CURRENT TRENDS IN HEMATOPOETIC STEM CELL TRANSPLANTATION IN EUROPE

Alois Gratwohl1, Helen Baldomero1, Bruno Horisberger2, Caroline Schmid2, Jakob Passweg1, Alvaro Urbano-Ispizua3
for the Accreditation Committee of the European Group for Blood and Marrow Transplantation (EBMT)

1Division of Hematology, Department of Internal Medicine and Department of Research, Kantonsspital Basel, Switzerland
2Research Institute for Management in Health Care FMIG, St. Gallen, Switzerland
3EBMT Secretariat, Hospital Clinic, Barcelona, Spain

Address for correspondence:
Prof. Dr. A. Gratwohl
Kantonsspital Basel
Div. Hematology
Dept. Internal Medicine
CH-4031 Basel, Switzerland
Tel + 41 61 265 42 77
Fax+ 41 61 265 44 50
E-mail: hematology@uhbs.ch

Running head: Trends in HSCT
Word counts: 4,007, of which Abstract 258

The work was supported in part by a grant from the Swiss National Research Foundation, 32-52756.97, the Swiss Cancer League and the Horton Foundation. EBMT is supported by grants from the corporate members: Hoffmann-La Roche Ltd, Amgen Europe, Chugai Rhone-Poulenc Rorer, Baxter, Astra, Cobe International, Nextar, Liposome Co, Imtix, Octapharma, Stem Cell Technologies, ICN Pharmaceuticals and Bristol-Meyers Squibb.

April 10, 2002
ABSTRACT

Major changes have occurred in the transplantation of hematopoetic stem cells (HSCT) during the last decade. This report reveals the changes, reflects current status and provides medium term projections of HSCT development in Europe. Data on 132,963 patients, 44,165 with an allogeneic HSCT (33%) and 88,798 with an autologous HSCT (67%), collected prospectively from 619 centres by the European Group for Blood and Marrow Transplantation (EBMT) in 35 European countries between 1990 (4,234 HSCT) and 2000 (19,136 HSCT) illustrate utilisation of HSCT. HSCT increased in all European countries and for all indications. There were major differences depending on disease indication and donor type. Transplant rates (numbers of HSCT per ten million inhabitants) varied from <1 for some rare indications to 37.7 ± 4.1 for acute myeloid leukemia in allogeneic HSCT or 95.5 ± 13.5 for Non Hodgkin's lymphoma in autologous HSCT. There were indications with a steady, continuing increase and others with initial increase but subsequent decrease.

Projections on medium term development for each disease based on a weighted sensitivity analysis, predict an ongoing increase in allogeneic HSCT except for chronic myeloid leukemia. In autologous HSCT they predict an increase for lymphoproliferative disorders, acute myeloid leukemia, myelodysplastic syndromes and some solid tumors but a decrease for most solid tumors, acute lymphoid leukemia and chronic myeloid leukemia. Transplant rates can be predicted with reasonable sensitivity for most disease indications. Despite marked changes in the rapidly developing field of HSCT, this information on current use, trends and mid-term predictions forms a rational basis for patient counselling and health care planning.
INTRODUCTION

Transplantation of hematopoetic stem cells (HSCT) is established therapy for many congenital or acquired severe disorders of the hematopoetic system as well as for chemo- or radiosensitive malignancies (1-3). Hematopoetic stem cells from bone marrow, peripheral blood or cord blood are used for autologous or allogeneic HSCT (4,5). Donors for allogeneic transplants include HLA-identical siblings, other family members or unrelated volunteers from the vast worldwide donor pools (6).

Major changes have occurred in HSCT over the last decade. Stem cell source has changed from bone marrow to peripheral blood for almost all disease indications in autologous HSCT. In allogeneic HSCT more than 50% of the HLA-identical sibling transplants, the majority of haplo-identical and twin transplants and more than one-third of the unrelated donor transplants were peripheral blood derived in the year 2000 (7,8). Expansion of unrelated donor pools to a current state of more than 7.5% million registered donors worldwide, the establishment of cord blood banks in North America and Europe and successful introduction of haplo-identical HSCT have made allogeneic HSCT available to patients without an HLA-identical sibling donor (4,6,9). New technologies, such as reduced intensity conditioning, limit early toxicity and allow allogeneic HSCT for patients above the previous age limit and for those with concomitant organ toxicity (10,11). At the same time, the role of HSCT has been put to question for certain disease indications. Excessive hopes first put forward HSCT for breast cancer, frustration about the results then halted its use (12). Furthermore, novel therapeutic strategies have emerged, such as the specific bcr/abl tyrosine kinase inhibitor imatinib mesylate for treatment of chronic myeloid leukemia (13,14). It made an immediate impact on HSCT use for this disease. All these changes occurred in a field of high technology and high cost medicine. Health care providers, hospital administrators and reimbursement agencies alike are challenged in this constantly changing field to have the resources available when needed. Correct assessment of current status, trends and predictions for the near future are essential for planning health care strategies (7).
Ten years ago the European Group for Blood and Marrow Transplantation (EBMT) initiated an annual activity survey as a new tool. All HSCT are registered by disease indication, donor type and stem cell source on an annual basis (15). Introduced as an instrument for quality control, the activity survey gained rapid acceptance and presently covers more than 95% of all HSCT in Europe are covered by this survey. It allows a precise description of current status each year, illustrates differences and similarities between European countries, allows calculations of transplant rates and team densities between the countries, reveals quantification of consensus for indications and permits detailed observations of changes in technologies (16,17). As presented in this report, observations over a decade now give a precise assessment of current status for the individual disease indications and permit a forecast with substantial sensitivity for the immediate future.

PATIENTS AND METHODS

Data collection and validation

Data collection is based on the EBMT activity surveys introduced in 1990 (15). Since then, all European centres, EBMT members as well as non-members are requested annually to report on a survey sheet the numbers of new patients by indication, stem cell source and donor type. Transplants are defined as the infusion of hematopoietic stem cells following a conditioning regimen with the intention of replacing the existing hematopoiesis by injected stem cells. The EBMT survey was adopted by the General Assembly as a mandatory self-reporting system and forms an integral part of a prospective quality assurance programme (http://www.EBMT.org). The latter includes revalidation of a computer print-out of entered data by reporting teams, cross-checking with national transplant registries and onsite visits.
Participating teams

Six hundred and nineteen teams in 36 European countries were contacted over time. Five hundred and eighty (94% return) replied in 2000. This includes all 470 EBMT member teams. No major transplant team in Europe is missing from this list. In 1990, the report began with 142 teams. The contacted teams are listed in the Appendix in alphabetical order according to country, city and EBMT centre code. In 2000 no blood or marrow transplants were performed in these European countries: Albania, Andorra, Armenia, Azerbaijan, Bosnia-Herzegovina, Georgia, Iceland, Latvia, Liechtenstein, Malta, Moldavia, Monaco, San Marino and the Vatican (personal communications).

Transplant rates

Transplant rates were defined as number of HSCT per 10 million inhabitants. They were computed as previously defined for each year, disease indication, donor type and country. For each disease indication transplant rates were assessed for all HSCT and separately for autologous, allogeneic and unrelated HSCT. Population data have been obtained from the US census office (http://www.census.gov) since 1996 and from the annual Fischer’s Weltalmanach for the years prior to 1996.

Statistical analysis, prediction of transplant rates and sensitivity analysis

Mean, median and standard deviations of numerical variables were calculated on an Excel spreadsheet. Groups were compared with chi-square tests.

In order to assess changes in transplant rates over time for each disease indication and to recognise trends, the following approach was used. All countries with at least 100 transplants during all the years since 1990 were selected; these include Belgium, France, Germany, The Netherlands, Switzerland, Italy, Spain, Sweden and UK. For each of these countries transplant rates were calculated for all indications as listed in Table 1, separately for autologous and allogeneic HSCT. For calculations of transplant rates a weighted
analysis was used considering the size of each of the nine individual countries. For each disease indication weighted means and standard deviations were calculated and in a regression analysis the best fitting curve was computed.

RESULTS

Development of transplant activity

The development of HSCT in Europe during the last decade is illustrated in Fig. 1. There has been an increase in HSCT activity for both allogeneic and autologous transplants. In 1991, there were equal numbers for both technologies. Autologous HSCT showed a marked increase after 1993, culminating in 1998 with almost 13,000 patients and a decline thereafter. As a total, there were 19,136 first transplants, including 6,404 (33%) allogeneic and 12,732 (67%) autologous HSCT in 2000.

Increase in transplant activity during the last decade is based both on increase in team numbers and increase in transplants within participating teams. Teams increased from 143 in 1990 to 619 in 2000. Of those, 579 responded to this survey. Fifty-three percent performed allogeneic and autologous transplants, 41% restricted their activity to autologous and 2% to allogeneic transplants only.

There was a wide variation in activity between teams. 137 (24%) teams performed less than 10 transplants, 128 (22%) teams between 10 and 20 HSCT, 180 (31%) between 20 and 50 HSCT, 107 (18%) between 50 and 100 HSCT and 27 teams (5%) more than 100 HSCT in 2000.

Indications for HSCT and donor type

Numbers of patients treated with HSCT over the last decade are listed in Table 1 according to disease indication and donor type. Table 1a lists the numbers of patients with allogeneic transplants by disease indication as a total for the years 1990-2000 and for the year 2000. Table 1b lists the autologous HSCT. Overall, from 1990 to 2000 there were 132,963 first transplants in Europe, of which 44,165 (33%) were allogeneic and 88,789 (67%) autologous
HSCT. They are grouped into four main disease categories, namely lymphoproliferative disorders with 52,847 patients (39.7%), leukemias with 48,561 patients (36.5%), solid tumors with 24,288 patients (18.3%), and non-malignant disorders with 6,016 patients (0.5%).

Not all indications increased at the same rate, as given in Tables 1a and 1b and as reflected in Fig. 2. Some indications appeared only recently, such as allogeneic HSCT for solid tumors or HSCT for autoimmune disorders. Concerning allogeneic HSCT, a marked increase was observed for leukemias and a relatively stable rate for non-malignant disorders, including aplastic anemia (Figure 2a). For lymphoproliferative disorders, a trend towards more allogeneic HSCT has been observed during the last two years. For autologous HSCT, the pattern is different (Fig. 2b). Breast cancer showed a marked increase after 1994 with a peak in 1997 and a continuous decline thereafter, while lymphoproliferative disorders and multiple myeloma continue to rise. Lymphoproliferative disorders (lymphoma) showed the most pronounced increase. For leukemias and other solid tumours, there are signs of a plateau developing over the last two years.

There are distinct differences between the disease groups with regard to donor type. Solid tumor patients were almost exclusively treated with autologous HSCT (98.0%). In contrast, patients with aplastic anemia, hemoglobinopathies, immunodeficiency disorders or inborn errors, in the group of non-malignant disorders, almost exclusively underwent allogeneic HSCT (98-100%). The few patients with congenital disorders and autologous HSCT are those given genetically modified autologous HSCT. Patients with lymphoproliferative disorders were treated predominantly with autologous HSCT (92.6%). Similarly, patients with autoimmune disorders were primarily treated with autologous HSCT (92%). Patients with leukemias were mainly treated with allogeneic HSCT (69.0%) even though for some subgroups, such as acute myeloid leukemia, numbers of autologous and allogeneic procedures were equal.

Of the 6,404 allogeneic HSCT in 2000, 3,955 (62%) recipients received cells from an HLA-
identical sibling donor, 437 (7%) from another family member, 58 (1%) from a syngeneic
twin and 1,954 (31%) recipients had an unrelated volunteer donor. Over the decade, the
percentage of twin donors has remained stable; the percentage of unrelated donors has
increased from less than 10% to over 30% in 2000.

**Stem cell source**

Stem cell source varied over time and was dependent on donor type. In 1990, almost all
HSCT were bone marrow derived. This has changed within the decade. Of the 19,136
HSCT in 2000, only 3,555 (19%) were still bone marrow derived, 15,581 (81%) were from
peripheral blood stem cells or were combined bone marrow and peripheral blood stem cell
transplants. There are differences in stem cell source for autologous and allogeneic HSCT.
Of the 12,732 autologous HSCT, only 566 (4%) used bone marrow and 12,166 (96%)
peripheral blood stem cells. Of the 6,404 allogeneic HSCT, 2,989 (47%) were bone marrow
derived and 3,415 (53%) were peripheral blood stem cell transplants. Peripheral blood was
used in 57% of HLA-identical sibling donor transplants, in 81% of HSCT from other family
members, in 76% of twin donor and in 39% of unrelated donor HSCT.

**Changes in transplant rates over time**

Transplant rates differed between the European countries but increased in all European
countries over the decade (Fig. 3). These rates differed depending on indication, donor type
and time. Changes in transplant rates for the nine selected countries described above are
given in Table 2.

For allogeneic HSCT transplant rates increased for all indications continuously with two
exceptions (Table 2a): Chronic myeloid leukemia and inborn errors, for which the maximum
was reached in 1999. For chronic myeloid leukemia, the likely explanation is the advent of
imatinib mesylate. For inborn errors, it could be a chance phenomenon at the beginning of
stabilisation. Mathematical models cannot separate chance variations from first signs of a
new trend but they predict an increase for both indications for 2003. Patterns of increase were not the same for all indications as illustrated in Figs. 4a and 4b. In aplastic anemia, increase was relatively small over time with a slow steady increase, and a decrease in standard deviation (trend mean $y = 0.0066x^2 + 0.187x + 4.0116; r^2 = 0.5398$; trend standard deviation $y = 0.0268x^2 + 0.3058x + 0.4446; r^2 = 0.5089$); in AML the increase is marked with a doubling of transplant rate almost every 5 years (trend mean $y = 0.0961x^2 + 1.3861x + 11,105; r^2 = 0.9973$).

