

# BCR-ABL TESTING FREQUENCY LOWER THAN NCCN RECOMMENDATIONS IN LAB NETWORK REVIEW OF CML PATIENTS

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## ABSTRACT

### INTRODUCTION:

The NCCN's guideline recommendation for monitoring response to TKI therapy in CML is quantitative PCR BCR-ABL testing every 3 months for 3 years, and every 3-6 months after complete cytogenetic remission (CCyR) has been achieved. Prior research showed gaps in testing frequency (Chen C, et al. *J Clin Oncol*. 2013;31(suppl, abstr 7096)). Our objective was to analyze testing rates among CML patients in a large, national database, to determine if there are differences across age, gender, or US regions (Northeast, Southeast, Midwest and West).

### METHODS:

We analyzed BCR-ABL lab test results for 5,446 CML patients, identified via ICD-9 codes in the nationwide Medivo Lab Exchange database (Medivo Inc., New York, NY) between March 2011-February 2014. Patients were categorized by the number of annual BCR-ABL tests per year (<1, 1, 2, 3, 4 and >4), and correlations between testing frequency and age, gender, and region were conducted. ANOVA was performed to assess differences in BCR-ABL testing frequency between male and female CML patients as well as patients <40 yrs. vs. > 40 yrs. Regression analysis was performed to assess regional differences in testing frequency.

### RESULTS:

Overall 79.4% (4,325 out of 5,446) of CML patients were tested at least once over the 3-year period. Across all CML patients, the average annual testing frequency was 1.6 tests/yr. The categories of testing frequency were: <1/yr., 1,121 (21%); 1/yr., 2,400 (44%); 2/yr., 1,097 (20%); 3/yr., 584 (11%); 4/yr., 160 (3%); and >4/yr., 84 (2%). Male patients (n = 2,832) and female patients (n = 2,614) were tested at similar rates/year (average test frequency 1.59 vs. 1.61, p = 0.6). Patients <40 yrs. (n = 621) were tested at a similar rate as those > 40 yrs. (n = 4,825), average test frequency 1.63 vs. 1.59 tests/yr.; p = 0.4. Interaction between patients' gender and age was not significant (p = 0.7). BCR-ABL testing frequency varied significantly across regions. The regression analysis showed significant downward trends in average annual frequency of testing (p<0.001) from the highest in the West (1.68 tests/yr.), less in the Northeast (1.62 tests/yr.), less in the Southeast (1.59 tests/yr.) to the lowest in the Midwest (1.37 tests/yr.).

### CONCLUSIONS:

The NCCN guidelines support BCR-ABL testing every 3 months for the first 3 years of therapy, and every 3-6 months thereafter. Thus, in a cross section of CML patients, compliant monitoring would result in at least 2 tests per year. In this large group of CML patients, only 36% of patients had > 2 tests/yr., with only 5% having >4 tests/yr.; 65% were tested once per year or less. There were no significant differences in testing frequency seen in patients by gender or age. However, there were significant differences seen across US regions, with the highest rate in the West and the lowest in the Midwest. Future analyses should include longitudinal views of BCR-ABL results to highlight trends in responses to therapy and CCyR status, and payor type analyses to assess additional characteristics associated with low vs. high rates of BCR-ABL testing.

## INTRODUCTION

The National Comprehensive Cancer Network (NCCN) guidelines recommend monitoring response to tyrosine kinase inhibitor (TKI) therapy in chronic myelogenous leukemia (CML) using quantitative PCR BCR-ABL testing every 3 months for 3 years, and every 3 - 6 months after complete cytogenetic remission (CCyR) has been achieved.<sup>1</sup>

The goal of monitoring tests is to identify CML patients with suboptimal response or treatment failure who need therapeutic intervention to try to prevent disease progression.<sup>2</sup>

Prior research indicated gaps in testing frequency in the CML patient population.<sup>3</sup> In a 2013 study of 189 patients newly diagnosed with CML followed over 18 months, Chen et al showed that about 50% had regular monitoring tests, and 15% had no monitoring tests; only 25% of tests conducted were reported in international standard (IS).<sup>3</sup>

## PURPOSE

Our objective was to analyze testing rates among CML patients in a large, national database, to determine if there are differences across age, gender, or US regions (Northeast, Southeast, Midwest and West).

