MRD in AML: update ELN 2025 guidelines

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ELN Foundation
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MRD ASSESSMENT and VALIDATION in AML

distinct applications? **systematically combined?**

Review Article

blood

Diagnosis and management of AML in adults: 2017 ELN recommendations from an international expert panel

Hartmut Döhner,[1] Elihu Estey,[2] David Grimwade,[3] Sergio Amadori,[4] Frederick R. Appelbaum,[2] Thomas Büchner,[5] Hervé Dombret,[6] Benjamin L. Ebert,[7] Pierre Fenaux,[8] Richard A. Larson,[9] Ross L. Levine,[10] Francesco Lo-Coco,[4] Tomoki Naoe,[11] Dietger Niederwieser,[12] Gert J. Ossenkoppele,[13] Miguel Sanz,[14] Jorge Sierra,[15] Martin S. Tallman,[10] Hwei-Fang Tien,[16] Andrew H. Wei,[17,18] Bob Löwenberg,[19] and Clara D. Bloomfield[20]

blood

Special Report

Check for updates

2021 Update on MRD in acute myeloid leukemia: a consensus document from the European LeukemiaNet MRD Working Party

Michael Heuser,[1] Sylvie D. Freeman,[2] Gert J. Ossenkoppele,[3] Francesco Buccisano,[4] Christopher S. Hourigan,[5] Lok Lam Ngai,[3] Jesse M. Tettero,[3] Costa Bachas,[3] Constance Baer,[6] Marie-Christine Béné,[7] Veit Bücklein,[8] Anna Czyz,[9] Barbara Denys,[10] Richard Dillon,[11] Michaela Feuring-Buske,[12] Monica L. Guzman,[13] Torsten Haferlach,[6] Lina Han,[14] Julia K. Herzig,[12] Jeffrey L. Jorgensen,[15] Wolfgang Kern,[6] Marina Y. Konopleva,[14] Francis Lacombe,[16] Marta Libura,[17] Agata Majchrzak,[18] Luca Maurillo,[4] Yishai Ofran,[19] Jan Philippe,[10] Adriana Plesa,[20] Claude Preudhomme,[21] Farhad Ravandi,[14] Christophe Roumier,[21] Marion Subklewe,[8] Felicitas Thol,[1] Arjan A. van de Loosdrecht,[3] Bert A. van der Reijden,[22] Adriano Venditti,[4] Agnieszka Wierzbowska,[23] Peter J. M. Valk,[24] Brent L. Wood,[25] Roland B. Walter,[26] Christian Thiede,[27,28] Konstanze Döhner,[12] Gail J. Roboz,[13] and Jacqueline Cloos[3]

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MRD ASSESSMENT and VALIDATION in AML

Blood. 2025 Dec 15:blood.2025031480. doi: 10.1182/blood.2025031480. Online ahead of print.

2025 Update on MRD in Acute Myeloid Leukemia: A Consensus Document from the ELN-DAVID MRD Working Party

Jacqueline Cloos [1], Peter J M Valk [2], Christian Thiede [3], Konstanze Döhner [4], Gail J Roboz [5], Brent L Wood [6], Roland B Walter [7], Sa A Wang [8], Agnieszka Wierzbowska [9], Andrew H Wei [10], David Wu [10], Francois Vergez [11], Adriano Venditti [12], Bert A van der Reijden [13], Arjan A van de Loosdrecht [14], Ing Soo Tiong [15], Felicitas R Thol [16], Marion Subklewe [17], Christophe Roumier [18], Tom Reuvekamp [19], Farhad Ravandi [20], Claude Preudhomme [21], Adriana Plesa [22], Jad Othman [23], Gert J Ossenkoppele [24], Yishai Ofran [25], Aguirre Mimoun [26], Luca Maurillo [27], Agata Majchrzak [28], David C de Leeuw [29], Wolfgang Kern [30], Dennis Dong Hwan Dong Hwan Kim [31], Maura Rosane Valério Ikoma-Colturato [32], Lukas H Haaksma [24], Monica L Guzman [5], Michaela Feuring [33], Barbara Depreter [34], Anna Czyz [35], Veit L Bücklein [17], Constance Baer [36], Costa Bachas [37], Sylvie D Freeman [38], Francesco Buccisano [39], Christopher S Hourigan [40], Richard James Dillon [41], Michael Heuser [42]

