Supplementary Materials

Supplementary Methods

Determination of Standard and Non-Standard Care:

In order to generate a preliminary category (standard or non-standard) for each test, we conducted a systematic literature review, using an approach outlined by Goddard and colleagues (Supplementary Table 2).[33] Goddard outlined a search method to identify references of evidence-based practice guidelines, systemic reviews, or expert consensus-based practice guidelines in the context of incidental germline findings. Because our search intended to capture the evidence base for both somatic and germline tests, we broadened our search to included cancer-specific practice guidelines, the Center for Disease Control Public Health Genomics site, and a publically available insurance bulletin of tumor-related tests.[6,34,35] After all PCM tests had been assigned a preliminary category, we conducted a modified expert Delphi panel in order to formulate a consensus judgment on whether tests were standard or non-standard.[7,36-40] The Delphi panel consisted of two rounds of review. The 14 panel members were Dana-Farber Cancer Institute faculty or staff members and had expertise in one or more of the following areas; somatic genetics, germline cancer genetics, medical oncology, genetic counseling, clinical trials, and pathology. Because we wanted to determine whether PCM tests had well-established clinical utility, we considered tests to be standard if ≥ 90% of expert panelists agreed at the end of round two that the test was standard (i.e., 13/14 panelists agreed that the test was standard). The Delphi panel study was approved by the Institutional Review Board (IRB) of the Dana-Farber Cancer Institute. Because the study presented minimal risk to participants, the IRB waived the requirement for documentation of informed consent.

Supplementary Table 1: Personalized Cancer Medicine Internet Search Terms
Personal cancer medicine
Personalized cancer medicine
Personal cancer care
Personalized cancer care
Personal cancer therapy
Personal cancer treatment
Personalized cancer therapy
Personalized cancer treatment
Personal cancer genomics/genome
Personalized cancer genomics/genome
Individual cancer medicine
Individualized cancer medicine
Individual cancer care
Individualized cancer care
Individual cancer therapy
Individualized cancer therapy
Individualized cancer treatment
Individual cancer treatment
Individual cancer genomics/genome
Individualized cancer genomics/genome
Cancer genome/genomics
Cancer genetics
Tumor Genome/genomics
Tumor genetics
Personal medicine
Personal care
Personal therapy
Personal treatment
Personal genomics/genome
Personalized medicine
Personalized care
Personalized therapy
Personalized treatment
Personalized genomics/genome
Individual medicine
Individual care
Individual therapy
Individual treatment
Individual genomics/genome
Individualized medicine
Individualized care
Individualized therapy
Individualized treatment
Individualized genomics/genome
Targeted cancer medicine
Targeted cancer care

Targeted cancer therapy
Targeted cancer treatment
Tumor profile molecular
Cancer profile molecular
Personal tumor profile
Tumor profiling cancer
Tumor sequencing clinical
Cancer sequencing clinical

Supplementary Table 2: Search Methods to Identify References for Determining Evidence of Clinical Utility	
Step	Resources
1	Review NCCN Practice Guidelines and ASCO clinical guidelines for recommendations
2*	Identify synonyms for the gene and the OMIM identification number from OMIM: http://www.ncbi.nlm.nih.gov
3*	Search GeneTest review http://www.ncbi.hlm.nih.gov/sites/GeneTests/review for reviews and guidelines
4*	Search gene OMIM articles for links to guidelines
5*	Search guidelines.gov for guidelines related to gene
6*	Build a search in PubMed including the gene, or gene family as a MeSH term, and "practice guidelines" and "systematic reviews" article types
7*	Search gene in OrphaNet (http://www.orphanet/consor/cgi-bin/index.php) and Clinical Utility Gene Cards (http://www.nature.com/ejhg/archive/categ_genecard_012011.html) and review results for relevant guidelines
8	Search CDC: Public Health Genomics (http://www.cdc.gov/genomics/gtesting/tier.htm#tier1) test/application for gene or related disease group and review recommendations
9	Search Aetna clinical policy bulletin (http://www.aetna.com/cpb/medical/data/300_399/0352.html) for clinical guidelines related to gene
* Steps included in Goddard et al. (2013)	