For autologous HSCT the changes in transplant rate differed from the pattern seen in allogeneic HSCT (Table 2b). For some indications, continuous increase occurred throughout the decade. This was the case for lymphoproliferative disorders, as exemplified by the curves for multiple myeloma (Fig. 4c) and a doubling every 3-4 years (trend mean $y = 0.33x^2 + 4.3538x - 4.0192; r^2 = 0.9899$). The same trend was observed for some leukemias (myelodysplastic syndromes, chronic lymphocytic leukemia) and some solid tumors (glioma, Ewing's sarcoma). In contrast, for other indications, most marked for breast cancer (Fig. 4d), the rapid increase in the early nineties with a peak between 1997/98 was followed by a rapid decline. Mathematical models would even predict a value of 0 at 3 years. Similarly, for chronic myeloid leukemia predictions cannot yet capture the decline in 2000 and show a continuing rise.

**DISCUSSION**

These data give an overview of the status of HSCT in Europe during the last decade and today. They illustrate the main changes in technology and the overall increase over time with substantial differences between European countries. They give detailed insight for individual disease indications and allow a precise medium term forecast.

Based on the analysis of weighted transplant rates in nine countries with the highest transplant numbers it can be predicted that transplant rates for allogeneic HSCT will
continue at the same or higher level in the immediate future for all indications. Only one exception is chronic myeloid leukemia which has been the leading indication for allogeneic HSCT up to the year 1999 (8,15). It is likely that the decline in 2000 is not a chance phenomenon but due to the introduction of Glivec®, a novel specific tyrosine kinase inhibitor (13,14). It is of interest to note that reduction in transplant rates for chronic myeloid leukemia occurred before the first publication on the results of the initial phase I trial, which were published in spring 2001. This sequence of events suggests that anticipation of therapeutic success was a major factor in decision making. The same phenomenon that changes in transplant rates occurred before the key publications was observed earlier in the decade with regard to breast cancer. This phenomenon of anticipation needs to be recognised at times of high praise for evidence based medicine (18). The issue of HSCT for chronic myeloid leukemia is still not settled. Imatinib failures continue to occur and therapists are reverting to HSCT in these cases. More observation time is needed for reevaluation of HSCT in chronic myeloid leukemia.

Predictions in autologous HSCT do not show a general pattern but rather different trends. The situation for autologous HSCT in breast cancer, as mentioned above, has received broad attention beyond the medical literature and was summarised in headlines, such as "transplants decline, research continues" (19). Hopes for cure stimulated initially autologous HSCT for breast cancer as well as solid tumors in general (20). Results did not meet expectations and induced a similar, marked decline (21,22). The pattern varies substantially depending on indications. HSCT rates declined for germ cell tumors and acute lymphocytic leukemia. In contrast, they continued for neuroblastoma and Ewing's tumors at similar rates and increased for non-Hodgkin's lymphoma, multiple myeloma or acute myeloid leukemia. For the latter three indications, autologous HSCT continued to increase with the highest transplant rates in the year 2000. Importantly, these indications correspond to those where HSCT were shown to provide a clinical benefit compared to standard therapy in prospective randomised studies (23-26). It is also noteworthy that indications with the highest transplant rate in 2000 were compatible and concordant with so-called "accepted indications for
HSCT" (3).

Health care today has many aspects of a market. Demand is there, if a given technology is recognised as the treatment of choice. Health care providers should be in a position to offer these therapies if the need arises. For high cost, complex techniques, such as HSCT, planning is essential. Medium term horizon-scanning (http://www.bham.ac.uk/PublicHealth/horizon/glossary.htm) has become vital for health care management. Novel tools are required in this field. The annual activity survey of the EBMT presents one such unique instrument. Thanks to a nearly complete coverage of a medical technology across several countries within a continent and the rapid return of information, trends can be discovered very early and predictions can be made with reasonable sensitivity and accuracy (27). The limitation of the approach is that new events, e.g. the introduction of a novel drug, such as imatinib mesylate, which can change treatment strategies within one year, cannot be anticipated. Despite the best mathematical models, statistical analyses cannot distinguish in the first year between chance events and the beginning of a new era.

Several factors influence transplant rates for individual disease indications. Prevalence of the disease, consensus on indication and the economic situation within a country are the main determinants. In addition, the technology has to be available and needs to be disseminated within a country (28). This can clearly be influenced by health care planning even though optimal team density (number of transplant teams per ten million inhabitants) needs to be defined.

In summary, these data based on ten years’ cumulative transplant activity data in Europe show that transplant rates for individual disease indications can change. Such shifts are not necessarily based on evidence but rather on anticipation. Nevertheless, transplant rates are not erratic but highly predictable at medium term.

REFERENCES


26. Zittoun RA, Mandelli F, Willemze R et al: Autologous or allogeneic bone marrow transplantation compared with intensive chemotherapy in acute myelogenous leukemia. European Organization for Research and Treatment of Cancer (EORTC) and the Gruppo Italiano Malattie Ematologiche


Legends to the Figures

Fig. 1  Evolution of HSCT in Europe from 1990 to 2000
       Annual numbers of allogeneic and autologous HSCT and of participating teams

Fig. 2  Absolute numbers of HSCT in Europe from 1990 to 2000 according to main indications.
       Fig 2a  Allogeneic transplants for leukemias, lymphoproliferative disorders and non-malignant disorders.
       Fig 2b  Autologous transplants for leukemias, lymphomas, multiple myelomas, breast cancer and other solid tumors.

Fig. 3  Transplant rates in participating European countries in 2000.
       Shades reflect number of total HSCT (autologous and allogeneic) per ten Million inhabitants.
       Fig 3a  Transplant rates in 1990
       Fig 3b  Transplant rates in 2000
       * countries selected for calculation of weighted transplant rates by disease indication (see below).

Fig. 4  Transplant rates for selected indications in nine European countries (see Fig. 3) from 1990 to 2000. Weighted transplant rates (per ten million inhabitants) are given (◆) and best fitting curves (lines).
       Fig. 4a: aplastic anemia, allogeneic HSCT
       Fig. 4b: acute myeloid leukemia, allogeneic HSCT
       Fig. 4c: multiple myeloma, autologous HSCT
       Fig. 4d: breast cancer, autologous HSCT
Legend to the tables

Table 1 Number of patients treated in Europe from 1990 to 2000 with a 1st hematopoetic stem cell transplant and percentage of total by disease indication and donor type.

Table 1a Allogeneic transplants
Table 1b Autologous transplants

Table 2 Transplant rates in nine selected European countries from 1990 to 2000, year of maximum transplant rate and country predictions for 2003. Numbers reflect weighted transplant rates per ten million inhabitants.

Table 2a Allogeneic transplants
Table 2b Autologous transplants
ACKNOWLEDGEMENTS

The cooperation of all participating teams and their staff (listed in the Appendix), the EBMT secretariat (A. Urbano-Ispizua, A. Baur), the European EBMT Data Office in Paris (V. Chesnels, P. Palut, N.C. Gorin), the EBMT Registry Subcommittee (P. Ljungman, C. Ruiz de Elvira), the French Registry SFGM (J.P. Vernant, M-L Tanguy), the Dutch Registry (T. de Witte, A. v. Biezen, N. Tazelaar), the Austrian Registry (D. Niederwieser, B. Gritsch), the Italian Registry (M. Vignetti, A. Bacigalupo, R. Oneto, C. Palazzi), the German Registry (H. Ottinger, C. Müller, B. Kubanek, N. Schmitz, U.W. Schaefer), the Swiss Registry (J. Passweg, H. Baldomero), the British Registry, the Belgium Registry, (Y. Beguin) and the Spanish Transplantation Office (ONT) (M.Naya) is greatly appreciated. The authors also thank A. Maerki for excellent secretarial assistance, A. Wodnar-Filipowicz for reviewing the manuscript as well as L. John and O. Baldomero for technical assistance with data management.
APPENDIX 2000

List of transplant centres in 2000 (numbers show total number of patients with first transplants in year 2000 (total number of transplants) followed by the allografts/autografts)

Albania: no report
Andorra: no report
Armenia: no report

Austria (15 teams; 329 (396), 127/202) **
Graz, University Hospital, CIC 308, W. Linkesch (52 (66), 10/42)
Graz, University Hospital, Onco, CIC 278, H. Samonigg, M. Schmid (4 (9), 0/4)**
Graz, Universitäts-Kinderklinik, CIC 593, Ch. Urban (12 (13), 5/7) **
Innsbruck, Universitätsklinikum (hem, onco), CIC 271, G. Gastl, D. Nachbaur (29 (33), 24/5)
Innsbruck, Universitätsklinikum (Internal Medicine), CIC 516, J. Thaler, W. Woell (4 (7), 0/4)
Klagenfurt, General Hospital Klagenfurt CIC 716, D. Geissler, M. Heistinger (8 (8), 0/8)
Linz, 1. Medizinische Abteilung, AO Krankenhaus, M.A. Fridrik (1 (1), 0/1)
Linz, AOK der Elisabethinen, CIC 594, D. Lutz, O. Krieger (32 (43), 7/25) **
Salzburg, LKA Salzburg (Onco), CIC 356, Prof. Hausmaninger (10 (10), 0/10)
Vienna-Lainz, Krankenhaus der Stadt Wien-Lainz, 5. Med Onko, CIC 362, G. Baumgartner, E. Ulisperger, Dr. Mayer (1 (1) 0/1)
Vienna, St. Anna Kinderspital, CIC 528, H. Gadner, C. Peters (35 (43), 20/15)
Vienna, Donauspital, CIC 767, W. Hinterberger (14 (18), 0/14) **
Vienna, Universitätsklinikum für Innere Medizin I - AKH, CIC 227, H.T Greinix, P. Kalhs (89 (97), 61/28) **
Vienna, Wilhelmenspital, CIC 828, H. Ludwig (31 (40), 0/31)
Vienna, Hansch-Krankenhaus, CIC 743, R. Reisner, E. Pittermann, E. Koller (9 (10), 0/9) **

Azerbaijan: no report

Republic of Belarus (3 teams; 41 (42), 13/28)
Minsk, Belorussian Center, CIC 591, O. Aleinikova (15 (16), 6/9)
Minsk, Hospital No. 9, CIC 801, N. Milanovitch (26 (26), 7/19)
Minsk, Institute of Haematology, V. Ivanov () *

Belgium (24 teams; 553 (647), 170/383)
Aalst, OLV Ziekenhuis, E. Wouters ()*
Antwerpen, A.Z. Middelheim, CIC 783, R. de Bock (7 (7), 0/7)
Antwerpen, Sint-Jan, CIC 339, P. Zachée (35 (41), 6/29)
Brugge, A.Z. Sint Jan, CIC 506, D. Selleslag, A. Van Hoof (40 (53), 12/28)
Brussels, Clinique Général Saint Jean, CIC 779, C. Dubois (4 (7), 0/4)
Brussels, Hôpital Erasme, CIC 596, W. Feremans (14 (16), 0/14)
Brussels, Clinique universitaire St. Luc (Adults), CIC 234, A. Ferrant (49 (52), 26/23)
Brussels, Institut Jules Bordet +Children's University Hospital, CIC 215, D. Bron C. Devalck, E. Sariban (48 (56), 24/24)
Brussels, University Hospital, CIC 630, B. Van Camp, A. Schots (25 (25), 12/13)
Brussels, Cliniques Universitaires St. Luc, (onco), M. Symann (3 (3), 0/3)
Brussels, Inst. Edith Cavelle Marie Depage (onco), C. Vanhaelen ()*
Charleroi, Hospital Notre-Dame, M. André (27 (29), 1/26)
Edegem, University Antwerpen, CIC 648, W. Schryvens (26 (28), 3/23)
Gent, University Hospital, CIC 744, L.A. Noens (50 (53), 20/30)
Haine St. Paul, Hôpital de Jolimont, CIC 234, A. Delannoy, C. Ravooit (13 (16), 0/13)
Hasselt, Virgjesse Ziekenhuis CIC 632, D. Vanstraalen, Dr. Janssen (25 (27), 0/25)
Jumet, Hôpital Civil de Jumet, A. Duvivier ()*
Leuven, University Hospital Gasthuisberg, CIC 209, M.A. Boogaerts, P. Vandenberghe, J. Maertens (76 (89), 29/47)
Liège, University Hospital Sart-Tilman, CIC 726, Y. Béguin (49 (71), 20/29)
Liège, CHR-Citadelle, CIC 353, B. De Prijck (6 (7), 0/6)
Liège, Centre Hospitalier St. Joseph (hem), L. Longree ()*
Roeselare, H. Hartzienhuis, F. Van Aest, J. Tytgat, J. Demol (13 (14), 2/11)
Yvoir, Clinique universitaire de Mont-Godinne CIC 234, C. Doyen (30 (40), 9/21)
Bosnia-Herzegovina: no report

Bulgaria (1 team; 15 (15), 3/12)
Sofia, Uni. Hospital 'Queen Johanna', CIC 346, (peds hem-onco), D. Bobev (15 (15), 3/12)

Croatia (2 teams; 93 (99), 24/69)
Zagreb, Hospital Merkur, CIC 159, B. Jaksic, H. Minigo (21 (21), 1/20)
Zagreb, Clinical Hospital Center, CIC 302, B. Labar, D. Nemet, M. Mrsic (72 (78), 23/49) **

