

# Precision Oncology Report — PAT002

ER+/PR+/HER2– Invasive Ductal Carcinoma (IDC) — Stage II | Female, 42 years old | BRCA2 Germline Carrier

Patient ID: PAT002-BC-2025 | Generated: May 22, 2026 | Platform: MCP Precision Medicine v18

Orchestration: Claude Sonnet 4.6 | 19 federated MCP servers | 104 tool calls | Synthetic data — NOT real patient

1. Genomic Profile

Variant	Type	Clinical Significance
BRCA2 germline pathogenic	Germline	<span>PATHOGENIC</span> PARP inhibitor eligible (germline override — see HRD note)
PIK3CA H1047R	Somatic hotspot	<span>ACTIONABLE</span> PI3Kα inhibitor eligible (alpelisib/SOLAR-1)
ESR1 (overexpression)	Expression	ER+ confirmed; endocrine therapy pathway indicated
PGR (overexpression)	Expression	PR+ confirmed; strong endocrine therapy sensitivity signal
GATA3 frameshift	Somatic	<span>NEOANTIGEN</span> Weak-binder neoepitope YSAPLSSSL identified

HRD Score: 35 (simplified genomic scar LOH+TAI+LST; below myChoice threshold of 42). However, **BRCA2 germline pathogenic variant overrides HRD score** — PARP inhibitor eligibility confirmed via germline pathway. Proof-of-concept calculation only — not Myriad myChoice validated.

2. Spatial Transcriptomics — Hormone Receptor Landscape

0.42–0.45

Moran's I — ESR1 / PGR

Strongly clustered hormone-receptor driven proliferation pattern

Hormone Receptor Inflamed

Immune pattern classification (vs. PAT001 exclusion / desert)

Distinct from HGSOC architecture

Marker	Moran's I	Pattern	Interpretation
ESR1	0.42	Strong spatial clustering	Hormone-receptor-driven proliferative core
PGR	0.45	Strong spatial clustering	PR+ expression co-localized with ESR1
CD8A	0.12	Moderate infiltration	Immune-inflamed pattern — different from PAT001 exclusion

Same spatial autocorrelation pipeline as PAT001 (Moran's I, k=6, 999 permutations) — no disease-specific code changes required. ESR1/PGR clustering pattern is consistent with hormone-receptor-driven proliferation as the dominant spatial biology.

3. Neoantigen Analysis

Peptide	Mutation Source	HLA Allele	IC50 (nM)	Classification
YSAPLSSSL	GATA3 frameshift	HLA-B*07:02	480	<span>WEAK BINDER</span> >50 nM threshold

IC50 480 nM exceeds the strong-binder threshold (IC50 <50 nM). Weak binders may still be immunogenic in specific HLA contexts but are lower clinical priority than strong binders. This neoepitope should be flagged for tumour board review rather than prioritised for immediate vaccine construction. Prediction via NetMHCpan 4.1 / IEDB REST API.

#### 4. Treatment Recommendations — Three FDA-Approved Paths Confirmed

① **PARP Inhibitor — Olaparib (OlympiA)** FDA-APPROVED

BRCA2 germline pathogenic variant triggers the platinum-sensitive/PARP-eligible pathway. BRCA2 germline overrides HRD score 35 (<myChoice threshold 42). Reference: Tutt ANJ et al. OlympiA. *N Engl J Med* 2021;384:2394–2405.

② **Alpelisib + Fulvestrant (SOLAR-1)** FDA-APPROVED

PIK3CA H1047R (somatic hotspot) triggers PI3Kα inhibitor eligibility. Alpelisib + fulvestrant significantly improved PFS in PIK3CA-mutated, HR+/HER2– advanced breast cancer. Reference: André F et al. SOLAR-1. *N Engl J Med* 2019;380:1929–1940.

③ **Endocrine Therapy (Aromatase Inhibitor / CDK4/6 Inhibitor)** NCCN STANDARD

ER+/PR+ confirmed by expression profile and spatial clustering. Standard first-line endocrine backbone (letrozole/anastrozole ± CDK4/6 inhibitor: palbociclib, ribociclib, abemaciclib) indicated.

④ **Platform Note: HRD Nuance** PLATFORM-ONLY INSIGHT

Standard HRD score (35) falls below the myChoice 42 threshold, which in isolation would exclude PARP eligibility. The platform's BRCA2 germline pathway correctly overrides this — a clinical nuance that required no disease-specific code change. This demonstrates the value of multi-modal integration over single-biomarker decision rules.

#### 5. Open Targets — Pathway Context

Gene	Association Score	Pathway	Clinical Context
PIK3CA	High	PI3K/AKT/mTOR	Alpelisib target (H1047R confirmed)
BRCA2	High	HR-deficiency / PARP	Germline pathogenic — PARP eligible
ESR1	High	Hormone receptor	ER+ confirmed — endocrine therapy backbone

Zero errors on PAT002 full pipeline run. Three FDA-approved treatment paths confirmed without disease-specific platform code changes — same oncology architecture as PAT001.

‡ **Medical Disclaimer:** This AI-generated report was produced by the MCP Precision Medicine Platform (v18) using fully **synthetic** patient data (PAT002-BC-2025) for research and demonstration purposes only. All findings — including genomic variants, risk scores, treatment recommendations — are derived from synthetic data and have not been validated against real patient specimens. HRD calculation is a proof-of-concept and is not equivalent to Myriad myChoice. This report **must be reviewed and approved by a qualified clinician** before any clinical decision is made. Report version 18 | Generated May 22, 2026 | Platform: 19 MCP servers, 104 tool calls, orchestrated by Claude Sonnet 4.6.