

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

| Clinical Performance Measure |
|---|
| <p>Numerator: Patients who had baseline cytogenetic testing* performed on bone marrow</p> <p>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</p> <p>Denominator: All patients aged 18 years and older with a diagnosis of myelodysplastic syndrome (MDS) or an acute leukemia</p> <p>Denominator Exceptions: Documentation of medical reason(s) for not performing baseline cytogenetic testing (eg, no liquid bone marrow or fibrotic marrow)</p> <p>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)</p> <p>Documentation of system reason(s) for not performing baseline cytogenetic testing (eg, patient previously treated by another physician at the time cytogenetic testing performed)</p> <p>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</p> |
| <p>The following clinical recommendation statements are quoted verbatim from the referenced clinical guidelines and represent the evidence base for the measure:</p> <p><i>For MDS:</i> 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, 2017¹)</p> <p>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, 2017¹)</p> <p><i>Acute Myeloid Leukemia:</i> 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) (NCCN, 2017²)</p> |

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 cytogenetic analysis, new molecular markers are helping to refine prognostics groups particularly in patients with a normal karyotype. (Category 2A Recommendation) (NCCN, 2016)

For Acute Leukemias:

In addition to morphologic assessment (blood and BM), the pathologist or treating clinician should obtain sufficient samples and perform conventional cytogenetic analysis (ie, karyotype), appropriate molecular-genetic and/or FISH testing, and FCI. The flow cytometry panel should be sufficient to distinguish between acute myeloid leukemia (including acute promyelotic leukemia), T-ALL (including early T-Cell precursor leukemias), B-cell precursor ALL (B-ALL), and AL of ambiguous lineage for all patients diagnosed with AL. Molecular genetic and/or FISH testing does not, however replace conventional cytogenetic analysis. (Strong Recommendation) (CAP/ASH, 2017³)

Acute Lymphoblastic Leukemia:

Hematopathology evaluations should include morphologic examination of malignant lymphocytes using Wright-Giemsa-stained slides and hematoxylin 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, 2017⁴)

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/Registry

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

Patients aged \geq 18 years on date of encounter

AND

Diagnosis for MDS or acute leukemia – not in remission (ICD-10-CM): 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

Patient encounter during the performance period (CPT): 99201, 99202, 99203, 99204, 99205, 99212, 99213, 99214, 99215, 99241, 99242, 99243, 99244, 99245

WITHOUT

Telehealth Modifier: GQ, GT, 95, POS 02

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:

Denominator Exception(s) are determined at the time of the diagnosis of MDS or Acute Leukemia or prior to initiating treatment.

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 cytogenetic testing performed)

- **Append modifier to CPT Category II code: 3155F-3P**

EVIDENCE CLASSIFICATIONS / RATING SCHEMES^{1,2,4}

National Comprehensive Cancer Network (NCCN) Recommendation Rating Scale - - - -

| Category of Consensus | Quality of Evidence | Level of Consensus |
|-----------------------|---------------------|--------------------|
| 1 | High | Uniform |
| 2A | Lower | Uniform |
| 2B | Lower | Non-uniform |
| 3 | Any | Major disagreement |

Category 1: The recommendation is based on high-level evidence (ie, high-powered randomized clinical trials or meta-analyses), and the panel has reached uniform consensus that the recommendation is indicated. In this context, uniform means near unanimous positive support with some possible neutral positions.

Category 2A: The recommendation is based on lower level evidence, but despite the absence of higher level studies, there is uniform consensus that the recommendation is appropriate. Lower level evidence is interpreted broadly, and runs the gamut from phase II or large cohort studies to individual practitioner experience. Importantly, in many instances, the retrospective studies are derived from clinical experience of treating large numbers of patients at a member institution, so panel members have first-hand knowledge of the data. Inevitably, some recommendations must address clinical situations for which limited or no data exist. In these instances, the congruence of experience-based opinions provide an informed if not confirmed direction for optimizing patient care. These recommendations carry the implicit recognition that they may be superseded as higher level evidence becomes available or as outcomes-based information becomes more prevalent.

Category 2B: The recommendation is based on lower level evidence, and there is nonuniform consensus that the recommendation should be made. In these instances, because the evidence is not conclusive, institutions take different approaches to the management of a particular clinical scenario. This nonuniform consensus does not represent a major disagreement, rather it

recognizes that given imperfect information, institutions may adopt different approaches. A Category 2B designation should signal to the user that more than one approach can be inferred from the existing data.

Category 3:

Including the recommendation has engendered a major disagreement among the panel members. The level of evidence is not pertinent in this category, because experts can disagree about the significance of high level trials (McNeill, 2001). Several circumstances can cause major disagreements. For example, if substantial data exist about two interventions but they have never been directly compared in a randomized trial, adherents to one set of data may not accept the interpretation of the other side's results. Another situation resulting in a Category 3 designation is when experts disagree about how trial data can be generalized. An example of this is the recommendation for internal mammary node radiation in postmastectomy radiation therapy. One side believed that because the randomized studies included this modality, it must be included in the recommendation. The other side believed, based on the documented additional morbidity and the role of internal mammary radiation therapy in other studies, that this was not necessary. A Category 3 designation alerts users to a major interpretation issue in the data and directs them to the manuscript for an explanation of the controversy.

College of American Pathologists/American Society of Hematology: Grades for Strength of Recommendation³

| Designation | Recommendation | Rationale |
|--------------------------|--|--|
| Strong Recommendation | Recommended for, or against a particular practice. (Can include “must” or “should.”) | Supported by convincing (high) or adequate (intermediate) quality of evidence and clear benefit that outweighs any harms. |
| Recommendation | Recommend for, or against, a particular practice. (Can include “should” or “may”.) | Some limitations in quality of evidence (adequate [intermediate] or inadequate [low]), balance of benefits and harms, values, or costs, but panel concluded that there is sufficient evidence and/or benefit to inform a recommendation. |
| Expert consensus opinion | Recommended for, or against, a particular practice. (Can include “should” or “may”.) | Serious limitations in quality of evidence (inadequate [low] or insufficient), balance of benefits and harms, values, or costs, but panel consensus was that a statement was necessary. |
| No recommendation | No recommendation for, or against a practice. | Insufficient evidence or agreement of the balance of benefits and harms, values, or costs to provide a recommendation. |

References

¹ National Comprehensive Cancer Network (NCCN). Clinical Practice Guidelines in Oncology: Myelodysplastic Syndromes. Version 1.2018, 2017. Available at: https://www.nccn.org/professionals/physician_gls/pdf/mds.pdf

² National Comprehensive Cancer Network (NCCN). Clinical Practice Guidelines in Oncology: Acute Myeloid Leukemia. Version 3.2017, 2017. Available at: https://www.nccn.org/professionals/physician_gls/pdf/aml.pdf.

³ Arber DA, Borowitz MJ, Cessna M, Etzell J, Foucar K, Hasserjian RP, Rizzo D, Wang SA, Smith AT, Rumble BR, Thomas NE, Vardiman JW. Initial diagnostic workup of acute leukemia. Guideline from the College of American Pathologists and American Society of Hematology. Arch Pathol Lab Med. 2017. Available at: doi: 10.5858/arpa.2016-0504-CP.

⁴ National Comprehensive Cancer Network (NCCN). Clinical Practice Guidelines in Oncology: Acute Lymphoblastic Leukemia. Version 5.2017, 2017. Available at: https://www.nccn.org/professionals/physician_gls/pdf/all.pdf