Process optimization

Introduction

- MRD should be in patients who achieve morphologic remission, with full or partial hematologic recovery (CR/CRh/CRi), independent of ELN 2022 risk classification
  - ELN favorable and intermediate risk patients: 1) after intensive chemotherapy or before allogeneic hematopoietic cell transplantation (HCT), 2) after consolidation chemotherapy/after alloHCT/EOT, 3) during follow-up
  - ELN adverse risk patients: MRD has a proven prognostic value but is not recommended per se before HCT because it should not impact the choice of transplant

Introduction

2025 Update on MRD in Acute Myeloid Leukemia: A Consensus Document from the ELN–DAVID MRD Working Party

56 recommendations
- 22 on clinical implementation
- **15 on MFC-MRD**
- 19 on molecular MRD
- /

Only six recommendations remain unchanged from 2021

Aligns MRD assessment explicitly with the ELN 2022 genetic risk classification, moving beyond methodological standardisation

Integrated clinical framework by strongly embedding MRD into treatment decision-making

2021 Update on MRD in acute myeloid leukemia: a consensus document from the European LeukemiaNet MRD Working Party

59 recommendations
- 29 on clinical implementation (8 and 8a)
- **12 on MFC-MRD**
- 14 on molecular MRD
- 4 on future improvement

Methodological and technology-centred consensus on MRD

No concrete decision pathways based on MRD

Cloos, J., et al. (2025). Blood.

Key updates of the revised AML MRD recommendations

1) Detailed MRD guidance is tailored to each (genetic) subgroup, aligned with the **ELN 2022 risk classification**, for each treatment-deciding timepoint in adults receiving intensive chemotherapy

! Does **not** include guidance on MRD assessment in **non-intensively** treated patients

Diagnosis and management of AML in adults: 2022 recommendations from an international expert panel on behalf of the ELN

Hartmut Döhner,[1] Andrew H. Wei,[2] Frederick R. Appelbaum,[3] Charles Craddock,[4] Courtney D. DiNardo,[5] Hervé Dombret,[6] Benjamin L. Ebert,[7] Pierre Fenaux,[8] Lucy A. Godley,[9] Robert P. Hasserjian,[10] Richard A. Larson,[11] Ross L. Levine,[12] Yasushi Miyazaki,[13] Dietger Niederwieser,[14] Gert Ossenkoppele,[15] Christoph Röllig,[16] Jorge Sierra,[17] Eytan M. Stein,[18] Martin S. Tallman,[18] Hwei-Fang Tien,[19] Jianxiang Wang,[20] Agnieszka Wierzbowska,[21] and Bob Löwenberg[22]

Genetic risk classification for adults with AML receiving less-intensive therapies: the 2024 ELN recommendations

Hartmut Döhner,[1] Courtney D. DiNardo,[2] Frederick R. Appelbaum,[3] Charles Craddock,[4] Hervé Dombret,[5] Benjamin L. Ebert,[6] Pierre Fenaux,[7] Lucy A. Godley,[8] Robert P. Hasserjian,[9] Richard A. Larson,[10] Ross L. Levine,[11] Yasushi Miyazaki,[12] Dietger Niederwieser,[13] Gert Ossenkoppele,[14] Christoph Röllig,[15] Jorge Sierra,[16] Eytan M. Stein,[11] Martin S. Tallman,[11] Hwei-Fang Tien,[17] Jianxiang Wang,[18] Agnieszka Wierzbowska,[19] Andrew H. Wei,[20] and Bob Löwenberg[21]

Received: 23 June 2023 | Revised: 15 August 2023 | Accepted: 21 August 2023

DOI: 10.1002/ajh.27087

RESEARCH ARTICLE

AJH WILEY

Measurable residual disease monitoring in patients with acute myeloid leukemia treated with lower-intensity therapy: Roadmap from an ELN-DAVID expert panel

Key updates of the revised AML MRD recommendations

ELN 2022 favorable risk

Risk Category	Genetic Abnormality
Favorable	t (8;21) (q22;q22.1); *RUNX1-RUNX1T1* inv (16) (p13.1q22) or t (16;16) (p13.1;q22); *CBFB-MYH11* Mutated *NPM1* without *FLT3*-ITD bZIP in-frame mutated *CEBPA*

ELN risk	Subgroup	After 2 cycles induction or pre-alloHCT	End of treatment (EOT: after consolidation/after alloHCT)	Follow-up
Favorable	mut*NPM1* without *FLT3*-ITD	PB	BM	PB or BM[2]
	RUNX1::RUNX1T1	BM	BM	PB or BM[4]
	CBFB::MYH11	BM	BM	PB or BM[4]
	PML::RARA	Not recommended	BM[5]	Only if MRD-positive at EOT, and in chemotherapy-treated high-risk APL even when MRD-negative; BM[1,5]
	CEBPA bZIP in-frame	Some evidence	Future research needed	Future research needed

Deng et al. Leukemia & lymphoma. 2019;60(9):2181-9; Vonk et al. HemaSphere. 2024;8(8):e141

Adapted version of Table 2. of the original ELN 2025 update: Recommended MRD assay per ELN risk group and per mutational status. Cloos, J., et al. (2025). Blood.

