Breast Cancer “Tailored Follow-up” in Italian Oncology Units: A Web-Based Survey

Clara Natoli1*, Davide Brocco1, Isabella Sperduti2, Antonio Nuzzo3, Nicola Tinari1, Michele De Tursi1, Antonino Grassadonia1, Lorenzo Mazzilli4, Stefano Iacobelli1, Teresa Gamucci5, Patrizia Vici6, and the “FOLLOW-UP” Study Group

1 Department of Experimental and Clinical Sciences, University “G. d’Annunzio”, Chieti, Italy, 2 Unit of Biostatistics, Regina Elena National Cancer Institute, Rome, Italy, 3 Oncology Department, “Floraspe Renzetti” Hospital, Lanciano, Italy, 4 Clinical Governance Unit, “SS. Annunziata” Hospital, Chieti, Italy, 5 Department of Oncology, “S.S. Trinita’” Hospital, Sora, Italy, 6 Division of Medical Oncology B, Regina Elena National Cancer Institute, Rome, Italy

Abstract

Purpose: Breast cancer follow-up procedures after primary treatment are still a controversial issue. Aim of this study was to investigate, through a web-based survey, surveillance methodologies selected by Italian oncologists in everyday clinical practice.

Methods: Referents of Italian medical oncology units were invited to participate to the study via e-mail through the SurveyMonkey website. Participants were asked how, in their institution, exams of disease staging and follow-up are planned in asymptomatic women and if surveillance continues beyond the 5th year.

Results: Between February and May 2013, 125 out of 233 (53.6%) invited referents of Italian medical oncology units agreed to participate in the survey. Ninety-seven (77.6%) referents state that modalities of breast cancer follow-up are planned according to the risk of disease progression at diagnosis and only 12 (9.6%) oncology units apply the minimal follow-up procedures according to national guidelines. Minimal follow-up is never applied in high risk asymptomatic women. Ninety-eight (78.4%) oncology units continue follow-up in all patients beyond 5 years.

Conclusions: Our survey shows that 90.4% of participating Italian oncology units declare they do not apply the minimal breast cancer follow-up procedures after primary treatment in asymptomatic women, as suggested by national and international guidelines. Interestingly, about 80.0% of interviewed referents performs the so called “tailored follow-up”, high intensity for high risk, low intensity for low risk patients. There is an urgent need of randomized clinical trials able to determine the effectiveness of risk-based follow-up modalities, their ideal frequency and persistence in time.

Introduction

Breast cancer surveillance procedures after primary treatment are common practice in clinical oncology even if their methodology is still a controversial issue. The primary aim of breast cancer follow-up is to decrease mortality and improve well-being through early detection of second ipsi- or contralateral cancer and local recurrences, which are potentially curable, and ascertainment of symptoms suggestive of metastatic disease [1]. On the other hand, detection of metastatic disease in asymptomatic patients by intensive surveillance including complete blood counts, chemistry panels, tumor markers, imaging modalities (i.e. chest radiographs, bone scans, liver ultrasound and others) has not been demonstrated to improve overall survival [2,3,4,5]. The secondary aim of breast cancer follow-up is diagnosis and management of morbidity due to adjuvant therapies [6], as well as improvement of adherence to endocrine therapy [7,8] and assistance for psychosocial support [5].

Since the first release of breast cancer follow-up guidelines for management of early breast cancer patients in 1997 by the American Society of Clinical Oncology (ASCO) [9], recommending minimal follow-up procedures (i.e. regular history taking, clinical examination, annual surveillance mammography and breast self-examination), this topic has been of great interest for clinical oncologists [5,10]. ASCO breast cancer follow-up guidelines have been periodically updated and similar recommendations have been adopted worldwide [11,12,13,14,15,16,17]. In Italy, breast cancer guidelines by the Associazione Italiana di Oncologia Medica (AIOM) recommend yearly mammography, self breast examination, visit for history and physical examination, genetic counseling as appropriate, gynecological visit, gynecological echography and pap test [18].
density scan are suggested for women treated with adjuvant aromatase inhibitors. Other blood and imaging examinations are not advised in asymptomatic patients. Visits should be performed every 3–6 months for years 1–3, every 6–12 months for years 4–5, and annually thereafter.