Supplementary Table 3: Definitions of Standard Care Based on Clinical Utility			
Test classification	**Evidence of clinical utility for genomic alterations**	**Grading of clinical utility**	**Examples**
Standard	Evidence supports improved health outcomes when genomic alteration data are used to • Aid in drug selection or dosing • Inform prevention, early detection, or treatment strategies • Establish a definitive diagnosis • Assess prognosis And/or Data is not medically actionable but may be useful for personal decision making	One or more of the following types of data are available for this genomic alteration • Systematic review/meta-analysis of randomized controlled trials showing consistency in results • At least one large randomized controlled trial • One or more controlled trials without randomization • Systematic review of cohort or case-control studies with consistent results	Examples • Predictive: EGFR mutations in NSCLC • Risk assessment: BRCA1 mutations for breast and ovarian cancer • Diagnostic: PML-RARA translocations in acute promyelocytic leukemia • Prognostic: KRAS mutations in NSCLC
Non-standard	Suggestive, inferential, or no evidence that health outcomes may be improved when genomic alteration data are used	One or more of the following types of data are available for this genomic alteration • Single cohort or case-control studies • Systematic review of cohort or case-control studies with heterogeneous results • Clinical laboratory or manufacturer data • Consensus guidelines • Expert opinion	Examples • Predictive: DDR2 mutations in colorectal cancer • Risk assessment: RAD50 mutations for breast cancer • Diagnostic: SMAD4 mutations in pancreatic cancer • Prognostic: BRAF mutations in NSCLC

Supplementary Table 4. List of Personalized Cancer Medicine Websites

Number	id	url
1	1	http://www.championsoncology.com/pos/lp
2	2	http://www.vicc.org/personalized/
3	3	http://www.personalized-cancer-medicine.com/
4	4	http://www.vanderbilthealth.com/cancer/33110
5	8	http://www.drshafir.com/cancercare.aspx
6	10	http://www.cancercenter.com/thyroid-cancer.cfm
7	11	http://www.northshore.org/about-us/press/publications/connections-features/personalized-cancer-treatment/
8	12	http://theoncologyinstitute.com/?pg=search&srch=personalized+medicine
9	13	http://nyoncology.localplacement.net/about-us/press-and-promotions
10	14	http://www.umcutrecht.nl/research/research/Personalized-Cancer-Care/
11	15	http://www.southlakeoncology.com/SO/POST/personal-care-cancer-treatment-clinic.html
12	17	http://www.mdanderson.org/education-and-research/research-at-md-anderson/personalized-advanced-therapy/institute-for-personalized-cancer-therapy/index.html
13	18	http://www.dukepersonalizedmedicine.org/patient_care/disease_management/cancer_care
14	19	http://www.winchesterhospital.org/our-services/medical-care/departments-centers/cancer-care-center/quality-personalized-cancer-care
15	20	http://www.floatinghospital.org/OurServices/HematologyOncology/NewmanLakkaInstitute/
16	22	http://www.ohsu.edu/xd/health/services/cancer/index.cfm
17	23	http://therapy.collabrx.com/colorectal
18	26	http://www.ctoam.com/services/personalized-options/
19	30	http://www.n-of-one.com/
20	31	http://cancergenetics.com/
21	32	http://www.burzynskiclinic.com/personalized-treatments.html
22	35	http://personalgenome.com/
23	36	http://txch.org/for-professionals/cancer-genomics/personal-cancer-genomics-therapeutics/
24	37	http://www.everistgenomics.com/
25	40	http://www.illumina.com/clinical/illumina_clinical_laboratory/igs_for_doctors.ilmn
26	44	https://www.23andme.com/?gclid=CMq-ub-88rMCFYqZ4Aod0yMAkQ
27	46	http://www.emoryhealthcare.org/medicaladvances/oncology-etma/lung-cancer.html

28	49	http://www.illinoiscancercare.com/index.cfm?pageID=179
29	50	http://www.uchospitals.edu/specialties/cancer/breast/treatment.html
30	52	http://cancerrecoverycenters.com/individualtreatment.html
31	54	http://www.pankreas-karzinom-zentrum.de/en/new_treatment_procedures/individual_treatment-pancreatic-cancer.html
32	59	http://www.interpretgenome.com/genomicsandcancer.htm
33	60	http://www.ambrygen.com/exome-sequencing-http://www.ambrygen.com/exome-sequencing-services?utm_source=bing&utm_medium=cpc&utm_content=new%2Blanding%2Bpage&utm_campaign=Next-Gen%2BSeq
34	66	http://www.mapmygenome.in
35	70	http://www.carislifesciences.com/oncology-target-now
36	72	http://www.carismolecularintelligence.com/
37	74	http://www.genekey.com/?gclid=CM6Ur5u_g7QCFcqY4AoduDoAVg
38	75	http://www.combimatrix.com/oncology/tumorprofile.html
39	110	http://www.clearityfoundation.org/clearity-overview.aspx
40	202	http://www.neogenomics.com
41	205	http://www.oncotypedx.com/
42	211	http://www.precisiontherapeutics.com
43	216	http://www.agendia.com/pages/blueprint/324.php
44	218	http://www.easternbiotech.com
45	226	http://www.chemofx.com/cancer-treatment/why-chemotherapy.html
46	227	http://www.rational-t.com
47	232	http://naturalmolecular.com
48*	233	http://www.canseq.com/home.html
49	234	https://www.tgen.org/patient-information/clinical-research.aspx
50	237	http://www.medcan.com/services/genetics/personal_genome_testing/
51	238	http://cccdiag.com/drug-response-indicator-test/personalized-anticancer-chemotherapy
52	246	http://www.foundationone.com
53	247	http://directhittest.com/technology.html
54	248	http://biospecifx.com/
55	249	http://lifelabdx.com

