Streamlining Solid Tumor Precision Medicine Pathology Workflows: Insights From a Multisite Quality Improvement Initiative

Samuel K. Caughron, MD, FCAP[1]; Amany R. Keruakous, MD, MS[2]; Wendi Waugh, RT(R)(T), CMD, ODS, BS[3]; Krista Marcello, CHCP[4]; Kristen M. Rosenthal, PhD[4]; Ying-Chun Lo, MD, PhD[5]; Laura J. Tafe, MD[6]; Robyn Temple-Smolkin, PhD, MBA[7]; Eriko Clements, PhD[7]; Joseph Kim, MD, MPH, MBA, FACHE[8]
1. AdventHealth Shawnee Mission, Merriam, KS. 2. Georgia Cancer Center, Medical College of Georgia at Augusta University, Augusta, GA. 3. Southern Ohio Medical Center, Portsmouth, OH. 4. Decera Clinical Education, Reston, VA. 5. Mayo Clinic, Rochester, MN. 6. Dartmouth-Hitchcock Medical Center and Geisel School of Medicine at Dartmouth, Lebanon, NH. 7. Association for Molecular Pathology, Rockville, MD. 8. Q Synthesis, LLC, Newtown, PA.

Introduction

Comprehensive molecular profiling is central to managing advanced solid tumors, yet the path from diagnostic tissue to an actionable report is often fragmented, and pathology sits at the center of many of those critical steps. Four recurring failure points delay or truncate biomarker results:

01
Send-outs split across multiple reference labs
Variable assays, report formats and turnaround

02
Manual order entry disconnected from the EHR
Paper requisitions, rekeying, lost orders

03
Inconsistent reflex protocols
Testing waits for an HCP request after diagnosis

04
Unstructured tissue vs ctDNA decisions
QNS specimens lead to incomplete profiles or rebiopsy

OBJECTIVE
To evaluate whether pathology-centered workflow redesign, supported by a multisite QI and educational initiative, could improve the timeliness and completeness of molecular testing and facilitate appropriate targeted therapy.

Methods

3 US cancer centers (1 academic, 2 community) participated in a multisite QI initiative combining education, QI coaching, and site-specific workflow interventions.

QI arm

NSCLC and colorectal cancer (CRC) served as index tumors.

STEP 1	STEP 2	STEP 3	STEP 4
Baseline chart review	Process mapping and root-cause analysis	Site-specific PDSA cycles	Postintervention chart review

QI outcome measures (pre vs post)

Measure	Definition
On-time ordering	Biomarker testing ordered ≤4 weeks from diagnosis (%)
Turnaround (TAT)	Median days, diagnosis → complete biomarker results
Time to therapy	Median days, result availability → targeted therapy start
Targeted therapy use	Patients with an actionable alteration receiving FDA-approved targeted therapy (%)

Accredited education arm

Accredited curriculum for oncologists, pathologists, nurses, pharmacists and other team members was integrated into the QI initiative for participating site teams and was also made available online to interested healthcare professionals.

The curriculum included: 1 live webinar, 2 video modules and 4 interactive case challenges (NSCLC, CRC, medullary thyroid cancer).

Education outcome measures (pre vs post)

Knowledge and competence (Moore levels 3–4) assessed with pre/post questions.

Analysis: pooled pre/post responses, chi-square test; effect size as Cohen's *h* (0.5 medium, ≥0.8 large).

Acknowledgments. Supported by a healthcare improvement grant from Lilly. Provided by Clinical Care Options, LLC, dba Decera Clinical Education, in partnership with Q Synthesis and the Association for Molecular Pathology. We thank the pathology, laboratory, oncology and navigation teams at the participating sites.

Contact: Joseph Kim, MD, MPH, MBA, FACHE jkim@qsynthesis.com

Restructuring the Testing Workflow

Across sites, interventions shifted key biomarker-testing decisions earlier in the diagnostic workflow and clarified ordering and follow-up responsibilities.

Baseline Workflow Challenges	Implemented Workflow Changes
Diagnosis signed out; testing waits for an oncologist request or tumor board	**Pathology-driven reflex testing at diagnosis** for advanced NSCLC and CRC
Paper or free-text requisitions outside the EHR	**EHR-integrated computerized order entry**, interfaced with the reference laboratory
Send-outs to multiple labs with different panels and report formats	**Reference lab consolidation:** standardized NGS assays and reporting
Tissue-only testing; ctDNA ordered ad hoc; QNS → incomplete profile	**Standardized complementary tissue + ctDNA**; PD-L1 prioritized when tissue is limited
No single owner tracks specimen → order → result	**Nurse navigators** track specimens, orders and results; weekly registry case-finding list

Testing modalities incorporated into site workflows

IHC
PD-L1, MMR, HER2; c-MET added to lung panel

DNA NGS
Mutations including *KRAS, NRAS, BRAF, EGFR;* MSI-H, TMB-H

RNA NGS
Improves detection of gene fusions (eg, *NTRK, RET, ALK, ROS1*)

Site baselines, aims and pathology-facing changes

Site 1 — ACADEMIC · NSCLC
Baseline: 30% of advanced NSCLC (n = 20) had tissue NGS results ≤1 month from diagnosis; 40% had tissue + ctDNA
Aim: >85% comprehensive testing ≤1 month
Changes: NSCLC testing algorithm; electronic biomarker order; EHR interfaces built with reference labs

Site 2 — COMMUNITY · CRC
Baseline: 42% of advanced CRC (n = 12) had complete biomarker testing
Aim: >80% multigene NGS in CRC
Changes: pathology-driven CRC testing; pathology checklist; tumor-registry case-finding list reviewed weekly by navigators

Site 3 — COMMUNITY · NSCLC
Baseline: 12% of advanced NSCLC (n = 17) had complementary tissue + ctDNA
Aim: >80%
Changes: tissue + ctDNA as standard; HER2 and c-MET IHC added; PD-L1 prioritized when QNS; biopsy-adequacy outreach to proceduralists

Abbreviations. CRC, colorectal cancer; ctDNA, circulating tumor DNA; EHR, electronic health record; IHC, immunohistochemistry; MMR, mismatch repair; NGS, next-generation sequencing; NSCLC, non-small cell lung cancer; PDSA, Plan-Do-Study-Act; QI, quality improvement; QNS, quantity not sufficient; TAT, turnaround time.

