MDS Risk Stratification

IPSS			R-IPSS			WPSS			Global MDAS			LR-MDAS		
Variable	**Score**		**Variable**	**Score**		**Variable**	**Score**		**Variable**	**Score**		**Variable**	**Score**	
BM Blasts			**BM Blasts**			**WHO Category**			**PS > 2**	2		**Unfavorable Cytogenetics[a]**	1	
< 5%	0		< 2%	0		RA, RARS, del5q	0		**Age, years**			**Age ≥ 60 years**	2	
5-10%	0.5		> 2 to < 5%	1		RCMD, RCMD-RS	1		60-64	1		**Hgb < 10 g/dL**	1	
11-20%	1.5		5-10%	2		RAEB-I	2		≥ 65	2		**Plt < 50 × 10^9/L**	2	
21-30%	2.0		> 10%	3		RAEB-II	3		**Platelets, × 10^9/L**			**Plt 50-200 × 10^9/L**	1	
Karyotype[b]			**Karyotype[c]**			**Karyotype[b]**			< 30	3		**BM blasts ≥ 4%**	1	
Good	0		Very good	0		Good	0		30-49	2				
Intermediate	0.5		Good	2		Intermediate	1		50-199	1				
Poor	1.0		Intermediate	4		Poor	2.0		**Hgb < 12 g/dL**	2				
Cytopenia[d]			Poor	6		**Transfusion[e]**			**BM Blasts, %**					
0/1	0		Very poor	8		Yes	1		5-10	1				
2/3	0.5		**Hgb**			No	0		11-29	2				
			≥ 10 g/dL	0					**WBC > 20 × 10^9/L**	2				
			8 to < 10 g/dL	1					**Karyotype**					
			< 8 g/dL	1.5					Chromosome 7 Abn or complex ≥ 3 Abns	3				
			ANC ≤ 0.8	1					**Transfusion**	1				
			Platelets											
			≥ 100	0										
			50-100	0.5										

Risk Group	Sum Score	OS, Y	Risk Group	Sum Score	OS, Y	Risk Group	Sum Score	OS, Mo	Risk Group	Sum Score	OS, Mo	Risk Group	Sum Score	OS, Mo
Low	0	5.7	Very good	0-2	8.8	Very low	0	141	Low	0-4	54	Cat-1	0-2	80
Int-1	0.5-1	3.5	Good	3-5	5.3	Low	1	66	Int-1	5-6	25	Cat-2	3-4	27
Int-2	1.5-2.0	1.1	Int	6-7	3.0	Int	2	48	Int-2	7-8	14	Cat-3	≥ 5	14
High	≥ 2.5	0.4	Poor	8-9	1.6	High	3-4	26	High	≥ 9	6			
			Very poor	10-18	0.8	Very high	5-6	9						

Abbreviations: Abn = abnormal; ANC = absolute neutrophil count; BM = bone marrow; Cat = category; Hgb = hemoglobin; Int = intermediate; IPSS = International Prognostic Scoring System; LR-MDAS = Lower-Risk MDAS; MDAS = M.D. Anderson Scoring System; MDS = myelodysplastic syndromes; OS = overall survival; Plt = platelets; PS = performance status; RA = refractory anemia; RAEB = refractory anemia with excess blasts; RARS = refractory anemia with ring sideroblasts; RBC = red blood cell; RCMD = refractory cytopenia with multilineage dysplasia; RCMD-RS = RCMD with ring sideroblasts; R-IPSS = revised International Prognostic Scoring System; WBC = white blood cell; WHO = World Health Organization; WPSS = WHO-Based Prognostic Scoring System.

[a] In this analysis, diploid and 5q were favorable cytogenetics, all others were considered unfavorable cytogenetics.

[b] Good = normal, -Y, del(5q), del(20q); intermediate = other karyotypic abnormalities; poor = complex (≥ 3 abnormalities) or chromosome 7 abnormalities.

[c] Very good, -Y, del 11q, good is normal, single del5q, del 12p, del 20q, or double including del 5q, intermediate include single del 7q, +8, I (17q), +19, or any double not including del 5q. Poor include der (3q), monosomy 7, double including -7/ 7q, or 3 abnormalities and finally very poor is more than 3 abnormalities.

[d] Hb < 10 g/dL; ANC < 1800/µL; platelets < 100,000/µL.

[e] RBC transfusion dependence was defined as having at least 1 RBC transfusion every 8 weeks over a period of 4 months.

MDS=myelodysplastic syndrome

Komrokji RS, et al. *Clin Lymphoma Myeloma Leuk*. 2013;13 suppl 2:S295-299.

