

Il Valore Aggiunto delle

Cure Palliative Precoci

The Added Value of

Early Palliative Care

Mario Luppi, MD, PhD

Hematology Chair and Division of Hematology

UNIMORE, AOU Modena, Italy

 **fondazione GIMEMA** onlus
per la promozione e lo sviluppo della ricerca scientifica
sulle malattie ematologiche. **FRANCO MANDELLI**

Con il patrocinio di



LE CURE PALLIATIVE PRECOCI IN
EMATO-ONCOLOGIA:
la nuova risposta ai bisogni di pazienti e caregivers

19 maggio 2023

Roma, Hotel Donna Camilla Savelli



Mario Luppi, MD, PhD

| Company name | Research support | Employee | Consultant | Stockholder | Speakers bureau | Advisory board | Other |
|--------------|------------------|----------|------------|-------------|-----------------|----------------|-------|
| Abbvie | | | | | | X | |
| Gilead Sci | | | | | | X | |
| Grifols | | | | | | X | |
| Jazz Pharma | | | | | | X | |
| Novartis | | | | | | X | |
| Sanofi | | | | | | X | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |



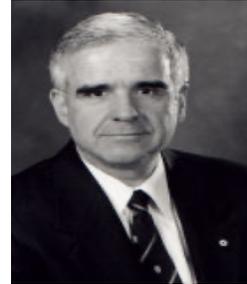
Cicely Saunders (1918- 2005)
Hospice Movement



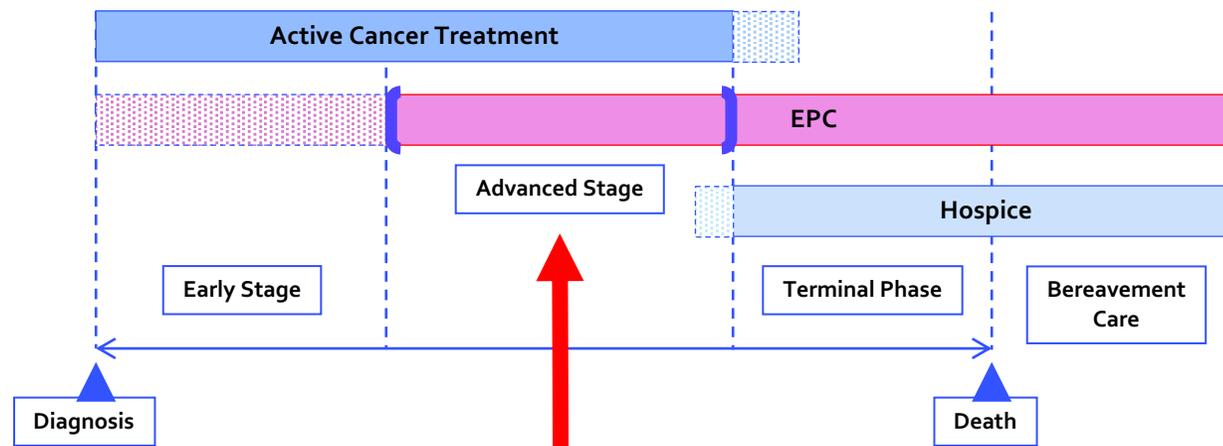
St. Christopher, 1967

END-OF-LIFE CARE INTERVENTIONS ARE IMPORTANT BUT NOT ENOUGH

Balfourt Mount in 1975,
Canada, coined the «Palliative Care»



Early Palliative Care in Oncologic (and Hematologic) Patients



PALLIATIVE CARE INTERVENTIONS ARE NECESSARY DURING THE WHOLE ILLNESS TRAJECTORY

Smith et al. J Clin Oncol 2012;30: 880–887 ,

Ferrell et al. J Clin Oncol 2017; 35: 96-112



Q: Why do we need to anticipate palliative care interventions?

A: May be, because patients/primary caregivers have unsatisfied needs, NOT ONLY AT THE END OF LIFE CARE.

Are there any evidences?



Added Value of Early Palliative Care (as Early as Possible)

- To provide LONG TERM comprehensive assessment and management of physical symptoms and psychological distress.
- To provide TIMELY AND LONG TERM measurement of physical symptoms and psychological distress (relevance for PROGNOSIS AND THERAPY).
- To implement TIMELY AND LONG TERM goals of care (GOC) discussion:
 - a) prognostic awareness of patients,
 - b) decision making-treatment choices-future planning,
 - c) coping with life-threatening disease and
 - d) support to primary caregivers, also after bereavement.



Is pain in patients with haematological malignancies under-recognised? The results from Italian ECAD-O survey

Bandieri et al., *Leukemia Research* 34 (2010) e334–e335

Pain intensity

Solid Tumors 59.4% moderate severe

Hematologic Tumors 67.3% moderate-severe

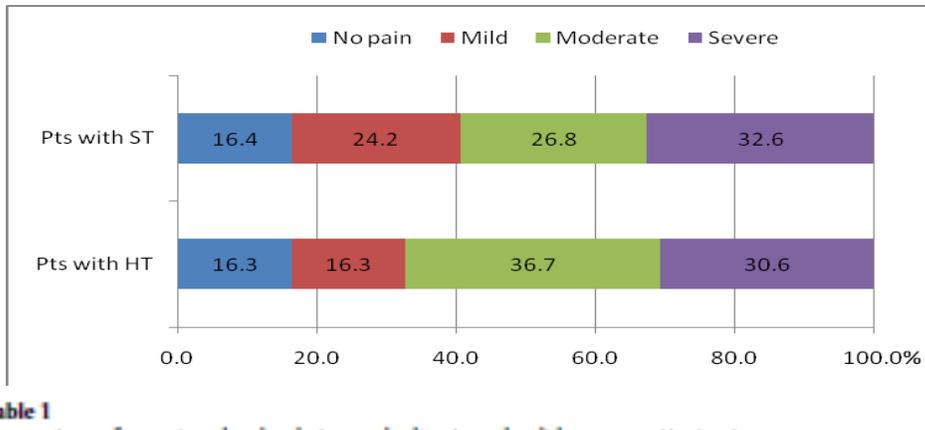


Table 1 Comparison of symptom burden between leukemia and solid cancer patients at diagnosis.

| ESAS symptoms | Leukemia | | Solid cancer | | p |
|---------------|----------|-------|--------------|-------|--------|
| | Median | Range | Median | Range | |
| Pain | 1 | 0-7 | 0 | 0-7 | 0.1306 |
| Fatigue | 3 | 0-10 | 1 | 0-9 | 0.0370 |
| Nausea | 0 | 0-8 | 0 | 0-9 | 0.0042 |
| Depression | 1 | 0-8 | 0 | 0-10 | 0.7243 |
| Anxiety | 1 | 0-10 | 2 | 0-10 | 0.4477 |
| Drowsiness | 2 | 0-10 | 0 | 0-10 | 0.002 |
| Appetite | 1 | 0-9 | 0 | 0-9 | 0.0039 |
| Well-being | 0.5 | 0-7 | 0 | 0-10 | 0.0692 |
| Dyspnea | 0 | 0-8 | 0 | 0-10 | 0.8096 |

Pain and emotional distress in leukemia patients at diagnosis

Leukemia Research 34 (2010) e67–e68



Pain in patients with newly diagnosed or relapsed acute leukemia

Adir Shaulov^{1,2} · Gary Rodin^{1,3} · Gordana Popovic¹ · Valerie B. Caraiscos^{1,4} · Lisa W. Le⁵ · Anne Rydall¹ · Aaron D. Schimmer^{6,7} · Camilla Zimmermann^{1,3,8}

Table 2 Pain frequency, severity and distress

| | Frequency | | Severity | | Distress | |
|---|-----------|------|----------|------|----------|------|
| | n | % | n | % | n | % |
| 0 | 161 | 50.8 | 161 | 51.3 | 169 | 53.8 |
| 1 | 31 | 9.8 | 26 | 8.3 | 37 | 11.8 |
| 2 | 59 | 18.6 | 72 | 22.9 | 37 | 11.8 |
| 3 | 42 | 13.3 | 42 | 13.4 | 36 | 11.5 |
| 4 | 24 | 7.6 | 13 | 4.1 | 35 | 11.2 |

Pain reported by 49,2% pts; of these 35.3% reported severe pain.

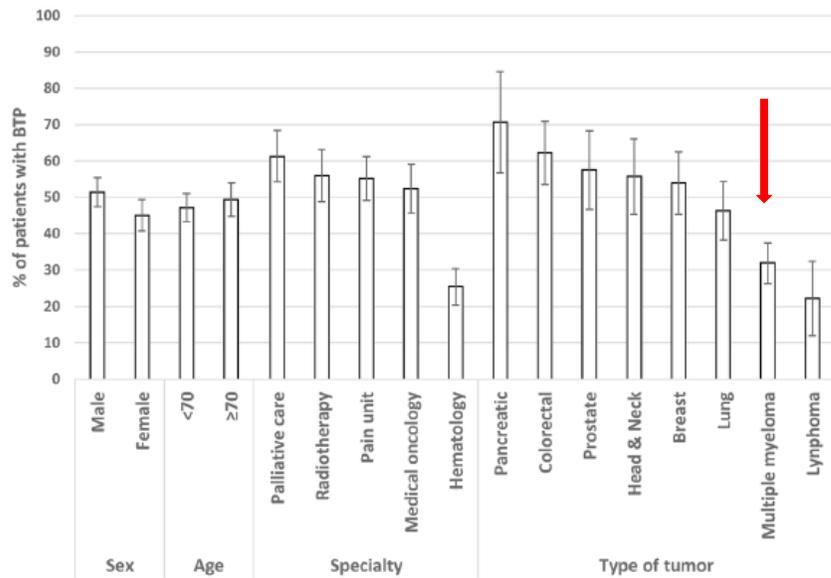
For frequency, 0 = did not have, 1 = rarely, 2 = occasionally, 3 = frequently, 4 = almost constantly. For severity, 0 = did not have, 1 = slight, 2 = moderate, 3 = severe, 4 = very severe. For distress, 0 = not at all or did not have, 1 = a little bit, 2 = somewhat, 3 = quite a bit, 4 = very much

Missing data: frequency, 1 patient; severity, 4 patients; distress, 4 patients



Prevalence and characterization of breakthrough pain in patients with cancer in Spain: the CARPE-DIO study

