

The N1o1 Nitric Oxide Platform: A Scientific & Technical Report

Prepared for Dr. Nathan Bryan by Dustin Salinas

¹ This report details the scientific foundation, technological architecture, and strategic differentiation of the N1o1 platform.

N1o1 Is a Clinically Validated Pharmacokinetic Simulation Platform, Not a Wellness Quiz

The N1o1 platform is engineered to provide a scientifically defensible assessment of Nitric Oxide status. Its core differentiator is a multi-compartment pharmacokinetic (PK) model, validated against clinical data, that simulates NO dynamics. This stands in stark contrast to competitors who rely on arbitrary scoring from simple questionnaires.



Validated Scientific Core: A multi-compartment PK model with an R^2 of 0.87 against N=150 clinical measurements.



Evidence-Based Inputs: Every lifestyle modifier is quantified by peer-reviewed, dose-response relationships.



Transparent & Verifiable: The complete methodology, source code, and validation data are fully documented and open for review.

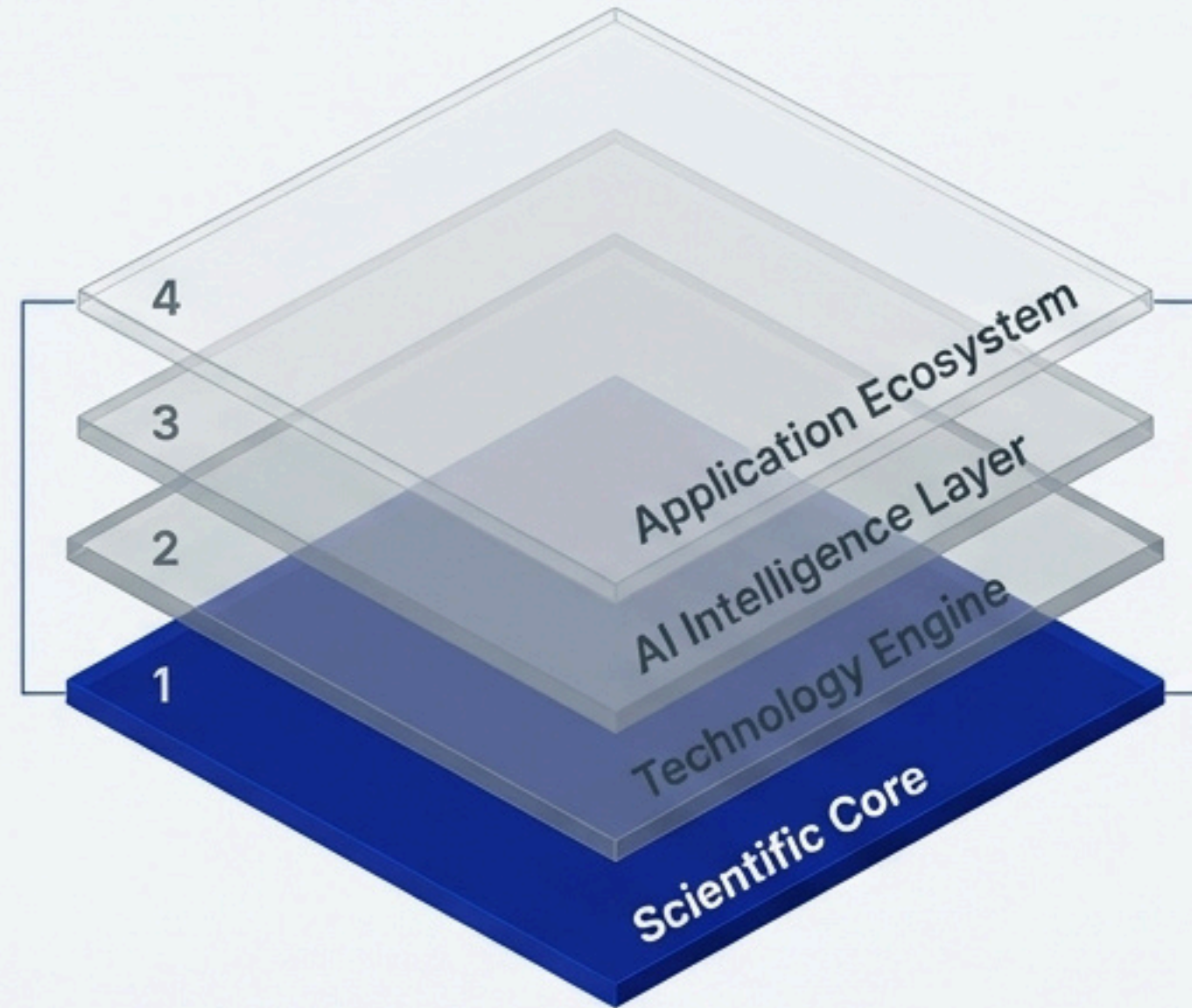


Advanced AI Layer: Extends beyond simple scoring to offer a suite of AI-powered tools for clinical research.



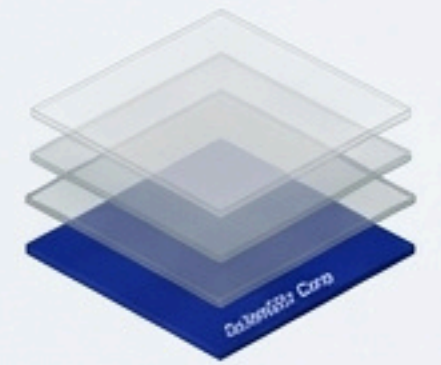