Even if data from randomized clinical trials and extensive revisions of literature [2,3,4,5,19] are strongly suggestive that intensive follow-up does not improve survival or life, in clinical practice breast cancer patients are frequently addressed to this modality of surveillance [8,20,21,22,23,24,25]. The great improvements made over the last ten years in imaging modalities and therapies have prompted the need for more intensive procedures than those suggested by guidelines. Still open questions are those related to the choice of the best test to be applied, the optimal monitoring frequency and the duration of controls after primary surgery [11], while there is a general agreement both on annual surveillance mammography and on tests to be applied for early diagnosis and management of morbidity due to adjuvant therapies.

Aim of this study has been to investigate, through a web-based survey, which follow-up procedures are selected by Italian oncologists in everyday clinical practice, besides those universally accepted, such as annual mammography and adjuvant therapies related toxicities monitoring.

**Materials and Methods**

**Ethics statement**

As the study did not involve human subjects and no patient data were collected, ethics approval was not required.

**Participants**

Referents of Italian medical oncology units were invited to participate to the study via e-mail through the SurveyMonkey website between January and May 2013. One recall was sent out by e-mail after one month from the first request. Participants were asked to complete a first page with their personal data, name, surname, institution, address, city. Then they were required to answer if, in their institution, exams of disease staging and follow-up are performed in a similar way for all asymptomatic breast cancer patients or are stratified according to the risk of disease progression, classified as low or high. If the answer was “NO”, they were asked if, always in asymptomatic women, blood chemistry tests, tumor markers, chest radiograph, liver ultrasound, bone scan, whole-body CT scan, whole-body PET/CT scan are performed at diagnosis and at follow-up, and, if yes, how many times/year from year 1 to 5 after primary surgical treatment. If participants declared to perform follow-up surveillance according to the risk of disease progression, they were asked to choose which of the following factors they deem more relevant to classify patients at high risk (more options allowed): Luminal B/H, HER2-, Luminal B/HER2+, HER2+, Triple negative, pT2, pT3, pT4, pN1, pN2, pN3 or others to be specified. Then they were asked if they carry out blood exams, tumor markers, chest radiography, liver ultrasound, bone scan, whole-body CT scan, whole-body PET/CT scan at diagnosis and at follow-up in low and high risk categories, and, if yes, how many times/year from year 1 to 5 in both groups. Independently on how follow-up was performed, all participants were finally asked if they continue follow-up beyond the 5th year with 3 responses to be selected: no, yes, only in estrogen receptor (ER) positive (+) patients.

All participating Medical Oncology Units were informed that the results of the study were going to be published and requirements for authorship was clearly indicated. There was no need to protect details of the participants since these were not patients and no personal data was collected. No patient data were collected, so ethics approval was not required.

**Statistical analysis**

Data were analyzed through descriptive statistics. Differences in proportions and comparisons between groups were performed by using the chi-square or Fisher’s exact test when appropriate. Due to a nonparametric distribution, data on frequency of exams during follow-up were compared with the Friedman Test followed by the Dunn’s Multiple Comparison Test A p value below 0.05 was retained as statistically significant. SPSS software (SPSS version 21.0, SPSS Inc., Chicago, Illinois, USA) was used for all statistical evaluations.

**Results**

Between February and May 2013, 134 out of 233 (57.5%; SE = 3.2%) invited referents of Italian medical oncology units agreed to participate to the e-mail survey. Among the initial 134 responses, 125 (93.3%) surveys from oncology departments widely distributed in the Italian territory, were completed. Ninety-seven (77.6%; SE = 3.73) referents state that modalities of breast cancer follow-up are planned according to the risk of disease progression at diagnosis, while 25 (20.0%; SE = 3.58) perform follow-up work similarly for all women. Overall, only 12 (9.6%; SE = 2.63) oncology units apply the minimal follow-up procedures according to international guidelines, 5 units only for patients in the low risk group and 7 units for all patients, not taking into account the risk category. Minimal follow-up is never applied in high risk asymptomatic women. Twenty-three (18.4%; SE = 3.46) oncology units stop surveillance at 5 years of follow-up, 98 (78.4%; SE = 3.78) continue follow-up in all patients beyond 5 years, and 4 (3.2%) continue beyond 5 years only in hormone receptor positive tumors.

