

Submission Topic: Personalizing treatment in precision oncology

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Objective of your solution:

(Briefly define the primary outcome of your solution to this challenge):

Primary Outcome of Precision Oncology Solutions:

1. Optimized Treatment Efficacy: Improved survival and response rates by matching therapies to tumor-specific genetic alterations (e.g., EGFR inhibitors for EGFR-mutant lung cancer).
2. Minimized Harm: Reduced unnecessary treatments/toxicity by avoiding therapies unlikely to benefit the patient (e.g., omitting chemotherapy in low-risk MSI-H colorectal cancer).
3. Streamlined Patient Care: Faster, coordinated decision-making via molecular tumor boards and integrated EHR workflows, reducing delays in therapy initiation.
4. Equitable Access: Broader availability of genomic testing and targeted therapies across diverse populations through cost-reduction strategies and training programs.

Describe your solution / proposal:

Provide a detailed account of your solution/ proposal to this challenge. You could type your solution/ proposal here. (Disclaimer: Solution/proposal should not exceed more than 300 words.):

Areas for Precision Oncology Application

1. Targeted Therapies: Match mutations (e.g., *EGFR*, *ALK*) with tyrosine kinase inhibitors in lung cancer.
2. Immunotherapy: PD-L1/MSI-H testing to guide checkpoint inhibitor use (e.g., pembrolizumab).
3. Hereditary Cancer Syndromes: *BRCA* testing for *PARP* inhibitors in ovarian/breast cancer.
4. Liquid Biopsies: Detect resistance mutations (e.g., *EGFR* T790M) to adjust therapy.
5. Minimal Residual Disease (MRD) Monitoring: ctDNA analysis post-surgery to guide adjuvant therapy.

Barriers to Uptake

1. Cost: High expenses of genomic testing/targeted drugs, particularly in low-resource settings.
2. Access: Limited availability of NGS (next-generation sequencing) platforms or bioinformatics expertise.
3. Knowledge Gaps: Clinician unfamiliarity with interpreting genomic data.
4. Regulatory Delays: Slow approval of novel biomarkers/tests.
5. Data Fragmentation: Fragmented genomic/clinical data across institutions.
6. Ethical Concerns: Patient anxiety about incidental findings/genetic discrimination.

Practical Solutions

1. Cost Reduction:
 - a) Subsidize testing via public-private partnerships.
 - b) Advocate for insurance coverage of NGS panels.
2. Capacity Building:
 - a) Train oncologists/pathologists via certifications (e.g. Molecular Oncology Course).
3. Standardization:
 - a) Adopt guidelines (e.g. ESMO Scale for Clinical Actionability of Molecular Targets).
 - b) Create shared genomic databases (e.g., AACR Project GENIE).
4. Patient Engagement:

- a) Use genetic counsellors to address ethical concerns.
- b) Develop multilingual apps for consent/education.

Molecular Tumor Board (MTB) & Care Coordination

Workflow:

1. Preparation:

- a) Circulate patient data (genomic, imaging, pathology) 72h pre-meeting.

2. Meeting Structure:

- a) Attendees: Medical oncologist, pathologist, geneticist, bioinformatician, ethicist.
- b) Case review (10 mins): Present actionable targets, clinical trials, and caveats.

3. Decision Documentation:

- a) Record recommendations in EHR with priority tiers (e.g., Tier 1: FDA-approved).
- b) Assign follow-up tasks (e.g., pharmacist to source off-label drugs).

Care Coordination:

1. Patient Navigation:

- a) Nurse navigators explain MTB outcomes and coordinate next steps (e.g., trial enrolment).

2. Tech Integration:

- a) EHR alerts for biomarker-driven trial eligibility.

3. Quality Assurance:

- a) Audit MTB decisions against outcomes (e.g., response rates).
- b) Feedback loops to refine protocols (e.g., rejecting low evidence targets).