*Website 48 has no relationship to the CanSeq program at the Dana-Farber Cancer Institute

Supplementary Table 5: Website and Search Characteristics			
All websites (n=55)		**N**	**%**
Search characteristics	Search engine*		
	Google	21	38
	Bing	29	53
	Yahoo	27	49
	Advertised		
	Yes	5	13
	No	26	68
	Both	7	18
	Domain type[†]		
	.com	39	71
	.org	10	18
	.edu	2	4
	.gov	0	0
	Other	4	7
Quality indicators	Date*		
	Any	53	96
	Created	0	0
	Updated	2	4
	Health on net certified	0	0
	References	27	49
Websites with commercial sponsor (n=31)[‡]		**N**	**%**
Directed content	Patient		
	Patient directed page	13	42
	Mean FK grade[§] (n=13)	12.0	(SD 5.4)
	Guidance for discussing with MD	9	29
	Physician directed page	18	33
Cost	Any mention of cost	17	55
	Range of lowest amount (n=5)	$99 to $7500	
	Range of highest amount (n=5)	$99 to $13,000	
	Mention of insurance/reimbursement	15	48
Physician directory	Directory of physicians providing service/test	3	10
Testimonials	Patient testimonial	11	35
	Video	0	0
	Text	9	82
	Both	2	18
	Physician testimonial	11	35
	Video	1	9
	Text	8	73
	Both	2	18

*Categories not mutually exclusive

† Domains in the .com category include some websites that were not categorized as commercial entities (e.g., university cancer centers)

‡ Commercial sponsor defined as a website appearing to sell a product or service for profit, excluding sites sponsored by academic/private institutions, research institutions, or physician practices.

§ Flesch-Kincaid grade level

Supplementary Table 6: Test List

Total websites specifying testing, n=18

Test	Standard or Non-Standard	n (%)
ABL1/ABL2	Non-standard	3 (17)
AKT1/AKT2/AKT3	Non-standard	2 (11)
ALK	Standard	4 (22)
APC	Standard	2 (11)
ARAF	Non-standard	1 (6)
AR-Androgen Receptor	Non-standard	2 (11)
ARFRP1	Non-standard	1 (6)
ARID1A	Non-standard	1 (6)
ARID2	Non-standard	1 (6)
ASXL1	Non-standard	1 (6)
ATM	Non-standard	3 (17)
ATR	Non-standard	1 (6)
ATRX	Non-standard	1 (6)
AURKA/AURKB	Non-standard	1 (6)
AXL	Non-standard	1 (6)
BAP1	Non-standard	1 (6)
BARD1	Non-standard	1 (6)
BCL2	Non-standard	2 (11)
BCL2L1/BCL2L2	Non-standard	1 (6)
BCL6	Non-standard	1 (6)
BCOR	Non-standard	1 (6)
BCORL1	Non-standard	1 (6)
BCR/ABL	Standard	2 (11)
Beta tubulin III	Non-standard	1 (6)
BML	Non-standard	1 (6)
BRAF	Standard	5 (28)
BRCA	Standard	2 (11)
BTK	Non-standard	1 (6)
CARD11	Non-standard	1 (6)
CBFB	Non-standard	1 (6)
CBFB-MYH11	Non-standard	1 (6)
CBL	Non-standard	1 (6)
CCND1/CCND2/CCND3	Non-standard	1 (6)
CCNE1	Non-standard	1 (6)
CD79A/CB79B	Non-standard	1 (6)
CDC73	Non-standard	1 (6)
CDH1/ CDH2	Non-standard	2 (11)
CDK12	Non-standard	1 (6)
CDK4/ CDK6/ CDK8	Non-standard	1 (6)
CDKN2A/ CDKN2B/CDKN2C	Non-standard	1 (6)
CEBPA	Non-standard	2 (11)
CHEK1/ CHEK2	Non-standard	1 (6)
Chemotherapy sensitivity	Non-standard	6 (33)