Cyprus (1 team; 14 (14), 0/14)
Nicosia Makarious Hospital III, N. Papaminas (14 (14), 0/14)

Czech Republic (10 teams; 392 (465), 103/289)
Brno, Masaryk University Hospital, CIC 597, J. Vorlicek (75 (91), 18/57)
Hradec Kralove, Charles University, CIC 729, S. Filip, M. Blaha (51 (59), 10/41)
Olomouc, University Hospital, CIC 574, K. Indrak (52 (61), 10/42)
Pilsen, Faculty Hospital, CIC 718, V. Koza (62 (67), 19/43)
Prague, Thomayer Memorial Hospital, CIC 375, J. Abrahamova, J. Nepomucka, L. Boublíková (7 (8), 0/7)
Prague, University Hospital Motol (peds onco), P. Kavan (22 (25), 0/22)
Prague, Clinical Haematology, Charles University, CIC 318, T. Kozak (22 (29), 0/22)
Prague, University Hospital Motol (peds hem), CIC 656, J. Stary (21 (23), 20/1)
Prague, Charles University, CIC 745, M. Trený (47 (66), 0/47)
Prague, Institute of Hematology and Blood Transfusion, CIC 656, A. Vítek, P. Kobylka (33 (36), 26/7)

Denmark (3 teams; 161 (179), 47/114)
Aarhus, Amtsbyghus, CIC 634, A. Boesen (38 (43), 0/38)
Copenhagen, Rigshospitalet, CIC 206, N. Jacobsen (93 (100), 47/46)
Copenhagen, Herlev Hospital, University, CIC 568, H.E. Johnson (30 (36), 0/30)

Estonia (1 team; 16 (16), 1/15)
Tartu, University Hospital, CIC 746, H. Everaars (16 (16), 1/15)

Finland (7 teams; 248 (271), 99/149)
Helsinki, University Hospital, Dept. Oncology, CIC 833, H. Joensuu, T. Wiklund (12 (13), 0/12)
Helsinki, University Hospital, Third Dept. of Medicine, CIC 515, T. Ruutu (88 (91), 63/25)
Helsinki, Children's Hospital, CIC 219, U. Pihkala, S. Vettenranta (28 (32), 18/10)
Kuopio, Department of Medicine, University Hospital, E. Jantunen, T. Nousiainen (28 (28), 0/28)
Oulu, University Central Hospital (haem/onco), CIC 690, P. Koistinen, T. Turpeenniemi-Hujanen (20 (20), 0/20)
Tampere, University Hospital, CIC 635, E. Koivunen, R. Silvennoinen (30 (41), 0/30) **
Turku, University Central Hospital, CIC 225, K. Remes (42 (46), 18/24)

France (85 teams; 3103 (3624), 711/2392) **
Amiens, CHU d'Amiens, B. Desabliens, ()* Angers, Paul Papin, Dr. Gamelin ( )* Angers, Centre Hospitalier, CIC 650, N. Ifrah (53 (64), 12/41) Argenteuil, Centre hospitalier, M. Urbajtel (28 (28), 7/21) Besançon, Hôpital Jean Minjoz & Hôpital St. Jacques (adults & peds), CIC 233, P. Hervé, J.-Y. Cahn, M.N. Cailleux, Dr. Surowka (86 (105), 26/60) Bobigny, Hôpital Avicenne (hem), P. Casassus ( )* Bordeaux, CHU Hôpital de Bordeaux Enfants, Y. Perel ( )* Brest, Centre Hospitalier, C. Berthou (40 (51), 0/40) Caen, Hôpital Cote de Nacre (peds hem onco), P. Boutard (3 (3), 0/3) Caen, Centre Hospitalier Régional, CIC 251, O. Reman (22 (25), 0/22) Caen, Centre Régional François Baclesse, A. M. Peny (19 (20), 0/19) Clermont Ferrand, Hotel Dieu (peds), F. Démocq ( )* Clermont Ferrand, Centre Jean Perrin, CIC 273, J.-O. Bay, (76 (76), 14/62) Clichy, Hôpital Beaujon, J. Brière ( )* Colmar, Hôpital civil, B. Audhuy (8 (8), 0/8) Corbeil Essonne, Hôpital Gilles de Corbeil, A. Devidas (11 (11), 0/11) Créteil, Hôpital H. Mondor, CIC 252, C. Cordonnier, M. Kuentz (60 (62), 22/38) Dijon, Hôpital d'Enfants, D. Caillot (70 (91), 0/70) Dunkerque, Centre Hospitalier (hem), M. Wetterwald (9 (9), 0/9) Grenoble, Centre Hospitalier (ads, allo peds), CIC 270, J.J. Sotto, F. Garban, P. Drillat (50 (55), 13/37) Grenoble, Centre Hospitalier (auto peds), D. Plantaz, M. Bost (8 (8), 0/8) Lille, Hôpital Claude Huriez, CIC 277, F. Bauters, J.P. Jouet (112 (126), 43/69) Lille, Hôpital Jeanne de Flandre, Dr. Nelken (2 (2), 0/2) Lille, Centre Oscar Lambret (onco), Dr. Depadt, Dr. Defaches (20 (20), 0/20)
Lille, Centre Hospitalier Saint Vincent, N. Cambier (15 (15), 0/15)
Limoges, Centre Hospitalier Dupuytren (ads.), CIC 977, D. Bordessoule, P. Turlure (37 (43), 0/37)
Limoges, Centre Hospitalier Dupuytren (peds.), Prof. De Lumley (2 (2), 0/2)
Lyon Sud (Pierre Benite), Centre Hospitalier, B. Coiffier (124 (135), 0/124)
Lyon, Hôpital Edouard Herriot, CIC 241, P. Biron, T. Philip (66 (78), 0/66)
Lyon, Hôpital Debrousse, N. Philippe, G. Souillet, Y. Bertrand (24 (27), 24/0)
Marseille, Inst. Paoli-Calmettes, CIC 230, D. Blaise (196 (283), 19/177)
Marseille, Hôpital d'Enfants de la Timone (onco), CIC 301, C. Coze, J.L. Bernard (9 (10), 0/9)
Marseille, Hôpital d'Enfants de la Timone, G. Michel (16 (18), 16/0)
Meaux, Centre Hospitalier de Meaux, C. Soussain (6 (8), 0/6)
Metz, Thionville Hôpital Notre-Dame de Bon-Secours (hem), V. Dorvaux (18 (24), 0/18)
Montpellier, CHU de Montpellier Hôpital Arnaud de Villeneuve, F. Bernard (11 (11), 2/9)
Montpellier, CHR Lapeyronie, J.F. Rossi (95 (100), 18/77)
Mulhouse, Hôpital du Hasenrain, Ph. Hénon, Dr. Becker (15 (16), 0/15)
Nantes, Hotel Dieu, CIC 253, J.L. Harousseau, N. Milpied (146 (203), 30/116)
Nice, Hôpital de Cimiez, CIC 523, J.G.Fuzibet, J.P. Cassuto, N. Gratecos (52 (55), 15/37)
Nice, Fondation Lernval (peds), Dr. Soler, Dr. De Ricaud (1 patient transplanted in Marseille (1 (1), 0/1)
Nice, Centre Antoine Lacassagne, A. Thyss (20 (21), 0/20)
Paris, Hôpital Européen G.P., J.M. Andrieu, C. Le Maignan (7 (10), 0/7)
Paris, Hôpital Cochin, J.P. Levy, F. Dreyfus (36 (36), 0/36)
Paris, Hôpital Necker des enfants malades, CIC 210, A. Fischer (39 (43), 36/33)
Paris, Hôpital St. Antoine, CIC 213, C. Gorin, L. Fouillard (48 (59), 8/40)
Paris, Hôpital St. Louis (auto), CIC 805, G. Gisselbrecht (58 (61), 0/58)
Paris, Hôpital St. Louis (allo), CIC 207, E. Gluckman (87 (92), 86/1)
Paris, Hôpital St. Louis (peds), CIC 748, A. Baruchel, M.-F. Auclerc (3 (3), 0/3)
Paris, Hôpital St. Louis (auto immuno-Haem), CIC 969, J.-C. Brouet, B. Royer, J.-P. Fermand (57 (58), 0/57)
Paris, Hôpital St. Louis (auto-leuk), CIC 960, H. Dombret, L. Degos, P. Rousselot (14 (16), 0/14)
Paris, Hôpital Pitié Salpêtrière (hem), CIC 262, J.-P. Vernant, V. Leblond (91 (100), 42/49)
Paris, Hôpital d'Enfants Armand-Trousseau, G. Leverger, A. Auclerc (10 (10), 0/10)
Paris, Hôpital Tenon, J.P. Lotz (32 (37), 0/32)
Paris, Hôpital Robert Debré, P. Rohrlich, E. Vilmer (22 (22), 21/1)
Paris, Hôpital Necker (ads), CIC 160, B. Varet, C. Bélanger, A. Veil (63 (66), 28/35)
Paris, Hôtel Dieu (hem), CIC 222, J.-P. Marie, B. Rio (50 (57), 13/37)
Paris, Institut Curie (ads/onco/peds), CIC 702, P. Pouillart, J. Michon, J.M. Zucker (*)
Pessac, Hôpital Haut-Lévêque, CIC 267, J. Reiffers, Dr. Fabères (98 (133), 31/67)
Poitiers, Hôpital Jean Bernard, CIC 264, A. Sadoun (*)
Pontoise, Hospital René Dubois, CIC 961, Dr. Morvan, Y. Kernéis (17 (19), 0/17)
Reims, Hôpital Robert Debré, J.C. Etienne (29 (32), 0/29)
Rennes, Institute Jean Godinot (onco), Dr. Eymard (*)
Rennes, Hôpital Pontchaillou, C. Dauriac (*)
Rennes, CHRU, Clinique Médical Infantil, E. Le Gall, V. Vandemer (17 (17), 7/10)
Rouen, Centre Henri Becquerel, H. Tilly, P. Lenain (66 (71), 17/49)
Rouen, Hôpital Charles Nicolle, P. Tron (16 (17), 10/6)
St. Cloud, Centre René Huguenin, M. Janvier (6 (7), 0/6)
St. Etienne, Hôpital Etienne, D. Guyotat, J.L. Stephan (*)
Strasbourg, Hôpital de Hautepierre, B. Lioure (72 (88), 15/57)
Strasbourg, Hospices Civils, Service de Pédiatrie 5, P. Lutz (13 (13), 10/3)
Toulouse, Hôpital de Purpan (hem), CIC 624, M. Attal (75 (82), 28/47)
Toulouse, Hôpital de Purpan (peds), A. Robert, H. Rubie (8 (8), 1/8)
Tours, Hôpital Bretonneau, CIC 272, P. Colombat (89 (99), 0/89)
Valenciennes, Hosp. De Valenciennes, M. Simon (19 (19), 0/19)
Vandoeuvre-les-Nancy, Hôpital d'Enfants, P. Bordigoni (33 (38), 28/5)
Vandoeuvre-les-Nancy, CHU Nancy-Brabois (hem auto), P. Lederlin, F. Witz (63 (73), 0/63)
Villejuif, Institut G. Roussy (peds), CIC 503, O. Hartmann (53 (86), 0/53)
Villejuif, Hôpital Paul Brousse, B. Delmas-Marsalet (8 (8), 0/8)