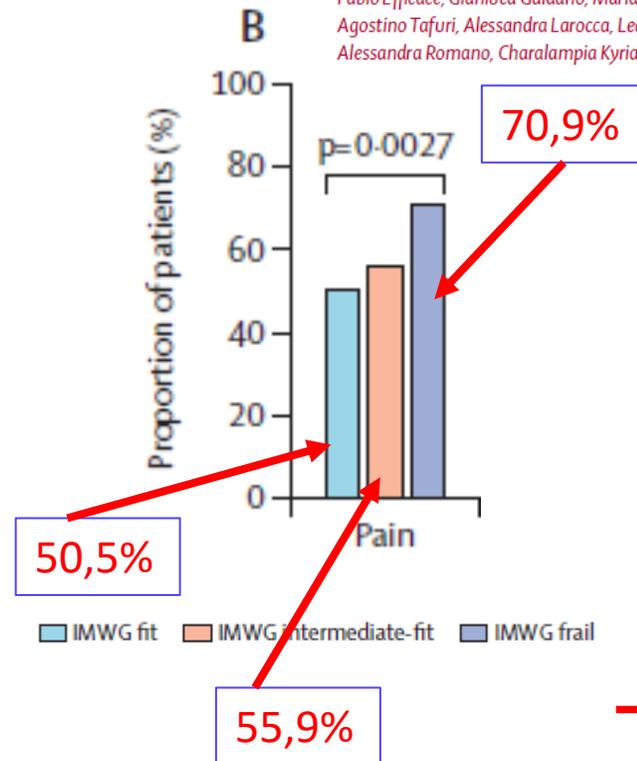
Concepción Pérez-Hernández¹, Ana Blasco², Álvaro Gándara³, Ana Mañas⁴, Manuel Jesús Rodríguez-López⁵, Vicente Martínez⁶, Alonso Fernandez-Nistal⁶ & Carmen Montoto⁶



3765 cancer patients

Association of IMWG frailty score with health-related quality of life profile of patients with relapsed refractory multiple myeloma in Italy and the UK: a GIMEMA, multicentre, cross-sectional study

Fabio Efficace, Gianluca Gaidano, Maria Teresa Petrucci, Pasquale Niscola, Francesco Cottone, Katia Codeluppi, Elisabetta Antonioli, Agostino Tafuri, Alessandra Larocca, Leonardo Potenza, Claudio Fozza, Domenico Pastore, Gian Matteo Rigolin, Massimo Offidani, Alessandra Romano, Charalampia Kyriakou, Nicola Cascavilla, Alessandro Gozzetti, Daniele Derudas, Marco Vignetti, Michele Cavo



| | Fit (n=200) | Intermediate-fit (n=112) | Frail (n=103) |
|--|---------------|--------------------------|---------------|
| EORTC QLQ-C30 | | | |
| Functional scales and global health status and quality of life | | | |
| Physical functioning | 71.17 (21.33) | 64.75 (26.05) | 48.95 (26.95) |
| Role functioning | 69.43 (31.01) | 58.93 (35.72) | 51.29 (33.31) |
| Emotional functioning | 73.93 (22.13) | 72.67 (22.56) | 62.94 (25.93) |
| Cognitive functioning | 82.75 (21.03) | 79.43 (24.10) | 73.62 (26.25) |
| Social functioning | 76.50 (25.13) | 71.62 (29.52) | 69.42 (29.62) |
| Global health status and quality of life | 61.17 (19.71) | 58.33 (21.35) | 53.56 (22.43) |
| Symptoms | | | |
| Fatigue | 35.94 (22.85) | 40.54 (25.63) | 54.69 (26.80) |
| Nausea or vomiting | 6.42 (12.80) | 9.76 (19.00) | 9.71 (18.75) |
| Pain | 27.42 (26.04) | 33.18 (30.19) | 43.37 (31.60) |
| Dyspnoea | 20.60 (24.27) | 27.63 (29.77) | 33.33 (31.47) |
| Insomnia | 32.50 (30.23) | 33.93 (33.02) | 43.23 (35.76) |
| Appetite loss | 10.33 (20.16) | 18.02 (25.34) | 27.18 (30.87) |
| Constipation | 19.33 (28.23) | 23.42 (27.56) | 31.39 (38.44) |
| Diarrhoea | 13.83 (22.24) | 16.82 (24.97) | 16.67 (28.05) |

Lancet Healthy Longev 2022; 3: e628-35



original article

Annals of Oncology
doi:10.1093/annonc/mds103**Impact of early access to a palliative/supportive care intervention on pain management in patients with cancer**E. Bandieri^{1†}, D. Sichetti^{2†}, M. Romero^{2†}, C. Fanizza², M. Belfiglio², L. Buonaccorso¹, F. Artioli¹, F. Campione³, G. Tognoni² & M. Luppi^{4*}¹Palliative Care Unit Azienda Unitaria Sanitaria Locale (USL), Modena; ²Department of Clinical Pharmacology and Epidemiology, Consorzio Mario Negri Sud, Santa Maria Imbaro, Chieti; ³Institute of Tanatologia, Clinica della crisi, I.A.T.S., University of Bologna, Bologna; ⁴Department of Oncology, Hematology and Respiratory Diseases, Azienda Ospedaliera Universitaria, Policlinico, Modena, Italy**Mirandola,
USL Modena
2007-2010**

Early palliative/supportive care integrated with primary oncologic care was an independent factor associated with a 31 % reduced risk of suffering from severe pain.

A multicentre cross-sectional study in 32 Italian Hospitals included 1450 patients, receiving analgesic therapy for cancer pain: 602 with access to standard care and 848 with early access to a palliative/supportive care, concomitant with primary oncology care.

Table 5. Factors associated with severe pain prevalence

| Variables | Univariate | | Multivariate | |
|--------------------|------------------|---------|------------------|---------|
| | RR (95 % CI) | P value | RR (95 % CI) | P value |
| Care model | | | | |
| SC | 1 | | 1 | |
| ePSC | 0.69 (0.48–0.99) | 0.037 | 0.69 (0.48–0.99) | 0.045 |
| Wards | | | | |
| Oncology | 1.00 (0.75–1.35) | 0.98 | 1.02 (0.76–1.36) | 0.91 |
| Non-oncology | 1 | | 1 | |
| Metastatic disease | | | | |
| No | 1.12 (0.89–1.41) | 0.35 | 1.16 (0.92–1.46) | 0.22 |
| Yes | 1 | | 1 | |
| Gender | | | | |
| Males | 0.75 (0.62–0.90) | 0.002 | 0.76 (0.63–0.91) | 0.003 |
| Females | 1 | | 1 | |
| Age | 0.99 (0.99–1.00) | 0.016 | 1.00 (0.99–1.00) | 0.25 |
| Analgesic therapy | | | | |
| Non-opioids | 1.00 | | 1 | |
| Weak opioids | 1.19 (0.74–1.92) | 0.47 | 1.12 (0.70–1.79) | 0.64 |
| Strong opioids | 1.38 (0.88–2.17) | 0.16 | 1.00 (0.84–2.05) | 0.23 |

CI, confidence interval; ePSC, early palliative/supportive care; RR, relative risk; SC, standard care.



Table 2. Outcomes

| Outcome | Weak Opioids (N = 117), No. (%) | Morphine (N = 110), No. (%) | Odds Ratio (95% CI) | P | Adjusted Odds Ratio* (95% CI) | P |
|--|------------------------------------|--------------------------------|------------------------|--------|----------------------------------|--------|
| Primary outcome Responders† | 64 (54.7) | 97 (88.2) | 6.18 (3.12 to 12.24) | < .001 | 6.89 (3.33 to 14.25) | < .001 |
| Secondary outcomes | | | | | | |
| Patients with a meaningful pain reduction‡ | 55 (47.0) | 91 (82.7) | 5.40 (2.92 to 9.97) | < .001 | 5.74 (3.03 to 10.90) | < .001 |
| Patients with highly meaningful pain reduction § | 49 (41.9) | 83 (75.5) | 4.27 (2.42 to 7.53) | < .001 | 4.58 (2.52 to 8.33) | < .001 |

*Adjusted by pain intensity at baseline, age, gender, Karnofsky performance score, adjuvant therapy, rescue therapy, cancer type and anticancer treatment.

†Patients with pain intensity reduction at least 20% from baseline.

‡Patients with \geq 30% pain intensity reduction from baseline.

§Patients with \geq 50% pain intensity reduction from baseline.

Independent, non Sponsored Study SETTING: EARLY PALLIATIVE CARE

VOLUME 34 · NUMBER 5 · FEBRUARY 10, 2016

JOURNAL OF CLINICAL ONCOLOGY

ORIGINAL REPORT

**Carpi,
USL Modena
2014-2016**

Randomized Trial of Low-Dose Morphine Versus Weak Opioids in Moderate Cancer Pain

Elena Bandieri, Marilena Romero, Carla Ida Ripamonti, Fabrizio Artioli, Daniela Sichetti, Caterina Fanizza, Daniele Santini, Luigi Cavanna, Barbara Melotti, Pier Franco Conte, Fausto Roila, Stefano Cascinu, Eduardo Bruera, Gianni Tognoni, and Mario Luppi

35% patients in the weak opioid group required switching to a strong opioid.

