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Operating at the crossroads of diagnostics, healthcare, and technology, Thierry brings a forward-looking perspective on how science can accelerate progress and create meaningful impact. His real specialty: turning "sample to insight" from a slogan into an actual business model.

Before disease decides

How Predictive Biology Can Move Healthcare From Late Intervention to Better-Timed Action

Modern medicine can do extraordinary things. But too often it enters the story too late – only after symptoms have appeared, damage has begun or options have narrowed. Healthcare responds with skill and compassion, but the harder question is whether we can move the moment of action earlier: not to treat more, but to treat better, faster, and sometimes not at all.

That is the promise of predictive biology. Not medicine as fortune-telling, and not a future in which every patient receives a fixed biological destiny – human biology is too complex, adaptive and individual for that. The point is not certainty. The point is timing, and timing is becoming one of the defining questions in healthcare.

For decades, healthcare has been organized around visible disease: symptoms appear, tests confirm what is wrong, treatment begins. This model has saved millions of lives, but it reflects a system built around episodes rather than trajectories – medicine waits until disease fits a diagnostic category, by which point patients may already have lost time, health or choices.

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The real failure is not that medicine lacks power, but that too much of it is deployed only after disease has set the terms – late medicine, built into reimbursement, workflows and evidence standards designed around intervention after need becomes visible. Predictive biology asks a different question: not only what disease a patient has, but what is beginning to happen and what can safely wait. The shift is not from medicine to technology, but from reaction to anticipation.

Prediction is not prophecy

The phrase inflates easily, so it needs a sober definition. It is not a promise to know every disease before it happens, nor will it make algorithms wiser than clinicians. Its value is practical: reading biological signals early – genes, molecular markers, immune responses, treatment-response data – and combining them with clinical context to see what may happen next. Individually incomplete, together they reveal direction: Is risk rising? Is treatment likely to work? Is intervention necessary, or would it add burden without benefit? This is not certainty, but usable probability – and that is not modest, since the better we understand uncertainty, the better we know when to act.

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The patient benefit is time

At its best, predictive biology gives patients something medicine too often cannot give back: time. Time to understand risk before crisis, choose therapy before options narrow, monitor before damage becomes irreversible, or avoid treatment unlikely to help. Patients experience healthcare as waiting – for symptoms to make sense, for results, to know if treatment is working. Better timing will not solve every problem, but it can reduce unnecessary uncertainty and give families more room to decide.

The same logic applies system-wide: better information helps scarce resources flow to patients who need them most, shifting healthcare from spending more at the latest moment to acting smarter at the right one. Healthcare has become very good at rescuing patients from crises it might one day help prevent – which is why predictive biology is not only a scientific shift, but a leadership challenge.

Timing changes outcomes

Cancer care shows what better timing means. Biomarker testing and companion diagnostics have moved oncology toward precise therapy selection: the question is no longer only what cancer a patient has, but which therapy is most likely to work. For some patients this has turned cancer into a condition managed over time, and molecular tools that catch recurrence before it is clinically visible can add a further layer of warning.

