



Chart Review in Oncology: Surfacing Biomarkers and Inferring Eligibility from the Patient Record.

Case studies demonstrating the PRIME engine reframed for oncology recruitment.

The core challenge in oncology recruitment is not finding patients by a diagnosis code — it is finding the **right patient at the right moment**: the correct molecular biomarker subtype, the eligible line of therapy, the performance status, or the current stage and disposition that determines trial fit, and identifying all of it in time to engage the patient before they progress. Nearly all of the usable information for those details lives in unstructured notes, pathology reports, and lab narratives that the EMR isn't capable of searching.

THE PRIME ENGINE

Areti's PRIME engine (**Precise Record Retrieval, Ingestion, & Matching Engine**) was built for exactly this. PRIME ingests the full longitudinal record — medical history, diagnosis, medications, procedures, labs — plus typed, dictated, and scanned narrative notes, then uses advanced AI with a clinical intelligence layer to **surface biomarkers, infer disease severity and stage, and match patients against protocol inclusion/exclusion criteria**. Every inference carries a rationale and is verified by clinical staff, with **>90% alignment** between PRIME and reviewing nurses.

A NOTE ON THESE CASE STUDIES

Our largest completed enrollments to date are outside oncology, but each was won on the precise capability an oncology team cares about — reviewing the chart, surfacing medical events, and inferring eligibility that keyword search misses. The four showcases below are selected to demonstrate that capability, culminating in an active oncology (**DLBCL**) program and the disease-severity inference framework that drives oncology-relevant eligibility like ECOG, staging, molecular biomarkers, and pathology matching.

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● CASE STUDY 01 · BIOMARKER-DRIVEN / PERSONALIZED-MEDICINE RECRUITMENT

APOL1-Mediated Chronic Kidney Disease (Large Nephrology Research Site)

A genotype-defined enrollment problem solved by record-level biomarker targeting.

● ONCOLOGY RELEVANCE

A precision-medicine study gated on a specific genetic biomarker — the high-risk APOL1 genotype — in a defined ancestry-enriched population. The recruitment problem is **structurally identical to a biomarker-stratified oncology trial** (e.g., BRAF V600E, KRAS G12C): the eligible population is a narrow molecular slice, and finding it requires reading NGS / genotype reports, labs, and other molecular signals out of the record rather than relying on a diagnosis code alone.

THE SITUATION

Study enrolling participants aged 18–65 with chronic kidney disease (CKD), elevated urine albumin, and a confirmed high-risk APOL1 genotype (G1/G2 vs. G0).

THE CHALLENGE

APOL1 risk predominantly affects patients of African ancestry, many of whom are unaware of the gene and may be hesitant about testing — making trust and education essential. Eligible patients also had to already have CKD with documented evidence of kidney damage, so the chart had to be read for **both the biomarker and the disease-severity signal**.

THE APPROACH

PRIME identified and matched **1,000 EMR-sourced leads** against the genotype-and-damage criteria. The AI Coordinator then engaged those leads over 7 days to educate, pre-screen, offer genotype testing, and schedule screening visits directly with the site.

THE RESULTS

163

Responses

8x improvement over the site's recruitment baseline.

130

Visits in 10 days

Screening visits scheduled within 10 days of outreach launch.

Volume-driven pause

The site requested an outreach pause due to volume and expanded the program to additional sites.

● ONCOLOGY TAKEAWAY

PRIME can operationalize a biomarker-stratified cohort at speed — surfacing the molecular signal, confirming the supporting disease evidence, and delivering scheduled, qualified patients to the site. **Those signals can include SNPs, DNA-level mutations, amino-acid codon changes, and the predicted or known impact of the variants.**

● CASE STUDY 02 · MEDICAL-RECORD CHART REVIEW + AUTOMATED OUTREACH

Early Alzheimer's Disease (Independent Neurology Research Site)

A high-screen-fail study rescued by interpreting unstructured notes and labs.

● ONCOLOGY RELEVANCE

Eligibility hinged on a specific biomarker (phospho-Tau: p-tau217 or p-tau181) plus a quantitative severity instrument (MMSE) frequently buried in narrative notes rather than coded fields — **the same problem oncology faces with histopathology typing, ECOG/Karnofsky, RECIST, staging, and line of therapy.** The differentiator was PRIME's ability to read and interpret the unstructured record, which collapsed the screen-fail rate.

THE SITUATION

Alzheimer's disease study enrolling adults with pre-clinical cognitive decline but confirmed phospho-Tau lab results.

THE CHALLENGE

Stringent medical eligibility (phospho-Tau biomarker plus MMSE results) drove a high screen-failure rate under conventional recruitment, where the eligibility signals were **lab- and note-based, not code-based.**

THE APPROACH

PRIME ingested and chart-reviewed **2,500 EMR-matched leads**, surfacing the biomarker and cognitive-scale evidence. The AI Coordinator contacted the first 500 candidates, then engaged those leads over 14 days to educate, pre-screen, and schedule visits directly with the site — fully automated outreach on a chart-qualified pool.



Your product is revolutionary to the industry and game-changing to my operations.

— Chief Executive Officer, Independent Neurology Research Site

THE RESULTS

44

Visits in 48 hrs

19% of leads responded; 69% of eligible leads scheduled — 44 visits booked in the first 48 hours.

2 wks

vs. 4–6 month forecast

Recruitment completed in two weeks against a 4–6 month forecast.

18

Enrolled

Enrollments delivered from the qualified pool above.

55%

Screen-fail with Areti

vs. a >95% rate without Areti — driven by PRIME's interpretation of unstructured notes.

