

From culture-based to culture-independent sepsis diagnostics: Qualitative research on healthcare professionals' perspectives



Anna Wijen^a, Immy van Teeffelen^b, Alena Kamenshchikova^{a,b,c}

^aDepartment of Medical Microbiology, Infectious Diseases & Infection Prevention, Maastricht University Medical Centre (MUMC), the Netherlands.
^bDepartment of Health, Ethics and Society, Maastricht University, the Netherlands.
^cDepartment of Social Medicine, Maastricht University, the Netherlands.

Background **Aim:** Investigate anticipation and potential challenges of replacing current blood culture-based practices with culture-independent methods



Key messages

- Blood cultures firmly embedded in current processes of sepsis diagnosis
- Expectations for new diagnostic among intended end-users are not yet aligned and projected in indeterminate future
- Implementation will require rethinking of material capacities but also its end-users and contexts of application

Methods

Research period
May to July 2024

Interviews
Individual = 13
Group = 1

Work shadowing
hours = 20

Actors interviewed:

- 3x Intensivists
- 3x Clinical microbiologists
- 2x ICU nurses
- 2x Molecular microbiologists
- 1x Care support team (ZOT)
- 1x Laboratory administrative employee
- 1x Diagnostic developer

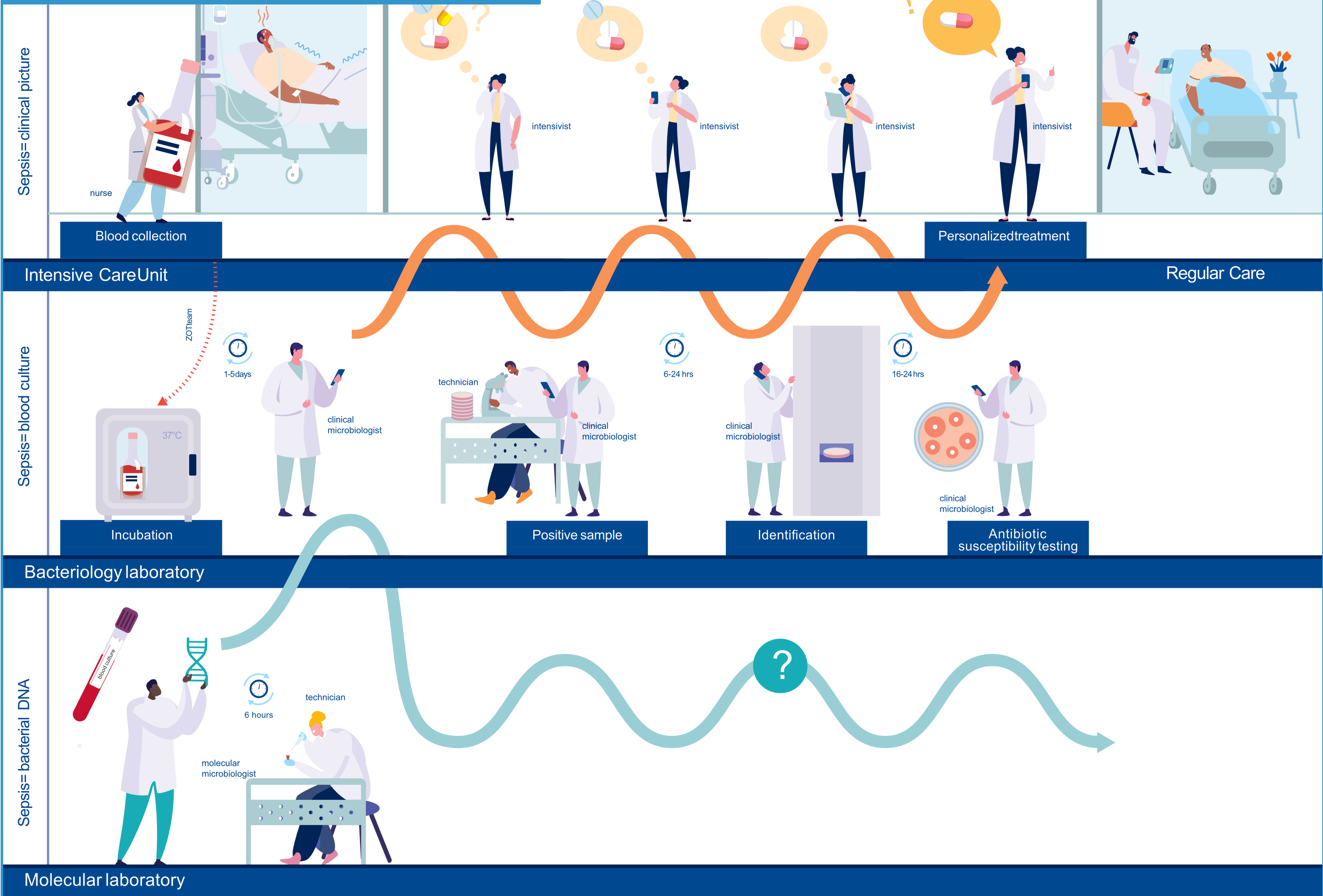
Settings observed:

- Intensive Care Unit (ICU)
- Bacteriology laboratory
- Molecular laboratory

Themes covered:

- Steps of sepsis diagnosis in ICU & bacteriology laboratory
- Communication between ICU & bacteriology laboratory
- Expectations and hopes for new culture-independent methods
- Expected accountability for new methods

Current & future sepsis diagnosis workflow



Results

Stabilisation of blood cultures in sepsis diagnosis

- Established communication between intensivist & clinical microbiologist & bacteriology lab technician
- Clear responsibilities and tacit experience
- Workarounds developed for flaws in current processes [1]

Anticipation of culture-independent methods

- Positive and hopeful [2]
- Yet, no alignment of expectations
- Expectations exceed speed only: discrimination from contamination, better sensitivity, no impact on working hours
- Deferred to indeterminate future [3]
- Shift from culture-based to culture-independent sepsis diagnostics: huge leap for organization of laboratory and labour [4]

[1] "It's actually a bit of a flaw [the design of blood culture bottles], so you're standing there just counting. Trying to get at least five cc [of blood] in, so you have to count one, two, three." – ICU nurse

[2] "If you can minimize that [the time to results for diagnosis], and that's what [the new culture-independent test] is doing of course, that would be an enormous step forward." – Clinical microbiologist

[3] "If we would get a high-quality test, yes [it would be accepted]. But yeah, I still have to see if we can get a high-quality test within the next ten years." – Clinical microbiologist

[4] "You need a year to learn everything for molecular and bacterial labs. Maintaining competence if you were to rotate between both doesn't seem very efficient. [...]" – Bacteriology lab technician

Potential routes for implementation

(A) Fragment new diagnostic to embed in current culture-based routine

- + Higher chance for acceptance from end users
- Less impact on patient care

(B) Substituting culture-based organization by new routines

- + Most impact of culture-independent methods on patient care
- Require significant investment of time, resources and motivation from all actors

(C) Align new diagnostic with ICU and not bacteriology laboratory to support intensivists' decision-making

- + No direct competition with blood culturing
- Need to reposition diagnostic in ICU (e.g. POCT)