Adverse effects were similar in both groups



Timing of referral to outpatient palliative care for patients with haematologic malignancies

Sameer Patel¹ | Geordyn Hoge² | Bryan Fellman³ | Sharanpreet Kaur² | Yvonne Heung² | Eduardo Bruera² | David Hui²

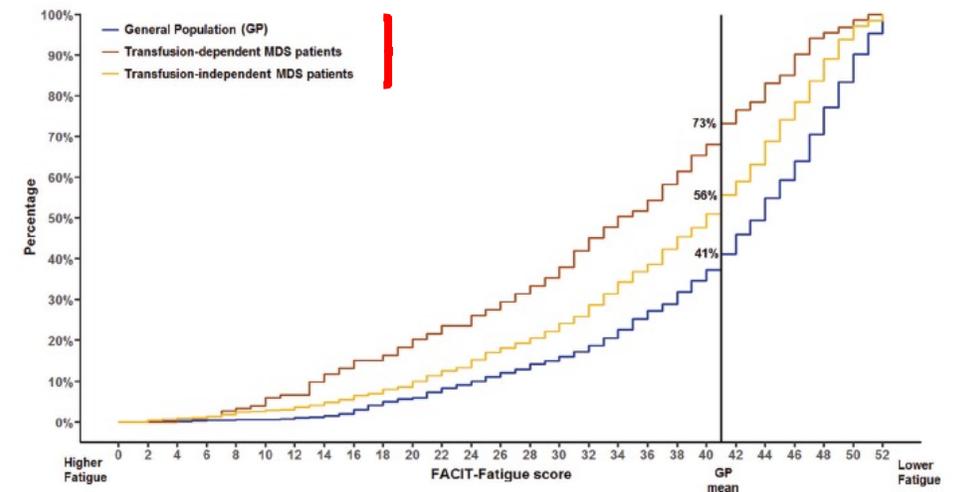
Median time from outpatient care-referral to death is 3,4 ys

TABLE 4 Supportive-care interventions

| Supportive-care topics addressed | Leukaemia N (%) | Lymphoma N (%) | SCT N (%) | Total N (%) |
|----------------------------------|--------------------|-------------------|--------------|----------------|
| Physical symptoms | | | | |
| Pain | 112 (78.3) | 156 (73.2) | 15 (53.57) | 283 (73.7) |
| Fatigue | 97 (67.8) | 123 (57.8) | 17 (60.7) | 237 (61.7) |
| Dyspnoea | 9 (6.3) | 6 (2.8) | 0 (0) | 15 (3.9) |
| Constipation | 74 (51.8) | 113 (53.1) | 12 (42.9) | 199 (51.9) |
| Nausea | 28 (19.6) | 47 (22.1) | 5 (17.9) | 80 (20.8) |
| Anorexia | 51 (35.7) | 62 (29.1) | 7 (25) | 120 (31.3) |
| Insomnia | 36 (25.2) | 55 (25.8) | 9 (32.1) | 100 (26) |
| Others | 17 (11.9) | 22 (10.3) | 6 (21.4) | 45 (12) |
| Psychological symptoms | | | | |
| Emotional | 106 (74.1) | 171 (80.3) | 19 (67.9) | 296 (77.1) |
| Spiritual | 2 (1.4) | 5 (2.4) | 1 (3.6) | 8 (2.1) |
| Social | 12 (8.4) | 18 (8.5) | 2 (7.1) | 32 (8.3) |
| EOL care plan | 58 (40.6) | 75 (35.2) | 7 (25) | 140 (36.5) |

The IPSS-R more accurately captures fatigue severity of newly diagnosed patients with myelodysplastic syndromes compared with the IPSS index

Fabio Efficace^{1,2} · Francesco Cottone¹ · Laura B. Oswald² · David Cella² · Andrea Patriarca³ · Pasquale Niscola⁴ · Massimo Breccia⁵ · Uwe Platzbecker⁶ · Giuseppe A. Palumbo⁷ · Giovanni Caocci⁸ · Reinhard Stauder⁹ · Alessandra Ricco¹⁰ · Duska Petranovic¹¹ · Jo Caers¹² · Mario Luppi¹³ · Luana Fianchi¹⁴ · Chiara Frairia¹⁵ · Isabella Capodanno¹⁶ · Elena Follini¹⁷ · Chiara Sarlo¹⁸ · Paola Fazi¹ · Marco Vignetti¹



Fatigue burden of MDS pts WORSE (on average 4,6 points below the mean of the GP).



The NEW ENGLAND JOURNAL of MEDICINE

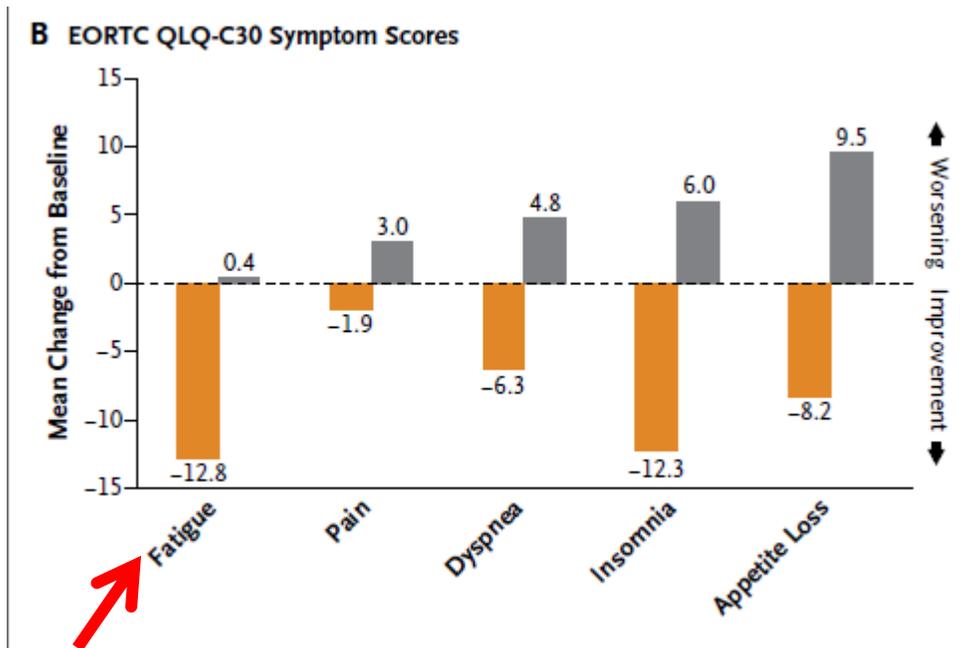
ESTABLISHED IN 1812

MARCH 1, 2012

VOL. 366 NO. 9

JAK Inhibition with Ruxolitinib versus Best Available Therapy for Myelofibrosis

Claire Harrison, D.M., Jean-Jacques Kiladjian, M.D., Ph.D., Haifa Kathrin Al-Ali, M.D., Heinz Gisslinger, M.D., Roger Waltzman, M.D., M.B.A., Viktoriya Stalbovskaya, Ph.D., Mari McQuitty, R.N., M.P.H., Deborah S. Hunter, Ph.D., Richard Levy, M.D., Laurent Knaoos, M.D., Ph.D., Francisco Cervantes, M.D., Ph.D., Alessandro M. Vannucchi, M.D., Tiziano Barbui, M.D., and Giovanni Barosi, M.D.



The NEW ENGLAND JOURNAL of MEDICINE

As an oncologist, when I sit with patients to discuss starting a new chemotherapy regimen, their first questions are often “How will it make me feel?” and “How did patients like me feel with

Perspective
AUGUST 1, 2013

Toward Patient-Centered Drug Development in Oncology

Ethan Basch, M.D.

«Ruxolitinib demonstrates the particular value that PROs provide for understanding clinical benefits when studies are not designed to detect overall survival advantages and instead rely on end points such as tumor response, progression-free survival, or noninferiority.»

Although overall, ruxolitinib represents a success story, measurement of fatigue and HRQOL decrements — which are prevalent and widely viewed as important to patients — were not included as key end points because the FDA had methodologic concerns about them; these omissions resulted in a label containing an incomplete picture of the patient experience»



Added Value of Early Palliative Care (as Early as Possible)

- To provide LONG TERM comprehensive assessment and management of physical symptoms and psychological distress.
- To provide TIMELY AND LONG TERM measurement of physical symptoms and psychological distress (relevance for PROGNOSIS AND THERAPY).
- To implement TIMELY AND LONG TERM goals of care (GOC) discussion:
 - a) prognostic awareness of patients,
 - b) decision making-treatment choices-future planning,
 - c) coping with life-threatening disease and
 - d) support to primary caregivers, also after bereavement.



Edmonton symptom assessment system Global Distress Score and overall survival in acute leukaemia > 60ys

ESAS
SINCE DIAGNOSIS

Monica Morselli,¹ Federico Banchelli,² Eleonora Borelli ^{1,3,4} Stefano Cordella,⁵ Fabio Forghieri,¹ Francesca Bettelli,⁶ Sarah Bigli,⁷ Giuseppe Longo,⁸ Roberto D'Amico,² Carlo Adolfo Porro,^{9,10} Fabio Efficace ¹¹ Eduardo Bruera ¹² Mario Luppi ⁵ Elena Bandieri,¹³ Leonardo Potenza ^{1,6}

Figure 1. The Edmonton Symptom Assessment System (ESAS)

In the last 24 h on average I have felt:
Please circle the number that best describes your symptoms:

| | | | | | | | | | | | | |
|----------------------------|---|---|---|---|---|---|---|---|---|---|----|-----------------------------|
| No pain | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Worst pain |
| No fatigue | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Worst fatigue |
| No nausea | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Worst nausea |
| No depression | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Worst depression |
| No anxiety | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Worst anxiety |
| No drowsiness | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Worst drowsiness |
| No shortness of breath | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Worst shortness of breath |
| Best appetite | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Worst appetite |
| Best feeling of well-being | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Worst feeling of well-being |
| Best sleep | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Worst sleep |