CIC	Non-standard	1 (6)
cKIT	Standard	3 (17)
CLL/AML "prognostic panels"	Non-standard	1 (6)
cMET	Non-standard	2 (11)
CREBBP	Non-standard	1 (6)
CRKL	Non-standard	1 (6)
CRLF2	Non-standard	1 (6)
CSF1R	Non-standard	1 (6)
CSG1R	Non-standard	1 (6)
CTCF	Non-standard	1 (6)
CTNNA1	Non-standard	1 (6)
CTNNB1	Non-standard	2 (11)
DAXX	Non-standard	1 (6)
DDR2	Non-standard	1 (6)
DNMT3A	Non-standard	2 (11)
DOT1L	Non-standard	1 (6)
EGFR	Standard	5 (28)
EMSY	Non-standard	1 (6)
EP300	Non-standard	1 (6)
EPHA3/ EPHA5/ EPHA6/ EPHA7	Non-standard	1 (6)
EPHB1/ EPHB4/ EPHB6	Non-standard	1 (6)
ERBB2/ ERBB3/ ERBB4	Non-standard	2 (11)
ERCC1	Non-standard	2 (11)
ER-Estrogen Receptor	Standard	4 (22)
ERG	Non-standard	1 (6)
ESR1	Non-standard	1 (6)
ETV1/ETV4/ ETV5/ ETV6	Non-standard	2 (11)
EWSR1	Non-standard	1 (6)
EZH2	Non-standard	1 (6)
FAM124B	Non-standard	1 (6)
FAM46C	Non-standard	1 (6)
FANCA	Non-standard	1 (6)
FANCC/ FANCD2/FANCE/FANCF/FANCG/FANCCL	Non-standard	1 (6)
FBXW7	Non-standard	2 (11)
FGF10	Non-standard	1 (6)
FGF14	Non-standard	1 (6)
FGF19	Non-standard	1 (6)
FGF23	Non-standard	1 (6)
FGF3	Non-standard	1 (6)
FGF4	Non-standard	1 (6)
FGFR1/ FGFR2/ FGFR3/ FGFR4	Non-standard	2 (11)
FLT1/ FLT3/ FLT4	Standard	3 (17)
GATA1	Non-standard	1 (6)
GNA11	Non-standard	2 (11)
GNAQ	Non-standard	1 (6)
GNAS	Non-standard	2 (11)

GPR124	Non-standard	1 (6)
HER2 (ERBB2)	Standard	6 (33)
HNF1A	Non-standard	1 (6)
HRAS	Non-standard	2 (11)
HSP90AA1	Non-standard	1 (6)
IDH1/ IDH2	Non-standard	3 (17)
IGF1R	Non-standard	1 (6)
IGHV	Non-standard	1 (6)
IGVH	Non-standard	1 (6)
IKBKE	Non-standard	1 (6)
IKZF1	Non-standard	1 (6)
INHBA	Non-standard	1 (6)
IRS2	Non-standard	1 (6)
JAK1/ JAK2/ JAK3	Non-standard	3 (17)
JUN	Non-standard	1 (6)
KDM6A	Non-standard	1 (6)
KDR	Non-standard	2 (11)
KI 67	Non-standard	1 (6)
KRAS	Standard	5 (28)
LRP1B	Non-standard	1 (6)
MAP2K1/ MAP2K2/ MAP2K4	Non-standard	1 (6)
MCL1	Non-standard	1 (6)
MDM2 /MDM4	Non-standard	1 (6)
MEN1	Standard	1 (6)
MGMT	Non-standard	1 (6)
MGMT-Me	Non-standard	1 (6)
MITF	Non-standard	1 (6)
MLH1	Standard	3 (17)
MLL	Non-standard	1 (6)
MPL	Non-standard	3 (17)
MRE11A	Non-standard	1 (6)
MSH2/ MSH6	Standard	2 (11)
MSI	Non-standard	1 (6)
MTOR	Non-standard	1 (6)
MUTYH	Non-standard	1 (6)
MYC	Non-standard	1 (6)
MYCL1	Non-standard	1 (6)
MYCN	Non-standard	1 (6)
Nat-2	Non-standard	1 (6)
NF1/ NF2	Non-standard	1 (6)
NKX2-1	Non-standard	1 (6)
NOTCH1	Non-standard	3 (17)
NPM1	Non-standard	3 (17)
NRAS	Non-standard	3 (17)
NTRK1/NTRK2/NTRK3	Non-standard	1 (6)
PAK3	Non-standard	1 (6)