## METHODS

At the time of analysis, the Medivo Lab Value Exchange Database™ (LVX™) included over 200,000 practice locations and 27 million patients nationwide.

We analyzed BCR-ABL lab test results for 5,446 CML patients, identified via ICD-9 codes in the LVX between March 2011 and February 2014. All test results were reported in IS.

Patients were categorized by the number of annual BCR-ABL tests per year (<1, 1, 2, 3, 4 and >4), and correlations between testing frequency and age, gender, and US region were conducted.

ANOVA was performed to assess difference in BCR-ABL testing frequency between male and female CML patients as well as patients <40 yrs. vs. > 40 yrs. Regression analysis was performed to assess regional differences in testing frequency.

## RESULTS

Overall 79.4% (4,325 out of 5,446) of CML patients were tested at least once over the three-year period.

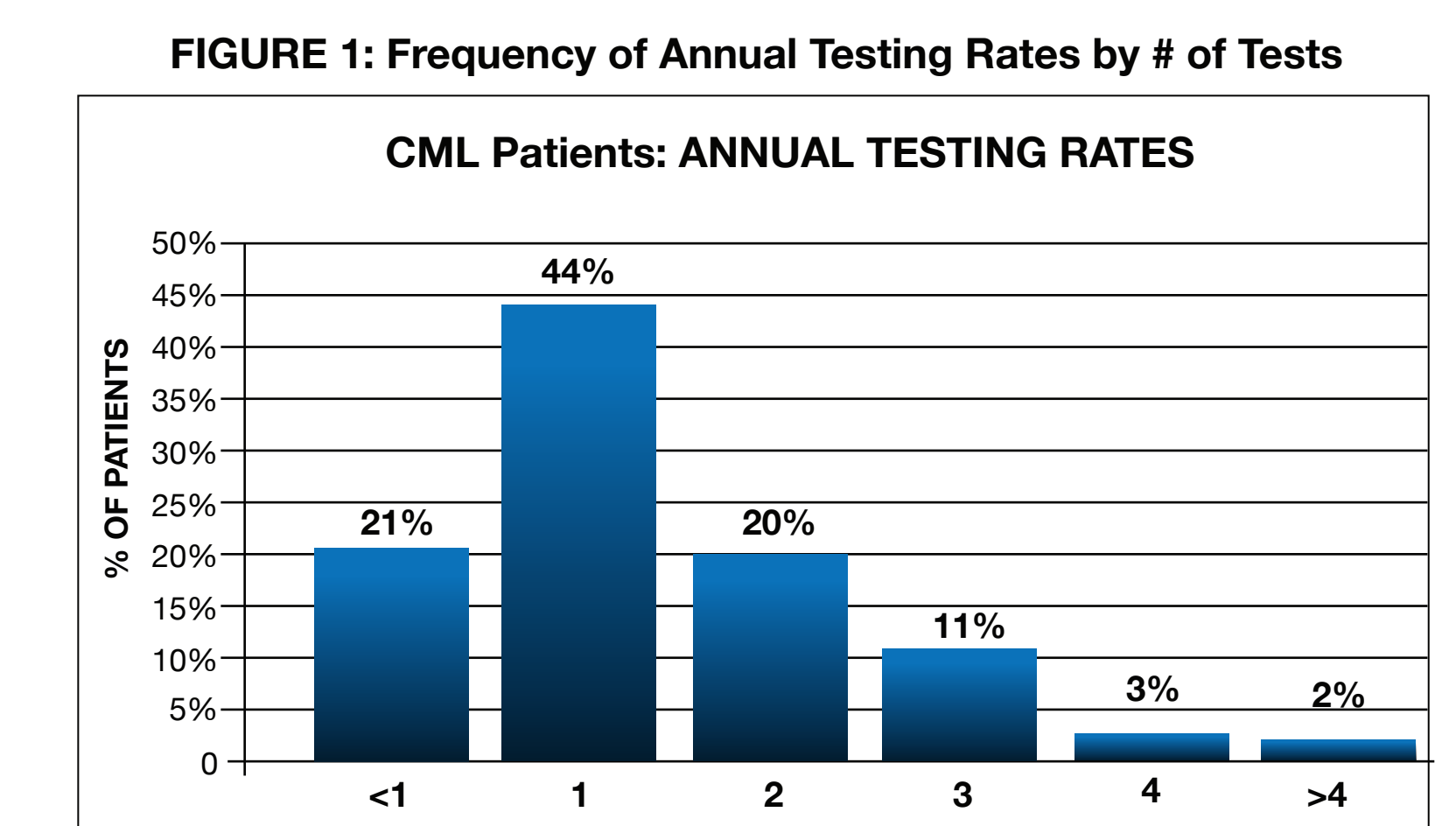
Across all CML patients, the average annual testing frequency was 1.6 tests/yr.

