

Title:

Tailoring therapy to the unique way in which Indians experience cancer and respond to anti-cancer drugs

Full Name:

Beulah Elizabeth Koshy

Name of the Institution:

Kidwai Memorial Institute of Oncology, Bengaluru

State:

Karnataka

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

Improving treatment outcomes in a varied community requires adjusting therapy to the particular experiences of Indian cancer patients and how they react to anti-cancer medications. Personalized methods can improve the effectiveness and safety of cancer treatments because of the substantial genetic, environmental, socioeconomic, and lifestyle variations.

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.):

A)

1. Content of the Disease Class and Stage of Cancer: Tumor occurrence, early as opposed to progressed cancer.
2. Biomarkers in the Individual: Ovarian (*BRCA*), lung (*EGFR*), kidney (*PD-L1*), and breast (*HER2*).
3. Resistance and Recurrence: Depending on the treatment (and prior treatment) tolerance and the chances of it to truly work.
4. The Patients and Their Factors Use of Health and Quality of Life and Age: ECOG/Karnofsky scores, frailty index.
5. Comorbidities are mainly heart/renal failure, diabetes, and high blood pressure.
6. The Income and Cultural Situations have to do with the fellow family members who support the need for, the available support to carry the cost of care and various factors that help the patients to have access to care.
7. Healthcare Structuring and The Environment How accessible the advanced therapies are to be is a point of contrast between urban and rural areas (immunotherapy, targeted therapy).
8. Hospital Type: In support of the idea: Private hospitals (more expensive but more advanced treatments) in contrast to government hospitals (less expensive yet with less resources).
9. Supportive care helps the patient get better, including stroke rehabilitation and palliative care.

Sections Relating to Money and Insurance

1. The prices for new treatments like immunotherapy are going up and they are expensive (immunotherapy, tailored medications).
2. States Departments of Health and The National Health Services are the main support tools for the government and the N.G.Os that have seen to collaborate in a successful project in health care (state health programs, Ayushman Bharat).
3. It is up to insured patients to bear the costs of a health plan that will vary according to the disease and the coverage level. The Impact and The Choices of the Patient Summary of Toxic Effects and Side Effects: Risk against Benefit.

The Conflict of Interest:

1. The management techniques are not dissimilar to those treatments by either the medical center or the patient. A patients and their families' thoughts on what treatment was to be chosen could have been influenced by psychological, social, or religious reasonings.

B)

Biology and Genetics Differences The rate of drug metabolism differs across ethnicity (for example, the Asians are more likely to be overdosed with the drug gefitinib). Different types of cancer in different regions. Genetic information that can affect how the patient responds to immunotherapy (especially those of PD-L1, HLA diversity). **Healthcare Access and Socioeconomic Status** Poorer countries endure difficulties in accessing state-of-the-art medical procedures owing to constraints in their budgets. The absence of professionals and the delay in diagnoses have become common in rural areas. Early diagnosis and treatment adherence depend on the patient's healthcare literacy. **Environmental and Lifestyle Factors** Pollution, infections (such as HPV and H. pylori), and diet also play a significant role in determining the risk of cancer as well as the effectiveness of cancer treatment. The chances of cancer become higher when there is contact with some metals and chemicals in the work environment of an industrial area. **Cultural as well as Psychological Factors** The role of the family in treatment, as well as the traditional medicine treatment preferences, have great influence over the therapeutic choices. Dissimilarly, populations vary in the degree to which they accept aggressive and palliative care as treatment options.

C)

1. Unequal access: Limited facilities that are of the upgraded levels inclusive of specialists for treating cancer are located in remote areas.
2. Exorbitant Fees for Treatment: A considerable proportion of the population still cannot afford the extremely high costs of precision and immune therapies and also get poor healthcare services due to a stringent insurance policy.
3. Cancer Genetic Features and Population Diversity: The anomalous cancer epidemiology of India might not be very well helped by the recommendations that are based on the cancer incidence and survival rates in the populations of the western world.
4. Underdiagnosis: Stigmatized by cultural authority, lack of screening, and financial insufficiency provocative treatment initiation is put off.
5. Regulatory & Supply Problems: The execution of guidelines is hindered by drug approval delays as well as the irregular availability of important medicines in the market.

