Hematology

Measure #1: Myelodysplastic Syndrome (MDS) and Acute Leukemias – Baseline Cytogenetic Testing Performed on Bone Marrow

This measure may be used as an Accountability measure.

<table>
<thead>
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<th>Clinical Performance Measure</th>
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<td><strong>Numerator:</strong></td>
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Definition: *Baseline Cytogenetic Testing- Testing that is performed at time of diagnosis or prior to initiating treatment (transfusion, growth factors, or antineoplastic therapy) for that diagnosis

| Denominator: | All patients aged 18 years and older with a diagnosis of myelodysplastic syndrome (MDS) or an acute leukemia |

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<th>Denominator Exceptions:</th>
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<td>Documentation of medical reason(s) for not performing baseline cytogenetic testing (eg, no liquid bone marrow or fibrotic marrow)</td>
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| Documentation of patient reason(s) for not performing baseline cytogenetic testing (eg, at time of diagnosis receiving palliative care or not receiving treatment as defined above) |

| Documentation of system reason(s) for not performing baseline cytogenetic testing (eg, patient previously treated by another physician at the time cytogenetic testing performed) |

| Measure Description: | Percentage of patients aged 18 years and older with a diagnosis of myelodysplastic syndrome (MDS) or an acute leukemia who had baseline cytogenetic testing performed on bone marrow |

The following clinical recommendation statements are quoted verbatim from the referenced clinical guidelines and represent the evidence base for the measure:

For MDS:

Bone marrow aspiration with Prussian blue stain for iron and biopsy are needed to evaluate the degree of hematopoietic cell maturation abnormalities and relative proportions, percentage of marrow blasts, marrow cellularity, presence or absence of ringed sideroblasts (and presence of iron per se), and fibrosis. Cytogenetics for bone marrow samples (by standard karyotyping methods) should be obtained because they are of major importance for prognosis. (Category 2A Recommendation) (NCCN, MDS 2016)

Significant independent variables for determining outcome for both survival and AML evolution were found to be marrow blast percentage, number of cytopenias, and cytogenetic subgroup (good, intermediate, poor). The percentage of marrow blasts was divisible into four categories: 1) less than 5%, 2) 5% to 10%, 3) 11% to 20%, and 4) 21% to 30% (Category 2A). (NCCN, MDS 2016)

Cytogenetic analysis should be performed on all patients with suspected MDS to confirm the diagnosis, inform management options and provide prognostic information. Cytogenetic analysis should be performed on at least 25 metaphases and should be reported in accordance with the International System for Human Cytogenetic Nomenclature Recommendations (Schaffer et al 2009). Identification of clonal chromosomal abnormalities has become essential.
for the application of international prognostic scoring systems (such as the International Prognostic Scoring System [IPSS] and the revised IPSS [IPSS-R]). A new comprehensive cytogenetic scoring system has been incorporated into the IPSS-R (Schanz, et al 2012). In addition, identification of a specific cytogenetic abnormality may provide a marker for assessing response to therapy. In patients where conventional marrow cytogenetic analysis is not possible (‘dry tap’) or has failed, fluorescence in situ hybridization analysis of bone marrow or peripheral blood films for selected cytogenetic anomalies (for instance monosomy 7, deletion of 5q, trisomy 8) may help provide diagnostic and prognostic evaluation (Evidence levels 2B,C). (BCSH, 20142)

For acute leukemias:

**Acute Myeloid Leukemia:**
Although cytogenetic information is usually unknown when treatment is initiated in patients with de novo AML, karyotype represents the single most important prognostic factor for predicting remission rate, relapse, and overall survival. Therefore, the importance of obtaining sufficient samples of marrow or peripheral blood blasts at diagnosis for this analysis cannot be overemphasized (Category 2A Recommendation).

The importance of obtaining adequate samples on marrow or peripheral blood at diagnosis to do full karyotyping as well as FISH probes for the most common abnormalities cannot be overemphasized. In addition to basic cytogenic analysis, new molecular markers are helping to refine prognostics groups particularly in patients with a normal karyotype (Category 2A Recommendation) (NCCN AML 20163)

**Acute Lymphoblastic Leukemia:**
Hematopathology evaluations should include morphologic examination of malignant lymphocytes using Wright-Giemsa-stained slides and hemtoxylin and eosin (H&E)-stained core biopsy and clot sections, comprehensive immunophenotyping with flow cytometry, and assessment of cytogenetic or molecular abnormalities. Identification of specific recurrent genetic abnormalities is critical for disease evaluation, optimal risk stratification, and treatment planning. (Category 2A Recommendation) (NCCN, 20154)

**Rationale for the measure:**

**For MDS:**
Cytogenetic testing is an integral component in calculating the International Prognostic Scoring System (IPSS) score. Cytogenetic testing should be performed on the bone marrow of patients with MDS in order to guide treatment options, determine prognosis, and predict the likelihood of disease evolution to leukemia.

**For acute leukemias:**
In addition to establishing the type of acute leukemia, cytogenetic testing is essential to detect chromosomal abnormalities that have diagnostic, prognostic, and therapeutic significance. Performing cytogenetic analysis on patients with AML identifies a subgroup of patients where further molecular genetics testing is indicated.
Measure Specifications – Measure #1: Myelodysplastic Syndrome (MDS) and Acute Leukemias – Baseline Cytogenetic Testing Performed on Bone Marrow

Administrative claims data
Administrative claims data collection requires users to identify the eligible population (denominator) and numerator using codes recorded on claims or billing forms (electronic or paper). Users report a rate based on all patients in a given practice for whom data are available and who meet the eligible population/denominator criteria.

Denominator (Eligible Population): All patients aged 18 years and older with a diagnosis of myelodysplastic syndrome (MDS) or an acute leukemia

Patient age >= 18 years

AND

ICD-9-CM diagnosis codes [reportable through 9/30/2015]: 204.00, 204.02, 205.00, 205.02, 206.00, 206.02, 207.00, 207.02, 207.20, 207.22, 208.00, 208.02, 238.72, 238.73, 238.74, 238.75

ICD-10-CM diagnosis codes [reportable beginning 10/01/2015]: C91.00, C91.02, C92.00, C92.02, C92.40, C92.42, C92.50, C92.52, C92.60, C92.62, C92.A0, C92.A2, C93.00, C93.02, C94.00, C94.02, C94.20, C94.22, C95.00, C95.02, D46.0, D46.1, D46.20, D46.21, D46.22, D46.4, D46.9, D46.A, D46.B, D46.C, D46.Z

AND

CPT codes: 99201, 99202, 99203, 99204, 99205, 99212, 99213, 99214, 99215, 99241, 99242, 99243, 99244, 99245

Numerator: Patients who had baseline cytogenetic testing performed on bone marrow
  - Report the CPT Category II code: 3155F – Cytogenetic testing performed on bone marrow at time of diagnosis or prior to initiating treatment

Denominator Exceptions:
  Documentation of medical reason(s) for not performing baseline cytogenetic testing on bone marrow (eg, no liquid bone marrow or fibrotic marrow)
  - Append modifier to CPT Category II code: 3155F-1P

  Documentation of patient reason(s) for not performing baseline cytogenetic testing on bone marrow (eg, at time of diagnosis receiving palliative care or not receiving treatment as defined above)
  - Append modifier to CPT Category II code: 3155F-2P

  Documentation of system reason(s) for not performing baseline cytogenetic testing on bone marrow (eg, patient previously treated by another physician at the time of cytogenetic testing performed)
  - Append modifier to CPT Category II code: 3155F-3P