**MDS Prognostic Scoring System: IPSS-R**

<table>
<thead>
<tr>
<th>Prognostic Variables</th>
<th>Lille</th>
<th>IPSS</th>
<th>DIPSS</th>
<th>DIPSS Plus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cytogenetic results (category)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Bone marrow blasts (%)</td>
<td>&lt;=2.0; &gt;2.0-&lt;5.0, 5.0-10.0, &gt;10.0</td>
<td>x</td>
<td>x</td>
<td></td>
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<tr>
<td>Degree of anemia (Hgb in g/dl) ≥ 10 vs. 8-10 vs. &lt; 8</td>
<td></td>
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<tr>
<td>Degree of neutropenia (x 10^9/L) ≥ 0.8 vs. &lt; 0.8</td>
<td></td>
<td></td>
<td>x</td>
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<tr>
<td>Degree of thrombocytopenia (x 10^9/L) &gt;100 vs. 50-99 vs. &lt;50</td>
<td>x</td>
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<td>x</td>
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*The Lille score identified a WBC > 30 x 10^9/L or a WBC of < 4 x 10^9/L as adverse indicators.

**Prognosis in Primary Myelofibrosis**

- **Anemia (Hgb < 10 g/dl)**
- **WBC > 25 x 10^9/L**
- **Circulating blasts ≥ 1%**
- **Constitutional symptoms**
- **Age > 65**
- **Abnormal karyotype**
- **Platelets <100 x 10^9/L**
- **RBC transfusion dependence**

Please look at each individual paper for the exact score calculation.

**MDS/MPN Prognostic Variables**

<table>
<thead>
<tr>
<th>Prognostic Variables in CMML</th>
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<tbody>
<tr>
<td>Advanced age (&gt;65)</td>
</tr>
<tr>
<td>Decreased hemoglobin (&lt; 10 g/dl)</td>
</tr>
<tr>
<td>*Red cell transfusion dependency</td>
</tr>
<tr>
<td>Decreased platelets (&lt; 100 x 10^9/L)</td>
</tr>
<tr>
<td>Increased absolute monocyte count (&gt; 10 x 10^9/L)</td>
</tr>
<tr>
<td>Circulating immature myeloid cells</td>
</tr>
<tr>
<td>CMMF FAB subtype (*leukocyte &lt;13 x 10^9/L more favorable)</td>
</tr>
<tr>
<td>CMMF WHO subtype (worse prognosis w/ increasing PB/*BM blasts)</td>
</tr>
<tr>
<td>*Cytogenetic risk category</td>
</tr>
<tr>
<td>Low: Normal or –Y</td>
</tr>
<tr>
<td>High: +8, abn of 7, complex</td>
</tr>
<tr>
<td>Intermediate: All others</td>
</tr>
</tbody>
</table>

*Presence of RUNX1, NRAS, SETBP1, ASXL1 mutations

*See [www.aamds.org/mdsrisk](http://www.aamds.org/mdsrisk) for summary of MDS prognostic scoring systems.
MDS: Refractory Cytopenias and Dysplasia

Clinical features
- Constitutional symptoms less likely
- Refractory cytopenia(s)
- Organomegaly unusual

Blood and marrow findings
- Hyper > hypocellularity
- ↑Peripheral/marrow blasts
- Single or multi-lineage dysplasia
- +/-ring sideroblasts

Cytogenetic and molecular features
- CKA in 40-70%, even in absence of dysplasia (commonly 5q-, -7 or 7q-, +8, 20q-, and -Y)

Mutations in SF3B1, TET2, SRSF2, ASXL1, DNMT3A, RUNX1, U2AF1, TP53, and EZH2 are commonly identified, but their presence alone is insufficient to make a diagnosis of MDS

MDS/MPN Overlap Syndromes: Dysplastic Cytopenias with Proliferation

Clinical features
- +/- Constitutional symptoms
- Cytopenia(s) with cytoysis:
  - Thrombocytosis (MDS/MPN with ring sideroblasts and thrombocytosis)
  - Monocytosis (CMML)
  - Neutrophilia (a CML)
- Organomegaly

Blood and marrow findings
- Marrow hypercellularity
- ↑Peripheral/marrow blasts
- Dysplasia
- Ring sideroblasts (RARS-T)

Cytogenetic and molecular features
- CKA in ~30% of CMML
  (+8, del(5q), +10, -11q, -12p, +17p, +19, and +21, and -Y)
- JAK2 V617F mutation (~50%) in MDS/MPN with ring sideroblasts and thrombocytosis
- Often co-mutated with SF3B1 mutations

CSF3R mutations are rarely identified in aCML, whereas SETBP1 and/or ETNK1 mutations can be seen in up to 30% of aCML cases

SRSF2, TET2, and/or ASXL1 are frequently identified in CMML, whereas SETBP1, NRAS/KRAS, RUNX1, CBL, and EZH2 are less frequently identified

Myelofibrosis: Myeloproliferation

Clinical features
- Constitutional symptoms likely
- Cytopenia or cytoysis
- Increased LDH
- Organomegaly

Blood and marrow findings
- Leukoerythroblastosis
- ↑Peripheral/marrow blasts
- Variable cellularity
- Proliferating/atypical megakaryocytes
- Reticulin/collagen fibrosis

Cytogenetic and molecular features
- CKA in ~50%
  (20q-,13q-, abn chromosome 1 or 12, +8,9,-5, and -7)
- JAK2 V617F (60%);
- CALR (20-25%);
- MPL (<10%)

CKA: clonal karyotypic abnormality
CMML: chronic myelomonocytic leukemia
aCML: atypical CML

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