**Georgia:** no report
Germany (106 teams; 3541 (4395), 1432/2109)
Aachen, Universitätshospital RWTH, Med Klinik IV, R. Osieka, U. Fabry (12 (18), 0/12)
Augsburg, Zentrale Klinik, Med Klinik II, G. Schlimok, P. Müller (37 (40), 8/29)
Bad Saarow, Humane Klinikum, G. Schultz, H. Fuss (49 (49), 0/49)
Berlin, Universitätshospital Charité Campus Mitte, II Med. Klinik, CIC 807, K. Possinger, R. Arnold (53 (58), 40/13)
Berlin, Univ. Charité der Humboldt Universität Campus, Robert- Rössle Klinik (onca), CIC 518, B. Dörken, G. Maschmeyer (10 (15), 0/10)
Berlin, KH Neukölln, A.C.Mayr, C. Kerschgens (1 (1), 0/1)
Bielefeld, Bethel KKS Gilead, R. Kolloch, F. K. Lindemann (0 (0), 0/0)
Bielefeld, Franziska Hospital, H.J. Weh, A. Zumsprekel (7 (14), 0/7)
Bochum, Knappschaftskrankenhaus, U. Graeven, W. Schmiegel (12 (17), 0/12)
Bremen, CIC 602, ZKK St. Jürgen-stasse, C. Meier, H. Rasch (11 (15), 0/11)
Bremen, DIAKO, DRST 28001, T. Wolff, K.H. Pflüger (9 (10), 0/9)
Chemnitz, KH Küchwald, F. Fledder, R. Nowak (20 (21), 0/20)
Duisburg, Klinikum Kalkweg (onca), H. Gerhartz (0 (0), 0/0)
Duisburg, Heinrich-Heine Universität; Zentrum für Kinderheilkunde, CIC 651, K. Göbel, W. Nürnberger, D. Dilloo (23 (26), 16/7)
Duisburg, Heinrich-Heine Universität; Medizinische Klinik (haem, onco), CIC 390, R. Haas, P. Schneider (76 (90), 22/54)
Erlangen, Universität Erlangen-Nuremberg, Med Klinik III, CIC 809, M. Gramatzki, J-R. Kalden (37 (40), 16/21)
Erlangen, Universität Erlangen-Nuremberg, Med Klinik I, CIC 809, M. Gramatzki, J-R. Kalden (37 (40), 16/21)
Erlangen, Universität Erlangen-Nuremberg, Med Klinik I, CIC 809, M. Gramatzki, J-R. Kalden (37 (40), 16/21)
Essen, Universitäts-Klinik (ads), CIC 259, W. Havers, B. Kremens (20 (21), 17/3)
Essen, Universitäts-Klinik (peds), CIC 259, W. Havers, B. Kremens (20 (21), 17/3)
Frankfurt a. M., J.W. Goethe-Universität (ads, peds), CIC 297+CIC 138, D. Hoelzer, H. Martin B. Kornhuber, D. Schwabe (65 (72), 34/31)
Frankfurt, KH Nordwest, A. Knuth, E. Jäger (1 (1), 0/1)
Freiburg i. Br., Universitätsklinik (ads), Med Klinik I, CIC 810, J. Finke, W. Lange, S. Fetscher (126 (136), 82/44)
Freiburg i. Br., Universitätskinderklinik, CIC 810, C. Niemeyer, M. Brandis, U. Duffiser, B. Bächle (22 (23), 20/2)
Göttingen, Georg-August Universität, G. Brittinger, T. Hagemann, B. Wörmann (25 (28), 0/25)
Greifswald, Ernst-Moritz-Amth University (ads + peds), CIC530, G. Dölken, T. Kiefer (37 (44), 6/31)
Hannover, Medizinische Hochschule, Abt. Kinderheilkunde, CIC 295, A. Ganser, B. Hertenstein (24 (24), 19/5)
Hannover, Medizinische Hochschule, Abt. Kinderheilkunde, CIC 295, A. Ganser, B. Hertenstein (24 (24), 19/5)
Hannover, KH Siloah, K. Hahn, T. Hagemann, B. Wehner, M. Schütt (13 (13), 0/13)
Heidelberg, Ruprecht-Karls Universitätshospital-Poliklinik, CIC 524, A.D. Ho (181 (217), 41/140)
Homburg/Saar, Universität des Saarlandes, CIC 785, L. Trümper, M. Pfreundschuh (38 (52), 16/22)
Idar-Oberstein, Klinik für Hämato-/Onkologie, CIC 592, A.A. Fauser, M. Kiehl (63 (69), 58/5)
Jena, Klinik fur Innere Medizin II, CIC 533, H.G. Sayer, K. Hoefkken (45 (62), 23/22)
Jena, Universitäts-Kinderklinik, CIC 785, F. Zintel, D. Fuchs (24 (28), 17/7)
Kassel, Städtische Kliniken, J. Fischer, T. Kubin (14 (22), 0/14)
Kassel, Städtische Kliniken, J. Fischer, T. Kubin (14 (22), 0/14)
<table>
<thead>
<tr>
<th>City</th>
<th>Institution</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Köln</td>
<td>Universitätss-Klinik, F. Berthold, T. Simon</td>
<td>(2 (2), 0/2)</td>
</tr>
<tr>
<td>Köln</td>
<td>Klinikum Krefeld, Med Klinik III, M. Planker, R. Peceny</td>
<td>(2 (2), 0/2)</td>
</tr>
<tr>
<td>Leipzig</td>
<td>Universitätss-Klinik, D. Niederwieser, W. Helbig, R. Krahl, W. Pöhnisch</td>
<td>(92 (105), 59/33)</td>
</tr>
<tr>
<td>Lemgo</td>
<td>Klinikum Lippe, H.P. Lohrmann</td>
<td>(6 (6), 0/6)</td>
</tr>
<tr>
<td>Lübeck</td>
<td>Städtisches KH Sud, M. Thalheimer, H. Bartels</td>
<td>(11 (12), 0/11)</td>
</tr>
<tr>
<td>Lübeck</td>
<td>Med. Universität, J. Fehm, T. Wagner</td>
<td>(13 (21), 0/12)</td>
</tr>
<tr>
<td>Lübeck</td>
<td>Klinik für Kinder und Jugendmedizin, P. Bucsky, Ch. Schultz, K. Kruse</td>
<td>(1 (1), 0/1)</td>
</tr>
<tr>
<td>Magdeburg</td>
<td>Städt. Klinik Magdeburg, E. Kettner, H. Krönig</td>
<td>(10 (10), 0/10)</td>
</tr>
<tr>
<td>Maniz</td>
<td>Medizinische Klinik der Universität</td>
<td>(103 (113), 46/57)</td>
</tr>
<tr>
<td>Mannheim</td>
<td>Ill. Med. Klinik, R. Hohlmann, J. Hashka</td>
<td>(15 (18), 0/15)</td>
</tr>
<tr>
<td>Marburg</td>
<td>Med. Universitätss-Klinik der Philippus Universität</td>
<td>(64 (94), 15/49)</td>
</tr>
<tr>
<td>Minden / Westfalen</td>
<td>Med. Klinik, H. Bodenstein, H.J. Tischler</td>
<td>(13 (18), 0/13)</td>
</tr>
<tr>
<td>Mönchengladbach</td>
<td>KH Maria Hilf II, Dr. Berkovic, D. Kohl, H.E. Reis</td>
<td>(7 (9), 0/7)</td>
</tr>
<tr>
<td>Munich</td>
<td>Städt Krankenhaus Schwabing (peds), P. Emmrich, L. Stengel-Rutkowski</td>
<td>(6 (6), 0/6)</td>
</tr>
<tr>
<td>Munich</td>
<td>Klinikum Innenstadt, B. Emmerich, C. Straka</td>
<td>(34 (55), 0/34)</td>
</tr>
<tr>
<td>Munich</td>
<td>Klinikum Grosshadern (ads) CIC 513, H.-J. Kolb, W. Hiddemann</td>
<td>(135 (174), 93/42)</td>
</tr>
<tr>
<td>Munich</td>
<td>Klinikum Grosshadern (peds) CIC 513, C. Bender-Götzke</td>
<td>(7 (7), 7/0)</td>
</tr>
<tr>
<td>Munich</td>
<td>Dr. v Haunersch. Kinderspital (hem &amp; onco) R.J. Haas, D. Stachel, S. Schulz</td>
<td>(9 (9), 8/1)</td>
</tr>
<tr>
<td>München</td>
<td>Klinikum Offenburg, Med Klinik III, B. Weber, F. Hirsch</td>
<td>(21 (28), 0/21)</td>
</tr>
<tr>
<td>München</td>
<td>Klinikum rechts der Isar, M. Sandherr C. Peschel, C. v Schilling</td>
<td>(56 (69), 0/56)</td>
</tr>
<tr>
<td>Neuss</td>
<td>Lukas Krankenhaus, T. Wieberding</td>
<td>(3 (3), 0/3)</td>
</tr>
<tr>
<td>Nürnberg</td>
<td>Klinikum CIC 625, W. Gallmeier, H. Wandel, K. Schäfer-Eckart</td>
<td>(52 (56), 20/32)</td>
</tr>
<tr>
<td>Oldenburg</td>
<td>Klinikum Offenburg, Med Klinik III, B. Weber, F. Hirsch</td>
<td>(0 (0), 0/0)</td>
</tr>
<tr>
<td>Oldenburg</td>
<td>Städtische Kliniken, CIC 749, H. Illiger, B. Metzner</td>
<td>(46 (63), 0/46)</td>
</tr>
<tr>
<td>Osnabrück</td>
<td>Paracelsus Klinik, O.M. Koch, G. Innig</td>
<td>(0 (0), 0/0)</td>
</tr>
<tr>
<td>Potsdam</td>
<td>Klinikum Potsdam, A. Haas, R. Pasold</td>
<td>(8 (13), 0/8)</td>
</tr>
<tr>
<td>Regensburg</td>
<td>Universitäts Klinikum, CIC 787, E. Holler, R. Andreas, A. Reichle</td>
<td>(80 (132), 26/54)</td>
</tr>
<tr>
<td>Siegen</td>
<td>St. Marien Krankenhaus, T. Gaska</td>
<td>(3 (4), 0/3)</td>
</tr>
<tr>
<td>Stuttgart</td>
<td>Bürgerhospital, H. Benôr, W. Grimminger, D. Hahn</td>
<td>(17 (23), 0/17)</td>
</tr>
<tr>
<td>Stuttgart</td>
<td>Olgahospital, Pädiatrisches Zentrum, CIC 701, U. Gross, J. Treuner, E. Koscielniak</td>
<td>(7 (8), 1/6)</td>
</tr>
<tr>
<td>Stuttgart</td>
<td>Diakonissen Krankenhaus, E. Heidemann, J. Kaesberger</td>
<td>(8 (8), 0/8)</td>
</tr>
<tr>
<td>Stuttgart</td>
<td>Robert-Bosch-Krankenhaus, CIC 145, S. Martin, W. Aulitzky</td>
<td>(28 (41), 0/28)</td>
</tr>
<tr>
<td>Stuttgart</td>
<td>Katharinenhospital, H. Schleicher, H.-G. Mengenthaler</td>
<td>(13 (26), 0/13)</td>
</tr>
<tr>
<td>Tübingen</td>
<td>Medizinische Universitäts-Klinik, CIC 223, L. Kanz, H. Einsele, W. Brugger</td>
<td>(135 (170), 54/81)</td>
</tr>
<tr>
<td>Tübingen</td>
<td>Medizinische Universitäts-Klinik, Abteilung Pädiatrie, CIC 535, D. Niethammer, T. Klingebiel</td>
<td>(39 (49), 24/15)</td>
</tr>
<tr>
<td>Ulm</td>
<td>Medizinische Universitäts-Klinik, CIC 204, H. Döhner, D. Bunjes</td>
<td>(110 (123), 52/58)</td>
</tr>
<tr>
<td>Wiesbaden</td>
<td>Deutsches Klinik für Diagnostik, CIC 311, R. Schwerdtfeger, M. Prümbeaum</td>
<td>(73 (77), 64/9)</td>
</tr>
<tr>
<td>Würzburg</td>
<td>Universitätss Klinikum, Würzburg, M. Wilhelm, K. Wilms, M. Braun</td>
<td>(22 (22), 0/22)</td>
</tr>
<tr>
<td>Greece</td>
<td>(11 teams; 216 (226), 83/133)</td>
<td></td>
</tr>
<tr>
<td>Athens</td>
<td>Hellenic Cancer Institute St. Savas, CIC 751, A. Efremidis, M. Stamatellou, K. Papanastassiou, M. Pouli</td>
<td>(24 (27), 1/23)</td>
</tr>
<tr>
<td>Athens</td>
<td>&quot;Aghia Sophia&quot; Children's Hospital, CIC 752, S. Graphakos</td>
<td>(29 (29), 18/11)</td>
</tr>
<tr>
<td>Athens</td>
<td>Evangelismos Hospital, CIC 622, D. Karakasial, A. Skandalis, N. Harhalakis, E. Nikiforakis</td>
<td>(49 (53), 31/18)</td>
</tr>
<tr>
<td>Athens</td>
<td>Medical Center, CIC 603, A. Pigadito</td>
<td>(3 (3), 0/3)</td>
</tr>
<tr>
<td>Athens</td>
<td>University, CIC 604, I. Dervenoulas</td>
<td>(6 (6), 1/5)</td>
</tr>
<tr>
<td>Athens</td>
<td>Laikon General Hospital, CIC 328, Y. Rombos</td>
<td>(13 (13), 0/13)</td>
</tr>
<tr>
<td>Crete</td>
<td>University Hospital of Heraklion (peds, hem-onco), CIC 352, M. Kalmanti</td>
<td>(1 (1), 0/1)</td>
</tr>
<tr>
<td>Patras</td>
<td>University Medical School, N. C. Zoumbos, M. Tiniakou</td>
<td>(12 (12), 2/10)</td>
</tr>
<tr>
<td>Hungary</td>
<td>(4 teams; 126 (130), 39/87)</td>
<td></td>
</tr>
<tr>
<td>Budapest</td>
<td>National Institute of Hematology, CIC 504, K. Palocz, R. Denes</td>
<td>(29 (29), 11/18)</td>
</tr>
</tbody>
</table>
Budapest, Szent Laszlo Hospital, CIC 739, T. Masszi, P. Reményi, G. Kriván (69 (72), 23/46)
Miskolc, Postgraduate Medical School (peds), CIC 599, N. Kalman, K. Kiss, G. Marton (14 (15), 5/9)
Pécs, University of Pécs, CIC 682, H. Losonczy (14 (14), 0/14)

Iceland (1 team; 0 (0), 0/0)
Reykjavik, National University Hospital, CIC 605, S. Reykdal (0 (0), 0/0)

Iran (1 team; 105 (108), 86/19)
Teheran, Shariati Hospital (Hem-Onco), CIC 633, A. Ghavamzadeh (105 (108), 86/19)

Ireland (3 teams; 62 (83), 30/32)
Dublin, St. James’s Hospital, CIC 257, S.R. McCann (34 (38), 20/14)
Dublin, St. Vincent’s Hospital, CIC 541, J. Crown (16 (32), 0/16)**
Dublin, Our Lady’s Hospital of Sick Children, Crumlin, CIC 774, A. O’Meara (12 (13), 10/2)