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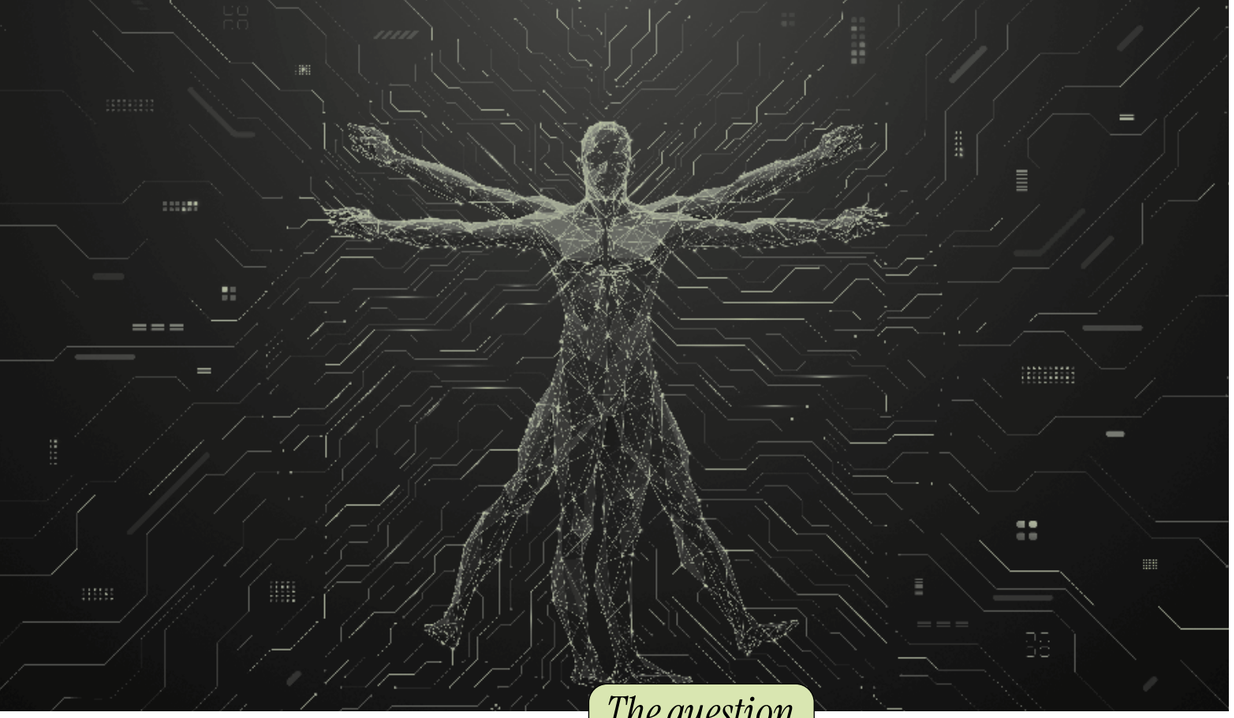
In infectious disease, timing is even less forgiving. When a patient may be developing sepsis, speed itself becomes part of the therapy: the faster clinicians understand what they face, the faster they can escalate, de-escalate or adjust treatment.

Tuberculosis offers a third lesson. TB is preventable and curable, yet remains one of the world's most serious infectious threats – an estimated quarter of the global population is estimated to have been infected with the TB bacteria, though only a minority ever develop active disease. The challenge is identifying latent infection before it emerges; a system that waits for TB to become active has already missed its chance. Across oncology, sepsis and TB, the lesson is the same: the decisive variable is not only what we know, but when we know it.



The question is not how much medicine can predict, but which predictions improve decisions.

AI makes biology visible

Predictive biology depends on data, and increasingly on artificial intelligence. No clinician can interpret the full complexity of modern biological information alone; AI can identify patterns across molecular, clinical and population data that would otherwise stay invisible, supporting risk stratification and personalized decisions. But its value lies not in replacing judgment, but in making complexity visible before judgment would know where to look – which makes judgment more important, not less. A model is only as good as the data and validation behind it; bias can be amplified, and explainability matters because patients are people making decisions under stress, not data points.

Prediction also has a dark side: a signal can inform but also frighten, guide action but also trigger unnecessary intervention – creating anxiety without action, or widening inequalities if advanced testing reaches only some patients. It must not become a consumer product detached from care; it belongs inside responsible healthcare, measured against real outcomes. The question is not how much medicine can predict, but which predictions improve decisions.

Systems built for rescue must learn prevention

The science is moving faster than the institutions. Most healthcare systems were designed around intervention after need becomes clear – predictive biology asks them to manage risk and prevention instead, which is harder than buying new technology. Systems often speak the language of prevention, but too many still pay mainly for rescue, rewarding activity more easily than avoided harm. That contradiction cannot survive the predictive era: it requires evidence models that value what does not happen, reimbursement that rewards better decisions over more procedures, and workflows that put predictive information to use without drowning clinicians in alerts.

Healthcare leaders will not succeed by bolting prediction onto systems built for reaction; they must redesign how decisions are made and value measured. The winners will not be the systems that test or digitize the most, but those that learn to act at the right moment.