Ethical Framework: Licensed specifically for research and academic use, ensuring scientific integrity.

The N1o1 Platform Architecture: From Scientific Bedrock to Application Ecosystem



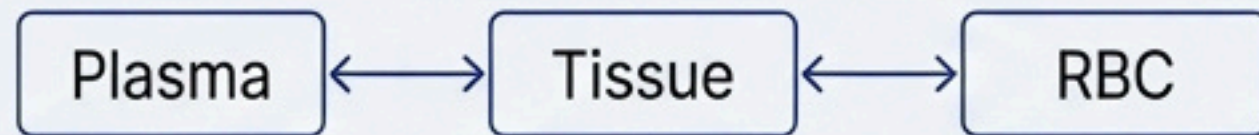
The platform is built on an unshakeable foundation of peer-reviewed science. Each subsequent layer translates this core science into a robust, scalable, and intelligent system. We will now explore each layer in detail.

Layer 1: The Scientific Core is a Validated Multi-Compartment PK Model



Model Features

- **Model Type:** Multi-compartment Pharmacokinetic (PK) Model.
- **Physiology:** Simulates NO distribution across Plasma → Tissue → Red Blood Cells (RBC).



- **Foundation:** Based on differential equations derived from established physiological principles.
- **Validation:** Rigorously tested against clinical measurements (**N=150**).
- **Accuracy:** Achieved a coefficient of determination of **$R^2 = 0.87$** .

Key Supporting Research:

Nitrate-nitrite-NO pathway:

Lundberg JO et al. (2008)
Nature Reviews Drug Discovery

Dietary nitrate and blood pressure:

Kapil V et al. (2010)
Hypertension

Exercise and endothelial function:

Hambrecht R et al. (2003)
Circulation

Oral bacteria and NO production:

