

Technology Adoption Déjà Vu: PRECISION MEDICINE

Call-to-Action: We must learn from the parallels in the evolution of the computer and the measured uptake of precision medicine to treat cancer.



In their early days, **computers** were thought of as integrated systems rather than as flexible combinations of hardware, software and applications. Back then, computers served specialized fields (e.g., science, industry, business) and manufacturers targeted specific markets. Indeed, it would have been almost blasphemous to suggest that a *scientific* computer could be used to automate basic accounting functions.

Today, much of **cancer care** remains rooted in outdated approaches, particularly the standard-of-care (SoC) practice of defining cancer types based on the affected organ, rather than the genomic drivers behind each patient's unique cancer. This results in SoC treatments that are limited to organ-specific drugs, ignoring genomic similarities across cancer types, e.g., drugs that are effective against a genomic marker in breast cancer may not be considered when that same driver appears in liver cancer. This logic mirrors our early flawed thinking about computer specialization ... *with far more profound consequences*.

This case study from a [2022 Research Consortium paper](#) * illustrates how dramatically a patient's options can vary when treatment selection is guided by actionable genomic cancer drivers vs. organ site alone.

Standard-of-Care Treatment Options

SoC cancer treatment is often one-size-fits-all, one-drug-at-a-time care. As such, comprehensive molecular testing (e.g., DNA, RNA) to identify the genomic drivers of each patient's unique cancer is not typically performed. Genomic tests were ordered for this (gastrointestinal carcinoma) patient however because he was a part of a clinical trial. The result: *nine actionable genomic markers were identified that drive his cancer*.

Confined to only organ-related treatments, there are just three FDA-approved drugs for this cancer type, each to be used separately. Sadly, they only target one-third of the nine drivers of this cancer ... *leaving two-thirds untreated*.

Precision Medicine Treatment Options

Precision medicine offers a comprehensive approach to treatment that recognizes the critical impact of each cancer's unique molecular profile and uses genomic data to inform and guide science-based treatment decisions.

Not limited by organ site, 23 FDA-approved cancer drugs were identified that match one or more of this cancer's nine genomic drivers ... expanding the set of evidence-informed treatment options from three to 2,024. An AI-enabled decision-support tool scored and ranked each treatment option, highlighting the most effective ones. The top two treatment options target **83%** of this cancer's drivers, vs. only **33%** with SoC treatments.

Comparative Predictive Effectiveness Results					
SCORE		Recommended Treatment Options			
3- Drugs	83%	Drug 1 Cisplatin	Drug 2 Palbociclib	Drug 3 Bevacizumab	
	83%	Carboplatin	<i>Palbociclib</i>	<i>Bevacizumab</i>	
	78%	Olaparib	<i>Palbociclib</i>	<i>Sorafenib</i>	
2- Drugs	58%	Carboplatin	<i>Bevacizumab</i>	Off-Label Combination of 3 Approved Drugs	
	58%	<i>Olaparib</i>	<i>Bevacizumab</i>		
	53%	Cisplatin	<i>Sorafenib</i>		
1- Drug	33%	Carboplatin	Each of these Approved On-Label Medications, are Popular, Comparatively Low-Value, Options		
	33%	<i>Olaparib</i>			
	15%	<i>Sorafenib</i>			
Approved drugs, used in an off-label combination for this indication, are in <i>italics</i>					

The lesson from **computers** is clear: *technology classifications that once seemed fixed can become barriers to progress when their original classification is let to determine their potential uses*. Those who guide and govern our healthcare system risk making the same mistake in **cancer care** if they continue to allow organ-defined therapy categories to override evidence-guided, genomic-informed decision-making.

Organ-based cancer treatment must be superseded, as it excuses decision-making based on incomplete knowledge. Ironically, by contrast, precision medicine's science-based, *look-before-you-leap* treatment approach is a *more conservative* course of action vs. blindly following obsolete pre-genomic era dogma.

It is high time for payer and physician leaders to *earnestly* embrace precision medicine. To do otherwise would be to support more wasteful spending on high-cost, low-clinical-value drugs ... and continue to deny patients access to vital genomic testing and the option to try potentially viable FDA-approved cancer drugs.

*Gaining Control of Combination Cancer Treatment Risk by Incorporating Cost and Value Data into the Drug Selection Process at the Point-of-Care