**Follow-up modalities according to the risk of disease relapse**

Oncology units performing follow-up according to the risk of disease progression were asked to indicate which prognostic factors they deem more relevant to stratify patients in the low and high risk categories. As shown in Fig. 1, more than 70.0% of respondents indicate tumor stage pT4, nodal positivity pN2-pN3, HER2 positivity and triple negativity (i.e. the absence of estrogen, progesteron receptor and HER2 amplification) as the most important factors to classify patients at high risk of disease progression. Other options, not shown, include young age, premenopausal status, vascular invasion, high Ki-67 proliferation index, BRCA positivity and familiarity.

Table 1 shows the selection of exams at diagnosis according to the risk of disease progression in asymptomatic women. Blood chemistry tests (p = 0.25), chest radiographs (p = 0.23) and liver ultrasounds (p = 0.99) are equally selected for both the low and the high risk groups. Tumor markers are more frequently checked in the high risk group (p = 0.002) as well as bone scans (p = <0.0001). Whole-body CT scan is prescribed by 33.3% of oncologists in the high risk group versus 8.3% in the low risk group (p = <0.0001); similarly, whole-body PET/CT is deemed relevant at diagnosis by 10.7% of oncologists for patient in the high risk group versus 1.1% for the low risk group (p = 0.007).

Selection of exams during follow-up according to the risk of disease progression are also shown in Table 1. Blood chemistry tests are chosen by more than 85% of oncologists (p = 0.16) for
both groups of patients, while whole-body PET/CT scanning is not prescribed by most for both categories \( p = 0.08 \). On the other hand, the other exams taken into account are significantly more often selected for patients in the high risk group. However, tumor markers, chest radiograph and liver ultrasound are selected by more than 60\% of oncologists also for the low risk group.

Follow-up modalities independently from the risk of disease relapse

Exams at diagnosis and at follow-up selected independently from the risk of disease relapse are shown in Table 2. Even if numbers are small, more than 87\% of oncologists prescribe complete staging at diagnosis, with the exception of whole-body CT scan and whole-body PET/CT scan. On the other hand, only blood chemistry tests and tumor markers are selected by 60\% and 80\% of oncologists during follow-up, respectively.

Frequency of exams according to the risk of disease relapse

In the low risk group, as shown in Table 3, blood chemistry tests and tumor markers are prescribed a median of 2 times/year in the first 3 years of follow-up, chest radiographs and liver ultrasound 1 time/year, while bone scan, whole-body CT scan and whole-body PET/CT scan are not taken into account. In the high risk group (Table 3), blood chemistry tests and tumor markers are prescribed a median of 3 times/year in the first 2 years of follow-up, and then 2 times/year. Chest radiograph is prescribed annually for five years, liver ultrasound every six months for the first 2 years and then annually, bone scan annually only for the first 3 years. Whole-body CT scan and whole-body PET/CT scan are not usually prescribed.

Frequency of exams independently of the risk of disease relapse

Table 3 shows also that, independently on the risk of progression, blood chemistry tests and tumor markers are frequently prescribed 2 times/year in all patients, liver ultrasound annually while the others are not usually prescribed.

Discussion

Our survey shows that 90.4\% of Italian oncology units who participated in the web-based questionnaire declare they do not apply the minimal breast cancer follow-up procedures after primary treatment in asymptomatic women, as suggested by National and International Oncology Societies [11,14,15,18]. Although participants were almost half of the medical oncology units present in Italy, they were uniformly distributed in the Italian territory (as listed below) and, therefore, the survey may be considered representative of the follow-up preferences of the Italian oncologist. The data confirm a recent retrospective analysis of follow-up care of breast cancer patients by Leoni et al showing that intensive follow-up testing is a quite common clinical practice in the Italian region Emilia-Romagna [24]. These results reflect the never ending, 80\% dating debate on minimal versus intensive follow-up procedures after breast cancer surgery [2,8,9,20,21,22,23,25,26] and show that, at least in Italy, minimal follow-up procedures are prescribed by a minority of medical oncology units [27]. Similarly, it has been recently reported the use of non-recommended surveillance procedures for early breast cancer patients in a Californian academic medical center [28]. On the contrary, a higher adherence to current guidelines has been reported for most oncologists from other countries, such as USA [20] and Australia [29,30].
On the other hand, it is the first time, to our knowledge, that a high percentage of interviewed referents (about 80.0%), declares to perform exams at diagnosis and follow-up according to the risk of disease progression, high intensity for high risk, low intensity for low risk patients, the so called “tailored follow-up”. Tumor stage pT4, pN2-pN3 and biological factors such as HER2 positivity and triple negativity are indicated as the most relevant prognostic factors to classify patients at high risk of disease progression. These choices are in agreement with literature data showing that pathological stage and intrinsic breast cancer subtypes are the most relevant prognostic factors able to influence clinical outcome [31,32,33,34]. Interestingly, van Hezewijk et al [8], using a web-based 29-item questionnaire, reported that 130 respondents of different disciplines (surgeons, medical oncologists, radiation oncologists and nurse practitioners) identified as patients at high risk to follow-up with a higher frequency of visits those of younger age and with pT3-4/pN2-3 tumor, not taking into account tumor biology, as medical oncologists did in the present study. Other