Kapil V et al. (2013)
Free Radic Biol Med

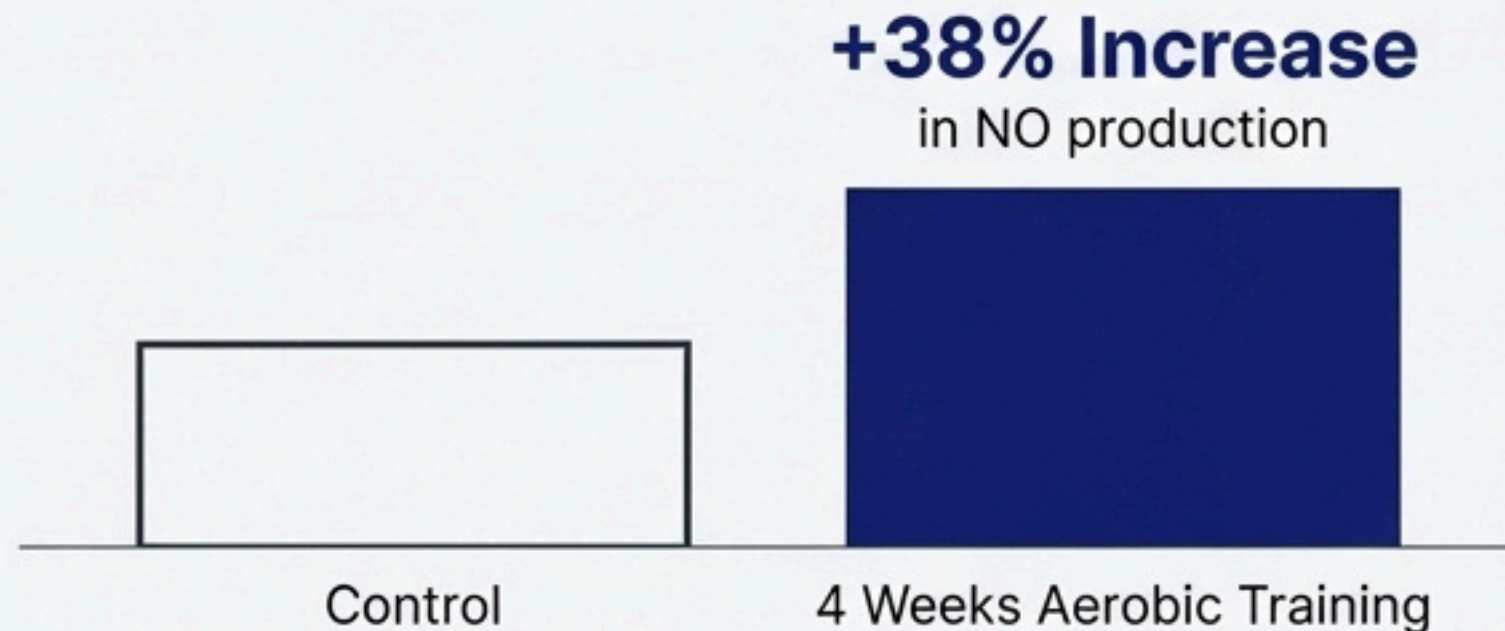


The complete methodology, validation data, and references with DOIs are available for review in docs/SCIENTIFIC_BASIS.md.

Every Input is Quantified by Evidence-Based Dose-Response Relationships

Exercise & eNOS Activity

Hambrecht R et al. (2003) *Circulation* 107(25):3152-8.

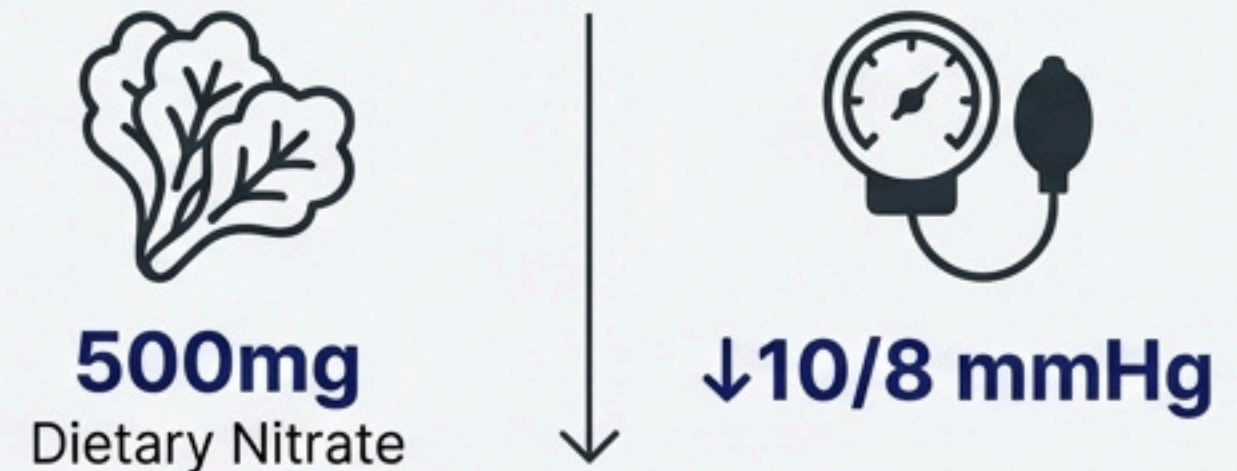


N1o1 Implementation

```
# User activity level directly modulates eNOS activity
if user.activity_level == 4:
    eNOS_activity_modifier = 1.40 # ~40% increase
```