PAX5	Non-standard	1 (6)
PDGFRA/ PDGFRB	Standard	3 (17)
PGP	Non-standard	1 (6)
PIK3CA	Non-standard	4 (22)
PIK3CG	Non-standard	1 (6)
PIK3R1	Non-standard	1 (6)
PML-RAR	Standard	1 (6)
PMS2	Non-standard	1 (6)
PRKDC	Non-standard	1 (6)
PR-Progesterone Receptor	Standard	3 (17)
PTCH1/ PTCH2	Non-standard	1 (6)
PTEN	Non-standard	3 (17)
PTPN11	Non-standard	2 (11)
RAF1	Non-standard	1 (6)
RARA	Non-standard	1 (6)
RB1	Non-standard	2 (11)
RET	Standard	2 (11)
RICTOR	Non-standard	1 (6)
ROS1	Non-standard	3 (17)
RPTOR	Non-standard	1 (6)
RRM1	Non-standard	1 (6)
RUNX1	Non-standard	1 (6)
RUNX1-Runx1t1 (AML1-ETO)	Non-standard	1 (6)
SF3B1	Non-standard	1 (6)
SMAD2/ SMAD3/ SMAD4	Non-standard	2 (11)
SMARCA4	Non-standard	1 (6)
SMARCB1	Non-standard	2 (11)
SMO	Non-standard	2 (11)
SOX10	Non-standard	1 (6)
SPARCm/SPARCp	Non-standard	1 (6)
SRC	Non-standard	1 (6)
STAT3	Non-standard	2 (11)
STK11	Non-standard	2 (11)
SUFU	Non-standard	1 (6)
TET2	Non-standard	1 (6)
TGFBR2	Non-standard	1 (6)
TLE3	Non-standard	1 (6)
TMPRSS2	Non-standard	1 (6)
TNFAIP3	Non-standard	1 (6)
TOP1	Non-standard	1 (6)
TOP2A	Non-standard	1 (6)
TOPO1	Non-standard	1 (6)
TOPO2 alpha, (TOPO2A)	Non-standard	1 (6)
TSC1 /TSC2	Non-standard	1 (6)
TS-Thymidylate synthase	Non-standard	3 (17)
TUBB3	Non-standard	1 (6)

VEGF	Non-standard	1 (6)
VHL	Non-standard	2 (11)
Whole-exome sequencing/ whole-genome sequencing	Non-standard	4 (22)
WT1	Non-standard	2 (11)
Zap-70	Non-standard	2 (11)

