

## Patient-reported problems with biomarker testing indicate inequities based on insurance type and cancer care setting

**INTRODUCTION:** Biomarker testing (BT) in oncology is rapidly becoming the standard-of-care across cancer types.<sup>1-3</sup> There is an established relationship between BT and subsequent prognosis, as well as patient-reported outcomes<sup>4</sup>; thus, the barriers and facilitators for BT are essential to understand. This study investigated the utilization of BT among people diagnosed with cancer and the most frequently experienced BT problems, as well as the person- and systems-level factors associated with BT problems.

**METHODS:** 436 adults diagnosed with either lung (38%), colorectal (35%), or breast cancer (27%) since 2018 (yrs since diagnosis  $M=2.6$ ,  $SD=1$ ) completed an online survey. Participants were recruited via research panel and cancer advocacy organizations and provided with a definition of BT prior to answering questions (see Figure 1).

**Table 1. Sample characteristics (N=436)**

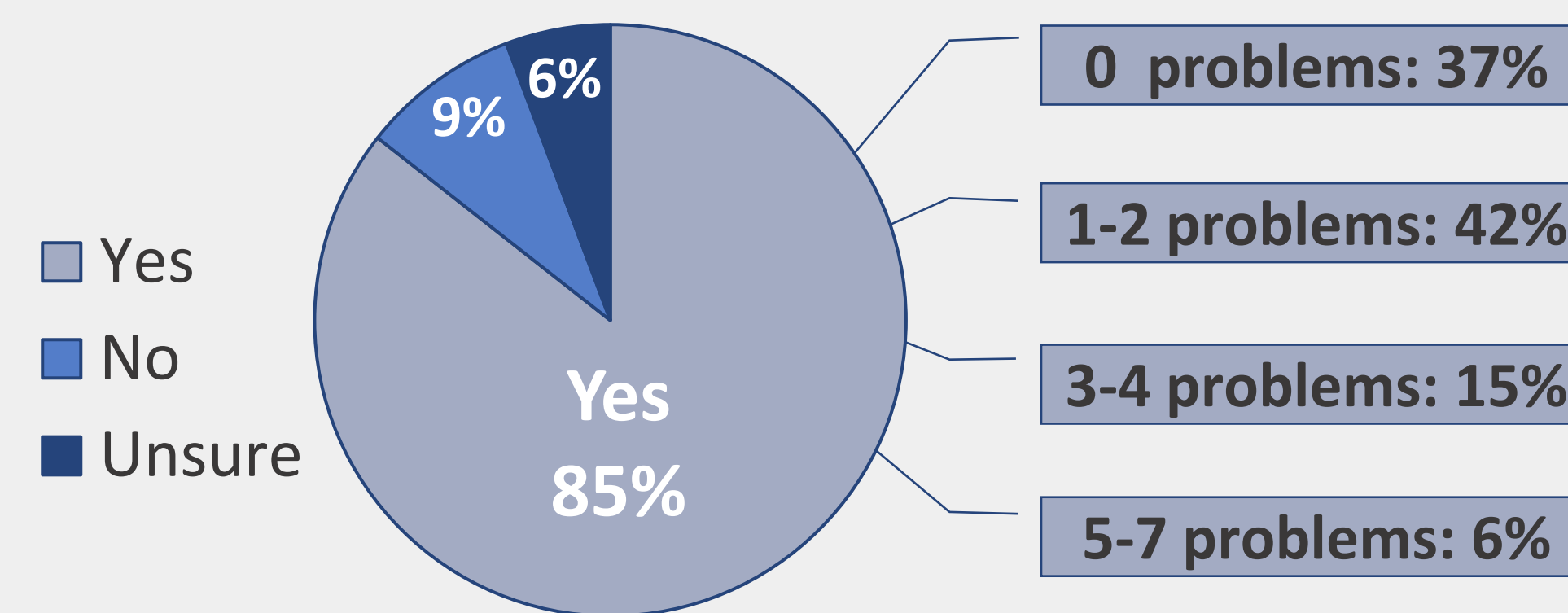
Race	
74% Non-Hispanic White	5% Hispanic/Latino
12% Black/AA	5% Multiple/PNS
5% Asian	
Income	
32% <\$40k	25% \$80k+
38% \$40-79k	5% DK/PNS
Stage at diagnosis	
2% Stage 0	16% Stage III
20% Stage I	35% Stage IV
20% Stage II	7% DK/NA
Treatment setting	
47% Community Hospital	7% None
20% Academic or CCC	3% Other/PNS
15% Private Practice	
Health insurance	
36% Employer	14% Medicaid
14% Private	15% Multiple/Other
14% Medicare	