D)

1. To lower financial costs for treatment, the use of biosimilars instead of biologics with excessive price is a good option. Apply dose modulation (like metronomic chemotherapy, for instance) for cost savings without being inefficient.
2. Localized Treatment Guidelines- Create in India with emphasis on ethnic background, lifestyle choices, and the high incidence of infection-related cancer (HPV, H. pylori) in the population.
3. Adopt personalized medicine approaches. Utilize oral protocols, which are less complex and therefore can be more conveniently and comfortably used in resource-limited settings. Increased Access & Insurance.
4. In order to afford new treatments, government programs like Ayushman Bharat should be made efficient. In addition to drugs, joint activities by drug companies and public health facilities will receive funding that unconditionally supports clinical trials of diagnostics for cancer.
5. Mobile Health & Telemedicine (mHealth)- Evolve a sustainable system of tele-oncology through the use of mobile health networks for real-time consultations of patients with cancer located in rural areas.
6. Train generalist doctors to become skilful in recognizing small signs of common cancers. Introduce low-cost, new verification techniques such as AI-assisted digital pathology, and VIA, cervical cancer testing, etc.

References:

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Full Name:

Anand Praveen Kumar A

Name of the Institution:

Stanley Medical College

State:

Tamil Nadu

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

Primary Outcomes

1. Improved Treatment Efficacy: Enhanced effectiveness of anti-cancer therapies tailored to the unique needs of Indian patients.
2. Enhanced Patient Safety: Reduced risk of adverse events and improved management of treatment-related toxicities.
3. Increased Patient Satisfaction: Improved patient satisfaction with personalized cancer treatment approaches.
4. Better Health Outcomes: Improved overall survival, progression-free survival, and quality of life for Indian patients with cancer.
5. Reduced Healthcare Costs: Decreased healthcare costs due to reduced hospitalizations, complications, and unnecessary treatments.

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.):

Factors Considered by Clinicians for Anti-Cancer Therapy in India

1. Genetic factors: Genetic mutations, polymorphisms, and variations that affect drug metabolism and response.
2. Environmental factors: Exposure to environmental toxins, pollution, and lifestyle factors that impact cancer risk and treatment response.
3. Socio-economic factors: Patient's income, education, occupation, and access to healthcare services.
4. Lifestyle factors: Diet, physical activity, tobacco and alcohol use, and other habits that influence cancer risk and treatment outcomes.
5. Co-morbidities: Presence of other health conditions, such as diabetes, hypertension, or kidney disease, that may impact cancer treatment.
6. Cancer type and stage: Type of cancer, stage of disease, and tumor characteristics that influence treatment choices.
7. Patient's preferences and values: Patient's personal values, preferences, and priorities that impact treatment decisions.

Population-Level Differences to Consider for Anti-Cancer Therapy in India

1. Genetic diversity: India's diverse population has distinct genetic profiles that affect drug response and efficacy.
2. Dietary habits: Traditional Indian diets, which are high in spices, vegetables, and fruits, may interact with anti-cancer medications.

3. Environmental exposures: India's high levels of air pollution, pesticide use, and industrial waste may impact cancer risk and treatment response.
4. Socio-economic disparities: India's significant socio-economic disparities affect access to healthcare services, cancer screening, and treatment.
5. Cultural and linguistic diversity: India's diverse cultures and languages may impact patient communication, adherence to treatment, and health outcomes.

Challenges in Implementing Global Guidelines for Anti-Cancer Therapy in India

1. Limited resources: Insufficient funding, infrastructure, and healthcare personnel hinder the implementation of global guidelines.
2. Diverse population: India's diverse population requires tailored approaches to cancer treatment, which may not be addressed by global guidelines.
3. Regulatory frameworks: India's regulatory frameworks may not align with global guidelines, requiring adaptations and modifications.
4. Access to medications: Limited access to anti-cancer medications, high costs, and lack of insurance coverage hinder treatment adherence.
5. Cultural and linguistic barriers: Language and cultural barriers may impact patient understanding, adherence, and health outcomes.

Ideas for Tailoring Anti-Cancer Therapy in India

1. Pharmacogenomics: Using genetic testing to identify genetic variations that affect drug response and tailor treatment accordingly.
2. Biomarker-driven therapy: Using biomarkers to identify specific cancer subtypes and tailor treatment to the individual's tumor characteristics.
3. Personalized medicine approaches: Using advanced technologies, such as next-generation sequencing, to identify specific genetic mutations and tailor treatment accordingly.
4. Adaptive clinical trials: Conducting adaptive clinical trials that allow for real-time adjustments to treatment based on patient response and outcomes.
5. Integrative medicine approaches: Incorporating traditional Indian medicine approaches, such as Ayurveda and yoga, into conventional cancer treatment to improve patient outcomes and quality of life.

