS' and '24 HOURS' text is positioned on the left side of the hourglass, while the '12 HOURS' text is on the right side. The text is repeated in a lighter, semi-transparent font in the background.

6 HOURS
12 HOURS
24 HOURS

How long are your blood cultures delayed?

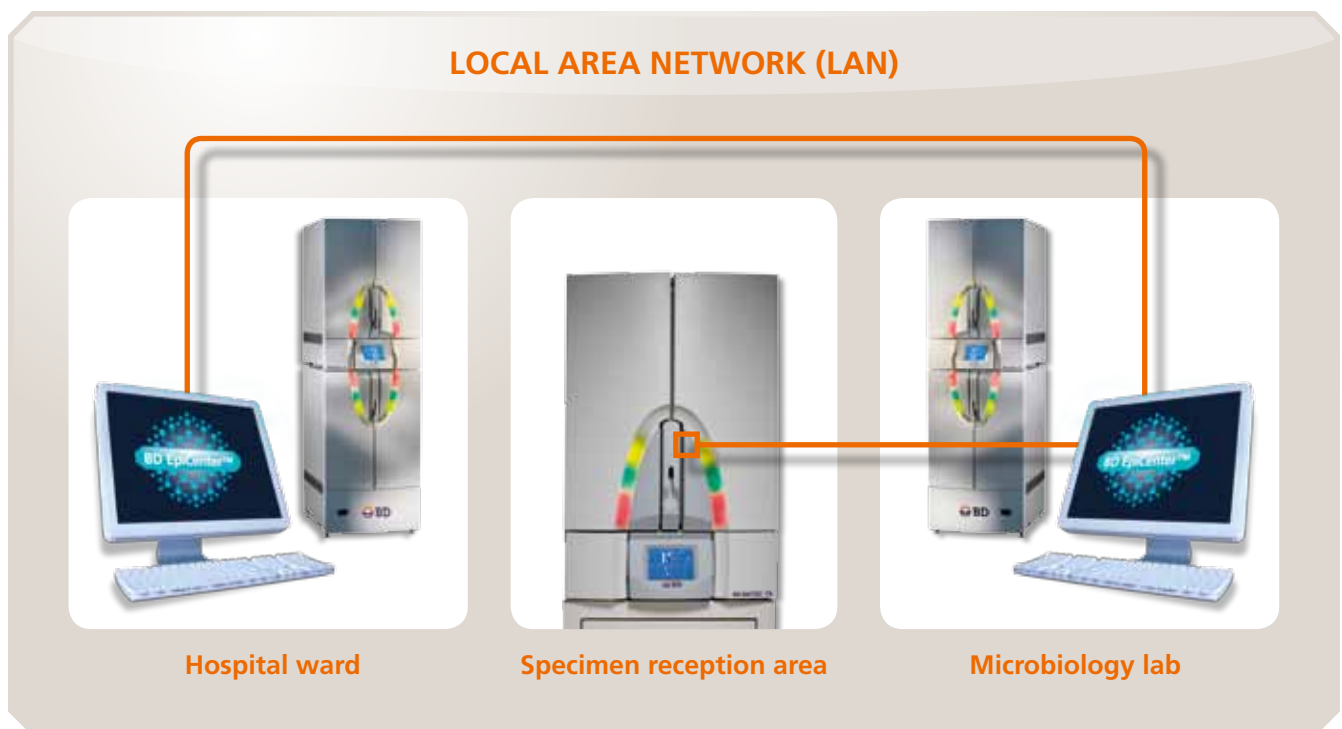
- To optimize the clinical use of blood culture results, the interval between the collection of blood and the entry of the bottles into an automated blood culture system should be kept to a minimum⁷.
- Published guidelines recommend that this interval should not be longer than 2 or 16 hours in the US and Germany, respectively^{8, 9}.
- However, because of off-site collection or restricted lab operating hours, there may be a substantial delay between blood culture inoculation and entry into the instrument¹⁰.
- Recent studies have shown that placing a continuously monitoring blood culture system outside the laboratory allows immediate incubation of blood culture bottles collected at odd hours. This results in significantly reduced turnaround times which allows significantly earlier changes in antibiotic therapy^{8, 11}.

Make the net work.

Using the power of the BD EpiCenter™ client-server network system, multiple BD BACTEC™ FX Blood Culture Systems can be controlled via a high speed Local Area Network (LAN), no matter where they are located within a hospital. This allows BD BACTEC™ FX systems to reside in multiple locations (e.g., ICU and micro lab) within a

medical center while the data can be accessed from any connected BD EpiCenter™ station (satellite blood culturing).

Positive blood cultures can be safely transported from satellite blood culture systems to the microbiology lab using UN 3373 compliant BD BACTEC™ SafePods.



Satellite blood culturing for prompt incubation and faster time to detection.

BD BRUKER Microbiology System

The Winning Team: Leading in Blood Stream Infection Diagnosis

What occurs when the two global leaders in clinical microbiology systems collaborate as one?

BD BACTEC™

BRUKER
MALDI BIOTYPER

The best performing team in the analysis of blood stream infections!

BD BRUKER Microbiology System

One for all: The Total Systems Approach

Clinical Responsiveness with Lab Efficiency.

The new BD Bruker Microbiology System will transform the way your lab works. Now you can complete complex microbial identification in a matter of minutes, not hours or days, speeding results for improved patient care and lab workflow.

What's more, the System delivers these rapid results along with a high degree of accuracy and efficiency. For clinical laboratories seeking higher standards of quality, productivity, and cost effectiveness. The BD Bruker Microbiology System offers a highly competitive edge in attaining these benchmarks.



