

# SmartBiotic

## Category:

Best Startup

## Company Name:

SmartBiotic

## Turnover and/or Funding:

SmartBiotic is a three-year-old startup. We have been marketing a version of our software since January 2025.

In 2024, our revenue was \$0 USD, and to date it stands at €125,000 (approximately \$146,000 USD).

We have completed two funding rounds: the first, in 2023, for €200,000 (US\$235,000), and a second, in May 2025, for €1,000,000 (US\$1.2 million).

## Sub-Category:

Medical Technology / Digital Health

## Corporate history (creation, key milestones, main funding,...)Information on Condition / Disease and need for solution / product (prevalence, existing treatments / solutions):

Antimicrobial resistance (AMR) is a growing global health crisis, exacerbated by the ease of international travel and affecting both high- and low-to-middle-income countries. Coordinated global action is essential, as bacteria know no borders. Preserving antibiotic effectiveness is a shared responsibility.

According to the World Health Organization (WHO), AMR contributes to nearly 5 million deaths annually. Its rise threatens the foundation of modern medicine, jeopardizing routine procedures like cesarean sections and organ transplants. Empiric or even lab-guided antibiotic therapy is becoming increasingly difficult as resistance spreads. New resistance mechanisms are emerging worldwide, making once-treatable infections-such as pneumonia, tuberculosis, sepsis, gonorrhea, and foodborne illnesses-more difficult, and at times impossible, to cure.

The higher the prevalence of AMR, the greater the risk of inappropriate empiric treatment, leading to complications, therapeutic failures, and the spread of deadly resistant strains. Without urgent change, we risk entering a post-antibiotic era where

minor infections could once again be fatal. Even with new antibiotics in development, few will effectively target the most dangerous pathogens.

Misuse accelerates resistance faster than new drugs can be introduced, leaving us with one clear path: optimizing existing antibiotic use and transforming prescribing behaviors on a global scale.

SmartBiotic is a digital health solution that analyzes data from clinical microbiology laboratories and electronic medical records. Our mission is to improve probabilistic antibiotic prescribing in order to reduce treatment failures and combat antimicrobial resistance.

In 2019, Dr. Mathieu Raad worked in Madagascar to optimize antibiotic treatments adapted to the local bacterial ecology. In partnership with the University of Oxford, he co-authored a paper published in *The Lancet*: Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis.

In 2021, Dr. Raad founded the company SmartBiotic in France to facilitate the use and interpretation of local bacterial ecology data, with the aim of optimizing probabilistic antibiotic therapy and promoting appropriate antibiotic use within a personalized medicine approach. In 2022, the company opened a branch with permanent offices in Montreal, Canada, to expand deployment of the solution in North America.

In early 2024, SmartBiotic completed its first funding round, raising \$200,000 USD from BAngel investors attracted by the project's values and strong market potential. Throughout 2024, the first version of the antibiotic prescribing support software was finalized and brought to market. Our first clients include the Montreal Pediatric University Hospital Center (Université de Montréal), the University of London, and several hospitals in France.

In 2025, the first clinical studies on antibiotic optimization are underway in multiple countries. A second fundraising round of \$1.2 million USD is being organized to accelerate commercial development and deepen the technological capabilities of the solution, including the integration of advanced AI systems. Outlook: The company is expected to reach profitability by the end of the year and is preparing for commercial expansion and its first partnerships in the U.S. market.

## **History of the development of the solution/product (Intellectual Property, preclinical and clinical datas, development collaborations):**

Our solution helps optimize initial probabilistic antibiotic therapy. When an infection is suspected, physicians usually:

1. order diagnostic tests (urine, blood, cerebrospinal fluid) to identify the causative bacteria-but results take 2-3 days;

2. prescribe empirical \"probabilistic\" antibiotics to begin treatment in the meantime.

This blind initial therapy is often too broad-contributing to antibiotic resistance-and frequently inappropriate for the actual pathogen. This leads to major human costs (delays in effective care, worsening infections, hospitalizations, even surgery) and significant financial costs (avoidable overuse of healthcare resources).

Smartbiotic addresses this challenge by combining hospital laboratory data, local pathogen prevalence, and antibiotic resistance patterns to generate more accurate, personalized, and effective antibiotic prescriptions than current practices.

In April 2023, we developed and filed our internationally patented PCT indicator, called \"Cumulative Weight Sensitivity.\" This tool helps prescribers identify which antibiotic treatment is likely to be both most effective and best targeted-based on local bacterial ecology and individual patient profiles.