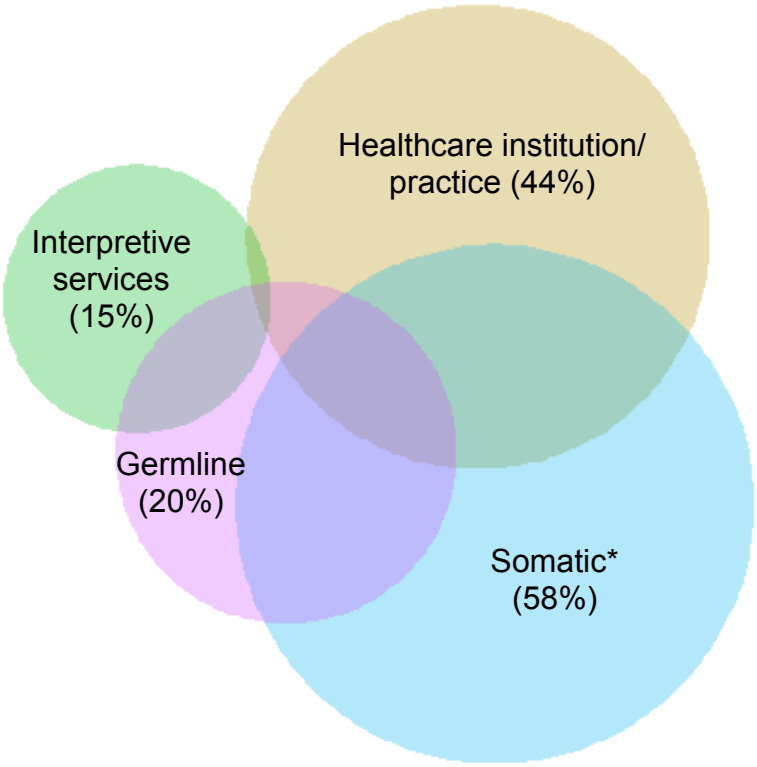
Supplementary Table 7: Additional examples of Benefit and Limitation Marketing Claims	
Benefit subtype (N=47)	**Examples of marketing claims**
Tailor/personalize your therapy	• "This approach is 'Personalized' because it exploits what makes one patient's cancer different from another" • "(Our) tumor profiling is an integrated, straightforward approach combining three core platforms of personalized medicine to capture the total sum of genomic, proteomic and functional information for each patient's cancer."
Identify more effective treatment	• "Some mutations may indicate that a drug will be particularly effective" • "You'll see that we combine a thorough examination of your medical records and personal history with our diverse and extensive knowledge of cancer, surgery, radiation oncology, off label drugs, chemotherapy optimization, human physiology, biochemistry, immunology, cell biology, molecular biology, nutritional based gene regulation and human genetics to identify and connect you to treatment options that have been shown to have success greater than that of standard treatment for your cancer." • "(we implant) your tumor in a xenograft mouse avatar model… (which) closely simulate(s) your tumor's response to each of your cancer treatment options"
Outcome benefit	• "Insights that can lead to better outcomes by giving 'the right drug to the right patient at the right dose.'" • "Molecular targets were detected in nearly all of the patients, and of those where targets were found, 27% found success in secondary treatment options, allowing them to experience a longer, progression-free survival" • "(Our company) is dedicated to improving the outcomes of cancer patients by providing personalized medicine solutions that aim to increase quality of life and cancer survival rates."
Avoid ineffective treatment	• "Other mutations may indicate your tumor is resistant to certain treatments" • "Test that quantifies an individual gynecologic cancer patient's probable tumor response to various chemotherapeutic and biologic agents--providing both sensitivity and resistance information"
Identify clinical trials	• "The information provided from those tests might present opportunities to participate in clinical trials" • "Based upon the test results, your options may include a new treatment being studied in a clinical trial." • "(Company) provides clinical interpretation of whole genome sequencing with an emphasis on what is actionable today based on the clinical strength of evidence linking observed mutations to therapy options, including drugs and clinical trials"
Decrease side effects	• "The main goal of a Personalized Treatment is to match the right patient to the right treatment to achieve maximum

	effectiveness with minimum side effects." • "Introducing a way to help treat cancer without a single patient side effect."
Improve prognostication/predict recurrence	• "The test looks at certain gene activity within a patient's tumor sample and provides a numerical figure to help predict the possibility of the cancer returning" • "Microarray assay tests that can determine whether an individual patient is at high or low risk for breast or colon cancers recurrence" • "Actual test result will indicate the prognosis for your patient"
Improve prevention/risk prediction	• "Personalized approaches not only aid prevention, but can also improve outcomes for patients who are diagnosed with cancer."
Improve diagnosis	• "(Our company) is an emerging leader in the field of personalized medicine, offering products and services that enable cancer diagnostics as well as treatments that are tailored to the specific genetic profile of the individual" • "(Our company) aims to provide a full service solution for oncology professionals to improve the diagnosis, prognosis, theranosis and treatment of hematological, urogenital and HPV-associated cancers."
Cost savings	• "(Healthcare Institute) for Personalized Cancer Therapy will provide personalized cancer therapy for all…patients and define the new standard of patient care by improving outcomes and reducing costs" • "Logistical support services to help you efficiently and cost-effectively navigate the myriad sources of ever-evolving molecular-targeted knowledge, tools, and resources" • "Products and services being developed at (our company) are poised to transform cancer patient management, increase treatment efficacy, and reduce healthcare costs."
Benefit to physicians	• "Physicians have access to the most up-to-date, and credible molecular-based data to support optimal decision making and treatment planning" • "(Our company) provides expert-backed, transparent, current, and peer-reviewed knowledge to physicians and patients to inform treatment plans that support optimal clinical outcomes and are as cost-efficient as possible"
Access to cutting-edge technology/ new models of care	• "Universal access to next generation healthcare boosts enrollment in clinical trials, increases in-house knowledge and expertise, fosters collaborative environments, and encourages patient-physician engagement" • "We use our network of integrated medical professionals, the incorporation of new technologies, and the consideration of the influence of dietary phytochemicals, to optimize your statistical chances for success." • "Our solutions are designed to facilitate access to the most leading-edge, reliable knowledge about molecular-targeted diagnostics and treatments at the point of care, tailored to what doctors need for each individual patient"