Israel (7 teams; 359 (383), 181/178)
Haifa, Rambam Medical Center, J. Rowe (123 (134), 40/83)
Jerusalem, Hadassah University Hospital, CIC 258, R. Or, S. Slavin (96 (101), 80/16)
Petach-Tikva, Children’s Medical Center, CIC 755, J. Stein (26 (28), 16/10)
Rehovot, Kaplan Hospital, CIC 327, A. Bernibi (9 (12), 0/9)
Tel Aviv, Sourasky Medical Center, CIC 161, E. Naparstek (*)
Tel Hashomer, Chaim Sheba Medical Center (hem) CIC 754, I. Ben-Bassat (89 (90), 33/56)
Tel Hashomer, Chaim Sheba Medical Center (peds), CIC 572, A. Toren, H. Golan, B. Bielorai (16 (18), 12/4)

Italy (94 teams; 3132 (3932), 963/2169)**
Alessandria, S.S. Antonio e Biagio e C. Arrigo, CIC 825, A. Levis, A. Allione, M. Pnin, F. Salvi (19 (23), 0/19)
Ancona, Nuovo Ospedale Torrette, CIC 788, P. Leoni, A. Olivieri (46 (52), 6/40)
Aviano, CRO Aviano, CIC 162, M. Michieli, M. Rupolo, M. Mazzucato, F. Lollo (5 (5), 0/5)
Avelino, A.O.S. Giuseppe Moscati, CIC 789, E. Volpe, N. Cantore (18 (18), 2/16)
Bergamo, Ospedale Riuniti, CIC 658, T. Barbui, A. Rambaldi (64 (90), 20/44)
Bologna, S.S. Antonio e Biagio e C. Arrigo, CIC 825, A. Levis, A. Allione, M. Pnin, F. Salvi (19 (23), 0/19)

For personal use only. on November 12, 2017. For personal use only.
Milano, S. Carlo Borromeo Hospital (onco), L. Tedeschi (2 (2), 0/2)
Modena, University of Modena, CIC 543, F. Narni, G. Torelli, R. Sabbatini (29 (46), 2/27)
Monza, Ospedale S. Gerardo, CIC 279, C. Uderzo (28 (30), 21/7)
Monza, Ospedale S. Gerardo de Tintori, CIC 544, P. Piotelli, E. Pogliani (32 (42), 5/27)
Napoli, Div. Di Oncologia, CIC 313, C. Battista, G. Pacilio, B. Chiurazzi, G. Iodice (0 (1), 0/0)
Napoli, Università CIC 766, B. Rotoli, C. Selleri, G. De Rosa (34 (34), 14/20)
Napoli, Hospital 'Pausilipon' (hem peds), CIC 341, V. Poggi, M. Ripaldi (3 (3), 3/0)
Napoli, Cardarelli Hospital (hem), CIC 607, F. Ferrara (20 (21), 1/19)
Noale, Civic Hospital (onco), CIC 563, O. Vinante, G. Azzarelli (17 (20), 1/16)
Nuoro, Ospedale San Francesco, CIC 793, A. Gabbas, A. Palmas (7 (15), 0/7)
Orbassano, Ospedale San Luigi Gonzaga, G. Saglio (34 (41), 0/34)
Padova, Centro Leucemie Infantili, CIC 285, C. Messina, S. Cesaro, L. Zanesco (30 (35), 15/15)
Padova, Centro Oncologia Regionale, CIC 319, S. Aversa, S. Monfardini (14 (18), 0/14)
Palermo, Uni degli studi di Palermo (hem), CIC 814, G. Mariani (10 (11), 0/10)
Palermo, Università CIC 529, G. Lucarelli (64 (64), 48/16)
Pescara, Ospedale Civile, CIC 248, P. di Bartolomeo (36 (40), 29/7)
Perugia, Silvestrini Hospital, CIC 815, A. Amici (2 (3), 2/0)
Perugia, Policlinico Monteluce, Università CIC 794, M.F. Martelli, F. Avsara, A. Tabillo (94 (95), 54/40)
Perugia, Policlinico Monteluce, CIC 573, A.M. Liberati, F. Grignani (14 (18), 0/14)
Pescara, Ospedale Civile, CIC 248, P. di Bartolomeo (36 (40), 29/7)
Pisa, University of Pisa (Ads hem, peds hem + onco), CIC 795, P. Macchia, M. Petrini (45 (54), 19/26)
Pisa, St. Chiara Hospital (ads onco) CIC 320, P.F. Conte, C. Bengala (7 (10), 1/6)
Ravenna, Ospedale Civile, CIC 306, G. Rosti (46 (79), 0/46)
Reggio di Calabria, Azienda Ospedale "Riuniti e Morelli", CIC 573, A.M. Liberati, F. Grignani (14 (18), 0/14)
Pescara, Ospedale Civile, CIC 248, P. di Bartolomeo (36 (40), 29/7)
Roma, Università Cattolica, CIC 307, S. Curone, S. Sica, G. Leone (42 (43), 17/25)
Roma, Ospedale Bambino Gesu, CIC 796, G. Deb (17 (23), 0/17)
Roma, Ospedale S. Camillo, CIC 287, I. Majolino, A. Locaschiulli (38 (45), 2/36)
Roma, Ospedale Bambino Gesu, G. De Rossi (4 (4), 3/1)
San Giovanni Rotondo, Hospital Casa Sollievo Sofferenza (onco), CIC 314, G. Lelli (12 (12), 0/12)
San Giovanni Rotondo, Hospital Casa Sollievo Sofferenza (hem), CIC 526, M.M. Greco, A. Carella (29 (31), 6/23)
Siena, Ospedale ScIavo, CIC 321, F. Lavini (21 (22), 1/18)
Taranto, Ospedale Nord, CIC 332, P. Mazza, G. Palazzo, B. Amurri (48 (58), 8/40)
Taranto, Ospedale SS. Annunziata, Dr. Pezzella (0 (0), 0/0)
Taranto, Ospedale SS. Annunziata, Dr. Pezzella (0 (0), 0/0)
Torino, Ospedale Mauriziano Umberto 1, CIC 377, M. Aglietta, A. Capaldi, G. Garetto (19 (26), 0/19)
Torino, University Hospital of Turin, Magg. San Giovanni Battista, CIC 231a, M. Falda, F. Locatelli, E. Gallo (95 (101), 52/43)
Torino, Dept. of Pediatrics, University, CIC 305, E. Madon, F. Fagioli (33 (38), 12/21)
Trieste, Istituto per l’Infanzia, Clinical Pediatrica, M. Andolina, A. de Manzini (19 (21), 10/9)
Udine, Policlinico Universitario, CIC 705, A. Sperotto, R. Fanin (65 (74), 19/46)
Venezia, Ospedale Civile Riuniti di Venezia, CIC 502, T. Chisesi, M. Vespignani, M. Chinello (17 (28), 0/17)
Verona, Policlinico di Borgo Roma (hem onco), CIC 623+CIC 514, G. Perona, F. Benedetti, G. Setto (40 (52), 13/27)
Vicenza, Ospedale S. Bortolo (hem), CIC 797, R. Raimondi, F. Rodeghiero (54 (63), 18/36)

Latvia: no report
Liechtenstein: no report
Lithuania: (1 team; 7 (7), 2/5)
Vilnui, University Hospital (hem), I. Trociukas (7 (7), 2/5)
Luxemburg (2 teams; 5 (6), 0/5)
Centre Hospitalier, M. Dicato (*)
Esch-Allette, Hopital de la Ville Esch/Alzette, CIC 545, F. Le Moine (5 (6), 0/5)

Macedonia: (1 team; 5 (5), 1/4)
Skopje, Medical Faculty (haem), B. Georgievski (5 (5), 1/4)

Malta: no report
Moldova: no report
Monaco: no report

Netherlands (15 teams; 499 (528), 323/267) **
Amsterdam, Free University Hospital (Haem), CIC 588, G.M. Ossenkoppele (60 (64), 15/45)
Amsterdam, Free University Hospital (onco), CIC 380, E. van der Wall (0 (0), 0/0)
Amsterdam, Academic Medical Center (ads, peds), CIC 247, J. van der Lelie, H. van den Berg (peds) (23 (25), 8/15)
Amsterdam, The Netherlands Cancer Institute, CIC 976, S. Rodenhuis J. Baars (13 (20), 0/13)
Enschede, The Medisch Spectrum Twente, CIC 360, Dr. Schaafsma (15 (15), 0/15)
Groningen, University Hospital (onco), CIC 395, E. de Vries (*)
Groningen, University Hospital (hem), CIC 546, E. Vellenga (29 (29), 0/29)
The Hague, Leyenborg Hospital, CIC 547, P.W. Wijermans (13 (13), 0/13)
Leiden, University Medical Centre (ads, peds), CIC 203, J. Vossen, R. Willemze (70 (75), 52/18)
Maastricht, University Hospital (haem, onco), CIC 565, H.C. Schouten, J. Wagstaff (36 (37), 21/15)
Nieuwegein, St. Antonius Hospital, CIC 200, D. Biesma, G. Veth, O. de Weerdt () reported with CIC 239
Nijmegen, University Hospital (ads, peds, onco), CIC 237, A. Schattenberg, L. Beex, P. Hoogerbrugge (81 (85), 50/31) **
Rotterdam, Dr. Daniel den Hoed Cancer Center, CIC 246, J.J. Cornelissen (72 (73), 30/42)
Utrecht, University Hospital (ads + peds), CIC 239, L.F. Verdonck, N.M. Wulffraat, D. Biesma (81 (86), 56/25)
Zwolle, Isala Klinieken / Sophia Ziekenhuis, CIC 548, M. von Marwijk Kooy (6 (6), 0/6) **

Norway (5 teams; 120 (132), 45/75)
Bergen, Haukelands Sjukhus, P. Ernst (9 (9), 0/9)
Oslo, Rikshospitalet, CIC 235, D. Albrechtsen, L. Brinch (58 (58), 45/13)
Oslo, The Norwegian Radium Hospital, CIC 782, S. Kvaloy (32 (44), 0/32)
Oslo, Ullevals Sjukhus (haem), F. Wisslöf, J-M.Tangen (14 (14), 0/14)
Trondheim, Regionsjukhuset, J. Hammerstrom, A. Waage (7 (7), 0/7)

Poland (14 teams; 581 (646), 201/380)
Gdansk, Medical University, CIC 799, A. Hellmann (52 (53), 18/34)
Katowice, Silesian Medical Academy, CIC 677, J. Holowiecki (139 (149), 39/100)
Krakow, CMUJ, CIC 553, A. Skotnicki (41 (47), 10/31)
Lublin, Ped Hem Onco, CIC 678, J. Kowalczyk (20 (20), 6/14)
Lublin, University Medical School, CIC 695, A. Dmoszynska, M. Wach, A. Walter-Croneck, W. Legiec (28 (31), 0/28)
Poznan, Medical Academy, CIC 730, J. Hansz (66 (73), 38/28)
Poznan, Institute of Pediatrics, CIC 641, J. Wachowiak (21 (21), 16/5)
Warsaw, Central Clinical Hospital, Military Medical Academy, CIC 816, K. Sulek (19 (19), 7/12)
Warsaw, Central Military Hospital (onco), CIC 824, C. Szczylik (11 (12), 0/11)
Warsaw, Maria Sklodowska-Curie, Centre of Oncology, CIC 800, J. Walewski (41 (43), 3/38)
Warsaw, Inst. of Haematology and Blood Transfusion, CIC 693, B. Marianska, L. Konopka (13 (15), 0/13)
Warsaw, Central Clinical Hospital, CIC 954, W. Wiktor-Jedrzejczak, A. Dzwigala, M. Rokicka-Piotrowicz (28 (40), 8/20)
Wrocław, University of Medicine, Dept. of Children, CIC 817, J. Boguslawska-Jaworska (45 (55), 23/22)
Wrocław, K. Diuske Hospital, CIC 538, A. Lange (57 (68), 33/24)

Portugal (6 teams; 206 (230), 70/136)
Coimbra, University Hospital, CIC 164, N. Costa (15 (15), 0/15)
Lisbon, Instituto Portugues de Oncologia, CIC 300, M. Abecasis, F. Leal Costa (68 (72), 22/46)
Lisbon, Hospital de Santa Maria, CIC 636, J. Alves do Carmo, F. de Lacerda (39 (41), 20/19)
Lisboa, Hospital dos Capuchos, A. Botelho de Sousa (9 (9), 0/9)
Porto, Instituto Portugues de Oncologia, CIC 291, P. Pimentel, F. Campilho (64 (82), 28/36)
Porto, Hospital S. Joao (hem. onco), CIC 329 + CIC 572, F. Principe, J.E. Guimaraes (11 (11), 0/11)

Romania: (1 team; 0 (0), 0/0)
Bucharest, Fundeni University Hospital, CIC 296, A.D. Mocean, D. Colita, C. Arion (0, 0/0)* starting in 2001

Russia (14 teams; 190 (199), 48/142)
Ekaterinburg, City Hospital No. 7, L.B. Filatov (4 (4), 0/4)
Ekaterinburg, Regional Hospital No. 1, T.S. Konstantinova, V.A. Shalaev (8 (10), 0/8)  
Moscow, Institute of Biophysics, A.E. Baranov (10 (10), 3/7)  
Moscow, Cancer Research Center, CIC 757, V. Ptuschkin (16 (17), 0/16)  
Moscow, Cancer Research Center peds Hem/onco, G. Mentrevich (5 (5), 0/5)  
Moscow, Research Hematology Center of RAS, V.G. Savtchenko (28 (29), 16/12)  
Novosibirsk, Institute of Clinical Immunology, CIC 376, I. Lisukov (3 (3), 0/3)  
Samara, Regional Hospital, V.A. Rossiev (32 (32), 2/30)  
St. Petersburg, Research Institute of Hematology, CIC 724, K.M. Abdulkadirov (10 (10), 4/6)  
St. Petersburg, Military Medical Academy, CIC 520, A. Novik (5 (5), 0/5)  
St. Petersburg, Clinical Center for Advanced Medical Tech, CIC 370, E. Podol'tseva, V. Soldatenkov, O. Ryasnyanskaya (16 (16), 3/13)  
St. Petersburg, State Pavlov Medical University, CIC 725, B.V. Afanassiev, L. Zubarovskaya (20 (21), 5/15)  
Yaroslavl, City Hospital No. 8, V.A. Lapin ()  