Key updates of the revised AML MRD recommendations

ELN 2022 intermediate risk

Intermediate	Mutated *NPM1* with *FLT3*-ITD
	Wild-type *NPM1* with *FLT3*-ITD
	t (9;11) (p21.3;q23.3); *MLLT3-KMT2A*
	Cytogenetic abnormalities not classified as favorable or adverse

ELN risk	Subgroup	After 2 cycles induction or pre-alloHCT	End of treatment (EOT: after consolidation/after alloHCT)	Follow-up
Intermediate	*FLT3*-ITD and *NPM1*wt	*FLT3*-ITD UHS-NGS: BM>PB	*FLT3*-ITD UHS-NGS[4]: BM>PB	*FLT3*-ITD UHS-NGS[6]: PB or BM[1]
		MFC: BM	MFC: BM	MFC: BM (q3 months for 12 months)
	FLT3-ITD and mut*NPM1*	mut*NPM1*-qPCR: PB	mut*NPM1*-qPCR: BM	mut*NPM1*-qPCR: PB or BM[1]
		FLT3-ITD UHS-NGS:BM>PB	*FLT3*-ITD UHS-NGS[6] BM>PB	*FLT3*-ITD UHS-NGS[6]: PB or BM[1]
	KMT2A::MLLT3, other fusion genes[7]	qPCR and MFC: BM	qPCR and MFC: BM	qPCR: PB or BM[1]
				MFC: BM (q3 months for 12 months)
	Other (with LAIP/DfN)	BM	BM	BM (q3 months for 12 months)
	Other (with gene mutation)	Cut-offs, time points and sample matrices for UHS-NGS of gene mutations should be further validated gene by gene		After alloHCT (only validated genes)[8] BM>PB[1,9]

Adapted version of Table 2. of the original ELN 2025 update: Recommended MRD assay per ELN risk group and per mutational status. Cloos, J., et al. (2025). Blood.

Key updates of the revised AML MRD recommendations

ELN 2022 adverse risk

Adverse	t (6;9) (p23;q34.1); *DEK-NUP214* t (v;11q23.3); *KMT2A rearranged* t (9;22) (q34.1;q11.2); *BCR-ABL1* inv(3) (q21.3q26.2) or t (3;3) (q21.3;q26.2); *GATA2, MECOM(EVI1)* t (3q26.2;v); *MECOM (EVI1)*-rearranged −5 or del (5q); −7; −17/abn (17p) Complex karyotype, monosomal karyotype Mutated *ASXL1, BCOR, EZH2, RUNX1, SF3B1, SRSF2, STAG2, U2AF1*, or *ZRSR2* Mutated *TP53*

ELN risk	Subgroup	After 2 cycles induction or pre-alloHCT	End of treatment (EOT: after consolidation/after alloHCT)	Follow-up
Adverse	Fusion genes (e.g. *KMT2A::X*)	qPCR and MFC: BM	qPCR and MFC: BM	qPCR: see section on future research MFC: BM (q3 months for 12 months)
	Other (with LAIP/DfN)	BM	BM	BM (q3 months for 12 months)
	Other (with gene mutation)[10]	Cut-offs, time points and sample matrices for UHS-NGS of gene mutations should be further validated gene by gene		After alloHCT (only validated genes)[8] BM>PB[1,9]

Adapted version of Table 2. of the original ELN 2025 update: Recommended MRD assay per ELN risk group and per mutational status. Cloos, J., et al. (2025). Blood.

Key updates of the revised AML MRD recommendations

2) Every **MRD answer**, regardless of the technique, should be **three-tiered**:
   - MRD%
   - MRD burden (categoric variable)
     - Negative
     - Low-level positive: detectable, prognostic?
     - Positive
   - Qualitative MRD response (contextual)
     ! CML traffic light model
     - Optimal
     - Warning
     - High risk of treatment failure
       or
     - MRD relapse