	• "On a patient-specific basis, we help you connect with and manage patient-relevant diagnostic tools, next-generation sequencing platforms, ever-expanding knowledge about new treatment approaches and drugs, access to clinical trials, and the many other challenges of delivering personalized cancer care." • "This information can help identify potential treatments for you, including treatments that would not be considered otherwise. We search for options not only among known cancer treatments, but among the more than 2,000 FDA-approved drugs, as well as drugs that are currently being studied in clinical trials." • "We envision a new treatment paradigm where each patient's care is driven by continuous research, testing and refining of strategies based on observing how the patient responds to therapies. A therapy that proves effective in a patient can efficiently drive the discovery of new cancer biology, diagnostics and therapeutics. Unsuccessful therapies can be analyzed to refine understanding of the tumor's biology and the drugs' mechanisms of action."
Psychological benefits	• "We work to lessen the frustration that comes with coordinating the variety of tests, physicians, and information on molecular medicine." • "Reduce the guessing game of which chemotherapy MIGHT work for you, thereby decreasing your potential therapy time and trials. - Increase your chances of winning this battle with cancer."
Limitations subtype (N=15)	
Test failure	• "First, the quantity of DNA obtained can be very low, limiting the amount of DNA molecules that can be successfully analyzed by next generation sequencing. Second, the purity of tumor DNA can be a factor, and significant portion of the DNA analyzed in the tumor sample may be derived from contaminating normal tissues. These aspects can reduce chance of detecting somatic sequence alterations." • "Specimen failure rate (4%)"
Cost to consumer	• "On some occasions, we are unable to provide an adequate analysis due to the quantity and/or quality of cells received. There are times when a specimen that is expected to contain malignant cells, may contain too few to setup a reliable evaluation. Under these circumstances, there is a sample processing fee to cover the cost of laboratory personnel, reagents and specimen processing."
Negative result	• "Finally, it is possible that your tumor is found to have no mutations."
Challenges of data interpretation	• "The sheer volume of data produced by NGS (next generation sequencing) far exceeds the ability of individual physicians, drug developers and healthcare providers to stay up-to-date on its potential clinical relevance…As sequencing costs continue to fall, increased emphasis will be placed on the interpretation

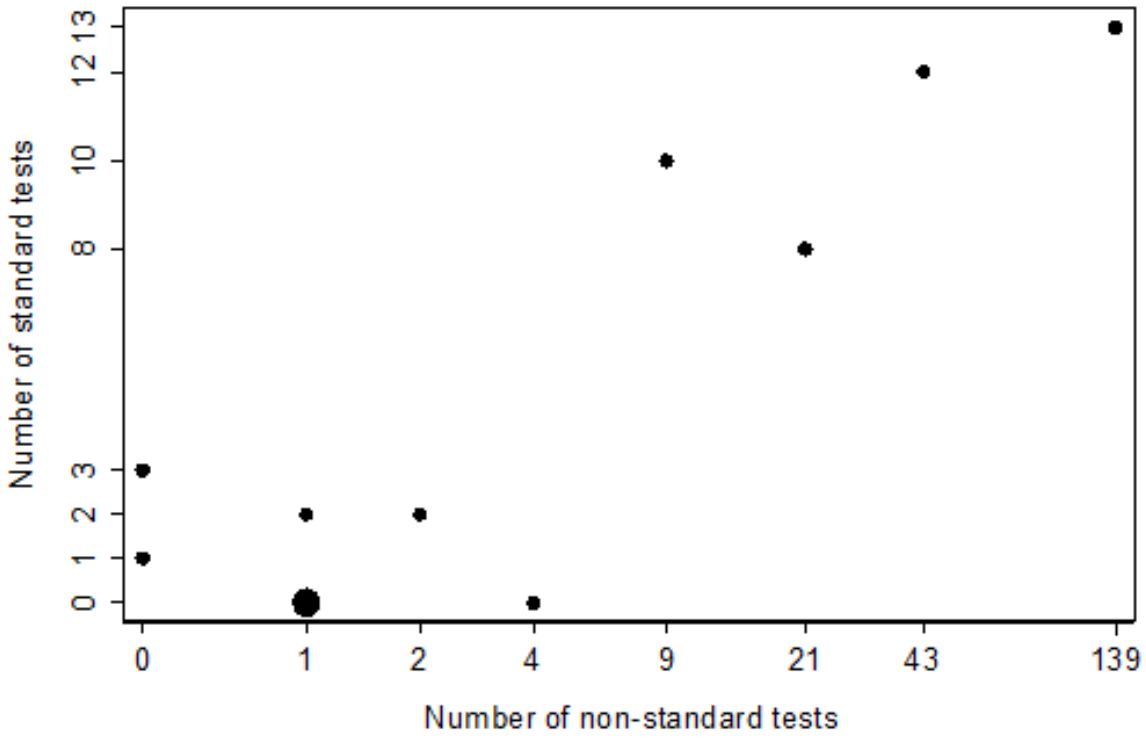
	of sequencing data."
Potential for discrimination	• "Americans are protected against discrimination based on genetic information -- at least with regard to employment and health insurance coverage. GINA (Genetic Information Nondiscrimination Act) does not extend to genetic information-based discrimination in life or long-term care insurance. And until the law is tested in court it is difficult to know how far its protections will extend in practice."
False positive/false negative	• "Next generation sequencing approaches may provide incorrect sequence or mutational data due to insufficient coverage in specific regions of the genome, inability to distinguish highly related human sequences, and sequencing errors."
Privacy	• "You might be surprised by a family member who would prefer not to know something you feel is important to share. At other times, you may learn something about yourself, your family, your ancestry, or health-related associations with your genotype that you would prefer to keep private. You may find yourself having to weigh sharing such information with other family members against your own desire for privacy--or their desire not to know"
Tests may not be FDA approved	• "The assays do not require, and therefore do not have, FDA clearance or approval."
Results not intended to be medical advice	• "The test results themselves do not constitute a clinical diagnosis and should not be construed as medical advice."