FOR THE LABORATORY:

- High level of clinical responsiveness through rapid identification and accurate detection of positive blood cultures
- Great workflow efficiency and safety through systems integration
- Cost effectiveness

FOR THE HOSPITAL:

- Better patient care
- Better antibiotic stewardship through significantly faster identification of causative micro-organisms
- Improved health and economic outcomes

FOR THE PATIENT:

- Better care

Uncompromising Innovation. Unmatched Experience.

The BD Bruker Microbiology System is the perfect synthesis of Bruker's industry-leading innovation in mass spectrometry and BD Diagnostic's unsurpassed experience in the field of clinical microbiology systems. Together, these two leaders have created a new technology paradigm in the industry – a total, end-to-end systems solution that integrates advanced microbial identification, best-in-class antimicrobial susceptibility testing and a robust data management system into a single seamless workflow.

The overall systems integration of the Bruker MALDI Biotyper, BD BACTEC™ and Phoenix™ through BD EpiCenter™ enables a highly efficient workflow with rapid and accurate results for microbiology laboratories.

**A revolutionary advance in blood culture diagnostics –
and the promise of better patient care.**

BD BRUKER Microbiology System

Ultimate Speed: Revolutionizing Blood Culture Diagnostics

Matrix-assisted laser desorption ionization time-of-flight mass spectrometry (MALDI-TOF MS) initiated a revolution in the direct identification of micro-organisms from positive blood cultures¹².

It has been shown in numerous recent studies that the combination of BD BACTEC™ blood culture media and the Bruker MALDI Biotyper microbial ID systems yields accurate identification in > 80% of cases, outperforming blood culture media from other manufacturers^{12, 13}.

The BD Bruker Microbiology System comprises the MALDI Biotyper – BD EpiCenter™ software integration to optimize workflows for rapid MALDI Biotyper pathogen identification directly on positive blood cultures from the leading BD BACTEC™ blood culture system. This rapid blood culture-to-ID workflow is supported by Bruker's new MALDI Sepsityper Kit*, which allows the accurate analysis of blood-borne micro-organisms within just 20 minutes.



BD BACTEC™ FX

- 63 cm width
- 400 bottle capacity



BRUKER MALDI-TOF MS*

- Bench-top MALDI-TOF MS
- Analysis within minutes



Result Overview

Analyte Name	Organism (best match)	Score Value	Organism (second best match)	Score Value
Sample 01 (+++)	Acinetobacter baumannii	2.476	Acinetobacter baumannii	2.443
Sample 02 (++)	Escherichia coli	2.097	Escherichia coli	2.016
Sample 03 (++)	Staphylococcus aureus	2.128	Staphylococcus aureus	2.105
Sample 04 (+++)	Klebsiella pneumoniae	2.341	Klebsiella pneumoniae	2.206
Sample 05 (+++)	Candida albicans	2.352	Candida albicans	2.126
Sample 06 (++)	Enterobacter cloacae	2.123	Enterobacter cloacae	2.029

- 1 Harvest 1 ml blood culture liquid in a test tube
- 2 Add Lysis Buffer and centrifuge
- 3 Add Washing Buffer and centrifuge
- 4 Suspend pellet in water
- 5 Standard Bruker extraction protocol for MALDI bacterial profiling
- 6 Spotting of 1 µl extract onto MALDI target, overlay with HCCA matrix
- 7 MALDI-TOF MS measurement
- 8 Receive result, ID

- Simple system integration and efficient workflow
- Maximum efficiency – fast, robust, reliable, bench-top MALDI-TOF MS
- Rapid, safe, and simple sample preparation
- Cost efficient

BD BACTEC™ EpiCenter™ Network

Uncompromising Innovation. Unmatched Experience.

The BD EpiCenter™ data management system is a UNIQUE solution for microbiology laboratories to efficiently communicate and track all the information needed by every professional involved in infection management and patient treatment.



BD EpiCenter™ - improving efficiency and patient care via real-time communication.

BD BACTEC™ Blood Culture Bottles

Proven Performance: Coming Soon in Plastic

Proven high performing
BD BACTEC™ media in plastic.



**Smaller size
and in plastic!**

We will reduce the size and weight, but not the performance.

BD Safety Solutions

We Take Care: Our Commitment to Healthcare Workers

Safety first and first in safety.

As the worldwide leader in safety-engineered medical devices, BD has designed its BD BACTEC™ blood culture bottles to be fully compatible with the widely available BD Vacutainer™ safety blood collection systems, thus reducing the risk of contaminations and accidental needle-stick injuries during blood collection and sub-culturing.

Integrated solutions for safety during blood collection

- Split-second in-vein needle retraction with the unique BD Vacutainer™ Push Button Blood Collection Sets virtually eliminates the risk of needle-stick injuries
- Closed direct draw of blood with BD Vacutainer™ Blood Collection Systems helps to keep contamination rates down
- Safety-engineered needles, syringes and transfer devices for quantitative blood culture

BD BACTEC™ C3 Box

For on-site trainings in best practices in blood culture collection

Integrated solutions for safety in the lab

- Safety-engineered syringes and transfer devices for direct identification of positive vials by Bruker MALDI Biotyper and MALDI Sepsityper Kit*
- Safety-engineered sub-culturing unit fully compatible with BD BACTEC™ vials for the safe sub-culturing of instrument positive blood cultures



Choose unparalleled safe solutions for your blood culture diagnostics.

* For research use only. Not for use in diagnostic purposes.

BD BACTEC™ Plastic Blood Culture Bottles

Improved Handling: Reduced Size & Weight – 100% Performance



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