

- Oncol 2004;22:416-23.
- Fernandez-Botran R, Chilton PM, Ma Y. Soluble cytokine receptors: their roles in immunoregulation, disease, and therapy. *Adv Immunol* 1996;63:269-336.
 - Liem LM, van Houwelingen HC, Goulmy E. Serum cytokine levels after HLA-identical bone marrow transplantation. *Transplantation* 1998;66:863-71.
 - Remberger M, Ringdén O, Blau I, Ottinger H, Kremens B, Kiehl MG, et al. No difference in graft-versus-host disease, relapse and survival comparing peripheral stem cells with bone marrow using unrelated donors. *Blood* 2001;98:1739-45.
 - Kobayashi S, Imamura M, Hashino S, Noto S, Mori A, Tanaka J, et al. Possible role of granulocyte colony-stimulating factor in increased serum soluble interleukin-2 receptor- α levels after allogeneic bone marrow transplantation. *Leuk Lymphoma* 1999;33:559-66.
 - Pan L, Delmonte J Jr, Jalonen CK, Ferrara JL. Pretreatment of donor mice with granulocyte colony-stimulating factor polarizes donor T lymphocytes toward type-2 cytokine production and reduces severity of experimental graft-versus-host disease. *Blood* 1995;86:4422-9.
 - Reddy V, Hill GR, Pan L, Gerbitz A, Teshima T, Brinson Y, et al. G-CSF modulates cytokine profile of dendritic cells and decreases acute graft-versus-host disease through effects on the donor rather than the recipient. *Transplantation* 2000;69:691-3.

Epidemiology

Newly diagnosed cases of hematologic malignancies in Sardinia in the early 2000s: an estimation of their number, age and geographic distribution on the basis of a previous epidemiologic survey

We estimate the number of cases of hematologic malignancies expected to be newly diagnosed in the resident population of Sardinia during the year 2001, and classify the predicted cases according to disease, age and geographic distribution. The implications of these predictions for the Sardinian health care system are discussed, particularly with respect to the development of policies aimed to ensure the most adequate medical care.

haematologica 2005; 90:429-430

(<http://www.haematologica.org/journal/2005/3/429.html>)

In a previous report¹ we described age and sex distributions and temporal changes in the incidence of hematologic malignancies (HM) on the island of Sardinia during the years 1974-1993. Cases (in total 7,264) were collected by direct manual consultation of the registers containing all the reports of histologic examinations and the registers containing all the diagnoses at hospital discharge from, respectively, all pathology and clinical institutions active in Sardinia during that period; diagnoses were validated by consultation of clinical records, possible in 95% of cases. Pathologies classified as HM are those here reported in the Tables.

In this letter, we report an estimation of the number of HM expected to be newly diagnosed in the year 2001 in the resident population of the island and analyze the characteristics and geographic distribution of these malignancies. We also discuss some of the possible implications of these predictions for health care policy, in order to achieve the best management of these patients.

The number of cases was estimated by applying the HM incidence rates calculated from the survey mentioned above to the resident population of Sardinia at the 2001 census.² Details of the procedure applied are

Table 1. Hematologic malignancies in Sardinia: estimated cases, 2001.

| | Total cases | >65 y | <15 y |
|--|-------------|-------|-------|
| Acute myeloid leukemia | 49 | 24 | 2 |
| Acute lymphoblastic leukemia | 23 | 5 | 8 |
| Acute leukemia, unknown type | 6 | 3 | 0.3 |
| Myelodysplasia | 46 | 36 | 0 |
| Chronic myeloid leukemia | 26 | 11 | 0.09 |
| Polycythemia vera | 11 | 5 | 0 |
| Essential thrombocythemia | 22 | 11 | 0 |
| Myelofibrosis | 9 | 6 | 0 |
| Myeloproliferative disorders unknown type | 3 | 3 | 0.03 |
| Chronic lymphocytic leukemia | 65 | 42 | 0 |
| Multiple myeloma | 66 | 40 | 0 |
| Solitary plasmacytoma | 1 | 0 | 0 |
| Hodgkin's disease | 45 | 7 | 1 |
| Non Hodgkin's lymphomas | 178 | 91 | 2 |
| Hairy cell leukemia | 7 | 2 | 0 |
| Waldenström's macroglobulinemia | 5 | 3 | 0 |
| Lymphoproliferative disorders unknown type | 4 | 2 | 0 |
| Total cases | 568 | 292 | 14 |

The number of expected cases was calculated by applying the specific incidence rates observed in our 1974-1993 survey¹ to the resident population of Sardinia at the 2001 census.¹ The rates applied are those of the whole surveyed period for diseases that had stable incidence rates (namely CML, ALL, HD) and those of the last 10 or 5 surveyed years for diseases incidence rates increased over time (mostly due to increased diagnostic efficiency). The number of cases could be higher than estimated for NHL, AML and MDS, whose rates increased over the entire period covered by our previous survey.

described in the legend to Table 1.

The same calculations were applied uniformly across the three areas into which we had arbitrarily divided the island. This division was made on a logistic basis i.e. road access to Cagliari, Sassari and Nuoro, the towns where the four hematology institutions most extensively involved in HM care are located. This division was documented to be reliable when retrospectively checked on the patients of the 1974-1993 survey. Details of the procedures applied are described in the legend to Table 2.