Supplementary Figure 1. Types of Personalized Cancer Medicine Tests and Services Marketed on the Internet



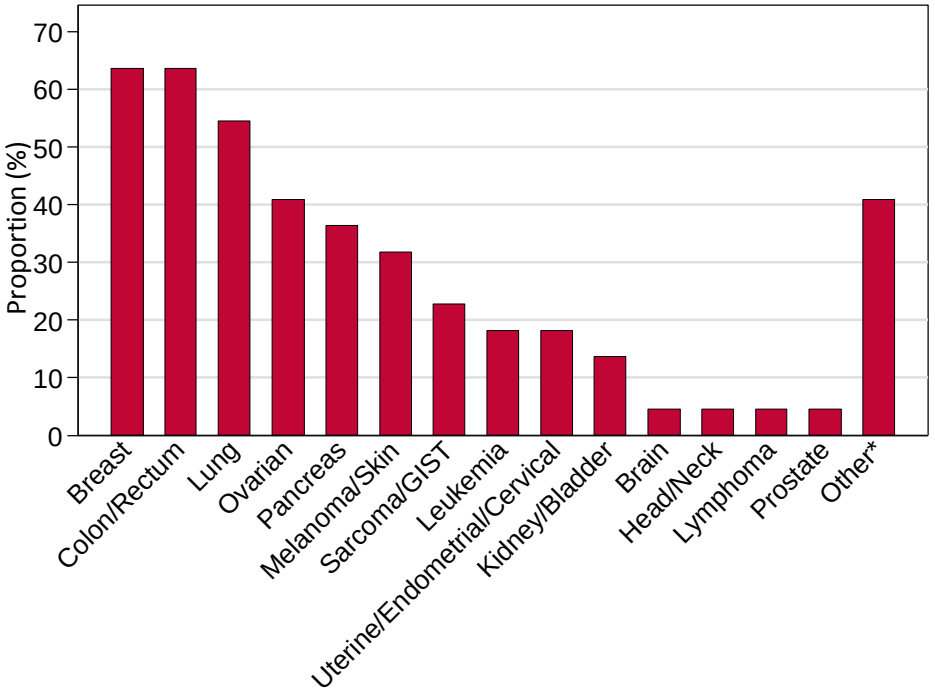
*Includes chemotherapy sensitivity and WES/WGS

Supplementary Figure 2. Scatter plot of the number of standard tests versus the number of non-standard tests marketed by 18 websites that specified the somatic testing. Note that the scale of the x-axis is different from the scale of the y-axis.



Note: 9 websites marketed 1 non-standard test and 0 standard tests, which is denoted by the larger symbol.

Supplementary Figure 3: Internet Marketing of Personalized Cancer Medicine for Specific Cancer Types



*Other included "all", "any", or "other" solid tumors; appendicial, adenoid, gall bladder/bile duct, thyroid, esophageal, gastric, unknown primary, mesothelioma, neuroblastoma, and stomach