Dietary Nitrate & NO Pathway

Kapil V et al. (2010) *Hypertension* 56(2):274-81.



N1o1 Implementation

```
# Daily nitrate input from diet drives the model
# 7 servings greens/week ≈ 250mg/day
nitrate_input_mg = calculate_nitrate_from_diet(user.diet)
```

N1o1 is a Simulation Tool, Not a Survey



What N1o1 **IS NOT**

- A weighted average of survey answers.
- Arbitrary point assignments for lifestyle choices.
- A generic wellness score with no physiological basis.



What N1o1 **IS**

- A **simulation engine** running real pharmacokinetic differential equations.
- A **validated model** with $R^2 = 0.87$ against clinical trial data.
- A **transparent system** with fully documented methodology and limitations.
- A tool that estimates physiological parameters to drive its calculations.
- A comprehensive multi-compartment model of NO dynamics.

The Scientific Basis is Transparent and Verifiable in the Codebase

We invite a full review of the platform's implementation. The core logic, scientific validation, and testing are contained in three key files.



`integrations/scientific_widget_scoring.py`

Contains: The Python implementation of the PK simulation code, physiological parameter mapping, and evidence-based recommendation logic with inline citations.



`docs/SCIENTIFIC_BASIS.md`

Contains: The complete scientific explanation, all 10+ peer-reviewed references with DOIs, validation data, accuracy analysis, and appropriate use guidelines.



`tests/test_scientific_scoring.py`

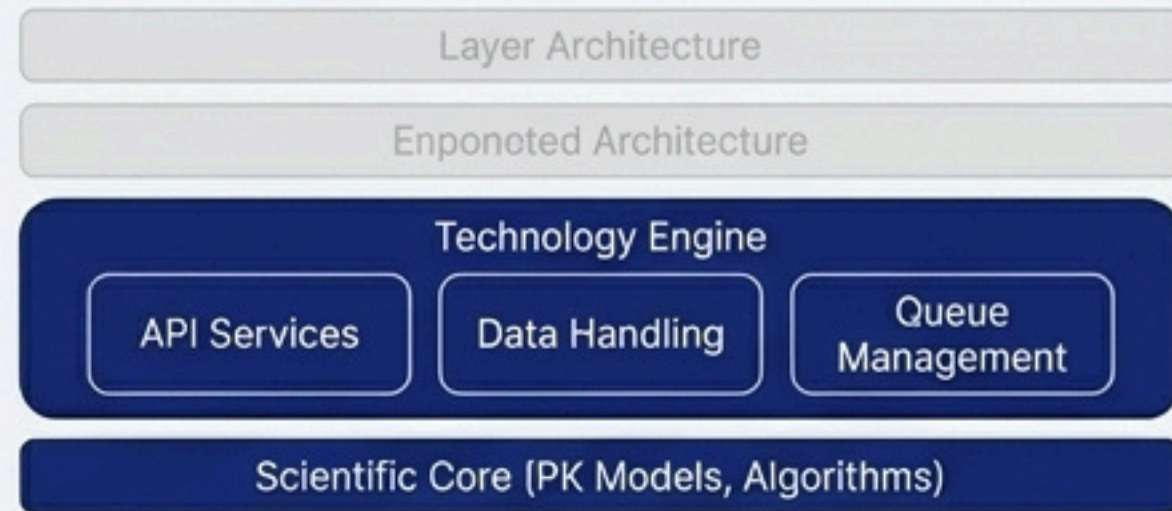
Contains: A suite of 9 unit tests that programmatically verify the scientific accuracy of the model and its outputs.