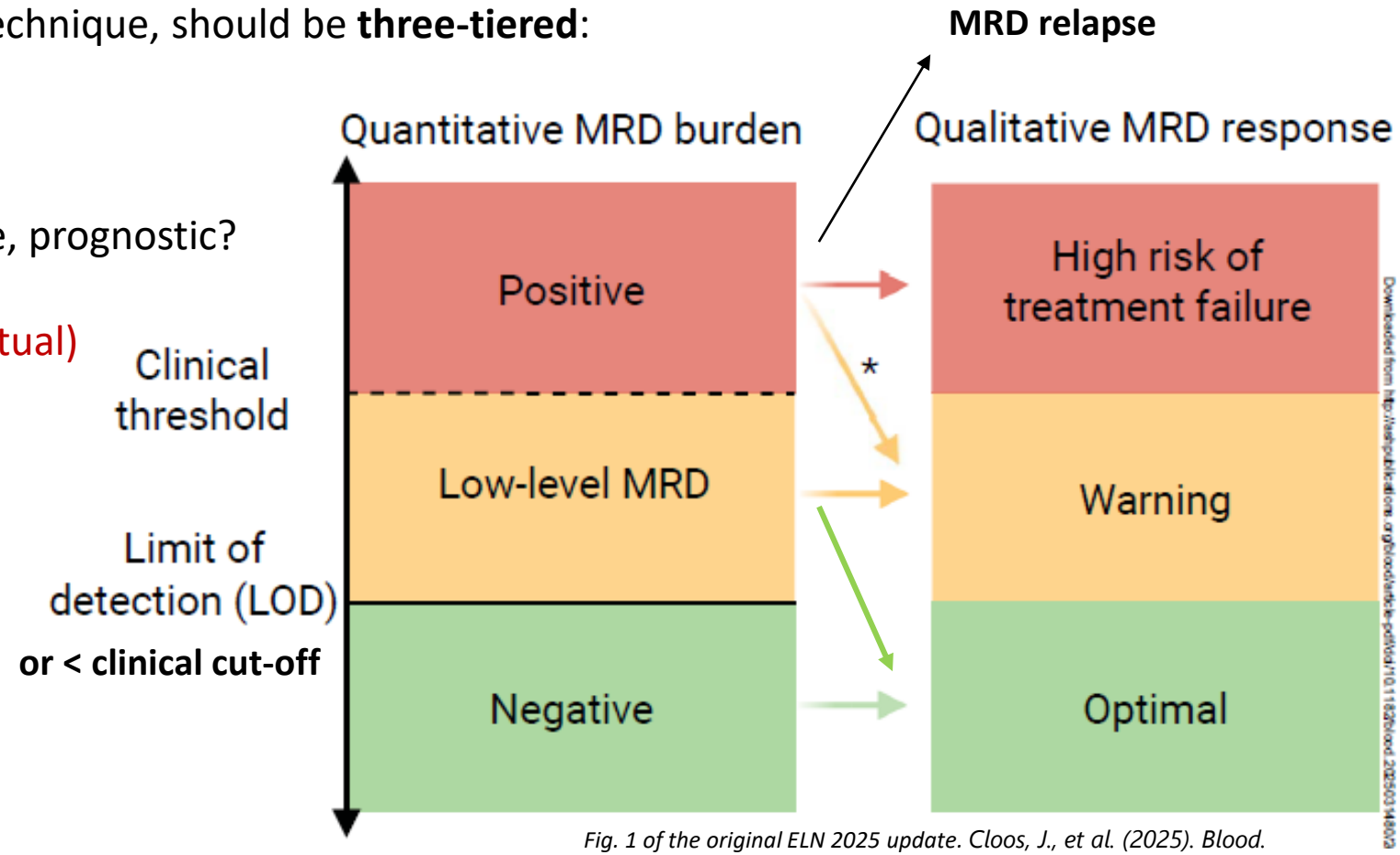


Fig. 1 of the original ELN 2025 update. Cloos, J., et al. (2025). Blood.

High flexibility in interpretation based on AML subtype, timepoint, and sample matrix

Key updates of the revised AML MRD recommendations

3) No one-fits-all-principle: **thresholds for MRD positivity** and **LOD** differ between **targets, assays, sample matrices and timepoints**

- Timepoints:
  - After induction/pre-alloHCT
  - After consolidation/after alloHCT (EOT)
  - Follow-up
- Sample matrix
  - PB
  - BM
  - PB or BM
- Assay
  - Multicolour flowcytometry (MFC)
  - Quantitative PCR (qPCR)
  - Ultrahigh-sensitivity (UHS) NGS

Key updates of the revised AML MRD recommendations

4) MRD Relapse is defined by the conversion from undetectable to detectable MRD combined with **AML (genetic) subtype-specific cut-offs** (and sample matrix specific cut-offs in case of mut*NPM1*)*