Full Name:

Kartik Gajanan Asutkar

Name of the Institution:

Kidwai Memorial Institute of Oncology, Bengaluru

State:

Karnataka

Objective of your solution:

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

Primary Outcomes of Tailored Cancer Therapy Solutions in India:

1. Improved Treatment Efficacy & Safety: Personalized regimens aligned with Indian genetic profiles (e.g., *EGFR/TP53* mutations) and comorbidities (e.g., diabetes) to enhance response rates and reduce toxicity.
2. Equitable Access: Reduced urban-rural disparities via telemedicine hubs, mobile diagnostic units, and nurse-led chemotherapy administration in underserved areas.
3. Cost-Effective Precision Care: Biomarker-guided use of generics/biosimilars (e.g., trastuzumab) and India-adapted dosing (e.g., carboplatin-based protocols).
4. Cultural Integration: Evidence-based incorporation of traditional practices (e.g., Ayurveda) to improve adherence and symptom management.

5. Scalable Solutions: National guidelines informed by local real-world data (e.g., NCRP registries) and affordable diagnostics (e.g., liquid biopsies).
5. Proactive Monitoring: Early detection of adverse effects via automated alerts (e.g., cardiac biomarkers for HER2+ therapies).
6. Data-Driven Adaptation: Continuous refinement of regimens using real-world evidence (e.g., registries tracking late toxicities).

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.):

Factors Clinicians Consider in India

1. Socio-Economic Status: Affordability of targeted therapies, travel costs for treatment, and insurance.
2. Genetic Variability: Higher prevalence of *EGFR* mutations in lung cancer, *BRCA1/2* in breast cancer.
3. Environmental Exposures: Tobacco use (smoked/smokeless), air pollution, and occupational hazards (e.g., pesticide exposure).
4. Comorbidities: High rates of diabetes, malnutrition impacting treatment tolerance.
5. Cultural Beliefs: Preference for alternative medicine (e.g., Ayurveda) or stigma around chemotherapy.
6. Healthcare Access: Rural-urban disparities in diagnostics (e.g., MRI availability) and specialist access.

Population-Level Differences to Consider

1. Genetic Diversity: Unique mutation profiles (e.g., higher *ALK*-negative lung cancer vs. Western populations).
2. Infection-Associated Cancers: HPV-linked cervical/oropharyngeal cancers, HBV/HCV-driven liver cancer.
3. Diet/Nutrition: Vegetarian diets affecting drug metabolism (e.g., folate levels with methotrexate).
4. Body Composition: Lower BMI impacting chemotherapy dosing and toxicity risks.
5. Late-Stage Presentation: Advanced diagnoses requiring palliative-focused protocols.

Challenges in Implementing Global Guidelines

1. Cost Barriers: Targeted therapies (e.g., osimertinib) and immunotherapy (e.g., pembrolizumab) are often unaffordable.
2. Lack of Local Data: Guidelines may not reflect Indian pharmacokinetics or outcomes.
3. Infrastructure Gaps: Limited molecular testing (e.g., NGS) and radiotherapy machines in rural areas.
4. Regulatory Hurdles: Delays in approving biosimilars (e.g., trastuzumab biosimilars).
5. Low Awareness: Patients/clinicians unfamiliar with precision oncology benefits.

Ideas for Tailoring Therapy in India

1. Develop India-Specific Guidelines:
 - a) Use real-world data from Indian registries (e.g., NCRP) to adapt dosing, schedules, and drug choices.
 2. Promote Pharmacogenomics:
 - a) Research on Indian-specific variants (e.g., CYP2D6 polymorphisms affecting tamoxifen efficacy).
 3. Affordable Diagnostics:
 - a) Subsidized liquid biopsies for EGFR testing in lung cancer.
 - b) Mobile labs for rural HPV screening.
 4. Hybrid Care Models:
 - a) Telemedicine hubs linking rural clinics to urban oncologists for follow-ups.
 - b) Task-shifting chemotherapy administration to trained nurses.
 5. Integrate Traditional Medicine:
 - a) Study interactions between Ayurvedic herbs and chemo.
 6. Policy Advocacy:
 - a) Price caps on essential anti-cancer drugs.
 - b) Fast-track approvals for biosimilars.
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Full Name:

Soumya BM

Name of the Institution:

Manipal Hospital, Bengaluru

State:

Karnataka

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

Personalizing care for Indian cancer patients means combining scientific precision with empathy and awareness of real-world challenges—ensuring therapies are not just effective, but also accessible and acceptable.