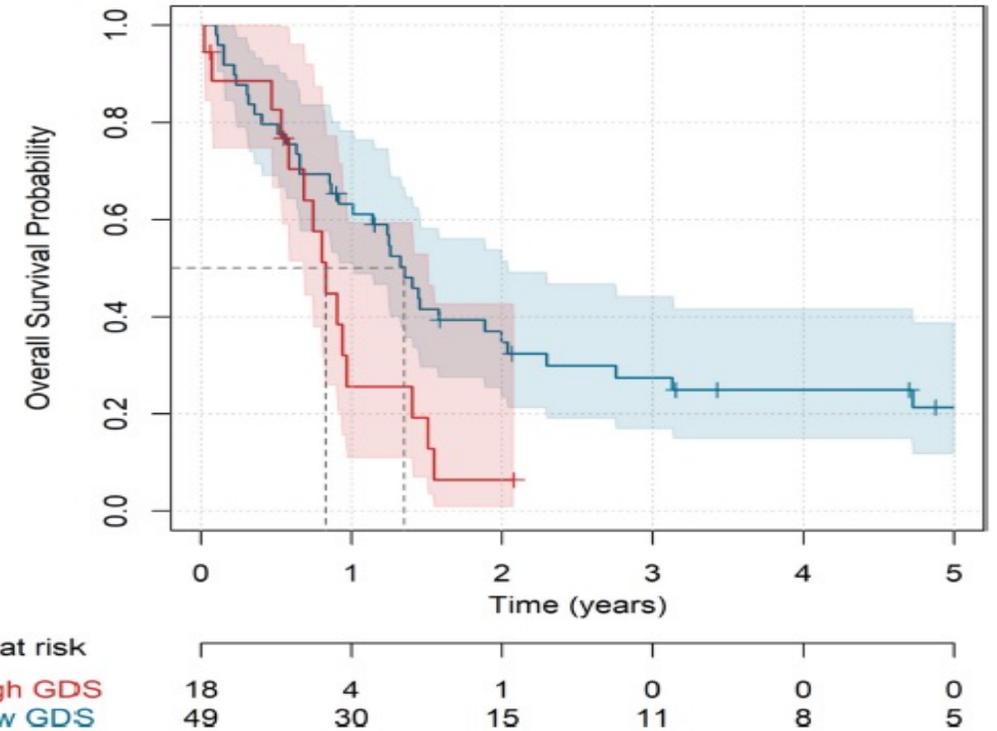
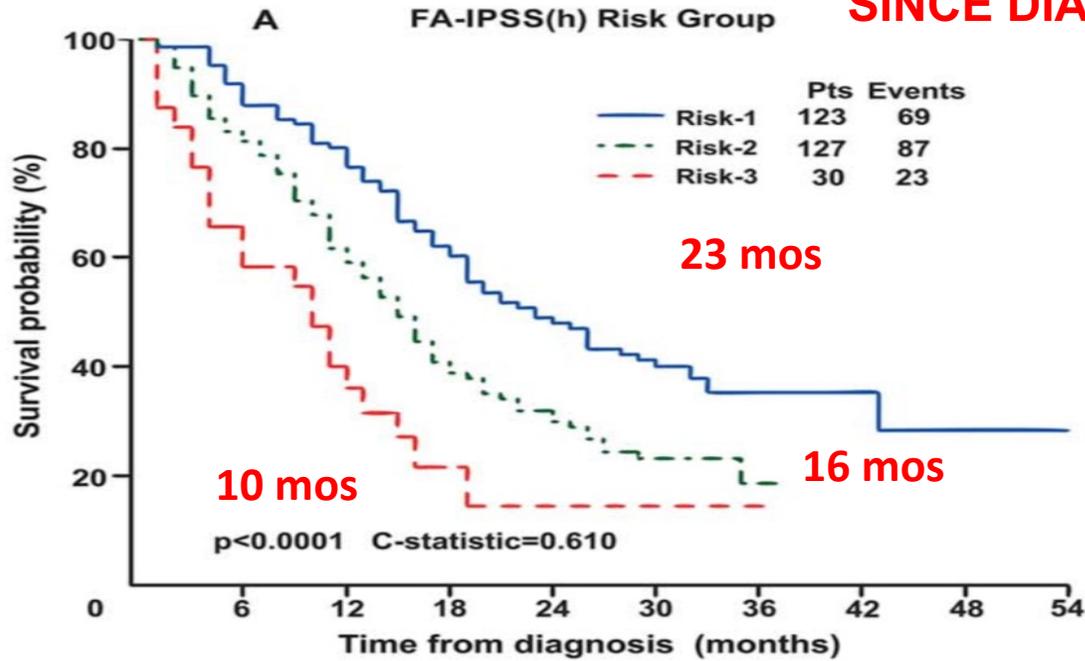


Figure 1 Overall survival curves by Global Distress Score (GDS) score (high vs low).

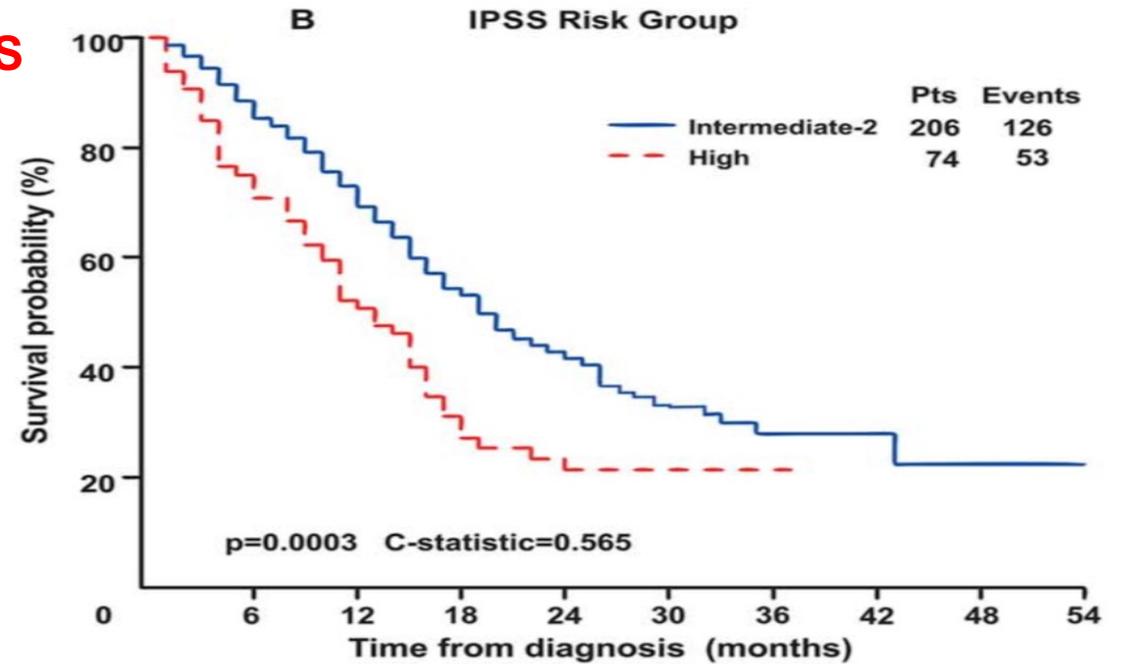
Global Distress Score-GDS- sum of the first 9 ESAS items
ESAS can be completed in less than 1 minute



FATIGUE SINCE DIAGNOSIS



| | No. of patients at risk | | | | | | | |
|--------|-------------------------|----|----|----|----|----|----|----|
| | 0 | 6 | 12 | 18 | 24 | 30 | 36 | 42 |
| Risk-1 | 112 | 91 | 66 | 51 | 38 | 10 | 6 | 1 |
| Risk-2 | 99 | 70 | 43 | 31 | 15 | 3 | 0 | 0 |
| Risk-3 | 18 | 10 | 3 | 2 | 2 | 1 | 0 | 0 |



| | No. of patients at risk | | | | | | | |
|----------------|-------------------------|-----|----|----|----|----|----|----|
| | 0 | 6 | 12 | 18 | 24 | 30 | 36 | 42 |
| Intermediate-2 | 176 | 136 | 96 | 72 | 46 | 12 | 6 | 1 |
| High | 53 | 35 | 16 | 12 | 9 | 2 | 0 | 0 |

Patient-Reported Outcomes Enhance the Survival Prediction of Traditional Disease Risk Classifications: An International Study in Patients With Myelodysplastic Syndromes

Fabio Efficace, PhD¹; Francesco Cottone, PhD¹; Gregory Abel, MD, MPH²; Pasquale Niscola, MD, PhD³; Gianluca Gaidano, MD, PhD⁴; Franck Bonnetain, PhD^{5,6}; Amelie Anota, PhD^{5,6}; Giovanni Caocci, MD⁷; Angel Cronin, MS²; Luana Fianchi, MD⁸; Massimo Breccia, MD⁹; Reinhard Stauder, MD¹⁰; Uwe Platzbecker, MD¹¹; Giuseppe A. Palumbo, MD, PhD¹²; Mario Luppi, MD, PhD¹³; Rosangela Invernizzi, MD¹⁴; Micaela Bergamaschi, MD¹⁵; Lorenza Borin, MD¹⁶; Anna Angela Di Tucci, MD¹⁷; Huiyong Zhang, MD¹⁸; Mirjam Sprangers, PhD¹⁹; Marco Vignetti, MD¹; and Franco Mandelli, MD¹

Cancer March 15, 2018

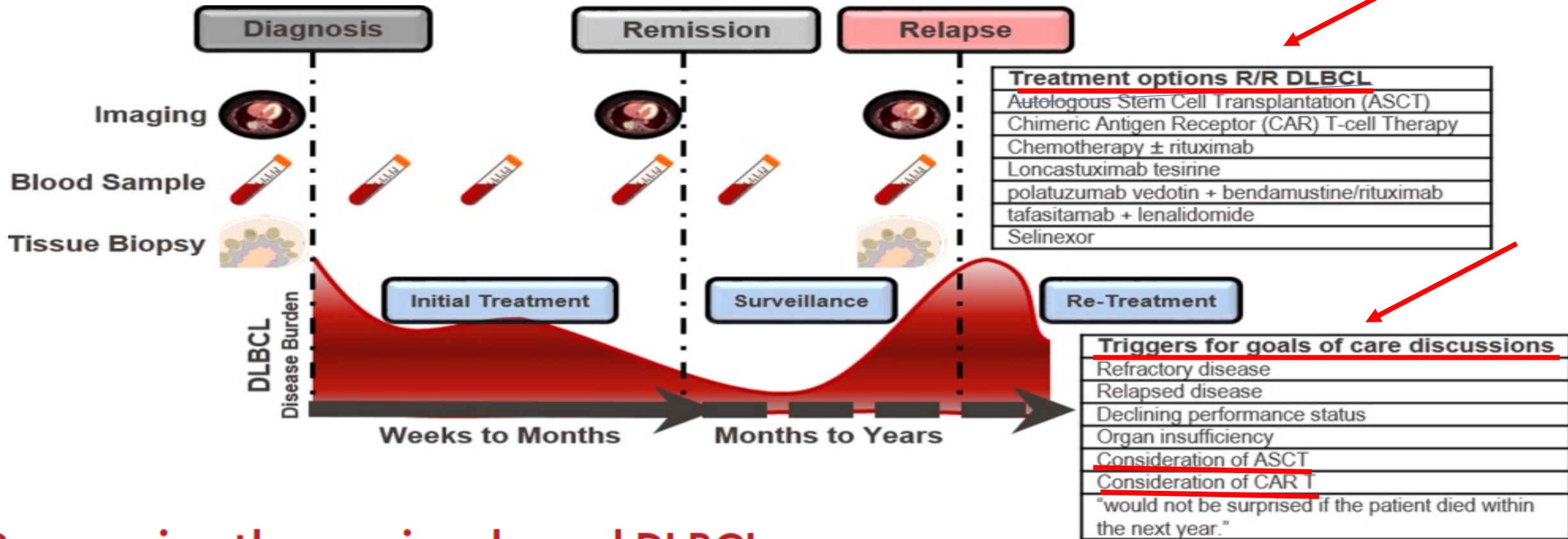
- Fatigue measured by EORTC QLQ-C 30
- A new prognostic index was developed: the FA-IPSS(h)
- The predictive accuracy of this new index was higher than that of the IPSS alone.



