



A New Model of Cancer Care

The past several decades have seen remarkable strides in the scientific understanding of cancer. Nobel prizes have been awarded for the discovery of cellular mechanisms that go awry in cancer cells. More recently, with the advent of highly sophisticated molecular diagnostic tools, including high-throughput genomic technologies, there is growing recognition that cancers can differ dramatically at the molecular level of genes and proteins—even if they are lumped together as the “same type” of cancer by traditional diagnostic pathology. Similarly, individual tumors classified as different—lung versus colon, for example—may turn out to share pathways and characteristics at the molecular level and may even respond in similar ways to drugs that target those common mechanisms. These advances in knowledge have led to what many believe is the coming revolution in cancer treatment: [personalized oncology](#), based on a new generation of molecular diagnostics and targeted therapy.

Although not yet fully integrated into the mainstream standard of care for most types of cancer, [molecular targeted therapy](#) is slowly shifting the treatment paradigm for cancer in several profound ways. One key shift is from a focus on clinical results obtained from the study of large populations of relatively unselected patients (an “n” of many) to clinical results based on diagnosis, treatment and observation tailored to each individual (an “n” of one), understanding as much as possible about that single patient’s disease at the most fundamental level. This often involves the molecular analysis of a patient’s tumor early in the diagnostic process to determine what molecular defect is fueling the cancer. (Drugs that aim at a particular molecular target will most likely be effective in patients whose cancer cells rely on that target or its associated pathway for their survival, growth or metastasis.) Therefore, a key component of molecular targeted therapy is the identification of relevant biomarkers that predict which patients are most likely to benefit.

Leading-edge clinical research trials and top-notch cancer centers are just starting to offer molecular testing to guide the use of targeted therapies. These pioneering efforts are worth celebrating. But the analysis and interpretation of the genetic and molecular signature of tumors represents complex and time-consuming efforts and is not part of the current standard of care in many hospitals. And delivering truly customized cancer care remains out of reach for most patients. The reasons are many. Personalized strategies take time to work out—time that physicians can rarely spare. Understanding the clinical significance of the growing numbers of cancer markers and investigational new drugs is a huge challenge for any individual doctor. Finally, the cancer care delivery system is riddled with gaps: gaps in knowledge of what is going on in different institutions; gaps between what is possible in cutting-edge research labs and what is actually available in the clinic; and gaps in data collection and information flow.

Challenges and Solutions

The current medical care system is not optimally set up to deliver highly customized strategies. Patients who want to apply the most-advanced science to their diseases have had to rely on their own efforts (and those of family and friends) to navigate dauntingly complex cancer research and treatment. The cost in anxiety, energy and time is distressingly high.

In order for patients and physicians to benefit from customized strategies, fundamental shifts need to occur in how people access and manage medical and scientific information, and in the resources available to implement strategies for advanced diagnostics and treatment. In today’s healthcare environment, that means addressing the following:



1. Institutional barriers. Patients typically are offered the treatment protocols and clinical research trials that are available and approved by the institution where they seek care. These protocols can vary significantly depending on the physician and the cancer center. As a result, patients often seek more than one opinion, which is costly in time, energy and travel expenses. Patients need convenient, timely access to information across multiple institutions so they can get the expertise best tailored to their conditions. Such information needs to be up-to-date, of high medical and scientific standard, independent and objective. Because often there is no “one best way” to manage a cancer, it is important to fully understand the range of options available so patients and families can function as truly informed collaborators in treatment planning along with the primary oncologist.

The traditional model	The new model
Care is based on the expertise of the oncologist who is treating the patient.	The treating doctor’s expertise is enhanced by the knowledge of a community of experts.
The patient and family are left to their own devices to search for additional options and answers to questions.	A professional service carries out the search, categorizes the options and provides a rational framework to interpret strategies that may be relevant to the individual patient.
Diagnosis is by one pathologist, perhaps using only conventional tools.	Diagnosis is supplemented by the newest scientific tools, which may shed additional light on specific pathways in that individual tumor.
Treatment protocols are limited to those offered by the specific medical center.	Treatment protocols are noted from multiple institutions, literature searches and clinical trials.
Insurance coverage heavily influences the amount and type of physician consultation, diagnostics and treatments.	Patients, rather than insurers, make the decision to purchase services, tests and treatments that may not be fully covered by insurance.

2. Limited access to the most advanced diagnostic tools. Cancer diagnostics is still largely focused on histological identification of a cancer based on the organ of origin and appearance of the tumor cell under a microscope—technology that has been around since the 1880s! Yet in research laboratories, cancer cells are interrogated in far greater detail at the genetic and protein level to elucidate the drivers of tumor growth. Increasingly, this knowledge can apply to patients. But today, such analysis is used only in special circumstances; and few patients benefit from more customized, molecular targeted strategies. Implementing advanced diagnostics is complex. Methods might include the analysis of genetic mutations—as well as of genes that are amplified (multiplied in number), deleted, moved around in the DNA or have their “on” or “off” switches locked into position—along with the analysis of proteins to understand how genetic aberrations play out in the functions of the cancer cell. Some of these technologies are commercially available diagnostics tests that can report results to doctors. Some tests are available only in research settings that require special arrangements to analyze patient samples. To harness advanced diagnostics, patients and their medical teams need access to the knowledge and workflows to apply the right method at the right time, so that the end results can be taken into account by the physician in weighing treatment options and management decisions.



**CUSTOMIZED CANCER
TREATMENT STRATEGIES™**

The traditional model	The new model
There is minimal analysis of unique biology of the patient's tumor.	There is extensive analysis of unique biology of patient's tumor.
Testing is limited to a small number of standard diagnostics, with no prior information on the specific biology of a patient's tumor.	Testing integrates a wide array of commercial and research labs to gain insight into individual tumor biology and inform diagnostic strategies.
The focus is on conventional therapies.	More comprehensive treatment strategies incorporate a focus on available molecular targeted therapies, new clinical research strategies and other customized approaches.

Conclusions

Delivering personalized cancer care to patients in the near future will require new models for connecting patients and their physicians to information and resources to implement targeted strategies. Because such approaches would have to be institutionally independent, yet be able to work with the existing healthcare delivery infrastructure, they will most likely have to be achieved through new kinds of services offered directly to consumers. Such services offer a new opportunity for physicians to enhance their professional services to patients.

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Chief Medical Officer, [Dr. Jennifer Levin Carter](#) or visit www.N-of-One.com