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.):

Tailoring cancer therapy to Indian patients is crucial because of the country's vast diversity in genetics, environment, lifestyle, and access to care. When suggesting anti-cancer treatment, Indian clinicians must consider more than just the type and stage of cancer. They look at the patient's overall health, financial capacity, where they live (urban or rural), access to hospitals or specialists, and their personal preferences. Cultural beliefs, nutrition levels, and family support also play a big role. At the population level, differences in genetics (like higher rates of *EGFR* mutations in Indian lung cancer patients), common infections (such as HPV or hepatitis), and environmental exposures (like tobacco and pollution) influence how cancer develops and responds to treatment. Also, many Indians may process drugs differently due to genetic variations, which can affect both side effects and effectiveness. One of the biggest challenges is that global treatment guidelines often don't fit the Indian context. Many therapies recommended internationally are too expensive or unavailable in smaller hospitals. Diagnostic tools like genetic testing are still out of reach for many, and overloaded public hospitals often lack the time or resources for personalized care. To overcome this, India needs its own treatment guidelines based on local data. Making molecular tests more affordable, training more cancer specialists, and investing in pharmacogenomic research can help. Simple tools like mobile apps and community health workers can support patients throughout treatment. Ultimately, the goal is to make cancer care in India not just advanced—but also accessible and patient-centered.

Full Name:

Vishwanath M

Name of the Institution:

Madras Medical College

State:

Tamil Nadu

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

1. To move beyond the margins of imported oncology and script a treatment philosophy rooted in India's realities.
2. To treat not just the tumor, but the terrain, the genes, the diet, the soil, the soul of a nation. This is not localization, it is liberation: of science from uniformity, and of healing from one-size-fits-all.

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.):

The “Bharat Oncology Framework”

I. Clinician Considerations in Indian Settings: Patient’s financial capacity and insurance status. Availability of drugs in public vs. private setups. Cultural beliefs, family dynamics, faith in traditional medicine. Nutritional status, comorbidities, distance from cancer centers.

II. Population-Level Differences in India: Higher prevalence of tobacco-related cancers. Younger median age of presentation. Genetic polymorphisms affecting drug metabolism (e.g., TPMT, NAT2 variants). Distinct microbiome and dietary patterns. Higher burden of infections (TB, Hep B/C) altering immunotherapy safety

III. Challenges with Global Guidelines: Cost-prohibitive drugs and diagnostics. Limited access to high-end imaging, molecular profiling. Guidelines based on Western clinical trials, not reflective of Indian demographics. Infrastructure gaps in tier 2–3 cities.

IV. Tailoring Therapy in India

1. Create Indian Clinical Algorithms Tiered recommendations: Ideal, Practical, Minimal-resource settings.

2. Build a Genomic-Pharmacovigilance Registry Capture Indian-specific drug responses and adverse events.

3. Hybrid Protocols Combine the best global practices with cost-effective local innovations (e.g., weekly chemo dosing, repurposed generics).

4. Patient Literacy Tools Regional language decision aids to empower shared decision-making.

To Indianize oncology is not to dilute it. It is to deepen it—until it speaks our biology, our burden, and our belief in better.

Full Name:

Prabhu Pandian

Name of the Institution:

Madurai Medical College

State:

Tamil Nadu

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

Improved efficacy and safety of anti-cancer therapies in India through personalized treatment approaches.

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.):

Indian clinicians tailor cancer therapy considering factors like patient age, comorbidities (diabetes, tuberculosis), performance status, access to healthcare (rural vs. urban), financial constraints, and treatment literacy.

Key Factors in Indian Anti-Cancer Therapy Decisions

1. Genetic Diversity: High prevalence of EGFR mutations in lung cancer (vs. global rates), TP53 variants in oral cancer.

2. Comorbidities: Diabetes, TB, or malnutrition altering drug metabolism (e.g., increased toxicity with chemo).

3. Socio-Economic Barriers: Affordability (generic vs. branded drugs), travel distance to centers.

4. Cultural Beliefs: Preference for Ayurveda/homeopathy alongside allopathy, stigma around opioids.

5. Genetic variations within diverse Indian populations influence drug metabolism and response; environmental exposures (diet, pollution) also impact disease presentation and treatment susceptibility.

Population-Level Differences to Consider

1. Pharmacogenomics: Higher DPYD deficiency risk 5-FU toxicity; CYP2D6 variants affecting tamoxifen efficacy.
2. Environmental Exposures: Tobacco (khaini, gutka) driving oral cancer's unique mutational signatures.
3. Diet-Drug Interactions: Turmeric (CYP3A4 inducer) may reduce kinase inhibitor efficacy.