Based on our analysis, the number of new HM cases expected to be diagnosed across the whole Sardinian population (1.631.880 at 2001 census) in the 2001 would be 568 (this could be an underestimate, as explained in the legend to Table 1). Table 1 shows the estimated division of these cases by disease and by two particular age classes (i.e. <15 and >65 years of age respectively). The estimated number of patients under 15 years old is only fourteen, with about twenty in total under 18 years old. Patients over 65 years old are expected to represent more than 50% of the total HM cases (292/568). Co-morbidity typical of this age group still further increase the burden on the health care system and must be taken into account when considering an adequate training of hematology staff.

Table 2. Hematologic malignancies in Sardinia: distribution of expected cases in 2001 according to geographic areas.

| Geographic area/ Hematology centers | Resident population (2001 census) | Male/ female ratio | % persons <15 y | % persons >65 y | Expected cases/year Total | Expected cases/year <15 y | Expected cases/year > 65y |
|--|---|--------------------------|--------------------|--------------------|------------------------------|------------------------------|------------------------------|
| Cagliari | | | | | | | |
| U.O. Osp. Businco | 866,107 | 0.959 | 13.63 | 15.45 | 295 | 7 | 148 |
| U.O. Osp. Binaghi | | | | | | | |
| Nuoro | | | | | | | |
| U.O. Osp. S.Francesco | 349,240 | 0.965 | 14.53 | 17.36 | 126 | 3 | 68 |
| Sassari | | | | | | | |
| Ist. Ematologia Università | 416,532 | 0.956 | 13.78 | 16.34 | 146 | 3 | 76 |
| Total | 1,631,880 | 0.959 | 13.86 | 16.08 | 567 | 14 | 292 |

Communes of the island were allotted to one of the three areas according to distance and time necessary to reach the principal town of that area via the recommended route.³ These criteria were adopted on the basis of the assumption that such elements would strongly influence patients' choice of a center for diagnosis and treatment. About 10% of the Sardinian population resided in the borderline between two areas (Nuoro-Cagliari and Nuoro-Sassari): 50% were allotted to each area. The estimated number of cases was calculated by applying, by disease, sex and age classes, the same specific incidence rates as applied in Table 1 to the resident population of the three areas at the 2001 census. Slight existing geographic differences in incidence were not taken into consideration. Concordance between area of residence and area of hematologic care, assessed in 93% of the patients of the 1974-1993 survey, was 101%, 93% and 47% for the Cagliari, Sassari and Nuoro areas, respectively. The low concordance found for Nuoro area could be due to the fact that, during the considered period, access was more difficult and the hematology facilities were not at that time fully developed.

The estimated distribution of cases expected to be newly diagnosed in the three sub-regional areas is illustrated in Table 2.

The estimated number of new cases/year to be managed by each of the four structures is calculated to be approximately 130-150. These estimations give us the opportunity to evaluate the current health care system organization for HM in Sardinia and provide the basis for some suggestions on how to achieve a better and more efficient medical care for HM patients.

Given the number, age and geographical distribution of the expected new cases of HM, we consider that the number and location of institutions currently involved in this field in Sardinia are appropriate (i.e. 1 institution for pediatric patients, in Cagliari, which also manages other pediatric patients with cancer on of the island; 4 institutions for adult patients, 2 in Cagliari, 1 in Sassari and 1 in Nuoro).

In fact, each center for adult patients could deal with 130-150 new cases/year. This number, in our opinion, is appropriate, because it allows expertise in the field to be acquired and maintained but avoids under-utilization of facilities.

Regarding this last point, we believe that the Sardinian health care system should be allowed to have a higher number of hematology hospital beds, as well as a lower percent utilization of these beds, than in the rest of Italy. The reasons for this include the low population density on the island, communication difficulties and the indisputable observation that insularity precludes admission to other nearby centers of patients who cannot be admitted to hematology centers on the island.

The above-mentioned geographical features strongly suggest that medicine, geriatrics and oncology departments of other hospitals of the three considered sub-

regional areas should be appropriately involved in the care of HM patients. These units, connected with the main hematology center and applying shared diagnostic and therapeutic guidelines, could offer nearby patients the required care, especially during particular phases of the clinical course of the disease.

Finally, we believe that a specific home care network is mandatory for the best palliative management which is, unfortunately, still necessary for many patients with hematologic malignancies. The ONLUS-AIL associations at present working in Cagliari, Sassari and Nuoro, which have made this commitment, deserve to have a primary role in this field.

Giorgio Broccia,* Attilio Gabbas,^o Maurizio Longinotti[#]

*Division of Haematology, Ospedale Oncologico A. Businco, Cagliari, ^oDivision of Haematology, Ospedale San Francesco, Nuoro; [#]Hematology Institute, University of Sassari, Italy

Key words: epidemiology, hematological malignancies, Sardinia, health care organisation.

Correspondence: Giorgio Broccia, via Guzzoni degli Ancarani 6, 09121 Cagliari, Italy. Phone & Fax: international +39.070.522992. E-mail: giorgio.broc@iiscai.it

References

1. Broccia G, Chessa E, Deplano W, Dessalvi P, Giannico B, Luxi G, et al. Hematological malignancies in the island of Sardinia, 1974-1993: age and sex distributions and temporal changes in incidence. *Hematol Oncol* 2004 (in press).
2. 14° censimento della popolazione e delle abitazioni. Sardegna Contacted October 20 2004. Available at URL: <http://www.istat.it/population/index.htm>
3. Guidare meglio. Come ci arrivi. Available at URL: <http://www.inauto.com>.