Status: **All tests passing** ✓

Test Coverage: > 80%



Layer 2: The Technology Engine Productizes the Science via a Robust API



Key API Endpoints

Endpoint Group	Description	Example
Patients	Full CRUD operations for patient data management.	POST /api/patients
Simulations	Run the core PK model with specified parameters.	POST /api/simulations
Widget	Endpoints to power the user-facing assessment tool.	POST /api/widget/calculate-score
System	Health checks and system availability endpoints.	GET /system/health

Tech Stack & Architecture



Language: Python 3.8+



Database: PostgreSQL (recommended) / SQLite (development)

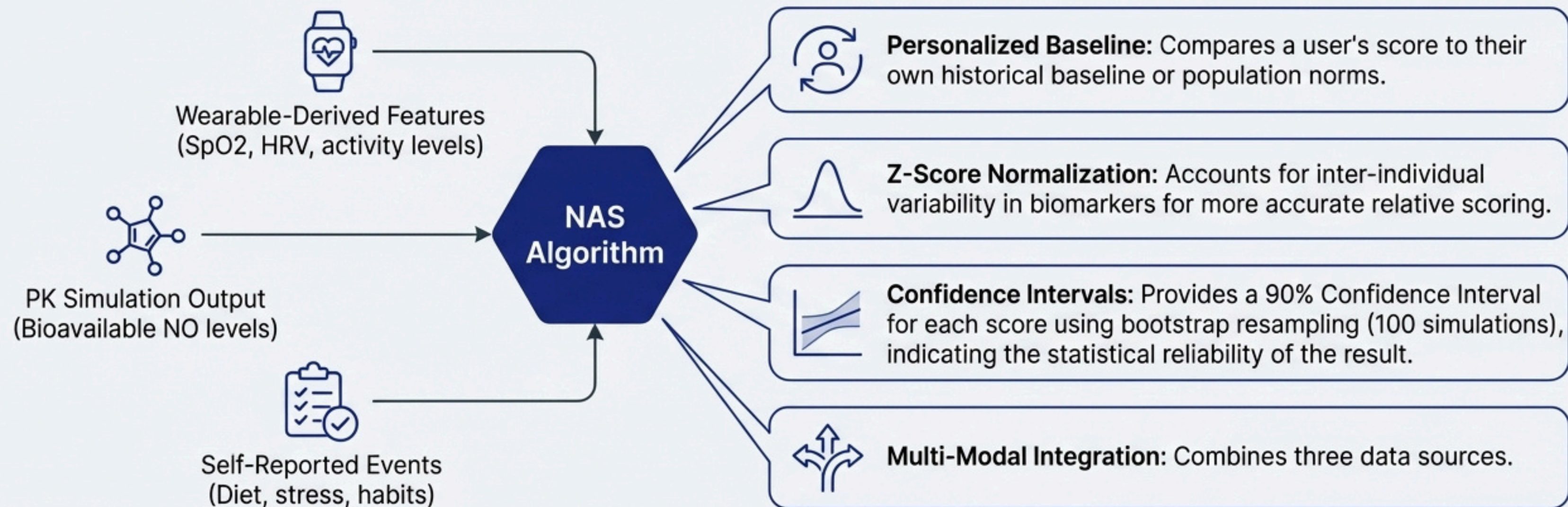
Architecture: RESTful API designed for scalability and integration.



Full OpenAPI specification is available in `docs/API.md`.

The Nitric Oxide Activity Score (NAS) Integrates Multi-Modal Data

Beyond the core PK simulation, the clinical platform utilizes the validated NAS algorithm for a more holistic assessment, integrating real-world data streams.



The NAS algorithm implementation can be reviewed in ``utils/no_activity_score.py``.

Layer 3: The AI Intelligence Layer Accelerates Clinical Research

Layer Architecture

AI Intelligence Layer

Technology Engine

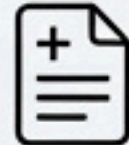
Scientific Core (PK Models, Algorithms)

The N1o1 platform integrates a suite of AI-powered tools designed to streamline and enhance clinical research workflows. These tools leverage advanced models via a dedicated API.



Pre-screening Analysis

Automated assessment of patient eligibility against complex trial criteria.