Added Value of Early Palliative Care (as Early as Possible)

- To provide LONG TERM comprehensive assessment and management of physical symptoms and psychological distress.
- To provide TIMELY AND LONG TERM measurement of physical symptoms and psychological distress (relevance for PROGNOSIS AND THERAPY).
- To implement TIMELY AND LONG TERM goals of care (GOC) discussion:
 - a) prognostic awareness of patients,
 - b) decision making-treatment choices-future planning,
 - c) coping with life-threatening disease and
 - d) support to primary caregivers, also after bereavement.





Sequencing therapy in relapsed DLBCL

Christopher R. Flowers¹ and Oreofe O. Odejide²

¹Department of Lymphoma/Myeloma, The University of Texas MD Anderson Cancer Center, Houston, TX; and ²Lymphoma and Myeloma, Dana-Farber Cancer Institute, Boston, MA

| Hematology 2022 | ASH Education Program



American Society of Hematology
Helping hematologists conquer blood diseases worldwide

LE CURE PALLIATIVE PRECOCI IN **EMATO-ONCOLOGIA**:
la nuova risposta ai bisogni di pazienti e caregivers

19 maggio 2023
Roma, Hotel Donna Camilla Savelli



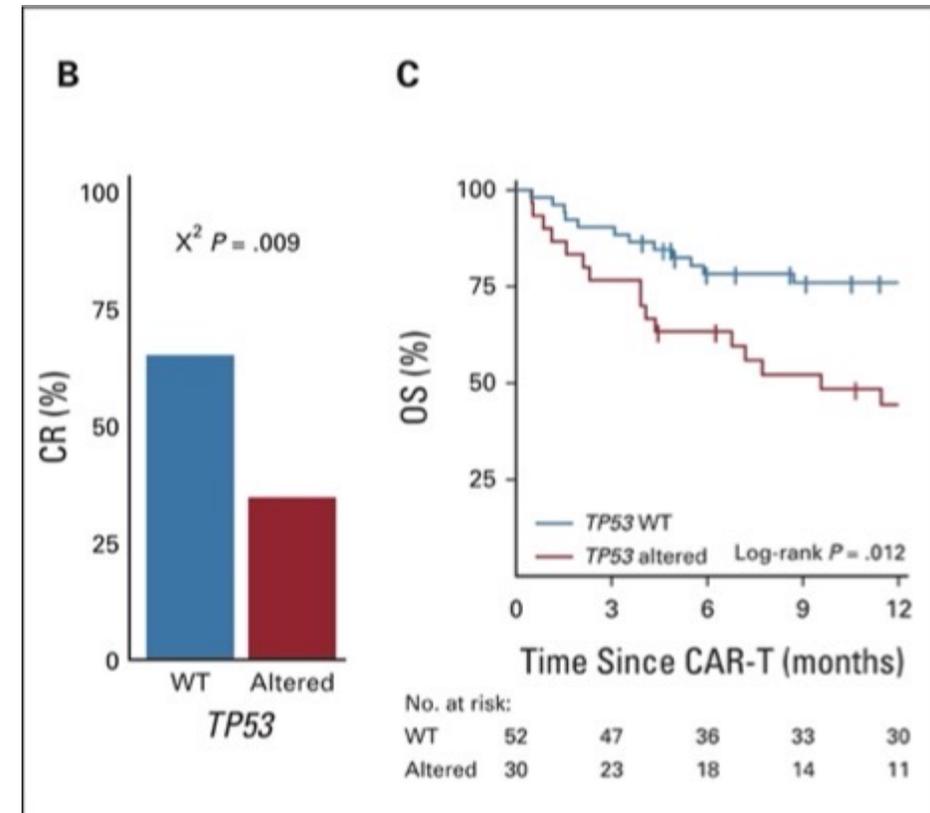
1. Pretreatment patient clinical features (parameters of lymphoma burden and levels of inflammatory cytokines).
2. *In vivo* CAR T-cell proliferation after infusion
3. T cell immunophenotypic composition of infusion products mediate *in vivo* CAR T-cell expansion and proliferation

CLINICAL RESPONSE TO CAR T-CELL THERAPY

Impact of *TP53* Genomic Alterations in Large B-Cell Lymphoma Treated With CD19-Chimeric Antigen Receptor T-Cell Therapy

Roni Shouval, MD, PhD^{1,2}; Ana Alarcon Tomas, MD^{1,2}; Joshua A. Fein, MD⁴; Jessica R. Flynn, MSc⁵; Etti Markovits, MD⁶; Shimrit Mayer, MSc⁷; Aishat Olaide Afuye, BA¹; Anna Alperovich, MD¹; Theodora Anagnostou, MD^{1,8}; Michal J. Besser, PhD^{6,9}; Connie Lee Batlevi, MD^{2,10}; Parastoo B. Dahi, MD^{1,2}; Sean M. Devlin, PhD⁵; Warren B. Fingrut, MD¹; Sergio A. Giralt, MD^{1,2}; Richard J. Lin, MD^{1,2}; Gal Markel, MD, PhD^{9,11}; Gilles Salles, MD^{2,10}; Craig S. Sauter, MD^{1,2}; Michael Scordo, MD^{1,2}; Gunjan L. Shah, MD^{1,2}; Nishi Shah, MD¹; Ruth Scherz-Shouval, PhD⁷; Marcel van den Brink, MD, PhD^{1,2}; Miguel-Angel Perales, MD^{1,2}; and Maria Lia Palomba, MD^{2,10}

J Clin Oncol 40:369-381. © 2021



Cellular therapy for multiple myeloma: what's now and what's next

Paula Rodriguez-Otero and Jesús F. San-Miguel



American Society of Hematology
Helping hematologists conquer blood diseases worldwide

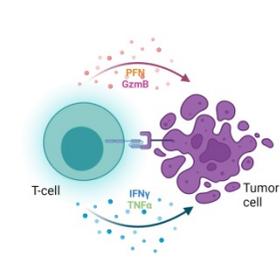
Hematology 2022 | ASH Education Program

Table 1. Safety and efficacy data of the 2 FDA- and EMA-approved CARs

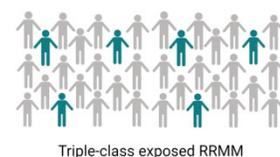
| | <u>Idecabtagene vicleucel KarMMa trial¹⁻³</u> | <u>Ciltacabtagene autoleucel CARTITUDE 1 trial</u> |
|--|--|--|
| ORR, n (%) | 94 (73) At 450×10 ⁶ (n=54): 44 (81%) | 95 (97.9) |
| CR or sCR, n (%) | 42 (33) At 450×10 ⁶ (n=54): 21 (39) | 82.5% (sCR) |
| Time to first response, median (range) | 1.0 mo (0.5-8.8) | 1.0 mo (IQR 0.9-1.0) |
| MRD in CR, n (%) | 33/42 MRD neg (10 ⁻⁵) | 61 evaluable 92% MRD negative (10 ⁻⁵) |
| DOR, median (95% CI) | 10.7 mo (9.0-11.3) | Not reported |
| PFS, median (95% CI) | 8.8 mo (5.6-11.6) At 450×10 ⁶ : 12.1 mo (8.8-12.3) | NR (16.8-NE) 2-y PFS: 60.5% (48.5-70.4) |
| PFS in high-risk, median (95% CI) | | PFS at 2y, % (95% CI) |
| ISS 3/R-ISS 3 | 4.9 mo (1.8-8.2) ^a | NE (NE-NE) |
| High-risk CA | 8.2 mo (4.8-11.9) | 48.4% (25.1-68.4) |
| Plasmacytomas | 7.9 mo (5.1-10.9) | 47.4% (24.4-67.3) |
| OS, median (95% CI) | 24.8 mo (19.9-31.2) | NR (27.2-NE) |



CAR T-cell therapy TODAY

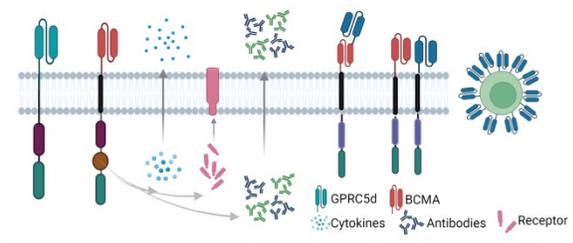


ide-cel cilta-cel



CAR T-cell therapy TOMORROW

Next-generation CAR T



Newly diagnosed MM
Early relapse
Unmet medical need population



Opportunities provided by the EPC setting

- Research in the field of cancer pain management and supportive care measures in hematologic malignancies
- PROs monitoring by digital health
- Multidisciplinary approach to go in depth into the LONG TERM relationship between physician-nurse and patients-caregiver and discuss prognostic awareness, perceptions of hope and death and providing realistic hope



2019



WHO GUIDELINES FOR THE PHARMACOLOGICAL AND RADIOTHERAPEUTIC MANAGEMENT OF CANCER PAIN IN ADULTS AND ADOLESCENTS



J Clin Oncol 41:914-930. © 2022



Volume 33 ■ Issue 12 ■ 2022



ORIGINAL ARTICLE

An international, open-label, randomised trial comparing a two-step approach versus the standard three-step approach of the WHO analgesic ladder in patients with cancer

M. Fallon^{1*}, K. Dierberger², M. Leng³, P. S. Hall^{1,2}, S. Allende⁴, R. Sabar⁵, E. Verastegui⁴, D. Gordon³, L. Grant⁶, R. Lee³, K. McWilliams⁷, G. D. Murray², L. Norris³, C. Reid⁸, T. A. Sande⁹, A. Caraceni¹⁰, S. Kaasa^{10,11} & B. J. A. Laird^{3,12}

UNDERPOWERED, POSSIBLY BECAUSE NOT IN EPC SETTING

«...The original plan was to recruit 400 participants (200 in each arm)...Unfortunately, after 3 years of slow recruitment (about 50 patients per year worldwide), the trial was closed after including 153 patients (76 in the weak opioid group and 77 in the strong opioid group...»