IPSS Is Most Common Tool for Risk Stratification of MDS

Score Value					
Prognostic variable	**0**	**0.5**	**1.0**	**1.5**	**2.0**
Bone marrow blasts	<5%	5% to 10%	--	11% to 20%	21% to 30%
Karyotype*	Good	Intermediate	Poor	--	--
Cytopenias†	0/1	2/3	--	--	--

*Good=normal, -Y, del(5q), del(20q); intermediate=other karyotypic abnormalities; poor=complex (≥3 abnormalities) or chromosome 7 abnormalities.
†Hb <10 g/dL; ANC <800/μL; platelets <100,000/μL.

Total Score					
	0	**0.5**	**1.0**	**1.5**	**2.0**	**≥2.5**
Risk	Low	Intermediate I		Intermediate II		High
Median survival, years	5.7	3.5		1.2		0.4

Cytogenetic Groups in the IPSS-R

Risk group	Included karyotypes (19 categories)	Median survival, months	Proportion of patients in this group
Very good	del(11q), -Y	60.8	2.9%
Good	Normal, del(20q), del(5q) alone or with 1 other anomaly, del(12p)	48.6	65.7%
Intermediate	+8, del(7q), i(17q), +19, +21, any single or double abnormality not listed, two or more independent clones	26.1	19.2%
Poor	der(3q), -7, double with del(7q), complex with 3 abnormalities	15.8	5.4%
Very poor	Complex with >3 abnormalities	5.9	6.8%

IPSS-R=Revised IPSS
Adapted with permission from Schanz J, et al. *J Clin Oncol*. 2012;30(11):820-829.
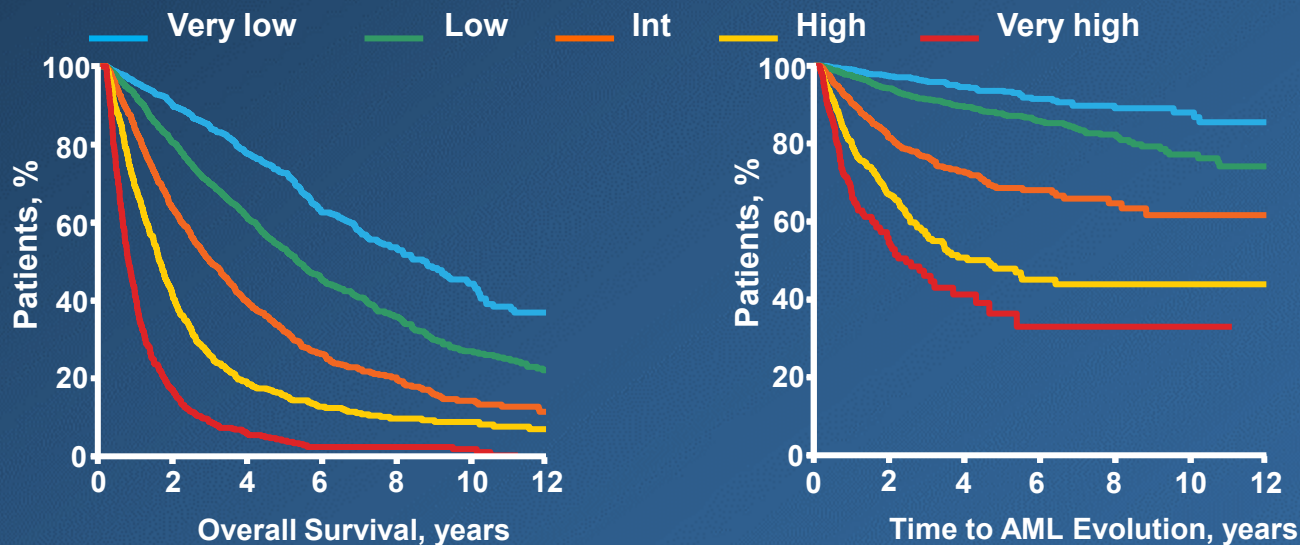
Scoring for the IPSS-R

Parameter	Categories and Associated Scores				
Cytogenetic risk group	Very good	Good	Intermediate	Poor	Very Poor
	0	1	2	3	4
Marrow blast proportion	≤2%	>2% - <5%	5% - 10%	>10%	
	0	1	2	3	
Hemoglobin (g/dL)	≥10	8 - <10	<8		
	0	1	1.5		
Platelet count (x 10^9/L)	≥100	50 - <100	<50		
	0	0.5	1		
Abs. neutrophil count (x 10^9/L)	≥0.8	<0.8			
	0	0.5			

Possible range of summed scores: 0-10

Risk Groups for the IPSS-R

Risk group	Points	% of Patients	Median survival, years	Time until 25% of patients develop AML, years
Very low	≤1.5	19%	8.8	Not reached
Low	>1.5 – 3	38%	5.3	10.8
Intermediate	>3 – 4.5	20%	3.0	3.2
High	>4.5 – 6	13%	1.6	1.4
Very High	>6	10%	0.8	0.73

Int=intermediate
Adapted from Greenberg PL, et al. *Blood.* 1997;89:2079-2088.