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Professor of Medicine, Hematology and Oncology
Professor of Anatomy, Cell Biology and Physiological Sciences
Director, Bone Marrow Transplantation Program
American University of Beirut, Medical Center
Lebanon characteristics

- Population: 1.8 million in 1960; 5.8 million in 2015
- Mean life expectancy 79.3 years
- GDP: $3.3 billion in 1988; $47 billion in 2015 (World bank)
- Human Development Index (HDI) ranked [67] by the UNDP with a Gross National Income (GNI) per Capita of $16,509.
  - This HDI of 67 is considered a “high” rank on the UNDP list, and is between Oman [52] and Iran [69].
- Overall annual cancer incidence: 382 per 100,000 in 2003; 470 in 2008; foreseen to be 636 cases per 100,000 by 2018
- First BMT: 1997
- External referral mostly from Syria, Iraq, Palestine, expatriates in Gulf countries
## Transplant centers in Lebanon

<table>
<thead>
<tr>
<th>Center</th>
<th>Type of HSCT</th>
<th>Specificities</th>
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</thead>
<tbody>
<tr>
<td>American University of Beirut</td>
<td>Autologous HSCT, Allogeneic HSCT</td>
<td>- Largest center in Lebanon</td>
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<td></td>
<td></td>
<td>- EBMT and EMBMT</td>
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<td>- NMDP agreement</td>
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<td></td>
<td>Autologous HSCT</td>
<td>- JACIE accredited</td>
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<td>Allogeneic HSCT</td>
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<td>- MRD</td>
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<td>- Haploidentical</td>
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<td></td>
<td>- MUD</td>
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<tr>
<td>Makassed Hospital</td>
<td>Autologous HSCT, Allogeneic HSCT</td>
<td>- Historically the first in Lebanon</td>
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<td>- EBMT and EMBMT</td>
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<td>- Has Ahmad Ibrahim</td>
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<td></td>
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<tr>
<td>Mount Lebanon Hospital</td>
<td>Autologous HSCT</td>
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</tbody>
</table>
Autologous HSCT By Diagnosis

- Solid Tumors: 12%
- PCD: 35%
- NHL: 27%
- HL: 26%

Solid Tumors
Neuroblastoma: 47.17%
Germ Cell Tumors: 30.2%
Brain Tumors: 22.63%
Allogeneic HSCT (diagnosis)

- AML 35%
- ALL 18%
- LPD 14%
- MPD/CML 5%
- Thalassemia 5%
- BMF 14%
- MDS 5%
- ID 4%

Lymphoproliferative Disorders
- HL 56%
- NHL 35%
- CLL 6%
- PCD 3%
Allogeneic HSCT - Donor Type

Year | MRD | haplo | MUD
--- | --- | --- | ---
2012 | 40 | 1 | 2
2013 | 50 | 1 | 1
2014 | 50 | 10 | 1
2015 | 40 | 20 | 1
2016 | 30 | 30 | 2
Stem Cell Source (Allogeneic Donors)

- Bone Marrow: 45%
- Peripheral Blood: 55%
International registries

• AUBMC and Makassed are members of EBMT and EMBMT

• Annual reporting of transplant data to the EBMT registry and transplant activity to EBMT and EMBMT

• AUBMC has a signed agreement with NMDP for MUD search
Quality and accreditation

- AUBMC quality program initiated in 2013
- JACIE accreditation in 2016
- Makassed is preparing for JACIE accreditation
The Joint Accreditation Committee
ISCT-EBMT (JACIE)

hereby declares that

American University of Beirut Medical Center
Beirut, Lebanon

has been found to meet the standards as set out in the FACT-JACIE International Standards for Cellular Therapy, edition 5 in the following area(s):

- Autologous & Allogeneic Transplantation in Adult Patients
- Autologous & Allogeneic Transplantation in Paediatric Patients
- Collection of HPC, Marrow
- Collection of HPC, Apheresis
- Cell Processing - minimally manipulated

Programme Director: Prof. Ali Bazarbachi

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Challenges

• Financial limitations

• Private practice and lack of referral

• Underrepresentation of middle east in international registries
Recent developments

• Haploidentical HSCT +++

• Allogeneic HSCT for lymphoma (HL and NHL)

• Reduced toxicity regimen (older patients, patients with comorbidities)

• Sequential conditioning for refractory patients
Research axis

• Personalized conditioning

• Post transplant maintenance

• Nutritional status
• Kharfan-Dabaja MA, Nishihori T, Bazarbachi A.
Allo-HCT regimens with low toxicity needed in older patients with acute myeloid leukaemia.