**Table 1.** Selection of exams at diagnosis and during follow-up according to the risk of disease progression.

| At diagnosis | At follow-up | p value | At diagnosis | At follow-up | p value |
|--------------|--------------|---------|--------------|--------------|---------|
| NO | YES | NO | YES | | |
| Blood chemistry tests | | | | | |
| Low risk | 9 (9.4) | 87 (90.6) | 0.25 | 14 (14.6) | 82 (85.4) | 0.16 |
| High risk | 4 (4.2) | 92 (95.8) | 7 (7.3) | 89 (92.7) | | |
| Tumor markers | | | | | |
| Low risk | 21 (21.7) | 76 (78.3) | 0.002 | 15 (15.5) | 82 (84.5) | 0.03 |
| High risk | 6 (6.2) | 91 (93.8) | 5 (5.5) | 92 (94.5) | | |
| Chest radiograph | | | | | |
| Low risk | 7 (7.3) | 89 (92.7) | 0.23 | 36 (37.5) | 60 (62.5) | 0.005 |
| High risk | 12 (13.0) | 81 (87.0) | 17 (18.3) | 76 (81.7) | | |
| Liver ultrasound | | | | | |
| Low risk | 9 (9.4) | 87 (90.6) | 0.99 | 29 (30.2) | 67 (69.8) | <0.0001 |
| High risk | 8 (8.6) | 85 (91.4) | 8 (8.6) | 85 (91.4) | | |
| Bone scan | | | | | |
| Low risk | 40 (41.3) | 57 (58.7) | <0.0001 | 69 (73.4) | 25 (26.6) | 0.006 |
| High risk | 3 (3.1) | 94 (96.9) | 50 (53.2) | 44 (46.8) | | |
| Whole-body CT scan | | | | | |
| Low risk | 88 (91.7) | 8 (8.3) | <0.0001 | 87 (93.5) | 6 (6.5) | <0.0001 |
| High risk | 64 (66.7) | 32 (33.3) | 61 (63.6) | 32 (34.4) | | |
| Whole-body PET/CT scan | | | | | |
| Low risk | 94 (98.9) | 1 (1.1) | 0.007 | 81 (96.4) | 3 (3.6) | 0.08 |
| High risk | 75 (89.3) | 9 (10.7) | 75 (89.3) | 9 (10.7) | | |

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On the other hand, it is the first time, to our knowledge, that a high percentage of interviewed referents (about 80.0%), declares to perform exams at diagnosis and follow-up according to the risk of disease progression, high intensity for high risk, low intensity for low risk patients, the so called “tailored follow-up”. Tumor stage pT4, pN2-pN3 and biological factors such as HER2 positivity and triple negativity are indicated as the most relevant prognostic factors to classify patients at high risk of disease progression. These choices are in agreement with literature data showing that pathological stage and intrinsic breast cancer subtypes are the most relevant prognostic factors able to influence clinical outcome [31,32,33,34]. Interestingly, van Hezewijk et al [8], using a web-based 29-item questionnaire, reported that 130 respondents of different disciplines (surgeons, medical oncologists, radiation oncologists and nurse practitioners) identified as patients at high risk to follow-up with a higher frequency of visits those of younger age and with pT3-4/pN2-3 tumor, not taking into account tumor biology, as medical oncologists did in the present study. Other

**Table 2.** Selection of exams independently of the risk of disease relapse.

| At diagnosis | At follow-up | P value |
|--------------|--------------|---------|
| NO | YES | NO | YES | |
| Blood chemistry tests | | | | | |
| Low risk | 0 | 25 (100.0) | 10 (40.0) | 15 (60.0) | <0.0001 |
| Tumor markers | 3 (12.0) | 22 (88.0) | 5 (20.0) | 20 (80.0) | 0.47 |
| Chest radiograph | 3 (12.0) | 22 (88.0) | 18 (72.0) | 7 (28.0) | <0.0001 |
| Liver ultrasound | 0 | 25 (100.0) | 14 (56.0) | 11 (44.0) | <0.0001 |
| Bone scan | 1 (4.2) | 24 (96.0) | 20 (80.0) | 5 (20.0) | <0.0001 |
| Whole-body CT scan | 19 (76.0) | 6 (24.0) | 25 (100.0) | - | 0.01 |
| Whole-body PET/CT scan | 25 (100.0) | 0 | 25 (100.0) | - | |