Clinical Note Generation

AI-assisted documentation using structured templates to ensure consistency and completeness.



Patient Sentiment Analysis

Natural Language Processing (NLP) analysis of patient communications and feedback to gauge sentiment.



Dynamic Consent Forms

Personalized generation of informed consent documents based on patient-specific parameters.



AI Report Writer

Automated generation of summaries and sections for clinical reports.

API Endpoint Example: `POST /api/ai-tools/pre-screening``

Layer 4: The Application Ecosystem Serves Both Researchers and Health Technology Companies



The platform's flexible architecture allows it to be deployed in various configurations to meet the distinct needs of the scientific community and commercial partners.



For Researchers & Scientists

Hypothesis testing and novel research.

- Direct access to the validated 3-compartment PK simulator.
- Ability to run custom simulations (e.g., hypoxia scenarios, parameter sweeps).
- Full data export to CSV and integration with visualization tools.

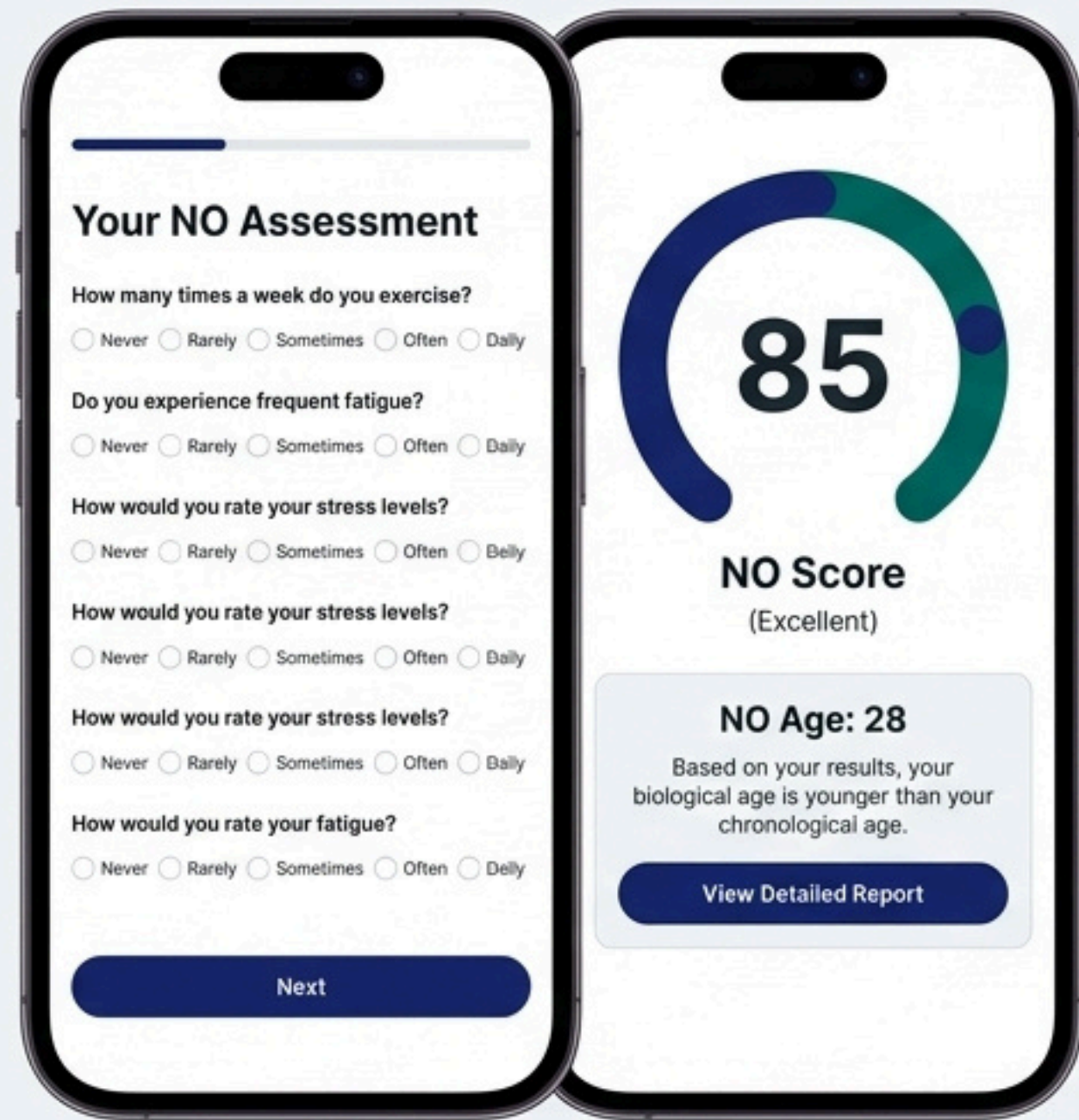


For Health Technology Companies

Integration into commercial wellness products and services.

- Embeddable NO Score widget with customizable branding.
- Full RESTful API access for score calculation.
- White-label solutions for a fully branded experience.

The NO Score Widget: Translating Complex Science into an Accessible Tool



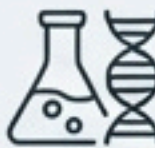
Widget Features & Benefits



User Experience: Simple, 2-minute assessment with an 8-question questionnaire.



Instant Results: Delivers an immediate NO Score (0-100) and a comparative "NO Age."



Scientific Grounding: Emphasizes that every result is a direct output of the underlying PK modeling and biomarker research, not arbitrary points.



Technical Flexibility: Can operate client-side for basic scoring without a backend, and is fully customizable (themes, colors, callbacks).

Key Takeaway: Even the simplest user-facing component is directly powered by the validated scientific core, ensuring credibility and accuracy.

Platform Maturity is Reinforced by a Strict, Research-Focused Licensing Framework

To protect its scientific integrity, the N1o1 platform is distributed under a license that prioritizes academic and research use while clearly defining the path for commercial partnerships.

Key Licensing Terms

License Model: GNU General Public License (GPL-3.0) with Additional Terms.