The categories of testing frequency were: <1/yr., 1,121 (21%); 1/yr., 2,400 (44%); 2/yr., 1,097 (20%); 3/yr., 584 (11%); 4/yr., 160 (3%); and >4/yr., 84 (2%) (Figure 1).

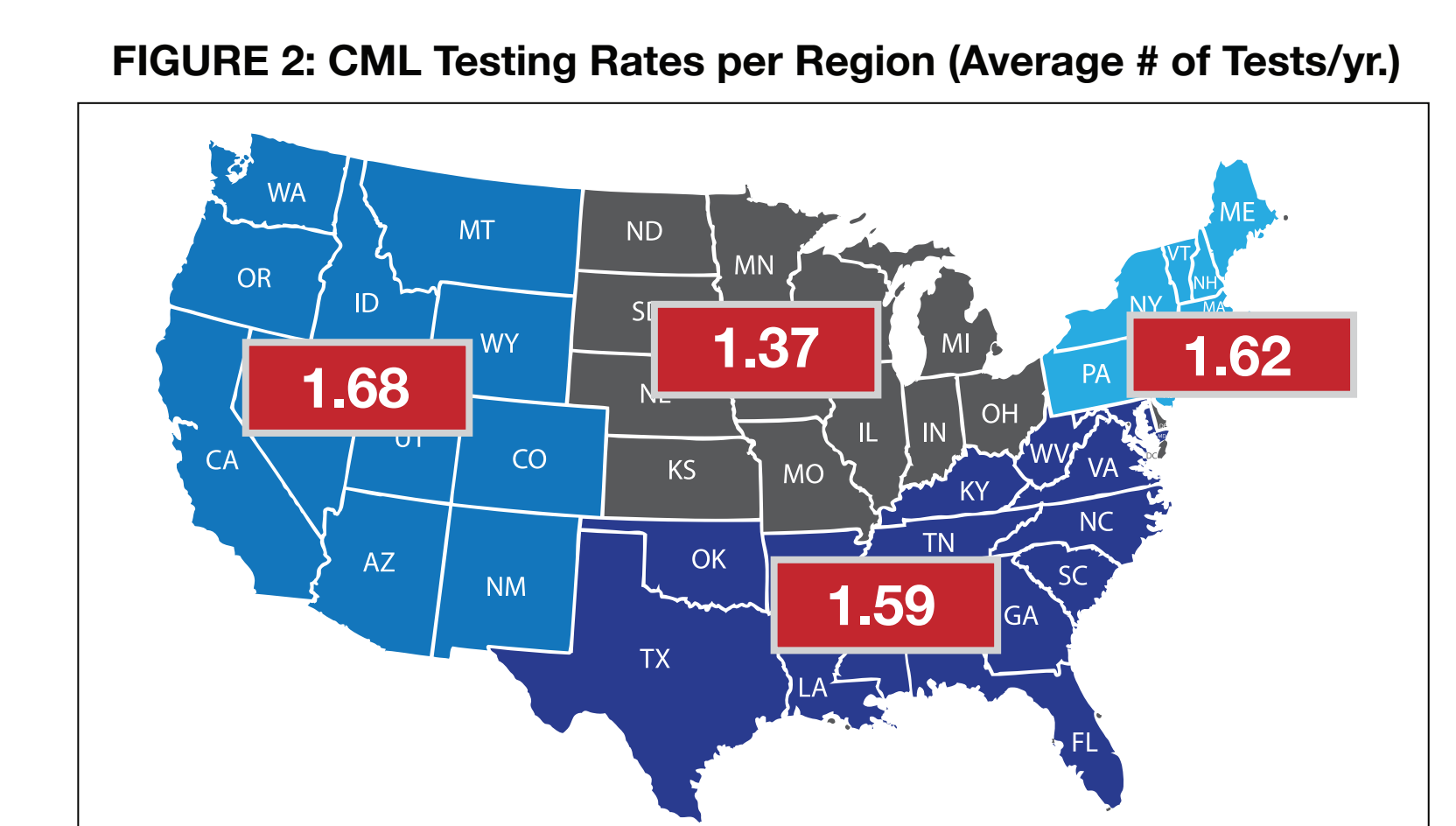
Male patients (n = 2,832) and female patients (n = 2,614) were tested at similar rates/year (average test frequency 1.59 vs. 1.61, p = 0.6).