Beyond individual decision support, analyzing hospital-wide databases enables us to statistically identify predictive and risk factors. This helps anticipate the likely bacterial agent, its resistance profile, and the most suitable antibiotic therapy.

A second patent is currently being filed to protect our unique method for generating personalized therapeutic decision trees.

Our deployment in pediatric university hospitals in Montreal, for example, has demonstrated a projected 11% reduction in probabilistic antibiotic failures-especially in neonatal infections and post-partum maternal infections. These results were presented at the Canadian National Congress of Obstetricians and Gynecologists, and in April 2025, an article was accepted for the ECCMID international infectious diseases congress. In May, we also presented at the International Pharmacists Congress in Tunisia. Our client, the University of London, has several joint publications underway with our team.

Now deployed in multiple hospitals, we are conducting clinical research to demonstrate the human (better patient outcomes) and economic (optimized resource use) benefits of our approach-starting with the most common infections (urinary tract infections) and the most critical (meningitis).

Following a partnership with the TransMedTech Institute in Montreal, Smartbiotic has joined the multi-hospital health data research and innovation center in Eastern France, accelerating our research and impact across healthcare systems.

**Why this drug or device is innovative, the broad implications for future research, and/or how it will improve the human condition:**

SmartBiotic is a breakthrough in antibiotic stewardship, integrating advances in artificial intelligence, clinical epidemiology, and large-scale data analysis. Designed as a real-time clinical decision support system, it relies on a self-learning decision tree algorithm that incorporates local bacterial ecology, individual patient characteristics, and evolving antimicrobial resistance patterns.

Traditionally, no system has been able to both frequently update antibiotic protocols-several times per year-and dynamically adapt prescriptions based on real-time microbiological data. SmartBiotic fills this gap by continuously analyzing local data and detecting early signs of resistance to specific antibiotics. When resistance patterns shift, the system autonomously adjusts its recommendations, helping reduce selective pressure and slow resistance spread. This happens without manual input, easing the burden on healthcare providers and improving the reliability of clinical decisions.

One of SmartBiotic's key innovations is its probabilistic identification of risk and protective factors for specific pathogens or pathogen-resistance combinations. This enables hospitals to better target infection control strategies and anticipate high-risk clinical situations. As a result, physicians can deliver more precise prophylactic treatments-avoiding both undertreatment and overtreatment, two major challenges in modern medicine.

By integrating diverse types of patient data-clinical, biological, environmental, and historical-SmartBiotic moves beyond traditional Evidence-Based Medicine (EBM). Instead, it introduces a new model: Data-Based Medicine (DBM). While EBM typically follows a top-down approach based on population-level studies, SmartBiotic adopts a bottom-up approach, using local real-world data to tailor care to each patient's profile. This multidimensional analysis enables highly personalized, context-aware decision-making.

Importantly, SmartBiotic's model is transferable. Its underlying architecture can be adapted to other complex medical fields, such as personalized oncology, stroke prevention, and chronic disease management. Any area requiring multifactorial treatment decisions could benefit from this dynamic, data-driven approach.

In public health, the broader impact of SmartBiotic is significant. By optimizing antibiotic use, improving infection prevention, and enhancing individualized care, it directly supports efforts to combat the global antimicrobial resistance (AMR) crisis. The system has already demonstrated measurable benefits in clinical settings. In pediatric and maternal care, for example, SmartBiotic has been shown to reduce empirical antibiotic treatment failures by over 11%, allowing for better patient outcomes and more efficient use of healthcare resources.

In summary, SmartBiotic represents a disruptive innovation that merges scientific rigor, algorithmic intelligence, and clinical relevance. It transforms antibiotic prescribing from a reactive, one-size-fits-all practice into a proactive, personalized, and data-driven

process. As healthcare systems around the world struggle with rising resistance and complexity in patient care, SmartBiotic offers a scalable and effective solution-one that not only improves clinical outcomes but also redefines how data is used in modern medicine.

**Please provide appropriate references (PubMed, Abstract, Website):**

SmartBiotic's website : <https://www.smartbiotic.ai>

**References File Document upload:**

**2024 SMARTBIOTIC BMJ\_Open\_TSARA.pdf**

**202404 SMARBIOTIC Poster\_Bacteriemia\_CNPRM2024.pdf**

**202502 SMARTBIOTIC Abstract Optimising decision tree models for predicting antimicrobial resistance insight from patient and specimen characteristics.pdf**