

Challenges
proposed by

AstraZeneca

ALEXION[®]

AstraZeneca Rare Disease

BACKGROUND

connects
science meets business



AstraZeneca is a global, science-led biopharmaceutical company operating in Oncology, Biopharmaceuticals (CVRM and Respiratory & Immunology) and Rare Disease (Alexion). Our Global Hub in Barcelona hosts R&D, Clinical Operations and Commercial Excellence teams, together with the Innovation team that connects AstraZeneca to the Catalan and Spanish deep-tech, research and healthcare ecosystem.

AREAS OF INTEREST

SUPERCOMPUTING / HPC

DATA & ANALYTICS

ARTIFICIAL INTELLIGENCE

LANGUAGE TECH / AINA

Aina 

 **Generalitat
de Catalunya**

CHALLENGE 1



TITLE Shortening the diagnostic odyssey with AI on real-world clinical data

WHY IT MATTERS Rare-disease patients wait 5–7 years for a correct diagnosis; in prevalent diseases many are identified only after an avoidable clinical event. The signal is usually already in the health system – scattered across notes, labs, imaging and prescriptions – but nobody reads it as a whole.

- WHAT WE ARE LOOKING FOR**
- Phenotyping and pattern detection across structured and unstructured EHR data; clinical text in Spanish and Catalan is an advantage, not an obstacle.
 - Predictive and prognostic biomarkers from real-world, multimodal or multi-omic data, including response-to-treatment prediction.
 - Federated, privacy-preserving architectures that keep patient data inside the hospital, ready for the European Health Data Space.
 - Explainable, confidence-ranked output embedded in the clinician's existing workflow – not one more dashboard.



This challenge focuses on language technologies; the solution you propose must incorporate the resources from the Aina project. Please find all of the Aina's resources linked here and on the website.

CHALLENGE 1

WHAT GOOD LOOKS LIKE

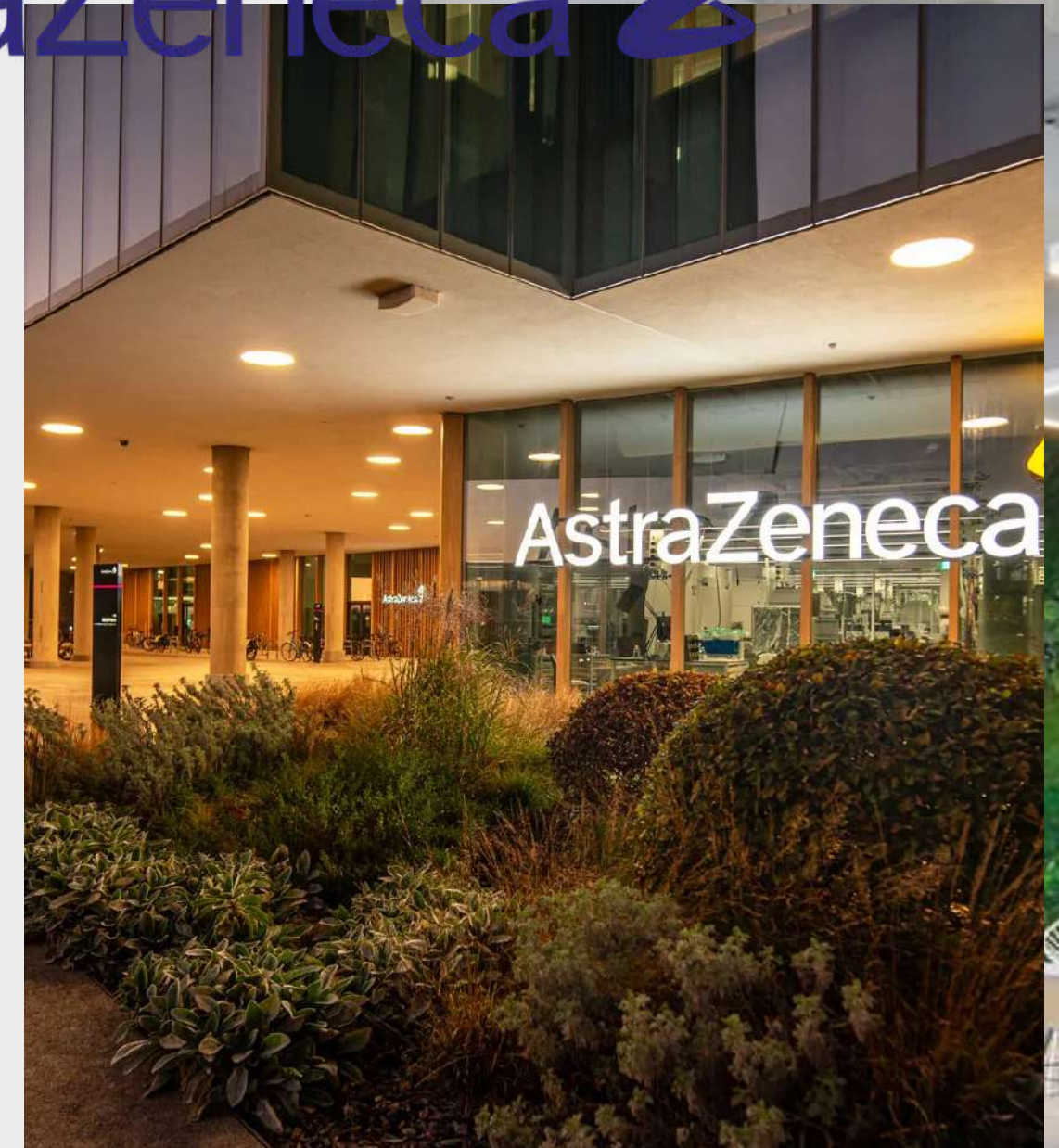
Validation on a retrospective cohort reporting positive predictive value and false-alert burden, plus a credible plan for a prospective pilot at one hospital site.