- CBF AML qPCR: PB or BM: ≥0.1%
- LAIP/DfN: BM: ≥0.1%
- *NPM1* qPCR
  - PB: ≥0.01%
  - BM: ≥0.1%
- Gene mutations UHS-NGS: PB or BM ≥0.01%
- *PML::RARA* qPCR: BM: ≥0.001%
- *FLT3*-ITD UHS-NGS: PB or BM: ≥LOD

Only if no high diagnostic LAIP/DfN certainty

? Repeat sample to confirm MRD relapse (within 4 weeks, preferably both in PB and BM)

+ Repeat sampling within 2–4 weeks is also advised when non-diagnostic immunophenotypic abnormalities are observed

*In patients who have never tested MRD-, a ≥1 $\log_{10}$ increase from the measured nadir within the same tissue regardless of threshold is required

MFC-MRD

- Applicable in ~90% of the AML patients, regardless of the ELN 2022 risk group (**including** *CEBPA*m patients, *KMT2A*r patients and *FLT3*-ITDm patients with no access to UHS-NGS MRD)
- Q3 monitoring during follow-up for 1 year

- Minimal 500 000 WBC events, no minimal events in the blast compartment
- Only BM
- Report LOD and LOQ
  - LOQ: minimal 0.01% (50 events / 500 000 WBC)
  - LOD: minimal 0.004% (20 events / 500 000 WBC)
- Regular EQC
- (Automated analysis)

MFC-MRD

Multiparameter flow cytometry MRD as LAIP+ or DfN+ blasts/CD45 expressing cells (%)				
Baseline	BM or PB[11]	≥10% of blasts	LAIP assessment	-
2 cycles of intensive chemotherapy or pre-alloHCT	BM	<0.01%[12] OR <LOD[12]	Negative	Optimal
		≥0.01% to <0.1% AND >LOD	Low-level positive	Warning
		≥0.1%	Positive	High risk of treatment failure
End of treatment (after consolidation/after alloHCT)	BM	<0.01%[12] OR <LOD[12]	Negative	Optimal
		≥0.01% to <0.1% AND >LOD	Low-level positive	Warning
		≥0.1%	Positive	High risk of treatment failure
Follow-up	BM	<0.01%[12] OR <LOD[12]	Negative	Optimal
		≥0.01% to <0.1% AND >LOD	Low-level positive	Warning[3]
		≥0.1%[13,14]	MRD relapse	MRD relapse

Irrespective of the timepoint: same cut-offs, MRD burden and qualitative MRD response for each MRD%

Adapted version of Table 3. of the original ELN 2025 update: Cloos, J., et al. (2025). Blood.

MFC-MRD

- Harmonized marker combinations

  8c ELN MRD (2021): CD45, CD33, CD13, CD34, CD117, HLADR, CD7, CD56

  - Build up experience with regenerating or “stressed” hematopoiesis
  - Panel ELN2025: Table S5

B3	We recommend harmonized use of the integrated diagnostic-LAIP and DfN strategy for MRD detection that incorporates core MRD markers CD34, CD117, CD45, CD33, CD13, CD56, CD7, HLA-DR to assess all samples. If using 10 colors, the consensus MRD marker combinations are: Core: CD33, CD13, CD56, CD7, HLA-DR, CD38, CD11b, CD34, CD117, CD45. Monocytic MRD: HLA-DR, CD64, CD14, CD15, CD4, CD123, CD36, CD34, CD117, CD45.

10c	12c	13-16c	monocytic
CD38			CD64
CD11b			CD14
	CD15		CD11b
	CD19		CD4
		CD123	CD123
		CD133	
		CD36	
		CD14	

Unpublished (ELN-DAVID WG)