**San Marino:** no report

**Slovakia** (4 teams; 107, (117) 26/81)  
Bansva Bystrica, Roosevelt Hospital, CIC 333, K. Mocikova (21 (28), 0/21)  
Bratislava, 2nd Children's Clinic, University Hospital, J. Lukac (19 (20), 10/9)  
Bratislava, University Hospital, CIC 610, M. Mistrik (25 (27), 14/11)  
Bratislava, National Cancer Institute, CIC 560, J. Lakota (42 (42), 2/40)  

**Slovenia** (1 team; 18 (21), 8/10)  
Ljubljana, University Medical Centre, CIC 640, J. Pretnar (18 (21), 8/10)  

**Spain** (77 teams; 1916 (2036), 451/1465)  
Alicante, Hospital General, C. Rivas-Gonzales (11 (11), 0/11)  
Barcelona, Instituto de Oncologia Corachan, D. Alfonso-Modolell (5 (5), 0/5)  
Barcelona, Santa Creu I Sant Pau (adults), CIC 260, J. Sierra, S. Brunet (78 (85), 26/52)  
Barcelona, Santa Creu I San Pau (pediatric), CIC 260, I. Badell Serra, J. Cubells-Riero (9 (9), 5/4)  
Barcelona, Santa Creu I Sant Pau (oncology), CIC 260, Dr. J.J. Lopez, C. Solia (*)  
Barcelona, Hospital Sant Joan de Deu, CIC 668, J. Estella Aguado (12 (12), 0/12)  
Barcelona, Hospital Duran i Reynals (hematology), Institut Catala d’Oncologia, CIC 759, A. Granena, C. Ferra, J. Berlanga (54 (58), 10/44)  
Barcelona, Hospital General "Vall d'Hebron", CIC 583, A. Julia Font (24 (25), 4/20)  
Barcelona, Hospital Mutua de Terrassa (hematology-oncology), CIC 556, R. Marti (7 (7), 0/7)  
Barcelona, Hospital Universitario Germans Trias i Pujol, CIC 613, J. Rivera (35 (35), 0/35)  
Barcelona, Sant Cugat del Vallés, Hospital General de Cataluña, M. Sureda-Gonzales (2 (2), 0/2)  
Barcelona, Hospital M. Infantil, CIC 527, J. Ortega (44 (45), 32/12)  
Barcelona, Hospital Clinic, CIC 214, E. Montserrat, E. Carreras (112 (116), 42/70)  
Barcelona, Instituto Hematologico Torre Vilana, CIC 777, P. Vivancos (5 (5), 0/5)  
Barcelona, Instituto Dexeus (hematology), CIC 670, A. Granena, J. Sarra, J. Garcia (3 (3), 0/3)  
Caceres, Hospital San Pedro de Alcantara, J. Bergua Burgues (10 (10), 0/10)  
Cadiz, Hospital del SAS de Jerez, A. Leon (26 (28), 6/20)  
Cadiz, Hospital Universitario Puerta del Mar, CIC 679, J. Gil (20 (25), 0/20)  
Canary Islands, Las Palmas, Hospital Insular, CIC 335, F. Fernandez-Fuentes, J. Gonzalez-San Miguel (13 (14), 0/13)  
Canary Islands, Las Palmas, Hop. Materno-Infantil (hematology-oncology), J. Lodos Rojas, A. Molinés (3 (3), 0/3)  
Canary Islands, Las Palmas, Hospital General de Gran Canaria, T. Molero, R. Mataix, C. Campo, T. Negri (36 (39), 18/18)  
Canary Islands, Tenerife, Hospital Universitario de Canarias, L. Hernandez Nieto, M.T. Hernandez Garcia (15 (16), 0/15)  
Canary Islands, Tenerife, Hospital Nuestra Senora de la Candelaria, P. RiosRu (12 (12), 0/12)  
Castellon de la Plana, Hospital General de Castellon (hematology), R. Garcia-Boyer (4 (6), 0/4)  
Cordoba, Hospital de la Cruz Roja de Cordoba (hematology), J-M Garcia-Castellano (2 (2), 0/2)  
Cordoba, Hospital Reina Sofia, CIC 238, A. Torres Gomez (46 (50), 28/18)  
Cruces-Barakaldo, Hospital de Cruces, I. Zuazua-Verde (34 (37), 0/34)  
Galdakao, Hospital de Galdakao, Hem, J. Ojanguren, K. Atucha (12 (12), 0/12)  
Granada, Hospital Virgen de la Nieves, J.M. de Pablos Gallego (22 (23), 4/18)  
Jaen, Hospital Ciudad de Jaen (hematology), Dr. Alcalo, (10 (10), 0/10)  
Llerida, Hospital Arnan de Villanova, J. Macia (10 (10), 0/10)  
Lugo, Hospital Xeral-Calde, M. Gonzales-Lopez (8 (8), 0/8)  
Madrid, Clinica La Luz, H. Cortes-Funes, J. Homedo (0 (0), 0/0)  
Madrid, Clinica Moncloa (hematology), J. M. Fernandez, Q. Escudero (17 (17), 0/17)  
Madrid, Hospital Universitario de Getafe (hematology), F. Oliva Compan, N. Somolinos, (12 (12), 0/12)
Madrid, Hospital Universitario San Carlos, CIC 733, J. Diaz Mediavilla, L. Llorente (30 (30), 0/30)
Madrid, Hospital Universitario San Carlos, Onco, CIC 733, M. Martin, E. Diaz-Rubio, A. Casado, J.A. Lopez-Martin (7 (9), 0/7)
Madrid, Hospital Ruber Internacional, J. Diaz Mediavilla (*)
Madrid, Unidad de TMO-ONC 4, Hospital Gregorio Maranon, CIC 819, J.L. Diez Martin (31 (34), 14/17)
Madrid, Clinica Ruber, J.M. Fernandez-Rafia, A. Figuera, A. Alegre (78 (83), 35/43)
Madrid, Clinica Puerta de Hierro, CIC 728, M.N. Fernandez (30 (34), 20/10)
Madrid, Hospital General La Paz (ads), F. Hernandez Navarro, M. Canales (55 (55), 5/50)
Madrid, Hospital Doce de Octubre, CIC 382, J.L. Lahuerta (hem), H. Cortés Funes (onco), J. Lopez Perez (peds) (60 (61), 7/53)
Madrid, Hospital Nuño Jesus, L.M. Madero (35 (35), 13/22)
Madrid, Hospital La Paz Infantil, CIC 734, A. Martinez-Rubio, A. Sastre, P. Garcia-Miguel (15 (15), 6/9)
Madrid, Hospital Ramon y Cajal (peds), CIC 615, A. Munoz Villa, M.S. Maldonado (12 (12), 5/7)
Madrid, Hospital Ramon y Cajal (ads), CIC 615, J. Odriozola, J. Perez de Oteyza, J. Lopez, J. Garcia Larana (38 (42), 7/31)
Madrid, Fundacion Jimenez Diaz, J. Tomas, C. Paniagua, F. Lobo (20 (23), 4/16)
Madrid, Hospital Militar Gomez Ulla, F. Sancho-Cuesta, S. Enrech-Frances (6 (6), 0/6)
Malaga, Hospital Regional, CIC 576, J. Maldonado (33 (34), 16/17)
Murcia, Hospital Virgen de la Arrixaca, CIC 323, R. Candel Parra (12 (13), 0/12)
Murcia, Hospital General Uni. Morales Meseguer, CIC 735, J.M. Moraledo, V. Vicente-Garcia, I. Heras (29 (31), 9/20)
Orense, Hospital Cristal-Pinor (hem), J.-L. Sastre-Moral (9 (10), 0/9)**
Oviedo, Hospital Covadonga, CIC 642, D. Carrera Fernandez, C. Rodriguez Pinto (35 (37), 6/29)
Palma de Mallorca, Hospital Son Dureta, CIC 722, J. Besalduch, H.S. Dureta (24 (26), 4/20)
Palma de Mallorca, Policlinica Miramar, J. Besalduch, A. Sampol (10 (10), 0/10)
Pamplona, Hospital Provincial de Navarra, CIC 577, E. Perez Equiza, M.J. Uriz Pascual, J. Gastearena (23 (23), 0/23)
Pamplona, Clinica Universitario de Navarra, CIC 737, J. Rfnon (14 (17), 3/11)
Pontevedra, Hospital Montecelo, CIC 549, M. Constella (17 (17), 0/17)
Salamanca, Complejo Hospital San Roque, CIC 727, D. Caballero (71 (87), 20/51)
San Sebastian, Hospital Nostra Senora de Aranzazu, CIC 598, J. Marin, D. Martinez (35 (42), 6/29)
Santander, Hospital Universitario M. de Valdecilla, CIC 242, A. Iriondo, E. Conde, E. Bureau, A. Zubizarreta-Pina (55 (56), 21/34)
Santiago de Compostela, Hospital Xeral de Galicia, CIC 570, J.L. Bello (17 (18), 3/14)
Sevilla, Hospital Universitario Virgen del Rocio, CIC 769, J.M. Rodriguez Fernandez (52 (56), 16/36)
Sevilla, Clinica Del Sagrado Corazon, J. M. Rodriguez ()
Tarragona, Hospital de Tarragona Joan XXIII (hem), A. Llorente Cabrera (11 (11), 0/11)
Valencia, Hospital Universitario La Fe (peds), CIC 653, V. Castel, A. Verduguer (16 (17), 4/12)
Valencia, Hospital Clinico Universitario, CIC 282, J. Garcia-Conde, C. Solano (76 (80), 11/65)
Valencia, Instituto Valenciano de Oncologia, V. Guillen, J. Palau (15 (15), 0/15)
Valencia, Hospital Universitario La Fe, CIC 663, M.A. Sanz, G.F. Sanz (69 (81), 33/36)
Valencia, Hospital Doctor Peset (hem), P. Ribas Garcia (11 (11), 0/11)
Valladolid, Hospital Rio Hortega, J. Garcia Frade (16 (16), 0/16)
Vigo, Hospital Xeral-Cies, A. Martinez-Dalmay (18 (21), 3/15)
Zaragoza, Hospital Miguel Servet (hem + onco) M. Giralt, G. Perez-Lugmus, D. Rubio-Felix, A. Anton (29 (29), 2/27)
Zaragoza, Clinico Universitario Lozano Blesa (Haem, onco), A. Tres, L. Palomera, M. Gutierrez, J. Mayordomo, (42 (42), 0/42)

**Sweden** (10 teams; 450 (513), 186/264)
Goteborg, Medical Clinic, CIC 715, M. Brune (82 (108), 23/59)
Goteborg, East Hospital, CIC 289, A. Fasth, S. Rodjer (16 (21), 10/6)
Huddinge, Hospital, CIC 212, P. Ljungman (114 (127), 79/35)
Linköping, University Hospital, CIC 740, G. Juliusson (43 (43), 19/24)
Lund, University Hospital, CIC 283, A.N. Bekassy (54 (61), 15/39)
Malmö, University Hospital, I. Turesson (6 (6), 0/6)
Örebro, Medical Center Hospital, CIC 738, U. Tiedfelt (7 (7), 0/7)
Stockholm, Karolinska Hospital, CIC 626, M. Björkholm (26 (30), 0/26)
Umea, Norrland University Hospital, CIC 731, A. Wahlin, P. Hörnsten, J. Lindh, E. Eliasson (34 (36), 13/21)
Uppsala, University Hospital, CIC 266, B. Simonsson, K. Carlson, G. Oberg (68 (74), 27/41)

**Switzerland** (10 teams; 293 (376), 95/198)
Aarau, Kantonsspital, CIC 316, M. Wernli (11 (11), 0/11)
Basel, Kantonsspital, CIC 202, A. Gratwohl, T. Kühne, R. Herrmann (60 (80), 40/20)
Bellinzona, Ospedale San Giovanni, CIC 829, F. Cavalli, M. Ghielmini, L. Leoncini (10 (14), 0/10)
Berne, Inselspital, CIC 221, A. Tobler, K. Leibundgut, M. Fey (27 (31), 0/27)
Geneva, Hôpital cantonal universitaire, CIC 261, B. Chapuis, P. Wacker (25 (27), 22/3)
Lausanne, CHUV, CIC 820+ CIC 579, D. Schapira, T. Kovacsovics, S. Leyvraz, N. Ketterer, N. Nenadov-Beck (50 (65), 0/50)
St. Gallen, Kantonsspital, CIC 324, U. Hess (8 (8), 0/8)
Zurich, University Hospital (ads, hem/onco), CIC 208, U. Schanz, J. Halter, R. Stahel, L. Jost (82 (107), 26/56)
Zurich, University Hospital (peds), CIC 334, R. Seger (12 (15), 7/5)
Zurich, Klinik Im Park, J. Gmü, U. Breitenstein, A. von Rohr (8 (18), 0/8)