KEY WORDS

AI/ML · clinical NLP · federated learning · real-world data · rare disease · EHDS

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CHALLENGE 2



TITLE In-silico trial design: AI and HPC for faster, leaner, more representative trials

WHY IT MATTERS Protocols are still designed largely on expert judgement and precedent, producing over-restrictive eligibility, unrepresentative cohorts, avoidable amendments and sites that never recruit. Compute and data now exist to stress-test a protocol before it opens.

- WHAT WE ARE LOOKING FOR**
- Simulation of eligibility criteria against real-world populations to quantify recruitment feasibility, diversity and screen-failure risk before lock.
 - Digital twins and synthetic or external control arms to size studies and reduce unnecessary placebo exposure.
 - AI and HPC for target identification, molecule design, dose selection and early safety-signal detection.
 - Auto-categorisation of quality events, early trend detection and LLM-based mapping of internal SOPs to evolving regulation.

CHALLENGE 2



WHAT GOOD LOOKS LIKE

A demonstration on public or synthetic data quantifying impact on one hard metric – screen–failure rate, time to first patient in, amendment risk or study size.

KEY WORDS

HPC/MareNostrum 5 • generative AI • digital twins • synthetic data • simulation • LLMs

CHALLENGE 3



TITLE Adherence that adapts: intelligent multilingual companions for complex therapies

WHY IT MATTERS Complex regimens – injectables, inhaled therapies, lifelong rare-disease treatment – fail for human reasons: fear of side effects, regimen fatigue, caregiver burden, low health literacy. Around half of patients on long-term therapy do not take it as prescribed; generic reminders do not fix that.

WHAT WE ARE LOOKING FOR

- Early prediction of individual non-adherence and discontinuation risk from routine or passively collected signals.
- Adaptive interventions grounded in behavioural science, tailored to the patient's context and moment in the journey.
- Agents for patients and caregivers answering strictly from approved, up-to-date sources – retrieval-grounded, traceable, auditable — in Spanish, Catalan and beyond.
- Scalable, easily updatable education for patients and HCPs, usable on low-end devices and by low-digital-literacy users.



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CHALLENGE 3

WHAT GOOD LOOKS LIKE

A measurable improvement in persistence or patient-reported outcomes in a defined cohort, on an architecture that is GDPR- and AI-Act-ready from day one.

KEY WORDS

conversational AI · RAG · language tech/Aina · behavioural science · wearables

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CHALLENGE 4

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TITLE Life beyond the prescription: equitable support networks for rare-disease quality of life

WHY IT MATTERS For rare-disease families the hardest part often begins after diagnosis: isolation, mental-health burden, caregiver exhaustion, and access to expertise that depends on where you happen to live. Little of this is addressed by the medicine itself.

**WHAT WE ARE
LOOKING FOR**

- Privacy-preserving matching of patients and caregivers to peer networks, patient organisations and the right expertise, across regions and languages.
- Platforms enabling multidisciplinary virtual boards and structured second opinions where no local centre of expertise exists.
- Continuous, low-burden capture of quality-of-life and mental-health signals (PROMs, speech, wearables) that feeds back into care.
- Designs that measurably reduce inequity: rural, elderly, low-digital-literacy and non-Spanish-speaking users included.



CHALLENGE 4

WHAT GOOD LOOKS LIKE

A pilot with a hospital or patient organisation showing movement on a validated quality-of-life measure, and a model that survives beyond the pilot.

KEY WORDS

matching algorithms · PROMs · telemedicine · digital mental health · speech & wearables





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