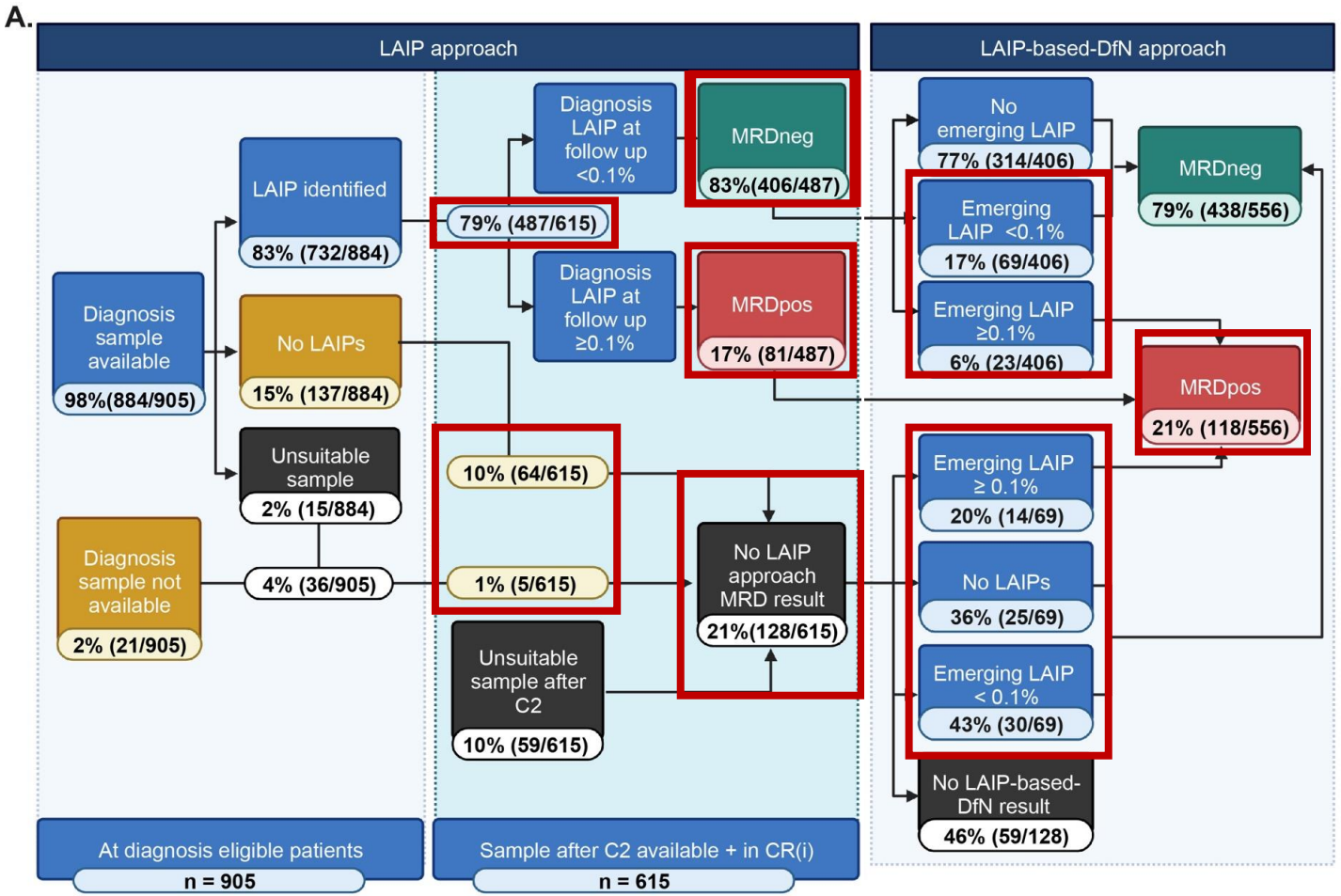
MFC-MRD

- Harmonized LAIP+DfN approach: tracking diagnostic and emergent clones
- MRD reporting based on the **total sum** of **LAIP/DfN** positive cells
  - LAIP
    - \+ sensitive
    - \- immunophenotypic shifts (clonal evolution, therapy…)
    - \- diagnostic material
  - DfN
    - \+ no diagnostic material
    - \- ample experience in maturation

  →Added value LAIP-based-DfN approach?