Disclosures. Author conflict-of-interest disclosures are available in the AMP 2026 mobile app.
Contact. Krista Marcello, CHCP, Decera Clinical Education • kmarcello@deceraclinical.com
Presented at AMP 2026 Annual Meeting & Expo, Seattle, WA • Abstract 2466173

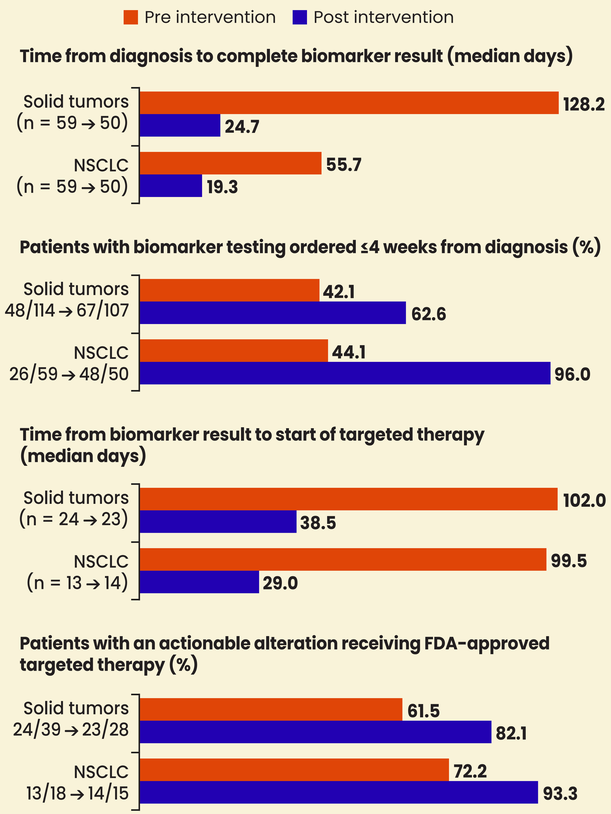
Results

Workflow and Care Delivery Outcomes

81% reduction
Median diagnosis-to-result TAT, solid tumors (103.5 day decrease)

96%
Of NSCLC biomarker orders placed ≤4 weeks from diagnosis (increased from 44%)

93%
Of NSCLC patients with an actionable alteration received targeted therapy (increased from 72%)

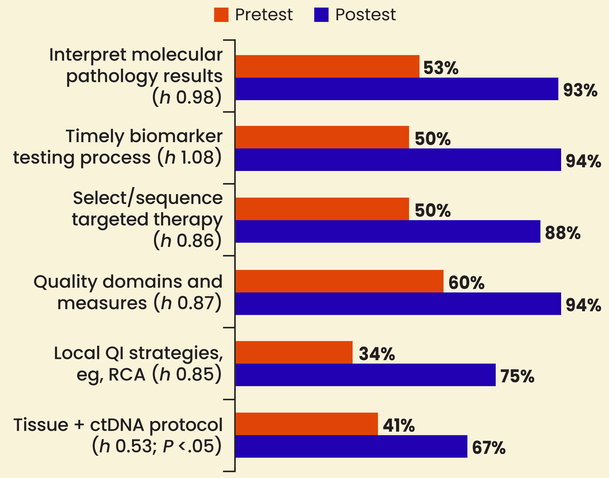


Lessons from the bench and the floor

- Tissue stewardship began before accessioning: outreach to physicians performing needle biopsies reinforced adequate sampling.
- Complementary ctDNA was more readily ordered in the outpatient setting; inpatient ordering was delayed by hospital billing and reimbursement policies.
- Teams reported that electronic ordering simplified order placement and reduced testing delays.
- Sustainment strategies included navigator ownership, automated EHR reporting, governance review, and an implementation toolkit.

Educational Outcomes

Correct responses by learning objective, enduring target learners (7431 learners; 825 completers). All $P < .001$ unless noted; h = Cohen's h.



Examples of baseline molecular pathology gaps

52%
Correctly chose IHC + DNA NGS, and RNA NGS for histology-agnostic biomarkers (n = 419), rising to **96% after CME activity (n = 293)**

41%
preferred a common mutation-only panel over complementing tissue with ctDNA (n = 78), rising to **68% after CME activity (n = 72)**

48%
ordered DNA NGS + MMR IHC at diagnosis of metastatic CRC (n = 420), rising to **94% after CME activity (n = 334)**

48%
chose a RET inhibitor for a somatic NGS–detected *RET* M918T mutation in MTC after negative germline testing (n = 328), rising to **88% after CME activity (n = 275)**

Question-level results, all enduring learners.

Conclusions

1. Pathology-anchored workflow redesign cut median diagnosis-to-result time by 81% across solid tumors and 65% in NSCLC.
2. Faster, more complete testing was accompanied by earlier and more frequent use of targeted therapy.
3. Key implementation strategies included pathology-driven reflex testing, EHR-integrated ordering, reference-lab consolidation, standardized tissue/ctDNA workflows, and navigator tracking.
4. Locally adapted redesign may strengthen the infrastructure underpinning precision oncology across academic and community settings.

Find this program on our website

DECERA CLINICAL Education