**Turkey** (24 teams; 403 (413), 182/221)
Ankara, Numune Education and Research Hospital, CIC 691, T. Demirer (64 (64), 19/45)
Ankara, Ibn-1 Sina Hospital, CIC 617, H. Koc (52 (53), 41/11)
Ankara, Hacettepe University, Inst. Of Oncology Hematopoietic Stem Cell Transplantation Unit CIC 292, E. Kansu, C. Akyüz (12 (12), 0/12)
Ankara, Childrens Hospital Hacettepe University, A. Tuncer, D. Uckan (19 (20), 19/0)
Ankara-Sihhiye, Hacettepe University Medical School (hem), CIC 168, O. Ozcebe (0 (0), 0/0), starting in 2001
Ankara-Beseveler, Gazi University (hem), CIC 169, R. Haznedar (0 (0), 0/0)**
Ankara, University of Ankara (peds), CIC 620, E. Unal (4 (4), 0/4)
Ankara-Etilk, GATA BMT Center, CIC 372, A. Yalcin, F. Arpaci, A. Özet, C. Beyan, A. Ural (44 (45), 15/29)
Antalya, Akdeniz University hospital, CIC 618, M.A. Yesilipek, V. Hazer, O. Yegin (12 (12), 11/1)
Antalya, Akdeniz University hospital, CIC 685, L. Undar (14 (14), 10/4)

**Turkey** (24 teams; 403 (413), 182/221)
Ankara, University of Ankara (hem), CIC 621, S. Cagirgan (48 (48), 5/43)
Ankara, University of Ankara (peds), CIC 621, S. Kansoy (8 (8), 5/3)
Istanbul, Marmara University, Altunizeade, CIC 714, S. Kalayoglu - Besisik (30 (34), 17/13)

**Turkey** (24 teams; 403 (413), 182/221)
Ankara, Childrens Hospital Hacettepe University, A. Tuncer, D. Uckan (19 (20), 19/0)
Ankara-Sihhiye, Hacettepe University Medical School (hem), CIC 168, O. Ozcebe (0 (0), 0/0), starting in 2001
Ankara-Beseveler, Gazi University (hem), CIC 169, R. Haznedar (0 (0), 0/0)**
Ankara, University of Ankara (peds), CIC 620, E. Unal (4 (4), 0/4)
Ankara-Etilk, GATA BMT Center, CIC 372, A. Yalcin, F. Arpaci, A. Özet, C. Beyan, A. Ural (44 (45), 15/29)
Antalya, Akdeniz University hospital, CIC 618, M.A. Yesilipek, V. Hazer, O. Yegin (12 (12), 11/1)
Antalya, Akdeniz University hospital, CIC 685, L. Undar (14 (14), 10/4)

**Turkey** (24 teams; 403 (413), 182/221)
Ankara, University of Ankara (hem), CIC 621, S. Cagirgan (48 (48), 5/43)
Ankara, University of Ankara (peds), CIC 621, S. Kansoy (8 (8), 5/3)
Istanbul, Marmara University, Altunizeade, CIC 714, S. Kalayoglu - Besisik (30 (34), 17/13)

**Turkey** (24 teams; 403 (413), 182/221)
Ankara, University of Ankara (hem), CIC 621, S. Cagirgan (48 (48), 5/43)
Ankara, University of Ankara (peds), CIC 621, S. Kansoy (8 (8), 5/3)
Istanbul, Marmara University, Altunizeade, CIC 714, S. Kalayoglu - Besisik (30 (34), 17/13)

Istanbul, Tip Fakultesi, CIC 762, G. Gedikoglu (23 (23), 13/10)
Istanbul, University of Istanbul, CIC 760, S. Kalayoglu-Besik (30 (34), 17/13)
Istanbul, GATA Haydarpasa Egitim Hst, CIC 687, A. Öztürk (3 (3), 1/2)**
Istanbul, Institute of Oncology, CIC 689, H. Onat (12 (12), 0/12)
Izmir, Ege University Medical Faculty (ads), CIC 628, S. Cagirgan (48 (48), 5/43)
Izmir, Ege University Medical Faculty (peds), CIC 621, S. Kansoy (8 (8), 5/3)
Izmir, Dokuz Eylul University, CIC 688, U. Yilmaz (3 (3), 0/3)
Kayseri, Erciyes University Hospital, CIC 627, A. Unal, M. Cetin, (17 (17), 2/15)
Trabzon, Karadeniz Technical University, CIC 170, E. Ovali (6 (7), 4/2)

**Ukraine:** (1 team; 12 (13), 1/12)
Izmir, Dokuz Eylul University, CIC 688, U. Yilmaz (3 (3), 0/3)
Kayseri, Erciyes University Hospital, CIC 627, A. Unal, M. Cetin, (17 (17), 2/15)
Trabzon, Karadeniz Technical University, CIC 170, E. Ovali (6 (7), 4/2)

**Ukraine:** (1 team; 12 (13), 1/12)
Izmir, Dokuz Eylul University, CIC 688, U. Yilmaz (3 (3), 0/3)
Kayseri, Erciyes University Hospital, CIC 627, A. Unal, M. Cetin, (17 (17), 2/15)
Trabzon, Karadeniz Technical University, CIC 170, E. Ovali (6 (7), 4/2)

**United Kingdom** (54 teams; 2009 (2184), 787/1222)
Aberdeen, The Royal Infirmary, CIC 344, D.J. Culligan (19 (20), 5/14)
Bangor, Gwynedd Hospital, CIC 736, H. Parry (8 (8), 0/8)
Bath, Royal United Hospital, CIC 619, J.G. Smith (6 (6), 0/6)
Belfast, Royal Victoria Hospital, CIC 268, F. Jones, M.F. McMullin, P. Burnside (15 (16), 9/6)
Belfast, City Hospital, CIC 753, T.C.M. Morris, L. Ranaghan (13 (15), 0/13)
Birmingham, The Birmingham Childrens Hospital, CIC 781, P.J. Darbyshire, M.W. Williams (31 (36), 27/4)
Birmingham, Queen Elizabeth Hospital, CIC 387, P. Mahendra, C. Craddock (91 (96), 42/49)
Birmingham, Heartlands Hospital, CIC 284, D.W. Milligan (34 (40), 14/20)
Bournemouth, Royal Bournemouth Hospital, CIC 765, S. Killick (11 (13), 0/11)
Bristol, Royal Hospital for Sick Children, CIC 386, J.M. Cornish & Southmead Hospital, J. Hows, M.G. Rainey (84 (90), 65/19)
Cambridge, Addenbrooke's Hospital and Norwich Hospital, CIC 566 + 391, R.E. Marcus, J. Craig, M. Deane (45 (46), 11/34)
Cardiff, University of Wales, CIC 303, C.H. Poynton, K. Wilson (40 (45), 11/29)
Coventry, Walsgrave Hospital, N. Jackson (6 (6), 0/6)
Dundee, Ninewells Hospital, CIC 719, D. Bowen (9 (9), 0/9)
Edinburgh, Western General Hospital, (hem) CIC 228, J.M. Davies, P.R.E. Johnson, M.J. Mackie, P.H. Roddie (39 (39), 6/33) **
Edinburgh, Western General Hospital (onco) CIC 228, R. Leonard (0 (0), 0/0)
Exeter, Royal Devon and Exeter Hospital, CIC 571, M. Joyner (13 (13), 0/13)
Glasgow, Royal Infirmary, CIC 244, A. Parker, I.G. McCuaker (60 (62), 31/29)
Glasgow, The Western Infirmary, CIC 325, T. Fitzsimons (30 (32), 0/30)
Glasgow, Royal Hospital for Sick Children, CIC 707, B. Gibson (12 (13), 7/5)
Leeds, St. James's University Hospital & The General Infirmary, D. Barnard, S. Kinsey, J.A. Child (102 (106), 26/76)
Leicester, Royal Infirmary, CIC 713, A.E. Hunter (51 (55), 13/38)
Liverpool, Royal Liverpool University Hospital, CIC 501, R.E. Clark (48 (48), 13/35)
Liverpool, Alder Hay, M. Caswell (12 (12), 10/2)
London, Hammersmith & Charing Cross Hospital, CIC 205, J.M. Goldman, D. Samson, C. Giles, E. Kanfer (120 (128), 45/75)
London, University College Hospital, CIC 224, A.H. Goldstone (143 (167), 54/89)
London Oncology Marrow Transplantation Group, CIC 263, P.J. Gravett (7 (9), 1/6)
London, St. George's Hospital, CIC 539, J. Marsh, S. Ball, E.C. Gordon-Smith, C. Dearden (12 (12), 7/5)
London, King's College, CIC 763, A. Pagliuca, G.J. Mufti (65 (75), 41/24)
London, Royal Marsden Hospital, CIC 218, R. Powles, J. Mehta (154 (182), 46/108)
London, Royal Free Hospital, CIC 216, H.G. Prentice, M. Potter (61 (67), 44/17)
London, St. Bartholomew's, CIC 768 and the Royal London Hospital, CIC 269, A. Rohatiner, A.C. Newland (53 (55), 19/34)
London, Guy's Hospital, CIC 721, S. Schey (25 (30), 8/17)
London, Institute of Child Health, CIC 243, P. Veys, I.M. Hann (52 (55), 38/14)
Manchester, Christie Hospital, G. Morgenstern (86 (101), 20/66)
Manchester, Royal Children's Hospital, CIC 521, A.M. Will (24 (27), 13/11)
Manchester, The Royal Infirmary, J.A. Yin (53 (57), 32/21)
Manchester, Trafford General Hospital, P.A. Carrington (1 (1), 0/1)
Manchester, Hope Hospital, P.A. Carrington (2 (2), 0/2)
Newcastle upon Tyne, Royal Victoria Infirmary, CIC 276, G.H. Jackson, S.J. Proctor, P. Taylor, A. Cant, R. Skinner (84 (87), 41/43)
Norwich, Norfolk and Norwich Hospital (hem), CIC 391, M. Deane (transplants performed in 2000 at Norwich are reported through Addenbrookes CIC 566)
Nottingham, City Hospital, CIC 717, N. Russell (85 (91), 43/42)
Oxford, John Radcliffe Hospital, Headington, CIC 255, T.J. Littlewood, C. Bunch, C. Mitchell, C. Hatton, G. Hall, J. Wainscoat (40 (41), 14/26)
Plymouth, Derriford Hospital, CIC 823, M.D. Hamon (33 (33), 11/22)
Poole, Dorset Cancer Centre, CIC 580, A. Bell (20 (25), 0/20)
Rotherham, General Hospital, CIC 778:5, H. Barker (1 (1), 0/1)
Sheffield, The Royal Hallamshire, Weston Park and the Children's Hospitals (ads, ped, onco) CIC 778:1/2/3, E. Vandenberghe, A. Vora, P. Lorigan (45 (46), 19/26)
Somerset, Taunton and Somerset Hospital, S.A. Johnson, S. Bolam (8 (8), 1/7)
CRC Wessex, Southampton, CIC 704, A. Smith, A. Duncombe, J. Sweetenham, J. Kohler (20 (20), 0/20)
Stoke-on-Trent, North Staffordshire Royal Infirmary, R. Chasty (12 (12), 0/12)
Sunderland, The Sunderland Royal, P.J. Carey (4 (4), 0/4)
Swansea, Singleton Hospital, Sketty, S. Al Ismail (7 (8), 0/7)
Swindon, Princess Margaret Hospital (Hem), CIC 608, N. E. Blesing, A. Gray, S. Green, A. Koster (4 (5), 0/4)
Wakefield, Pinderfield's and Pontefract Hospitals NHS Trust, CIC 764, M. C. Galvin, D. Wright (9 (9), 0/9)

**Yugoslawia (Serbia and Montenegro)** (4 teams; 23 (24), 9/14)
Belgrade, Clinical Centre of Serbia, CIC 373, M. Colovic, A. Bogdanovic (1 (1), 0/1)
Belgrade, Mother and Child Health Institute, CIC 358, D. Makic, D. Vujic (2 (2), 0/2)
Belgrade, Military Medical Academy, CIC 582, M. Malesevic (20 (21), 9/11)
Novi Sad, Institute of Internal Diseases, CIC 655, D. Pejcin (*)

* no report
** late data, included only in Fig. 3b

Total number teams 2000 = 600
Total number transplants 22,496 (allo 7,146, auto 15,350)
Total number 1st transplants 19,366 (allo 6,456, auto 12,910)