Challenges in Adopting Global Guidelines

1. Trial Underrepresentation: <2% of global trial data comes from India.
2. Infrastructure Gaps: Limited NGS access, delayed biomarker testing.
3. Cost Constraints: Immunotherapy/ targeted drugs often unaffordable.

To tailor therapy, we propose a multi-pronged approach.

1. First, a national biobank initiative capturing genetic, environmental, and lifestyle data linked to treatment response and outcomes would inform personalized medicine approaches.
2. Second, developing user-friendly digital tools accessible through mobile phones would help improve patient education and adherence to treatment protocols, particularly in remote areas.
3. Third, implementing tele-oncology programs, utilizing videoconferencing and remote monitoring of vital signs, would increase access to specialists for patients in underserved regions.
4. Fourth, establishing standardized, cost-effective treatment protocols for common cancers tailored to the Indian context while adhering to global best practices and ensuring quality control would improve patient outcomes.
5. Fifth, creating a national cancer registry to accurately capture treatment outcomes would enable continuous monitoring and optimization of treatment strategies.
6. Finally, incentivizing pharmaceutical companies to conduct clinical trials in diverse Indian populations will ensure the development of more effective and safer therapies.

Full Name:

Ananya Ghosh

Name of the Institution:

Narayana Superspeciality Hospital

State:

West Bengal

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

Clinicians consider patient-specific, cancer-specific, socioeconomic, geographical, cultural, and environmental factors when recommending anti-cancer treatment. India faces challenges in implementing global cancer treatment guidelines due to resource limitations, cost issues, cultural relevance, and regulatory issues. Innovative strategies for customizing anti-cancer treatment in India include precision medicine, hub-and-spoke models, affordable innovations, telemedicine, and community engagement. These strategies aim to identify mutations, customize therapies, enhance accessibility, develop cost-effective options, and raise awareness about cancer prevention and early detection among communities.

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.):

Factors Considered by Clinicians When Recommending Anti-Cancer Treatment:

1. Patient-Specific Factors: These include age, gender, existing health conditions, overall health status, and genetic factors.

2. **Cancer-Specific Factors:** This encompasses the type, stage, grade, and molecular characteristics of the cancer.
3. **Socioeconomic Factors:** Considerations include the patient's ability to pay, access to healthcare services, and insurance coverage.
4. **Geographical Factors:** The presence of specialized oncology centres, particularly in rural versus urban areas, is also a consideration.
5. **Cultural and Lifestyle Factors:** Factors such as diet, tobacco use, and alcohol consumption patterns are evaluated.

Differences at the Population Level:

1. **Genetic Variations:** Variations in drug metabolism and tumor biology, including differences in EGFR mutations.
2. **Epidemiological Trends:** A higher incidence of tobacco-related and oral cancers in India.
3. **Socioeconomic Disparities:** Inequities in healthcare access and affordability.
4. **Environmental Factors:** Exposure to carcinogens and dietary influences.

India encounters specific challenges in implementing global cancer treatment guidelines:

1. **Resource Limitations:** Insufficient infrastructure and trained professionals in rural regions.
2. **Cost Issues:** The high expense of advanced treatments and diagnostic procedures.
3. **Cultural Relevance:** Guidelines may not consider local dietary habits and lifestyle factors.
4. **Regulatory Challenges:** Delays in the approval and availability of new medications.

Here are some innovative strategies for Customizing Anti-Cancer Treatment in India:

1. **Precision Medicine:** Utilize genetic testing to identify mutations and customize targeted therapies.
2. **Hub-and-Spoke Model:** Create regional cancer centers linked to smaller clinics to enhance accessibility.
3. **Affordable Innovations:** Develop cost-effective treatment options, such as nanotechnology-based drug delivery systems.
4. **Telemedicine:** Implement teleconsultations to connect urban and rural areas and provide expert advice.
5. **Community Engagement:** Raise awareness about cancer prevention and early detection among communities.

Full Name:

Baghath Singh L A

Name of the Institution:

Madras Medical College

State:

Tamil Nadu

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

To improve treatment outcomes with patient centred treatment models.

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.):

In the Indian context, cost effectiveness, cultural and social preference of patients, nutritional status, social support infrastructure of patients are very important to consider before initiating treatment. The cultural stigma associated with cancer is very high and to allay the fears and mental agony detailed evidence based, empathetic counseling is imperative. High Frailty in elderly poor social support, urban vs rural divide in resources and economy of patients are all to be considered. Most of the global studies have a meagre representation of our patients. The inclusion criteria and performance status, tolerability of drugs age wise can't be translated to Indian context directly, as proportion of malnutrition, social

infrastructure, general health in India are different here collaborations with multinational institutes and increased participations of our patients in international trials might give better insight by studying our population response to particular treatment. The social support of stage 4 and palliative care patients is very poor in Indian context. More palliative care centers with government and NGO aid is the need of hour in Indian context as cancer trends are raising in India.