Allogeneic hematopoietic cell transplantation in acute myeloid leukemia with normal karyotype and isolated Nucleophosmin-1 (NPM1) mutation: outcome strongly correlates with disease status.

• El Cheikh J, Otrock ZK, Qannus AA, Kharfan-Dabaja MA, Bazarbachi A.
Risk-Adapted Approach to HLA-Matched Sibling Hematopoietic Cell Allografting: Impact of Adjusting Conditioning Intensity and Integrating Post-Transplant Therapeutic Interventions.
**Clin Lymphoma Myeloma Leuk.** 2016 May;16(5):304-10.
Bone Marrow Transplant. 2016 May 16. doi: 10.1038/bmt.2016.130. [Epub ahead of print]

Bone Marrow Transplant. 2016 Sep 12. doi: 10.1038/bmt.2016.154. [Epub ahead of print]

Bone Marrow Transplant. 2016 Nov 28. doi: 10.1038/bmt.2016.300. [Epub ahead of print]

• Antar A, Otrock ZK, El-Cheikh J, Kharfan-Dabaja MA, Battipaglia G, Mahfouz R, Mohty M, Bazarbachi A. Inhibition of FLT3 in AML: a focus on sorafenib. 
**Bone Marrow Transplant.** 2016 Oct 24. doi: 10.1038/bmt.2016.251. [Epub ahead of print]
Risk-Adapted Approach to HLA-Matched Sibling Hematopoietic Cell Allografting: Impact of Adjusting Conditioning Intensity and Integrating Post-Transplant Therapeutic Interventions.

<table>
<thead>
<tr>
<th></th>
<th>Additional therapy (n=26)</th>
<th>No additional therapy (n=25)</th>
<th>P value</th>
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<tbody>
<tr>
<td>Median age at transplant (years)</td>
<td>32</td>
<td>40</td>
<td>0.971</td>
</tr>
<tr>
<td>Gender</td>
<td>M=21, F=5</td>
<td>M=18, F=9</td>
<td>0.244</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>AML=11, ALL=8, MDS=3, CML=3, MPN=1</td>
<td>AML=15, ALL=4, MDS=3, CML=1, MPN=2, CLL=2</td>
<td>0.384</td>
</tr>
<tr>
<td>CIBMTR risk group</td>
<td>Low risk=9, Intermed =12, High risk=4, Other=1</td>
<td>Low risk=14, Intermed=10, High risk=1, Other=2</td>
<td>0.336</td>
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<tr>
<td>Median follow up (months)</td>
<td>12</td>
<td>15.4</td>
<td>0.229</td>
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N=26; Deaths = 1
P=0.04

N=27; Deaths = 8
5-AZACYTIDINE (VIDAZA) PREVENTIVE THERAPY FOR RELAPSE OF MYELOID MALIGNANCIES FOLLOWING ALLOGENEIC HEMATOPOIETIC SCT

Jean El Cheikh, Radwan Massoud, Elie Fares, Nabila Kreidieh, Rami Mahfouz, Mohamed Kharfan-Dabaja, Ali Bazarbachi

Bone Marrow Transplantation (2016), In press

• 18 high risk patients (13 AML and 5 MDS).
At the last follow up 13 patients (72%) are alive in complete remission and full donor chimerism. 1-year DFS and OS were 63% and 70%, respectively.
Sorafenib for prevention of AML relapse post allo-SCT in cases of Flt3 mutations

1-year LFS: 91±6%

Relapse occurred in 2 out of 28 patients
Death (due to relapse) occurred in 2 out of 28 patients

Sorafenib for prevention of AML relapse post allo-SCT in cases of Flt3 mutations

1-year OS: 89±7%