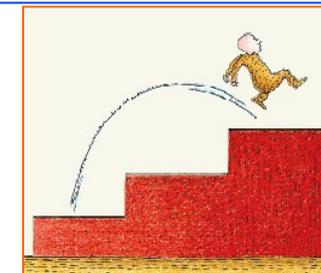
VOLUME 34 · NUMBER 5 · FEBRUARY 10, 2016

JOURNAL OF CLINICAL ONCOLOGY

ORIGINAL REPORT

Randomized Trial of Low-Dose Morphine Versus Weak Opioids in Moderate Cancer Pain

Elena Bandieri, Marilena Romero, Carla Ida Ripamonti, Fabrizio Artiofi, Daniela Sichetti, Caterina Fanizza, Daniele Santini, Luigi Cavanna, Barbara Melotti, Pier Franco Conte, Fausto Roika, Stefano Cascinu, Eduardo Bruera, Gianni Tognoni, and Mario Luppi



Use of Opioids for Adults With Pain From Cancer or Cancer Treatment: ASCO Guideline

Judith A. Paice, PhD, RN¹; Kari Bohlke, ScD²; Debra Barton, PhD, RN³; David S. Craig, PharmD⁴; Areej El-Jawahri, MD⁵; Dawn L. Hershman, MD, MS⁶; Lynn R. Kong, MD⁷; Geana P. Kurita, PhD, MNSc⁸; Thomas W. LeBlanc, MD⁹; Sebastiano Mercadante, MD¹⁰; Kristina L. M. Novick, MD, MS¹¹; Ramy Sedhom, MD¹²; Carole Seigel, MBA¹³; Joanna Stimmel, PhD¹⁴; and Eduardo Bruera, MD¹⁵

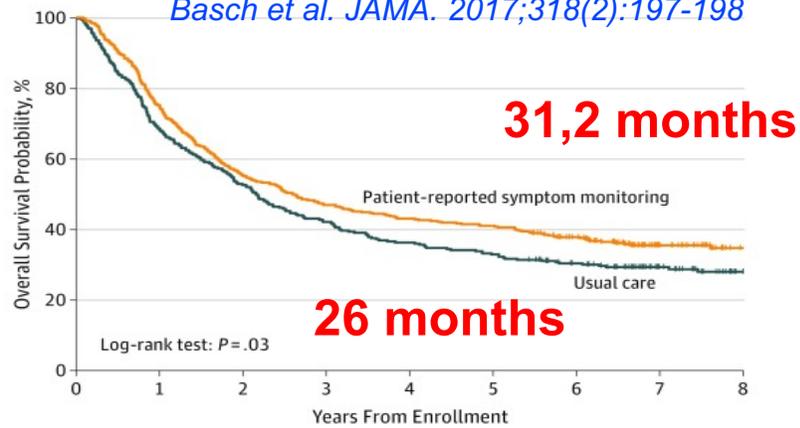


Opportunities provided by the EPC setting

- Research in the field of cancer pain management and supportive care measures in hematologic malignancies
- PROs monitoring by digital health
- Multidisciplinary approach to go in depth into the LONG TERM relationship between physician-nurse and patients-caregiver and discuss prognostic awareness, perceptions of hope and death and providing realistic hope



Basch et al. JAMA. 2017;318(2):197-198



| No. at risk | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------------------------------------|-----|-----|-----|-----|-----|-----|-----|----|----|
| Patient-reported symptom monitoring | 441 | 331 | 244 | 207 | 190 | 181 | 148 | 65 | 33 |
| Usual care | 325 | 223 | 171 | 137 | 118 | 107 | 89 | 50 | 27 |

The systematic monitoring of PROs via web-based platforms, was also found to be associated with improved overall survival in patients with advanced cancers.

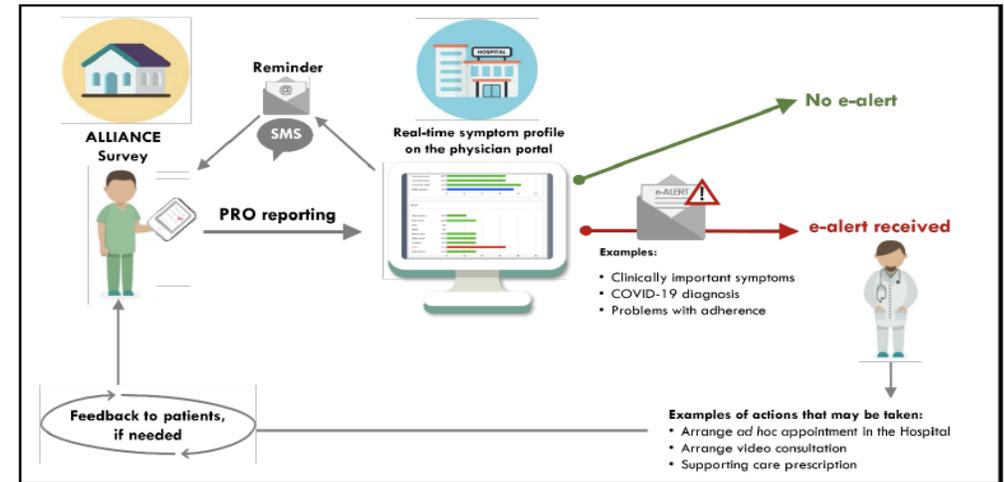
Physicians' Perceptions of Clinical Utility of a Digital Health Tool for Electronic Patient-Reported Outcome Monitoring in Real-Life Hematology Practice. Evidence From the GIMEMA-ALLIANCE Platform

Fabio Efficace^{1*}, Andrea Patriarca², Mario Luppi³, Leonardo Potenza³, Giovanni Caocci⁴, Agostino Tafuri⁵, Francesca Fazio⁶, Claudio Cartoni⁶, Maria Teresa Petrucci⁶, Ida Carosino⁶, Riccardo Moia², Gloria Margiotta Casaluci², Paola Boggione², Elisabetta Colaci³, Davide Giusti³, Valeria Pioli³, Francesco Sparano¹, Francesco Cottone¹, Paolo De Fabritiis⁷, Nicolina Rita Ardu⁷, Pasquale Niscola⁷, Isabella Capodanno⁸, Anna Paola Leporace⁸, Sabrina Pelliccia⁸, Elisabetta Lugli⁸, Edoardo La Sala¹, Luigi Rigacci⁹, Michelina Santopietro⁹, Claudio Fozza¹⁰, Sergio Siragusa¹¹, Massimo Breccia⁶, Paola Fazi¹ and Marco Vignetti¹



BRIEF RESEARCH REPORT
published: 17 March 2022
doi: 10.3389/fonc.2022.826040

Figure 1. Schematic workflow of the patient-generated alerts to the medical team



90% of 201 patients accepted to enter the platform
All hematologists agreed that the platform was easy to use, and (91.3%) agreed that is useful in the clinical management of their patients.

Opportunities provided by the EPC setting

- Research in the field of cancer pain management and supportive care measures in hematologic malignancies
- PROs monitoring by digital health
- Multidisciplinary approach to go in depth into the LONG TERM relationship between physician-nurse and patients-caregiver and discuss prognostic awareness, perceptions of hope and death and providing realistic hope



Oreofe O. Odejide

Dana-Farber Cancer Institute, Boston, MA; and Harvard Medical School, Boston, MA

Conversations and Goals-of-Care Discussions with Patients with DLBCL

Barriers:

Table 1. Barriers to primary and specialty palliative care

| |
|--|
| Disease-related barriers |
| High prognostic uncertainty |
| Rapid decline at the end of life |
| Physician-related barriers ← |
| Misperception that palliative care is synonymous with end-of-life care |
| Unrealistic physician expectations |
| Not knowing the right thing to say |
| <u>Concern that the term "palliative care" will decrease patients' hope</u> |
| Patient-related barriers |
| Misperceptions about palliative care |
| Unrealistic patient expectations |
| System-related barriers |
| Lack of universal and systematic symptom screening |
| Lack of universal and standardized training in primary palliative care |
| Limited access to specialty palliative care in some clinical settings |
| Difficulty integrating palliative and oncologic appointment schedules for patients |

1. Given recent treatment advances and the potential for cure in R/R settings, the high prognostic uncertainty in DLBCL may lead some clinicians to delay discussions until death is very clearly imminent.
2. Even when clinicians grasp the importance of engaging in goals-of-care discussions, about 40% report that they do not know the right thing to say, which may result in low-quality discussions.
3. Concerns about taking away patients' hope also contribute to hesitancy in conducting these discussions.

Hematology 2020 | ASH Education Program



Highly interdisciplinary research at the confluence of medical, language and cognitive sciences, studying the affective meaning and semantics of words associated with suffering and hope in hematology patients, including, acute leukemia, multiple myeloma, lymphoma and hemopoietic stem cell transplant patients.

Perceptions of Hope Among Bereaved Caregivers of Cancer Patients Who Received Early Palliative Care: A Content and Lexicographic Analysis

Sarah Bigi^{1,*}, Vittorio Ganfi², Eleonora Borelli², Leonardo Potenza^{2,3}, Fabrizio Artioli⁴, Sonia Eliardo⁴, Claudia Mucciarini⁴, Luca Cottafavi⁴, Massimiliano Cruciani⁴, Cristina Cacciari^{5,6}, Oreofe Odejide^{7,†}, Carlo Adolfo Porro^{5,6,†}, Camilla Zimmermann^{8,9,†}, Fabio Efficace^{10,†}, Eduardo Bruera^{11,†}, Mario Luppi^{2,3,*}, Elena Bandieri^{4,†}

The Oncologist, 2023, 28, e54–e62
<https://doi.org/10.1093/oncolo/oyac227>
Advance access publication 1 November 2022

Primary caregivers frequently described a direct link between the truth they were told by the doctors about the clinical conditions of their relative and the trust they developed towards them, which, in turn was linked to hope. A crucial factor in this positive dynamic seems to be the connection between hope, truth, and trust.