## RESULTS

Patients < 40 yrs. (n = 621) were tested at a similar rate as those > 40 yrs. (n = 4,825), average test frequency 1.63 vs. 1.59 tests/yr.; p = 0.4. Interaction between patients' gender and age was not significant (p = 0.7).



BCR-ABL testing frequency varied significantly across regions. The regression analysis showed significant downward trends in average annual frequency of testing (p<0.001) from the highest average rate in the West (1.68 tests/yr.), less in the Northeast (1.62 tests/yr.), less in the Southeast (1.59 tests/yr.), to the lowest rate in the Midwest (1.37 tests/yr.) (Figure 2).



## LIMITATIONS

Other potential patient factors were not studied, including stage of CML, therapeutic regimen, duration of disease, comorbidities and insurance status.

Regional differences may reflect the locations of treatment centers of excellence, and require further study.

## CONCLUSIONS

The NCCN guidelines support BCR-ABL testing every 3 months for the first 3 years of therapy, and every 3-6 months thereafter. Thus, in a cross section of CML patients, compliant monitoring would result in at least 2 tests per year.

In this large group of CML patients, only 36% of patients had > 2 tests/year, with only 5% having >4 tests/year. Our results show that ~ 21% of patients had no tests reported over a three-year period. There were no significant differences in testing frequency seen in patients by gender or age.

There were significant differences in testing rates seen across US regions, with the highest rate in the West and the lowest in the Midwest.

Future analyses should include longitudinal views of BCR-ABL results to highlight trends in responses to therapy and CCyR status, and payor type analyses to assess additional characteristics associated with rates of BCR-ABL testing.

### References

1. National Comprehensive Cancer Network. NCCN Guidelines Version 1.2015. Chronic Myelogenous Leukemia. Available at: [http://www.nccn.org/professionals/physician\\_gls/pdf/cml.pdf](http://www.nccn.org/professionals/physician_gls/pdf/cml.pdf) Accessed November 4, 2014.
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### Acknowledgements

The research was funded by Medivo, Inc., New York, NY.

### Disclosure Information

JB: co-founder of Medivo, Inc.; CS, TS, NP: employees of Medivo, Inc.; VO: nothing to disclose. JR: Served as an advisor or consultant for: ARIAD Pharmaceuticals, Inc.; Incyte Corporation; Netris Pharma; Pfizer Inc.; received grants for clinical research from: Novartis Pharmaceuticals Corporation.