Full Name:

Baghath Singh L A

Name of the Institution:

Madras Medical College

State:

Tamil Nadu

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

Factors considered before chemotherapy and Indian context with need for modifications in guidelines tailored for Indian patients.

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.):

Factors Considered Before Chemotherapy

1. We evaluate cancer type, stage, and biomarkers (e.g., *EGFR* in lung cancer) to select chemotherapy regimens.
2. Patient factors like age, performance status, and comorbidities (e.g., diabetes, prevalent in 10-15%) assess tolerance.
3. Socioeconomic constraints, with treatments costing ₹50,000-₹5,00,000 yearly and 50-60% out-of-pocket expenses, drive use of generics. Limited access, with 1,500 oncologists for 1.4 billion, affects rural care.
4. Cultural beliefs and patient preferences shape decisions.
5. Toxicities (e.g., nausea) are weighed against benefits, using supportive care to optimize outcomes, ensuring regimens are affordable and tailored to local challenges.

Population Differences for Global Guidelines

1. Indian patients differ from global norms, impacting guideline use. High *EGFR* mutations (30-40%) in lung cancer require targeted drugs, unlike Western cohorts.
2. Oral and cervical cancers, linked to tobacco and HPV, are common, unlike breast/prostate dominance elsewhere.
3. Younger patients (10-15 years earlier) need robust treatment.
4. Malnutrition (20-30%) and comorbidities like diabetes complicate toxicity.
5. Low insurance and high costs contrast with Western systems, while scarce specialists (1 per 900,000) and cultural stigma limit adherence.
6. Adapting guidelines to India's genetic, disease, and economic profile ensures relevance and affordability.

Steps to Overcome Challenges Adapting global guidelines requires:

1. India-specific protocols using local data (e.g., ICMR).
2. Training via CMEs equips oncologists for cost-effective care despite shortages.
3. Subsidies through Ayushman Bharat lower NGS (₹50,000) and drug costs.
4. Community workers raise awareness, reducing stigma.
5. Faster biosimilar approvals cut expenses.

These steps make guidelines practical, equitable, and effective for India's diverse cancer landscape. Screening programs help to identify early stage and in treatment and prevent development of further complications.

Full Name:

Gopishetty Raghu

Name of the Institution:

Kidwai Memorial Institute of Oncology, Bengaluru

State:

Karnataka

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

To develop and implement cost-effective, patient-centered cancer treatment strategies tailored to the Indian healthcare setting by optimizing chemotherapy dosing, utilizing affordable diagnostics and drugs, leveraging digital health tools, and integrating community-based care—thereby improving treatment tolerance, accessibility, and outcomes for Indian cancer patients.

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.):

Cancer treatment in India must consider unique patient factors and limited resources. Most chemotherapy protocols are based on Western data, which may not suit Indian patients who often have poorer nutritional status. At our institute, we start chemotherapy at 80% of the standard dose and escalate to full dose if tolerated. For example, carboplatin is capped at 150 mg for AUC 2 and 450 mg for AUC 5. In metastatic settings, it's preferable to continue 80% dosing and avoid growth factors, rather than giving full doses with support. We implement resource-stratified protocols:

1. Basic level: Symptom control and palliative care.
2. Limited level: Use of generic drugs, minimal imaging, and local radiotherapy.
3. Enhanced level: Targeted therapies if affordable.
4. Maximal level: Full adherence to NCCN/ESMO guidelines.

To reduce costs, we prioritize low-cost diagnostics, such as immunohistochemistry (IHC) over next-generation sequencing (NGS), and use IHC surrogates for expensive biomarkers.

We also rely on affordable chemotherapy and targeted therapies from Indian pharmaceutical companies. Digital health tools—mobile apps, SMS follow-ups, teleconsults, and AI-based systems—support adherence and toxicity monitoring.

Community-based treatment involves training local health workers for oral chemotherapy delivery and side effect monitoring, with district centers facilitating drug distribution and follow-up.

Finally, we emphasize real-world evidence from Indian registries to validate cost-effective alternatives, ensuring treatment strategies are grounded in local data.

Full Name:

Nithiya Piriya C R

Name of the Institution:

Coimbatore Medical College

State:

Tamil Nadu

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

Promote clinical research on frugal innovations to generate high quality data, use this to bridge the gaps in data tools like GRADE-ADOLOPMENT and form our own guidelines.