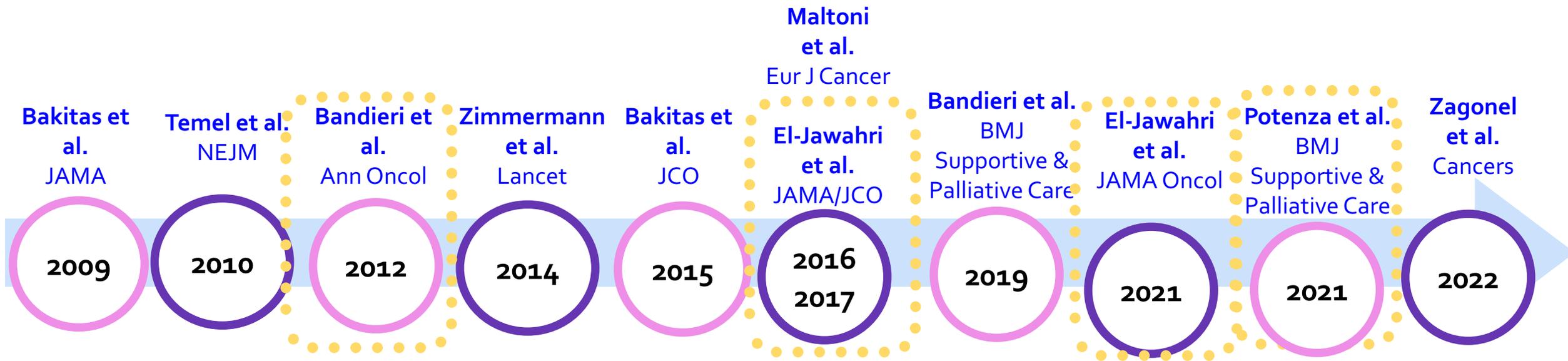
Table 1. Analyzed questions from the questionnaires.

| <u>Questions about EPC and hope</u> | |
|-------------------------------------|--|
| 1. | Per quanto tempo il suo caro ha frequentato l'ambulatorio di cure palliative precoci? <i>For how long did your relative come to the EPC Unit?</i> |
| 2. | A suo parere, le cure palliative precoci, cosa hanno significato per il suo caro? <i>What do you think EPC treatments meant for your loved one?</i> |
| 2.1 | E per lei come familiare? <i>And what did they mean to you?</i> |
| 4.1 | Come considera il ruolo delle cure palliative precoci per la malattia oncologica? <i>What do you think is EPC's role in the treatment of oncologic illness?</i> |
| 5. | Ritiene che le cure palliative permettano di tenere accesa la speranza? <i>Do you think EPC treatments allow keeping hope alive?</i> |
| 5.1 | Che cos'è per lei la speranza? <i>What is hope for you?</i> |
| 5.2 | C'è un episodio che desidera condividere con noi di questa esperienza di accompagnamento? <i>Is there an episode you would like to share with us from the period of time when you were caring for your loved one?</i> |
| 6. | Si sente di aggiungere altro? <i>Would you like to add something else?</i> |

Abbreviation: EPC, early palliative care.



HOW TO IMPROVE AND IMPLEMENT EPC IN HEMATOLOGY SETTINGS?



- Improved QoL
- Reduced physical and psychological symptoms burden
- Improved prognostic awareness
- Lower rates of intensive health care utilization near death
- Increased survival

Early, i.e. within 8 weeks, since diagnosis of advanced cancer

ASCO statements

2013
2017

EPC only in hematology

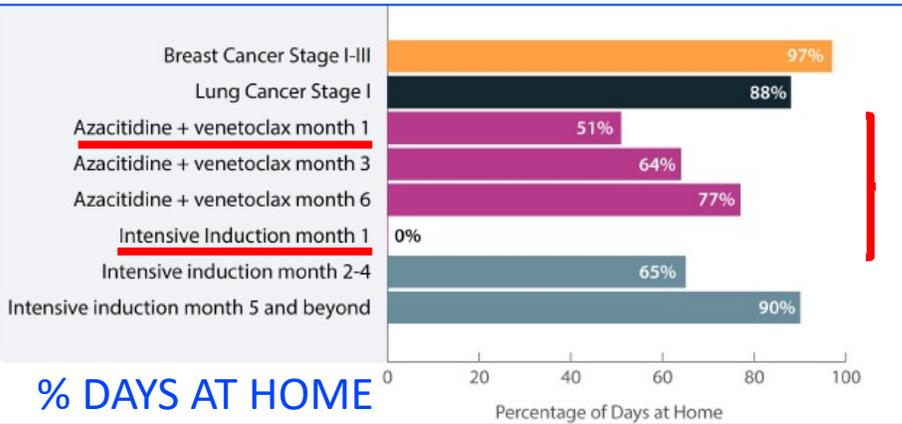


1) SCIENTIFIC EVIDENCES AND CLINICAL RECOMMENDATIONS

Early palliative/supportive care in acute myeloid leukaemia allows low aggression end-of-life interventions: observational outpatient study

Leonardo Potenza ¹, Miki Scaravaglio, ¹ Daniela Fortuna, ² Davide Giusti, ¹ Elisabetta Colaci, ¹ Valeria Pioli, ¹ Monica Morselli, ¹ Fabio Forghieri, ¹ Francesca Bettelli, ¹ Andrea Messerotti, ¹ Hillary Catellani, ¹ Andrea Gilioli, ¹ Roberto Marasca, ¹ Eleonora Borelli ³, Sarah Bigi, ⁴ Giuseppe Longo, ⁵ Federico Banchelli, ⁶ Roberto D'Amico, ⁶ Anthony L Back, ⁷ Fabio Efficace ⁸, Eduardo Bruera ⁹, Mario Luppi ¹, Elena Bandieri ¹⁰

BMJ Potenza L, et al. *BMJ Supportive & Palliative Care* 2021;0:1-8. doi:10.1136/bmjspcare-2021-002898



NEW MODELS OF OUTPATIENT EPC FOR AML, SINCE DIAGNOSIS



5. Il panel raccomanda, laddove fattibile, il precoce coinvolgimento del team di cure palliative e l'eventuale servizio di Assistenza Psicologica (istituzionale o supportato dalle Organizzazioni di Volontariato) nell'ottica di promuovere un simultaneo intervento dell'ematologo e del medico palliativista.

EDITORIAL E. Atallah
Low-intensity induction in acute myeloid leukemia. Always in the patients' best interest?

Haematologica | 108 - April 2023



2) EPC TRIGGERS, SPECIFIC FOR DIFFERENT HEMATOLOGIC MALIGNANCIES, NEED TO BE IDENTIFIED

SPECIAL SERIES: PALLIATIVE CARE: SCIENCE AND PRACTICE

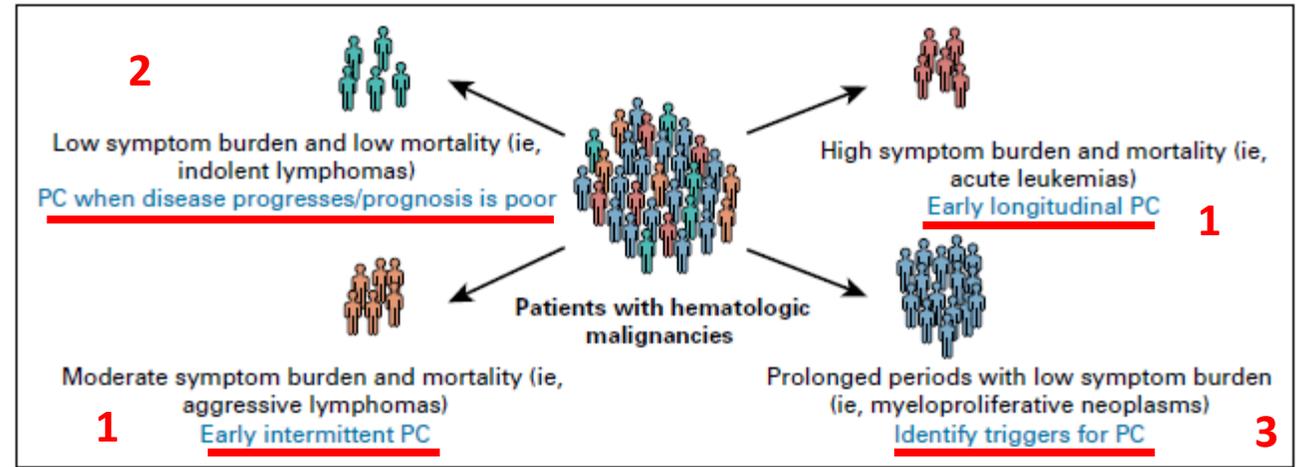
Palliative and End-of-Life Care for Patients With Hematologic Malignancies

J Clin Oncol 38:944-953. © 2020

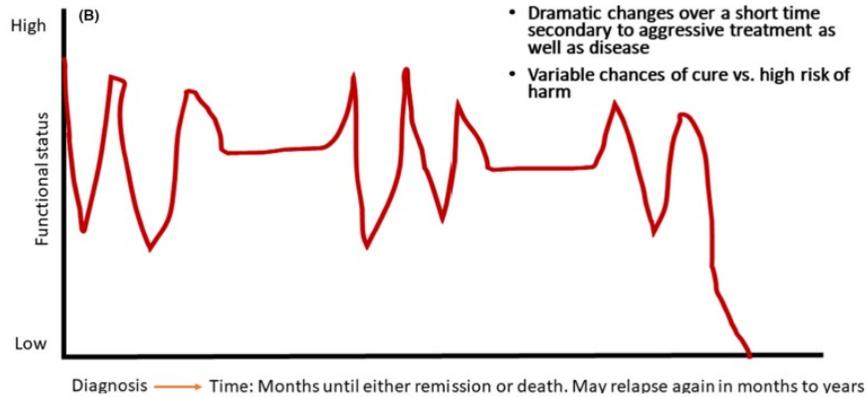
Areej El-Jawahri, MD^{1,2}; Ashley M. Nelson, MA^{1,2}; Tamryn F. Gray, PhD^{2,3}; Stephanie J. Lee, MD⁴; and Thomas W. LeBlanc, MD⁵

Early integration of palliative care for patients with haematological malignancies

Adir Shaulov^{1,2} | Ariel Aviv³ | Jacqueline Alcalde^{4,5} | Camilla Zimmermann^{4,5,6}



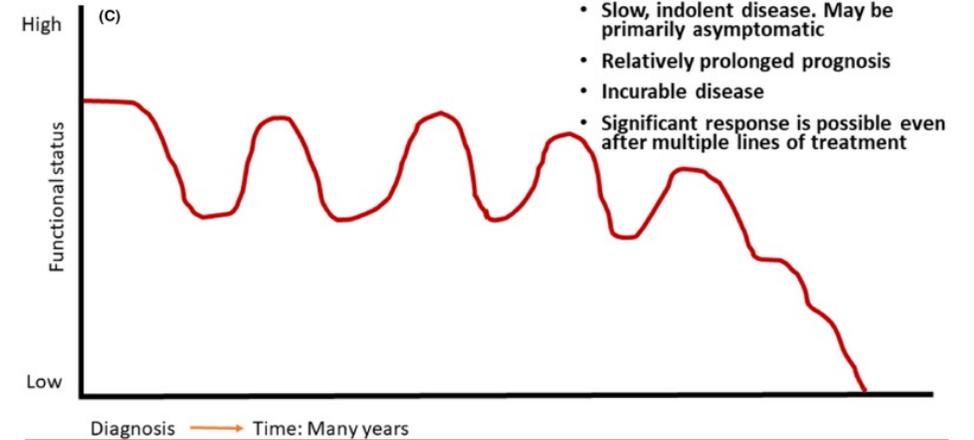
Aggressive trajectory



Br J Haematol. 2022;00:1-17.