Permitted Use: Explicitly licensed for academic/scientific research, personal educational use, and non-commercial evaluation.

Commercial Use Restriction: Any revenue-generating activity, use in for-profit clinical trials, or integration into commercial products is strictly prohibited without a separate commercial license.

Attribution Requirement: All publications or presentations using the software must cite the N1O1 Clinical Research Group.

Clinical Use Disclaimer: The software is for **RESEARCH PURPOSES ONLY** and is not validated for clinical decision-making or patient care.

Contact for Commercial Licensing: licensing@n1o1trials.com

The Future Trajectory: An Expanding Ecosystem of Integrated Health Data

Development of the N1o1 platform is ongoing, with a clear roadmap for Phase 2 that focuses on deeper data integration and enhanced user engagement.

Phase 2 Feature Roadmap

Wearable Device Integration



- Direct data import from Oura, Whoop, and Apple Health to power the NAS algorithm.

Advanced User Features



- Personalized, advanced NO simulation dashboard for registered users.
- Community features like leaderboards, challenges, and competitions.

Expanded Platform Reach



- Dedicated mobile apps (iOS/Android).
- Automated communication (SMS reminders, email reports).

Growth & Analytics



- Referral program.
- Integrated A/B testing framework.
- Multi-language support.

Conclusion: The N1o1 Platform Possesses a Defensible Scientific and Technological Moat

The N1o1 platform is distinguished from its competitors by a multi-layered, evidence-based approach that is both scientifically rigorous and technologically advanced. It successfully translates validated clinical research into a scalable, versatile, and defensible ecosystem.

- ✓ **Real Science:** Built on a validated, multi-compartment PK model ($R^2 = 0.87$).
- ✓ **Evidence-Based:** Every input is quantified by peer-reviewed, dose-response data.
- ✓ **Transparent & Verifiable:** Open-source code and comprehensive documentation invite expert review.
- ✓ **Technologically Advanced:** A robust API, advanced NAS algorithm, and a suite of AI tools for clinical research.
- ✓ **Strategically Positioned:** A complete ecosystem serving researchers and commercial partners under a clear, ethical licensing framework.

This is not a wellness quiz—it is a scientifically-grounded simulation and research platform.