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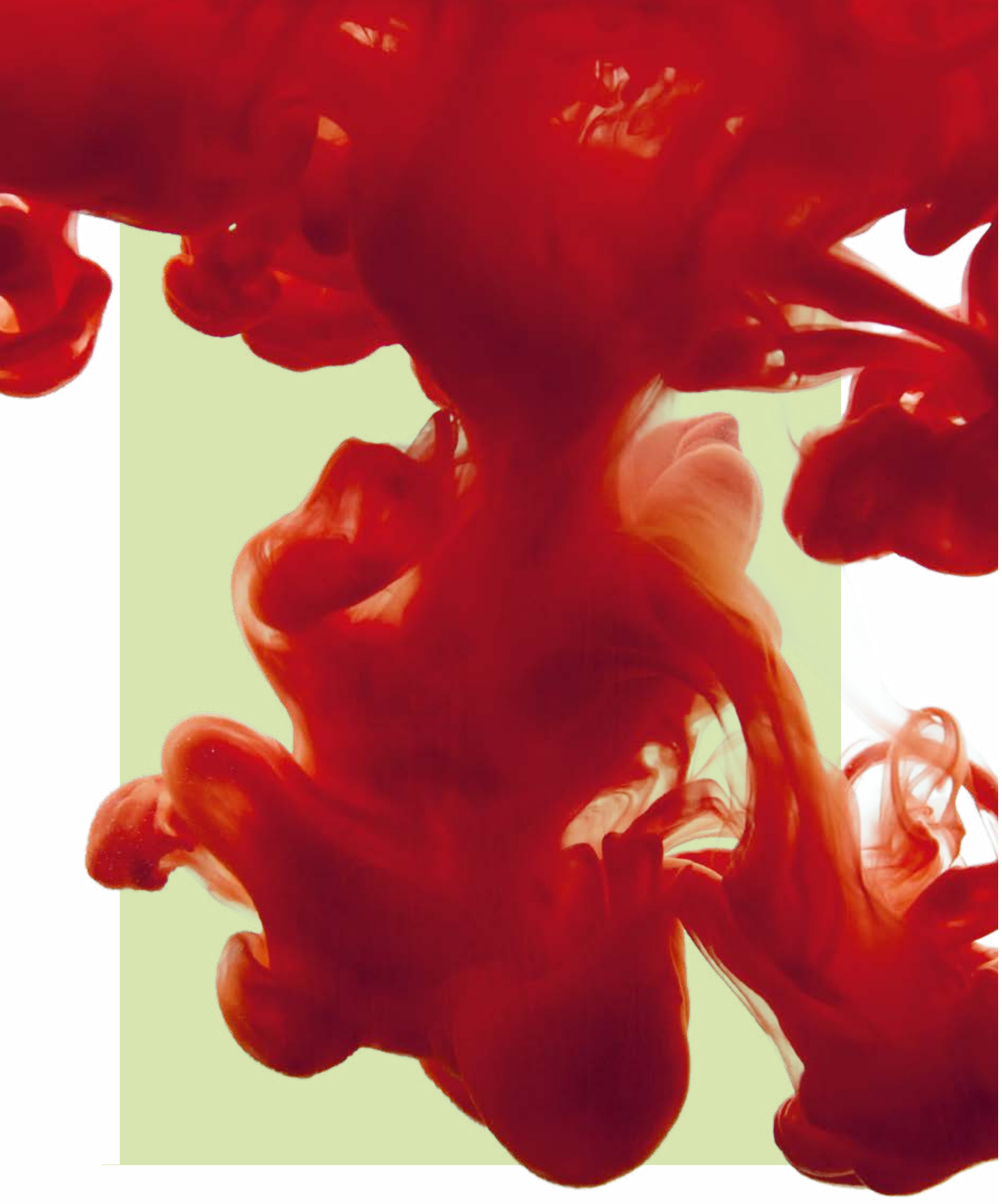

Diagnostics are becoming medicine's timing mechanism

This is not theoretical. QIAGEN's work spans finding tuberculosis risk before active disease develops, reducing uncertainty in acute infection through bloodstream testing from positive blood cultures, and matching therapies to patients through companion diagnostics before time is lost to trial and error. These point to a larger change: diagnostics are becoming part of medicine's timing mechanism, translating biological insight into decisions clinicians can use – when to act, adjust, monitor, or sometimes not to treat. The future of diagnostics is not more testing, but better decision-making.

Predictive biology will not eliminate disease or remove the need for clinical judgment and difficult choices. But it can change the moment those choices are made: earlier clarity for patients, better information for clinicians, resources used more wisely across systems.

Modern medicine has become extraordinarily powerful. The next challenge is to make that power arrive sooner, with more precision and discipline. The future of healthcare will not be defined by doing everything earlier or more often. It will be defined by knowing when to act.

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