

Economic burden of not testing for *FLT3* to treat acute myeloid leukemia

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Background

Acute myeloid leukemia (AML) is a hematologic neoplasm with poor 5-year survival (33%; US 2016), a median survival of only 4 months for relapsed/refractory cases, and, in 2016, a US incidence of 19,950 cases and 10,340 deaths. With the largest patient cohort over 65, AML treatment costs in the first year are >\$25,000 per patient per month (PPPM); the initial month's cost is \$82,328. Mutations in the FMS-like tyrosine kinase 3 (*FLT3*+) pathway confer resistance to standard chemotherapy and reduce the likelihood of survival after relapse. In 2017 and 2018, the FDA approved midostaurin and gilteritinib, two current *FLT3*+ precision medicines for AML. Here, we determine the economic burden of not testing for *FLT3*+

Methods

AML healthcare costs were assessed and modeled for the following settings: hospital, outpatient, emergency, and primary care. Pharmaceutical activity and cost data were extracted from the Centers for Medicare and Medicaid Services (CMS) database, employing Diaceutics' proprietary Global Diagnostic Index. Our model forecasts the economic impact of precision testing to guide *FLT3*+ precision medicines in 2017 through 2019. Our algorithm calculates the number of AML patients with *FLT3*+ based on AML Medicare patients in the Healthcare Cost and Utilization Project database and *FLT3*+ prevalence and switching data.

Results

Total US 2016 AML costs were \$1.574 billion (bn), consisting of (i) hospital care \$1 bn (including \$229 million (mn) for bone marrow transplantation and \$20.5 mn for pharmaceuticals); (ii) outpatient care \$9.8 mn; (iii) emergency care \$553.9 mn; (iv) primary care \$6.6 mn. Analysis of CMS data revealed a paucity of *FLT3*+ testing to guide therapy. We estimate that after testing, 2,164 *FLT3*+ Medicare patients could benefit from precision medicine interventions, generating 2,965 quality-adjusted life years (QALYs) or 2,783 QALYs when administering midostaurin or gilteritinib, respectively.

Discussion

This study is the most detailed analysis of the economic burden of AML among US Medicare patients to date and is the only AML cost-of-illness study to incorporate data concerning patients' QALYs lost by failure to employ precision medicine. This study not only illustrates the minimal *FLT3* testing conducted, but also the lack of precision medicines administered.