Indolent trajectory



Acute leukemias, aggressive lymphomas, HSCT, aGHVD

Multiple myeloma, indolent lymphomas, CLL



L'assistenza nel fine vita ai pazienti oncologici in Emilia-Romagna nel decennio 2010-2019

Outpatient Early Palliative Care (EPC) is under-represented.



Engagement and Education of Policymakers, Stakeholders and the Public

Education and Training of Healthy Professionals in EPC could favour development of PC in Hematology wards.

What about PC and EPC in Emilia-Romagna Region, Italy?

Tabella 10. Caratteristiche dei pazienti in studio

| Caratteristiche dei pazienti | Totale | | ADI | | Hospice | | Cure palliative ambulatoriali | | Tutte le tipologie di cure palliative | |
|------------------------------|---------|--------|--------|-------|---------|-------|-------------------------------|------|---------------------------------------|-------|
| | N | % | N | % | N | % | N | % | N | % |
| Totale | 174.658 | 100,0% | 83.686 | 47,9% | 39.945 | 22,9% | 3.443 | 2,0% | 103.770 | 59,4% |
| Genere | | | | | | | | | | |
| Femminile | 79.212 | 45,4% | 39.834 | 50,3% | 18.851 | 23,8% | 1.459 | 1,8% | 48.909 | 61,7% |
| Maschile | 95.446 | 54,6% | 43.852 | 45,9% | 21.094 | 22,1% | 1.984 | 2,1% | 54.861 | 57,5% |
| Età | | | | | | | | | | |
| < 18 | 202 | 0,1% | 65 | 32,2% | 8 | 4,0% | 6 | 3,0% | 69 | 34,2% |
| 18 - 49 | 5.430 | 3,1% | 2.201 | 40,5% | 1.714 | 31,6% | 177 | 3,3% | 3.102 | 57,1% |
| 50 - 64 | 19.637 | 11,2% | 8.037 | 40,9% | 6.017 | 30,6% | 617 | 3,1% | 11.341 | 57,8% |
| 65 - 69 | 14.501 | 8,3% | 6.096 | 42,0% | 4.146 | 28,6% | 331 | 2,3% | 8.292 | 57,2% |
| 70 - 74 | 19.884 | 11,4% | 8.540 | 42,9% | 5.505 | 27,7% | 438 | 2,2% | 11.406 | 57,4% |
| 75 - 79 | 27.429 | 15,7% | 12.511 | 45,6% | 6.955 | 25,4% | 563 | 2,1% | 16.014 | 58,4% |
| 80 - 84 | 32.921 | 18,8% | 16.231 | 49,3% | 7.356 | 22,3% | 601 | 1,8% | 19.809 | 60,2% |
| 85 - 89 | 31.623 | 18,1% | 16.988 | 53,7% | 5.580 | 17,6% | 464 | 1,5% | 19.569 | 61,9% |
| ≥ 90 | 23.031 | 13,2% | 13.017 | 56,5% | 2.664 | 11,6% | 246 | 1,1% | 14.168 | 61,5% |
| Tipologia di tumore | | | | | | | | | | |
| Maligni solidi | 146.691 | 84,0% | 71.829 | 49,0% | 37.218 | 25,4% | 3.291 | 2,2% | 90.507 | 61,7% |
| <u>Maligni ematologici</u> | 15.034 | 8,6% | 5.997 | 39,9% | 1.823 | 12,1% | 85 | 0,6% | 6.947 | 46,2% |



3) ENGAGEMENT AND EDUCATION OF POLICYMAKERS, STAKEHOLDERS, AND THE PUBLIC

Palliative Care Is the Umbrella, Not the Rain— A Metaphor to Guide Conversations in Advanced Cancer

JAMA Oncology May 2022 Volume 8, Number 5 681

ecancer 2022, 16:1377; www.ecancer.org; DOI: <https://doi.org/10.3332/ecancer.2022.1377>



Figure. Illustrated Metaphor of Late vs Early Palliative Care

A Late palliative care referral



B Early palliative care referral



Camilla Zimmermann,
MD, PhD

Jean Mathews, MD

**AVOID STIGMA ABOUT
PALLIATIVE CARE WHICH
SHOULD BE ROUTINE CARE,
DURING THE WHOLE ILLNESS
TRAJECTORY:**

«...referrals are made too late because of misperceptions that palliative care is end-of-life care and palliative care remains synonymous with end-of-life care due to late-referrals...»



4) EDUCATION AND TRAINING OF HEALTHCARE PROFESSIONALS IN EPC



UNITI CONTRO IL CANCRO

NASCE LA RETE ONCOLOGICA ED EMATO-ONCOLOGICA DELLA REGIONE EMILIA-ROMAGNA



UNIMORE
UNIVERSITÀ DEGLI STUDI DI MODENA E REGGIO EMILIA

Dipartimento di Scienze Mediche e Chirurgiche
Materno-Infantili e dell'Adulto

www.smechinsl.unimore.it

Dual Board-Certified Hematologist/Oncologists

Annals of Hematology (2021) 100:2857–2858

<https://doi.org/10.1007/s00277-021-04512-0>

LETTER TO THE EDITOR



Education of early palliative care specialists among hematologists and oncologists to address patients' rather than physicians' rights

Leonardo Potenza¹ · Mario Luppi¹ · Eleonora Borelli¹ · Sarah Bigi² · Elena Bandieri³

Mario LUPPI¹
Il nuovo standard
delle Cure Palliative Precoci

1° Master Universitario di Secondo Livello

LE CURE PALLIATIVE PRECOCI E SIMULTANEE IN ONCO-EMATOLOGIA E MEDICINA INTERNA: LA CLINICA, LA COMUNICAZIONE E LA QUALITÀ DI VITA

Direttore del Master: prof. Leonardo Potenza (UniMoRe)
Coordinatore Didattico e Organizzativo: dott.ssa Elena Bandieri (Ausl Modena)
Referente: dott.ssa Eleonora Borelli (UniMoRe)
Comitato scientifico: dott.ssa Elena Bandieri, prof. Roberto D'Amico, prof. Massimo Dominici, prof. Fabio Efficace, dott. Fabio Gilioli, prof. Frank Reinhard Heinrich Lohr, dott. Giuseppe Longo, prof. Mario Luppi

Da settembre 2023 a giugno 2025
c/o Centro Oncologico Modenese (COM) e Centro Servizi
Policlinico di Modena - Largo del Pozzo 71, Modena



25

Mario LUPPI
è Direttore della Struttura Complessa di Ematologia dell'Ateneo Ospedaliero - Universitario di Modena

Si ringrazia per il supporto

Con il patrocinio di

fondazione GIMEMA
per la promozione e lo sviluppo della ricerca scientifica in ematologia oncologica. www.fondazione-gimema.it

UNIMORE
UNIVERSITÀ DEGLI STUDI DI MODENA E REGGIO EMILIA

AION
SICP
SIE Società Italiana di Ematologia

LE CURE PALLIATIVE PRECOCI IN
EMATO-ONCOLOGIA:
la nuova risposta ai bisogni di pazienti e caregivers

19 maggio 2023 Roma, Hotel Donna Camilla Savelli

LE CURE PALLIATIVE PRECOCI IN **EMATO-ONCOLOGIA:**
la nuova risposta ai bisogni di pazienti e caregivers

19 maggio 2023
Roma, Hotel Donna Camilla Savelli



ACKNOWLEDGEMENTS

Prof. Leonardo Potenza

Early Palliative Care for
Hematologic Patients
UNIMORE/AOU Modena

Dr Giuseppe Longo

Department of Oncology and
Hematology
AOU Modena

Prof. Sarah Bigi

Department of Linguistic
Sciences and Foreign
Literatures, Catholic University
of the Sacred Heart, Milan, Italy

Dr Eleonora Borelli

Department of Medical and Surgical
Sciences, University of Modena and
Reggio Emilia, Modena, Italy

Prof Carlo A. Porro

Department of Biomedical, Metabolic and Neural Sciences. Center
for Neuroscience and Neurotechnology,
Rector, University of Modena and Reggio Emilia, Modena, Italy

Dr Elena Bandieri

Early Palliative Care for
Oncologic Patients

Dr Fabio Gilioli

Department of Internal Medicine
and Rehabilitation,
USL Modena

Prof Eduardo Bruera

Palliative Care & Rehabilitation Medicine,
UT MD Anderson Cancer Center,
Houston, TX, USA.

Prof Fabio Efficace Chairman

Working Party QoL. Italian Group for Adult
Hematologic Diseases (GIMEMA), Data
Center and Health Outcomes Research
Unit, Rome, Italy.
Northwestern University, Chicago, IL, USA

Prof Oreofe Odejide

Department of Medical Oncology, Dana-
Farber Cancer Institute, Boston, MA, USA.

Prof Camilla Zimmermann

Princess Margaret Cancer Centre,
University Health Network, University of
Toronto, Toronto, Ontario, Canada