**Figure 1. Definition of BT given in survey**

*Biomarker testing may also be called: molecular testing, tumor profiling, somatic testing, or genomic testing of cancer cells, among other things. Sometimes doctors do not use "biomarker" or any of the other terms we just went over—they may simply say they are taking a sample of tissue or blood to test for abnormalities. Biomarker testing involves collecting a sample of cancer from blood or bodily fluids or from the tissue taken during a surgery or biopsy. The sample is then sent to a lab for testing. The tests can help determine how the tumor or tumors might behave (how aggressive), and which treatments might work best for your tumor or tumors.*

### RESULTS:

- The vast majority of respondents (85%) reported having BT as part of their cancer care experience (see Figure 2) with a low occurrence of BT problems ( $M=1.4$ ,  $SD=1.5$ ).
- The most commonly cited BT problems were similar across cancer types, but rates of endorsement varied across insurance types and care setting (see Table 2).



**Figure 2. Prevalence of BT and related problems (N=436)**

- Significant bivariate associations were found between the number of BT problems reported and key sociodemographic and clinical variables: age, gender, income, cancer diagnosis, insurance type, and care setting.
- When considering the variables concurrently in a backwards elimination linear regression model, only two remain as significant predictors: having Medicaid significantly increased the number of BT problems ( $\beta=.29$ ,  $p<.001$ ), while receiving care at an academic/comprehensive care center significantly decreased the number of BT problems ( $\beta=-.13$ ,  $p<.05$ ).

**Table 2. Types of biomarker testing problems experienced by insurance type and cancer care setting**

Type of problem experienced (% among those who reported having biomarker testing)	Insurance Type				Cancer Care Setting		
	Employer	Private	Medicare	Medicaid	Academic or CCC	Community Hospital	Private Practice
Difficulty understanding results	24%	29%	29%	45%	11%	28%	35%
Long wait period between test and results	20%	40%	23%	36%	24%	25%	30%
Difficulty with scheduling test	18%	38%	25%	36%	8%	28%	27%
Problems with insurance coverages/approval	14%	2%	19%	49%	9%	32%	0%
Difficulty with a biopsy (e.g., not enough tissue)	5%	17%	12%	11%	7%	10%	8%
Complication or side-effect when collecting sample	5%	12%	8%	11%	4%	8%	12%
Doctor did not explain how the test would be done	3%	12%	8%	12%	7%	9%	2%
Doctor did not share results	3%	7%	6%	0%	4%	4%	2%
Unable to pay for tests	3%	2%	15%	30%	3%	17%	0%
Other	3%	0%	0%	0%	0%	2%	0%
I did not experience any problems	43%	36%	44%	14%	48%	26%	38%

Note: Some categories removed due to low endorsement or analytic value (e.g., "other," more than one insurance type/care setting)  
CCC= Comprehensive Care Center ■ Red = Most common problem by insurance type and care setting □ Pink = 2<sup>nd</sup> and 3<sup>rd</sup> most common problems

### CONCLUSIONS AND IMPLICATIONS:

- Using a diverse sample of patients recently diagnosed with lung, colorectal, or breast cancer, we observed a strong rate of BT. However, opportunities exist for institutions and testing companies to better support patient understanding of results and testing system delivery (wait time, scheduling).
- Patients with Medicaid and those receiving care outside academic/comprehensive care centers were statistically more likely to report problems, even after controlling for other key variables, highlighting the need to continue addressing insurance coverage of BT on a policy level.
- Lastly, having care team members and testing companies use consistent language, like CSC's Precision Medicine Plain Language Lexicon (QR code below) can improve patient understanding of results so they can be an informed partner in their cancer care.

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