● ONCOLOGY TAKEAWAY

Reading the full medical chart — including notes, not just the codes — is what cut screen failures nearly in half. In oncology, where eligibility lives in **pathology reports and clinician narratives**, that same note-level interpretation is the difference between a referred patient and an enrolled one.

● CASE STUDY 03 · ONCOLOGY SHOWCASE

Challenging Lymphoma — DLBCL (Global Oncology Sponsor)

Real-time immunophenotype and biomarker monitoring to capture patients at the right line of therapy.

THE PROBLEM

CAR-T therapy for DLBCL has high adoption in academic settings with good insurance market access. As a result, the study's enrolled population skewed toward a **challenging molecular subtype** that made the study drug less effective, while an outdated control arm further deterred patients. Enrollment needed both more patients and a better-balanced, more representative subtype mix.

PRIME-DRIVEN SOLUTION

- **Rapidly onboard community and rural cancer centers** where CAR-T is not offered, positioning the study drug as the local next-line option.
- **EMR-match patients contraindicated for CAR-T** (e.g., lymphopenia) by reading the contraindicating signal directly from the record.
- **EMR-match other immunophenotypic subtypes** to balance and broaden the enrolled population.
- **Real-time biomarker and progression tracking:** poll record updates for CAR-T treatment failure, non-response, or progression, and trigger immediate outreach before the patient is referred to the next line of therapy.

SIGNALS PRIME MONITORS ACROSS THE PATIENT JOURNEY

JOURNEY STAGE	RECORD SIGNAL PRIME SURFACES	RECRUITMENT ACTION
Diagnosis, staging & lab workup	New DLBCL diagnosis; immunophenotyping / genetic profile	Flag patient for monitoring
Subtype characterization	Biomarker status (e.g., CD19 ^{low})	Match to subtype-appropriate cohort
First-line therapy	CAR-T contraindication (e.g., lymphopenia)	Route to local study-drug option
Relapse / refractory	Rapid CAR-T failure, non-response, or progression	Immediate outreach before next-line referral

● ONCOLOGY TAKEAWAY

This is chart review applied **dynamically** — PRIME reads immunophenotype, biomarker status, and contraindications, and continuously re-reads the record so the AI Coordinator reaches the patient inside the **narrow window when they become trial-eligible**.

● SHOWCASE 04 · NATURAL-LANGUAGE INFERENCE FRAMEWORK

Inferring Disease Severity & Stage from Unstructured Notes

How PRIME goes beyond keyword search to read the chart the way a clinician would.

SITUATION

Most modern trials require patients to be risk-stratified or assigned a known disease severity for enrollment.

COMPLICATION

Standardized severity instruments are often not used in routine care, and severity is rarely defined explicitly against the trial's scales — so the eligibility-determining information is **implied in narrative text, not coded**.

SOLUTION

PRIME reads all unstructured notes and reports in the record, infers the relevant severity / stage construct, and presents each finding with a **supporting rationale that clinical staff verify** — with >80% alignment between PRIME and reviewing clinicians.

HOW PRIME BUILDS THE MATCHING LOGIC

- Reviews the protocol, identifies each eligibility criterion and its associated clinical guideline, and **designs the matching algorithm**.
- Aligns guideline definitions against the criteria so clinical requirements stay current (**via the Areti Clinical Intelligence Library, ACIL**).
- Interprets discrete and unstructured chart data to **infer implied severity and diagnoses**, with nurse review validating interpretation and handling special cases.

INFERRING ECOG PERFORMANCE STATUS

CRITERION TYPE	WHAT THE NOTE ACTUALLY SAYS	PRIME INFERENCE
ECOG / Karnofsky performance status	<i>"Patient spends most of the day in bed or a recliner. Able to use the bathroom and occasionally prepare meals but unable to do household chores."</i>	Consistent with ECOG 3 : capable of limited self-care, confined to bed/chair >50% of waking hours. Flagged for clinician confirmation.

Additional oncology criteria PRIME infers from narrative and report text: disease staging and grading (e.g., TNM), pathology typing, and disease progression — alongside biomarker and prior-line-of-therapy context.

THE SAME ENGINE ACROSS THERAPEUTIC AREAS

THERAPEUTIC AREA	EXAMPLE UNSTRUCTURED NOTE	INFERRED CONSTRUCT
Oncology	"Target left lower lobe pulmonary nodule has increased from 1.8 cm to 2.2 cm."	Possible RECIST Progressive Disease (PD)
Cardiovascular	"SOB while walking but denies problems while sitting."	NYHA class (possible Class III)
Hepatology	"Elastography results: 7.9 dB / 218 CAP."	Fibrosis F2 / Steatosis severity S0
Neurology	"Patient reports migraines 2–3 times a week."	Migraine frequency

● ONCOLOGY TAKEAWAY

The inference engine that reads "mostly in bed" and returns **ECOG 3** is the same engine that surfaces TNM stage, pathology subtype, and biomarker status across the chart — with a clinician-verifiable rationale on every call.

● NEXT STEP

We'd welcome a working session to run PRIME against **two or three live oncology protocols** on your team's radar — the fastest way to show how biomarker surfacing, performance-status inference, and real-time progression tracking combine on a real indication.

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● ABOUT ARETI

An AI Coordinator for clinical trials.

Areti Health provides an AI-powered platform that automates and streamlines patient engagement workflows in clinical research. Our AI Coordinator mines electronic medical records, conducts mass outreach, engages and pre-qualifies patients, and schedules follow-up visits autonomously — compressing multi-month enrollment phases into weeks. **200+ studies supported.**