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.):

Problem statement: The challenges faced in applying an 'anti-cancer therapy developed in foreign soil' in Indian context has two perspectives- individual patient's perspective and population perspective. Biologically, Indian patients differ from the population in clinical trials in many aspects- nutritional status, body composition, tumor biology, and differences in pharmacogenomics. On logistical aspects, many patients face unavailability/inaccessibility to the drug or treatment modality which is mentioned as standard of care in international guidelines. Clinician has to consider all these factors while making decisions. From a population perspective - there is huge disparity in access (especially continued access) to therapy and the social and financial support (like paid leaves, health insurance, transport facilities) needed for the patient to continue the therapy. These differences in population characteristics, disparity in infrastructure and socio-economic factors are the major hurdles for direct implementation of global guidelines in India.

Solution: Since we lack our own data, we completely depend on global guidelines for our clinical decisions, tailoring of which is difficult, on case-by-case basis. Adoption and altering of global guidelines have been done by many sectors (Eg: Electric Vehicle policy) in our country, but they are randomly altered to suit our context and based on expert consensus. Such random methods cannot be used to form Evidence Based Clinical Practice (EBCP).

GRADE- ADOLOPMENT is a promising framework initially developed by for a structured adaptation of health care policies. But soon many countries started using this tool for a structured adoption of global clinical practice guidelines. (Eg Saudi Arabia uses GRADE ADOLOPMENT for adoption ACR 2015 criteria for Rheumatoid arthritis) GRADE or GRADE EtD (Grading of Recommendations Assessment, Development and Evaluation- Evidence to Decision) is a framework to ensure transparency, assessment of strength of evidence based on which recommendations are made, also incorporating other relevant factors. Global guidelines like ESMO, NCCN, ASCO use the GRADE EtD frameworks.

ADOLOPMENT involves three step process –

1. Adoption- adoption of an existing guideline with minor changes
2. Adaptation- Modify recommendations to better suit local contexts
3. Development- Create new recommendations with local data evidence to address the gaps in the existing guidelines like a lower dose of chemotherapy, surgeries requiring less infrastructure etc. The third step of development requires creation of our own data that can bridge the gap that is created while adapting the global guidelines to our context, like cheaper interventions.

Based on this I would recommend,

Step 1: Reduce disparity in access to drugs/treatment modalities

Step 2: Policy changes to promote indigenous clinical trials and inclusion of substantial proportion of representative Indian population in multinational trials

Step 3: With the help of this good quality, indigenous bridging data, use tools like GRADE-ADOLOPMENT method to create more transparent, evidence informed recommendations, relevant to local context.

Full Name:

Nithiya Piriya C R

Name of the Institution:

Coimbatore Medical College

State:

Tamil Nadu

Objective of your solution: (Briefly define the primary outcome of your solution to this challenge):
Modify Global guidelines to Indian context using scientific tools like GARDE-ADOLOPMENT and frame Indian Guidelines for day-to-day Clinical decisions.

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.):

Problem statement: While applying a globally recommended Anti-cancer therapy in Indian context, Clinician faces problems in two aspects. Biologically, Indian patients differ from the population studied in clinical trials in aspects like nutritional status, body composition, tumor biology, and pharmacogenetics. On logistical aspects, patients face unavailability/ inaccessibility to the drug or treatment modality mentioned as standard of care in global guidelines from a population perspective - there is huge disparity in access to a therapy and the social and financial support needed for the patient to continue the therapy. These differences in population characteristics, disparity in infrastructure and socio- economic factors are the major hurdles for implementing global guidelines in India.

Solution: Development of indigenous guidelines by promoting indigenous clinical trials and inclusion of representative Indian population in multinational trials. This requires lot of infrastructure and resources. Tailoring anti-cancer therapy suggested by global guidelines to Indian context is a practical option. Currently this is done by clinicians on a case-by-case basis, which utilizes a lot of their time and effort and is prone for errors. A better alternative to this is to devise Indian National guidelines, by adaptation of global guidelines to Indian context using scientific methods.