MFC-MRD

- Harmonized LAIP+DfN approach



Emerging LAIP: LAIP present at FU but not found at Dx

11,3% (69/615) additional MRD interpretations

Reclassification of 23% MRD- results

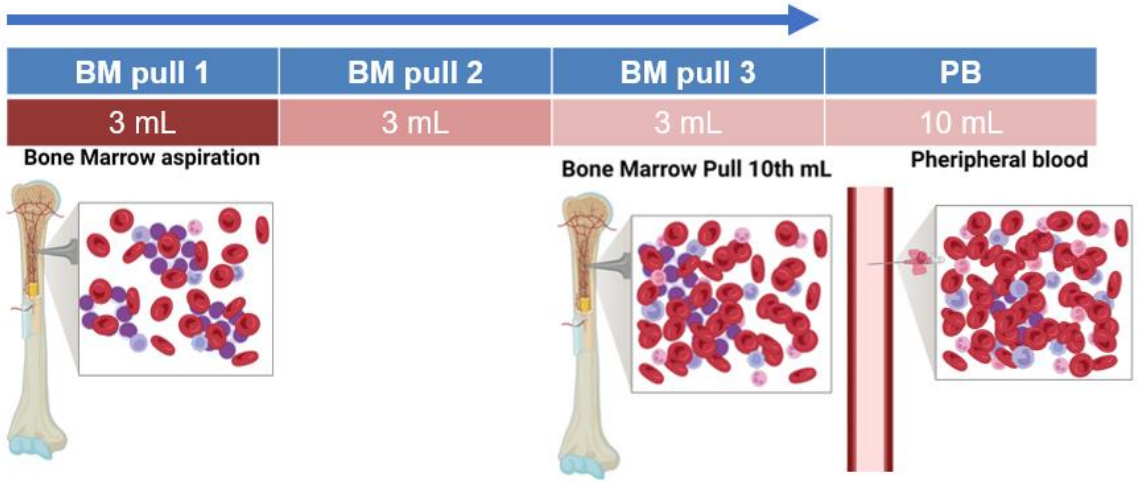
Subsequent increase of 4% MRD+ results
Also consider emerging LAIPs: double # MRDpos!

! Critical note: no significant impact on relapse prediction
* 25% MRDneg patients relapsed within 5 years
* 'old' cut-off

[1]Ngai LL, et al. Blood. 2023;142(Supplement 1):1572–1572: Re-analysis of HOVON-SAKK132.

MFC-MRD

- Harmonized sample quality control: check for hemodilution



Formula for detecting hemodilution	Disease measured	Additional requirements
Bone marrow purity = [1-(erythrocytes BM/erythrocytes PB) x (leukocytes PB/leukocytes BM)] x 100%	MDS	Matched PB
PB contamination index = −3.052 + 0.065 x (%CD10+ neutrophils of granulocytes) −0.609 x (%CD34+)−2.008 x (%plasma cells)	MM (not used post induction)	CD10, CD38, CD138, CD34 positive cells and plasma cells
Normalized blast count = (80% / % dim CD16) x blast count	MDS/ AML	CD16 (maturing neutrophils)
Predicted bone marrow purity = [1 - (Lymphocytes FCM / Lymphocytes PB) x (Leukocytes PB / Leukocytes FCM)] x 100%	AML/MDS	Matched PB
Suggested blood contamination if mast cell population ($CD117^+$) ⩽ 0.002%	MM	CD117 positive mast cells

  - Request first-pull BM aspirate for MRD
  - Process sample within 3 days of storage, undiluted, in ambient conditions
  - Include hemodilution strategies and result in the MRD assay report
- If present, BM re-evaluation within 2 weeks to avoid unreliable MRD results.
- Panel experience: poor quality BMs more frequent after venetoclax/azacitidine regimens

Tettero, et al. *HemaSphere* 2021

MFC-MRD

- Harmonised Report (Table S2)

Parameter	MFC-MRD
MRD technique	MFC-MRD
MRD approach	LAIP/DfN
Analyzed tissue	BM
Time point of tissue sampling relative to treatment	PC2, EOT, follow-up etc.
Quality of sample/analysis	Adequate (number of CD45 expressing cells >500,000), inadequate
Number of CD45+ cells	Cell number
Blast percentage	Blast %
Target phenotype 1	Markers of LAIP/DfN no.1
Quantification of phenotype	Number of cells with phenotype 1
Percentage MRD	% LAIP or DfN positive cells of CD45+ cells
MRD burden	Positive; LL-pos, negative
Qualitative MRD response	Optimal, warning, high risk of treatment failure or MRD relapse
Limit of detection (LOD) (especially if MRD is negative)	LOD (for each phenotype)

4 interpretation-specific

4 sample-quality

5 disease-/sample-specific

Cloos, J., et al. (2025). Blood.

Examples

A. A *CEBPA*-bZIP mutated patient underwent 2 cycles of intensive chemo and BM shows 60 LAIP/DfN events (total of 800.000 WBC measured)

***Multiparameter flow cytometry* MRD as *LAIP+ or DfN+* blasts/CD45 expressing cells (%)**				
Baseline	BM or PB[11]	≥10% of blasts	LAIP assessment	-
2 cycles of intensive chemotherapy or pre-alloHCT	BM	<0.01%[12] OR <LOD[12]	Negative	Optimal
		≥0.01% to <0.1% AND >LOD	Low-level positive	Warning
		≥0.1%	Positive	High risk of treatment failure
End of treatment (after consolidation/after alloHCT)	BM	<0.01%[12] OR <LOD[12]	Negative	Optimal
		≥0.01% to <0.1% AND >LOD	Low-level positive	Warning
		≥0.1%	Positive	High risk of treatment failure
Follow-up	BM	<0.01%[12] OR <LOD[12]	Negative	Optimal
		≥0.01% to <0.1% AND >LOD	Low-level positive	Warning[3]
		≥0.1%[13,14]	MRD relapse	MRD relapse