April 2002
<table>
<thead>
<tr>
<th></th>
<th>Number of patients</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>total 1990-2000</td>
<td>%</td>
<td>total 2000</td>
<td>%</td>
</tr>
<tr>
<td><strong>Leukemias</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute myeloid leukemia</td>
<td>10990</td>
<td>24.9</td>
<td>1627</td>
<td>25.4</td>
</tr>
<tr>
<td>Acute lymphocytic leukemia</td>
<td>8871</td>
<td>20.1</td>
<td>1135</td>
<td>17.7</td>
</tr>
<tr>
<td>Chronic myeloid leukemia</td>
<td>10599</td>
<td>23.9</td>
<td>1315</td>
<td>20.5</td>
</tr>
<tr>
<td>Myelodysplastic syndromes</td>
<td>2680</td>
<td>6.1</td>
<td>454</td>
<td>7.1</td>
</tr>
<tr>
<td>Chronic lymphocytic leukemia</td>
<td>403</td>
<td>0.9</td>
<td>122</td>
<td>1.9</td>
</tr>
<tr>
<td><strong>Lymphoproliferative disorders</strong></td>
<td>3030</td>
<td>8.9</td>
<td>820</td>
<td>12.8</td>
</tr>
<tr>
<td>Multiple myeloma</td>
<td>1470</td>
<td>3.3</td>
<td>255</td>
<td>4.6</td>
</tr>
<tr>
<td>Non-Hodgkin's lymphoma</td>
<td>2140</td>
<td>4.8</td>
<td>457</td>
<td>7.1</td>
</tr>
<tr>
<td><strong>Solid tumors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neuroblastoma</td>
<td>272</td>
<td>0.6</td>
<td>104</td>
<td>1.6</td>
</tr>
<tr>
<td>Osteosarcoma</td>
<td>2</td>
<td>0.0</td>
<td>1</td>
<td>0.0</td>
</tr>
<tr>
<td>Soft tissue sarcoma</td>
<td>13</td>
<td>0.0</td>
<td>5</td>
<td>0.1</td>
</tr>
<tr>
<td>Germinal tumors</td>
<td>10</td>
<td>0.0</td>
<td>3</td>
<td>0.0</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>57</td>
<td>0.1</td>
<td>15</td>
<td>0.2</td>
</tr>
<tr>
<td>Ewing's sarcoma</td>
<td>20</td>
<td>0.1</td>
<td>4</td>
<td>0.1</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>1</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Other soft tumors</td>
<td>120</td>
<td>0.3</td>
<td>67</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Non-malignant disorders</strong></td>
<td>5605</td>
<td>12.0</td>
<td>700</td>
<td>10.9</td>
</tr>
<tr>
<td>Aplastic anemia/Fanconi</td>
<td>2483</td>
<td>5.6</td>
<td>267</td>
<td>4.5</td>
</tr>
<tr>
<td>Thalassemia</td>
<td>1349</td>
<td>3.1</td>
<td>147</td>
<td>2.3</td>
</tr>
<tr>
<td>Combined immune deficiencies</td>
<td>724</td>
<td>1.5</td>
<td>103</td>
<td>1.6</td>
</tr>
<tr>
<td>Autoimmunity</td>
<td>1112</td>
<td>2.5</td>
<td>153</td>
<td>2.4</td>
</tr>
<tr>
<td>Auto immune diseases</td>
<td>27</td>
<td>0.1</td>
<td>19</td>
<td>0.2</td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td>759</td>
<td>1.7</td>
<td>127</td>
<td>2.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>44165</td>
<td></td>
<td>6404</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of patients</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------------</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td></td>
<td>total 1990-2000</td>
<td>%</td>
<td>total 2000</td>
<td>%</td>
</tr>
<tr>
<td><strong>Leukemias</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute myeloid</td>
<td>15052</td>
<td>17.0</td>
<td>1764</td>
<td>13.0</td>
</tr>
<tr>
<td>leukemia</td>
<td>8129</td>
<td>9.2</td>
<td>1047</td>
<td>8.2</td>
</tr>
<tr>
<td>Acute lymphocytic</td>
<td>3765</td>
<td>4.2</td>
<td>302</td>
<td>2.4</td>
</tr>
<tr>
<td>leukemia</td>
<td>1967</td>
<td>2.2</td>
<td>148</td>
<td>1.2</td>
</tr>
<tr>
<td>Chronic myeloid</td>
<td>297</td>
<td>0.3</td>
<td>50</td>
<td>0.4</td>
</tr>
<tr>
<td>leukemia</td>
<td>694</td>
<td>1.0</td>
<td>217</td>
<td>1.7</td>
</tr>
<tr>
<td>Lymphoproliferative</td>
<td>48917</td>
<td>55.1</td>
<td>8498</td>
<td>66.7</td>
</tr>
<tr>
<td>disorders</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple myeloma</td>
<td>16206</td>
<td>18.3</td>
<td>3388</td>
<td>26.6</td>
</tr>
<tr>
<td>Hodgkin's disease</td>
<td>9078</td>
<td>10.2</td>
<td>1228</td>
<td>9.6</td>
</tr>
<tr>
<td>Non Hodgkin's</td>
<td>23633</td>
<td>26.6</td>
<td>3384</td>
<td>30.5</td>
</tr>
<tr>
<td>lymphoma</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Solid tumors</strong></td>
<td>24016</td>
<td>27.0</td>
<td>2286</td>
<td>18.0</td>
</tr>
<tr>
<td>Neuroblastoma</td>
<td>1912</td>
<td>2.2</td>
<td>262</td>
<td>2.1</td>
</tr>
<tr>
<td>Glioma</td>
<td>544</td>
<td>0.6</td>
<td>73</td>
<td>0.6</td>
</tr>
<tr>
<td>Soft tissue sarcoma</td>
<td>1013</td>
<td>1.1</td>
<td>144</td>
<td>1.1</td>
</tr>
<tr>
<td>Germinal tumors</td>
<td>2653</td>
<td>3.0</td>
<td>304</td>
<td>2.4</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>12508</td>
<td>14.2</td>
<td>781</td>
<td>6.1</td>
</tr>
<tr>
<td>Ewing's sarcoma</td>
<td>1401</td>
<td>1.6</td>
<td>244</td>
<td>1.9</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>318</td>
<td>0.4</td>
<td>62</td>
<td>0.5</td>
</tr>
<tr>
<td>Ovarian cancer</td>
<td>628</td>
<td>0.7</td>
<td>100</td>
<td>0.8</td>
</tr>
<tr>
<td>Other solid tumors</td>
<td>2944</td>
<td>3.3</td>
<td>316</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>Non malignant</strong></td>
<td>321</td>
<td>0.4</td>
<td>100</td>
<td>0.8</td>
</tr>
<tr>
<td>disorders</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aplastic anemia+Fanconi</td>
<td>7</td>
<td>0.0</td>
<td>1</td>
<td>0.0</td>
</tr>
<tr>
<td>Thalassemia</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Combined immune deficiencies</td>
<td>10</td>
<td>0.0</td>
<td>2</td>
<td>0.0</td>
</tr>
<tr>
<td>Inborn errors</td>
<td>4</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Auto immune diseases</td>
<td>300</td>
<td>0.3</td>
<td>97</td>
<td>0.8</td>
</tr>
<tr>
<td>Others</td>
<td>492</td>
<td>0.6</td>
<td>84</td>
<td>0.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>88798</td>
<td></td>
<td>12732</td>
<td></td>
</tr>
</tbody>
</table>
Table 2A

Changes in transplant rates from 1990 to 2000 in nine selected countries with predictions for 2003: Allogeneic HSCT

<table>
<thead>
<tr>
<th></th>
<th>Year of transplant</th>
<th>Maximum transplant rate</th>
<th>Predictions 2003</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1990</td>
<td>1995</td>
<td>2000</td>
</tr>
<tr>
<td><strong>Leukemias</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute myeloid leukemia</td>
<td>13.2 ± 2.2</td>
<td>22.4 ± 3.2</td>
<td>37.7 ± 4.1</td>
</tr>
<tr>
<td>Acute lymphocytic leukemia</td>
<td>12.7 ± 2.8</td>
<td>21.0 ± 2.5</td>
<td>26.9 ± 3.3</td>
</tr>
<tr>
<td>Chronic myeloid leukemia</td>
<td>14.4 ± 2.1</td>
<td>20.3 ± 3.1</td>
<td>28.3 ± 4.6</td>
</tr>
<tr>
<td>Myelodysplastic syndromes</td>
<td>2.2 ± 1.9</td>
<td>6.3 ± 1.2</td>
<td>10.5 ± 1.2</td>
</tr>
<tr>
<td>Chronic lymphocytic leukemia</td>
<td>0.4 ± 0.2</td>
<td>0.7 ± 0.5</td>
<td>2.9 ± 0.8</td>
</tr>
<tr>
<td><strong>Lymphoproliferative disorders</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple myeloma</td>
<td>1.4 ± 1.0</td>
<td>2.7 ± 1.2</td>
<td>7.4 ± 1.5</td>
</tr>
<tr>
<td>Hodgkin’s disease</td>
<td>0.6 ± 0.3</td>
<td>0.4 ± 0.2</td>
<td>1.7 ± 0.5</td>
</tr>
<tr>
<td>Non Hodgkin’s lymphoma</td>
<td>2.2 ± 0.8</td>
<td>4.7 ± 1.5</td>
<td>10.7 ± 1.8</td>
</tr>
<tr>
<td><strong>Non malignant disorders</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aplastic anemia+Fanconi</td>
<td>4.0 ± 1.0</td>
<td>4.8 ± 1.3</td>
<td>5.7 ± 0.5</td>
</tr>
<tr>
<td>Combined immune deficiencies</td>
<td>0.8 ± 0.5</td>
<td>1.3 ± 0.5</td>
<td>2.2 ± 0.6</td>
</tr>
<tr>
<td>Inborn errors</td>
<td>0.9 ± 0.7</td>
<td>2.2 ± 0.6</td>
<td>3.4 ± 0.6</td>
</tr>
</tbody>
</table>
### Table 2B

Changes in transplant rates from 1990 to 2000 in nine selected countries with predictions for 2003: Autologous HSCT

<table>
<thead>
<tr>
<th></th>
<th>Year of transplant</th>
<th>Maximum transplant rate</th>
<th>Predictions 2003</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1990</td>
<td>1995</td>
<td>2000</td>
</tr>
<tr>
<td><strong>Leukemias</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute myeloid leukemia</td>
<td>10.8 ± 2.2</td>
<td>19.3 ± 4.8</td>
<td>23.7 ± 4.4</td>
</tr>
<tr>
<td>Acute lymphocytic leukemia</td>
<td>8.1 ± 1.8</td>
<td>9.9 ± 2.6</td>
<td>6.2 ± 2.1</td>
</tr>
<tr>
<td>Chronic myeloid leukemia</td>
<td>2.4 ± 1.4</td>
<td>5.5 ± 1.5</td>
<td>3.6 ± 1.3</td>
</tr>
<tr>
<td>Myelodysplastic syndromes</td>
<td>0.1 ± 0.1</td>
<td>1.1 ± 1.3</td>
<td>1.4 ± 0.8</td>
</tr>
<tr>
<td>Chronic lymphocytic leukemia</td>
<td></td>
<td>1.3 ± 0.7</td>
<td>5.6 ± 1.5</td>
</tr>
<tr>
<td><strong>Lymphoproliferative disorders</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple myeloma</td>
<td>3.8 ± 2.4</td>
<td>34.3 ± 12.1</td>
<td>32 ± 15.2</td>
</tr>
<tr>
<td>Hodgkin's disease</td>
<td>0.3 ± 2.7</td>
<td>21.0 ± 4.5</td>
<td>24.9 ± 3.2</td>
</tr>
<tr>
<td>Non Hodgkin's lymphoma</td>
<td>13.7 ± 5.0</td>
<td>56.6 ± 8.4</td>
<td>95.5 ± 13.6</td>
</tr>
<tr>
<td><strong>Solid tumors</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neuroblastoma</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glioma</td>
<td>1.7 ± 1.6</td>
<td>1.6 ± 1.1</td>
<td>1.8 ± 0.9</td>
</tr>
<tr>
<td>Soft tissue sarcoma</td>
<td>1.2 ± 0.6</td>
<td>2.0 ± 0.8</td>
<td>3.8 ± 1.1</td>
</tr>
<tr>
<td>Germinal tumors</td>
<td>3.6 ± 1.9</td>
<td>7.3 ± 2.5</td>
<td>7.3 ± 2.5</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>27.0 ± 1.5</td>
<td>33.3 ± 14.4</td>
<td>20.0 ± 8.8</td>
</tr>
<tr>
<td>Ewing's sarcoma</td>
<td>11 ± 0.7</td>
<td>3.0 ± 0.8</td>
<td>5.6 ± 2.0</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>n.a.</td>
<td>n.a.</td>
<td>1.4 ± 0.7</td>
</tr>
<tr>
<td>Ovarian cancer</td>
<td>n.a.</td>
<td>n.a.</td>
<td>2.7 ± 1.1</td>
</tr>
<tr>
<td>Other solid tumors</td>
<td>n.a.</td>
<td>n.a.</td>
<td>7.6 ± 1.9</td>
</tr>
</tbody>
</table>
Fig 2a
Fig 3a

Total transplants (1st.) per 10 million

- □ 0 or no report
- □ 1 - 50
- □ 51 - 200
- □ 201 - 400
- □ > 400
Fig 3b

Total transplants (1st.) per 10 million

- 0 or no report
- 1 - 50
- 51 - 200
- 201 - 400
- > 400

Israel
Iran
Fig 4a
Fig 4c

Mean weighted (standardized frequency)

Current Trends in Hematopoietic Stem Cell Transplantation in Europe
Alois Gratwohl, Helen Baldomero, Bruno Horisberger, Caroline Schmid, Jakob Passweg and Alvaro Urbano-Ispizua

Information about reproducing this article in parts or in its entirety may be found online at:
http://www.bloodjournal.org/site/misc/rights.xhtml#repub_requests

Information about ordering reprints may be found online at:
http://www.bloodjournal.org/site/misc/rights.xhtml#reprints

Information about subscriptions and ASH membership may be found online at:
http://www.bloodjournal.org/site/subscriptions/index.xhtml

Advance online articles have been peer reviewed and accepted for publication but have not yet appeared in the paper journal (edited, typeset versions may be posted when available prior to final publication). Advance online articles are citable and establish publication priority; they are indexed by PubMed from initial publication. Citations to Advance online articles must include digital object identifier (DOIs) and date of initial publication.