GRADE- ADOLOPMENT, is one such framework initially developed for structured adaptation of health care policies, but later used by many countries for structured adoption of global clinical practice guidelines. (Eg: Saudi Arabia uses adopted ACR 2015 criteria for Rheumatoid arthritis, adopted by GRADE-ADOLOPMENT) GRADE or GRADE EtD (Grading of Recommendations Assessment, Development and Evaluation- Evidence to Decision) is a framework used to ensure transparency and assessment of strength of evidence, by global guidelines like ESMO, NCCN, ASCO ADOLOPMENT involves three step process

1. Adoption- adoption of an existing guideline
2. Adaptation- Modify recommendations to better suit local contexts
3. Development- Create new recommendations with local data evidence to address the gaps created during adaptation, like protocols with cheaper alternative chemotherapy, surgeries requiring less infrastructure etc. The third step of development requires creation of our own good quality data only on frugal interventions. Thus, we can frame a scientifically more correct, yet more locally applicable guidelines with minimal expenditure.

Full Name:

Pankaj Deep Rana

Name of the Institution:

Metro Hospital and Cancer Institute

State:

Tamil Nadu

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

Tailoring anti-cancer therapy to Indian patients requires more than just applying Western treatment protocols. It demands a culturally, genetically, and socioeconomically contextualized approach. By focusing on equitable access, cost-effective strategies, and local data generation, India can develop a

uniquely effective model for precision oncology that addresses both population-level diversity and individual patient needs.

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.):

Factors Clinicians Consider While Suggesting Anti-Cancer Therapy in India

Clinicians in India tailor cancer treatment plans based on a wide array of patient-specific and systemic factors, such as:

A. Patient-Specific Factors

1. Genetic & Molecular Profile: *EGFR*, *ALK*, *BRCA*, *KRAS* mutations more or less prevalent in Indian subgroups (e.g., *EGFR* mutations in NSCLC more common in Indian patients: ~30-40%).
2. Performance Status (ECOG score): Determines suitability for aggressive therapy.
3. Comorbidities: TB, diabetes, cardiovascular diseases may limit chemotherapy or immunotherapy options.
4. Nutritional Status: Malnutrition is prevalent in rural and low-income settings, affecting drug metabolism and tolerance.
5. Financial Capacity: Out-of-pocket expenses dictate treatment feasibility; clinicians often need to balance cost-effectiveness with efficacy.
6. Social Support System: Impacts follow-up, continuity of care, and tolerance to toxic regimen.
7. Geographic Accessibility: Patients from remote areas may not afford frequent travel for chemotherapy or radiotherapy.

B. Disease-Specific Factors

1. Stage of Cancer at Presentation: Many Indian patients present at late stages due to lack of screening or awareness.
2. Tumor Biology: Certain subtypes (e.g., triple-negative breast cancer) are more prevalent in younger Indian women.
3. Prior Treatments: Including indigenous or alternative therapies that may alter disease progression or organ function.

Population-Level Differences to Consider in Anti-Cancer Therapy in India

India's vast heterogeneity necessitates a population-level approach to personalization:

A. Genetic Diversity

1. Significant regional variation in oncogenic driver mutations, pharmacogenetics, and metabolizing enzyme polymorphisms (e.g., CYP450 variations).

B. Environmental Exposure

1. Higher exposure to environmental carcinogens: biomass fuel, industrial pollutants, pesticides.
2. Betel nut chewing and smokeless tobacco in East/Northeast India contribute to high oral and esophageal cancers.

Challenges in Implementing Global Therapy Guidelines in India

A. Resource Limitations

1. Limited access to advanced diagnostics (NGS, PET-CT, IHC in rural centers).
2. Inadequate number of trained oncologists per capita.
3. Lack of insurance coverage for many targeted therapies or immunotherapies.

B. Infrastructure Gaps

1. Scarcity of comprehensive cancer centers in Tier 2/3 cities.
2. Delays in treatment due to referral chains.

C. Cost-Prohibitive Guidelines

1. NCCN/ESMO guidelines often recommend therapies unaffordable to average Indian patients (e.g., checkpoint inhibitors).

Ideas to Tailor Anti-Cancer Therapy in India

A. Develop India-Centric Clinical Guidelines

1. Guidelines that reflect affordability, access, and demographic characteristics. E.g., Tata Memorial's evidence-based, low-cost protocols for head and neck cancers.

B. Expand Molecular Profiling Programs

1. Use subsidized NGS or focused panels to identify actionable mutations.
2. Create national registries for molecular and treatment outcomes.

C. Leverage Technology for Tiered Care

1. Tele-oncology platforms connecting district hospitals to tertiary centers.
2. AI-based treatment planning tools using Indian datasets.

D. Generic and Biosimilar Integration

1. Promote use of high-quality generics and biosimilars.
2. Collaborate with pharma for 'compassionate access' programs or tiered pricing.

E. Community-Based Screening and Early Diagnosis

1. Mobile screening units for oral, cervical, and breast cancers.
 2. Train frontline healthcare workers in early warning signs.
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