Examples

A. A *CEBPA*-bZIP mutated patient underwent 2 cycles of intensive chemo and BM shows 60 LAIP/DfN events (total of 800.000 WBC measured: LLOQ 0.0063%, LOD 0.0025%)

    1. MRD%: 0.0075% (LOD<MRD% <0.01%)
    2. MRD burden: negative
    3. MRD qualitative respons: optimal

Examples

B. An ELN IR patient receives EOT a MFC-MRD evaluation in BM, which shows 300 LAIP/DfN events (total of 800.000 WBC measured)

***Multiparameter flow cytometry* MRD as *LAIP+ or DfN+* blasts/CD45 expressing cells (%)**				
Baseline	BM or PB[11]	≥10% of blasts	LAIP assessment	-
2 cycles of intensive chemotherapy or pre-alloHCT	BM	<0.01%[12] OR <LOD[12]	Negative	Optimal
		≥0.01% to <0.1% AND >LOD	Low-level positive	Warning
		≥0.1%	Positive	High risk of treatment failure
End of treatment (after consolidation/after alloHCT)	BM	<0.01%[12] OR <LOD[12]	Negative	Optimal
		≥0.01% to <0.1% AND >LOD	Low-level positive	Warning
		≥0.1%	Positive	High risk of treatment failure
Follow-up	BM	<0.01%[12] OR <LOD[12]	Negative	Optimal
		≥0.01% to <0.1% AND >LOD	Low-level positive	Warning[3]
		≥0.1%[13,14]	MRD relapse	MRD relapse

Examples

B. An ELN IR patient receives EOT a MFC-MRD evaluation in BM, which shows 300 LAIP/DfN events (total of 800.000 WBC measured: LLOQ 0.0063%, LOD 0.0025%)

   1. MRD%: 0.038% (0.01%≤MRD%<0.1% AND MRD%>LOD)
   2. MRD burden: MRD-LL
   3. MRD qualitative respons: warning

Examples

C. A *NPM1*wt/*FLT3*-ITDm patient with no access to UHS-NGS MRD shows 6 months after stop therapy in BM 3000 LAIP/DfN events (total of 800.000 WBC measured : LLOQ 0.0063%, LOD 0.0025%) whereas nadir measurement was negative

Multiparameter flow cytometry MRD as LAIP+ or DfN+ blasts/CD45 expressing cells (%)				
Baseline	BM or PB[11]	≥10% of blasts	LAIP assessment	-
2 cycles of intensive chemotherapy or pre-alloHCT	BM	<0.01%[12] OR <LOD[12]	Negative	Optimal
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Follow-up	BM	<0.01%[12] OR <LOD[12]	Negative	Optimal
		≥0.01% to <0.1% AND >LOD	Low-level positive	Warning[3]
		≥0.1%[13,14]	MRD relapse	MRD relapse

Examples

C. A *NPM1*wt/*FLT3*-ITDm patient with no access to UHS-NGS MRD shows 6 months after stop therapy in BM 3000 LAIP/DfN events (total of 800.000 WBC measured: LLOQ 0.0063%, LOD 0.0025%) whereas nadir measurement was negative

1. MRD%: 0.38% (MRD%>0.1%)
2. MRD burden: MRD pos
3. MRD qualitative respons: MRD relapse

! Depending on the diagnostic LAIP/DfN certainty: ask for repeat sample to confirm MRD relapse (within 4 weeks, preferably both in PB and BM)

Summary

- Well-validated cut-offs, together with the newly introduced MRD burden and qualitative MRD response, are proposed to harmonise MFC-MRD reporting
- Main changes compared to ELN 2021
  - MRD-LL
  - No minimal blast events
  - Q3 monitoring for 1 year
- MRD reporting based on the total sum of LAIP/DfN positive cells: tacit knowledge (ab)normal immunophenotypic expression patterns

! Stressed and regenerating haematopoiesis

! Low risk MDS and clonal haematopoiesis of indeterminate potential (CHIP)

Summary

- The updated MRD recommendations are summarized in the AML MRD guideline App (https://eln-aml-mrd-2025.vercel.app/)
- Review Belgian Journal Hematology (upcoming): practical must-to-knows (haematologist's point-of-view)

Questions?

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