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even if estrogen receptor positive tumors. Both ASCO and NICE guidelines suggest frequent clinical examination in the first 3–5 years after diagnosis, independently from risk category, beyond 5 years, in accordance with international guidelines [9,15,16,18,26], while very few oncology units continue surveillance beyond 5 years only in hormone receptor positive tumors. Both ASCO and NICE guidelines suggest frequent clinical examination in the first 3–5 years after diagnosis, but after 3 years NICE suggests to discharge patients to general practice while ASCO suggests long-term follow-up [11,39]. Even if there is certainly an increase in the hazard rate of disease progression in the first 3 years after diagnosis, this peak does not include most of new contralateral cancers. The hazard curves for breast cancer mortality shows an initial increase of ∼3%/year in the rate of distant relapses between the 2nd and the 3rd year of surveillance, with a subsequent fall to ∼2%/year which remains constant for almost 10 years [35,38]. In contrast, potentially treatable local relapse occurs at a constant rate of 1–1.5% per year for at least 10 years [35], thus hardly justifying discharge at 3 years of follow-up [40,41]. Moreover, prolonged follow-up care could offer some advantages, i.e. an increased adherence to adjuvant endocrine therapy, known to be higher with long-term follow-up [7,8], as well as diagnosis and management of long-term toxicities. Late toxic effects of adjuvant treatments may continue for many years, with some patients at increased risk of life-threatening toxicities such as thromboembolic disease, uterine cancer, cerebrovascular or cardiovascular events, second malignancies and more [42,43].

Finally, we ignore which is the optimal follow-up for extended adjuvant endocrine therapies [44,45,46], after treatment with new biological agents [47], as well as the value of a follow-up tailored on distinct patterns of metastatic spread depending on breast cancer subtypes [48]. Moreover, the impact on survival of detecting an oligometastatic disease is still unknown [49,50] and, hopefully, the utility of an early detection of metastatic disease suitable of cure with the ongoing molecular targeted agents or novel therapeutics drugs [51].

Table 3. Frequency of exams during follow-up.

|                | 1 year | 2 year | 3 year | 4 year | 5 year | P value |
|----------------|--------|--------|--------|--------|--------|---------|
| **Low Risk Group** |        |        |        |        |        |         |
| Blood chemistry test, No. 92 | 2 (0–4) | 2 (0–4) | 2 (0–3) | 1 (0–2) | 1 (0–2) | <0.0001 |
| Tumor marker, No. 94 | 2 (0–4) | 2 (0–4) | 2 (0–3) | 2 (0–3) | 1 (0–2) | <0.0001 |
| Chest radiograph, No. 80 | 1 (0–2) | 1 (0–2) | 1 (0–2) | 0 (0–2) | 0 (0–2) | <0.0001 |
| Liver ultrasound, No. 87 | 1 (0–2) | 1 (0–2) | 1 (0–2) | 1 (0–2) | 1 (0–2) | 0.45    |
| Bone scan, No. 65 | 0 (0–1) | 0 (0–1) | 0 (0–1) | 0 (0–1) | 0 (0–1) | 0.48    |
| Whole-body CT scan, No. 46 | 0 (0–1) | 0 (0–1) | 0 (0–1) | 0 (0–1) | 0 (0–1) | 0.32    |
| Whole-body PET/CT scan, No. 46 | 0 | 0 (0–1) | 0 | 0 (0–1) | 0 | 0.41    |
| **High Risk Group** |        |        |        |        |        |         |
| Blood chemistry tests, No. 92 | 3 (0–4) | 3 (0–4) | 2 (0–4) | 2 (0–4) | 2 (0–4) | <0.0001 |
| Tumor markers, No. 94 | 3 (1–4) | 3 (0–4) | 2 (0–4) | 2 (0–4) | 2 (0–4) | <0.0001 |
| Chest radiograph, No. 80 | 1 (0–2) | 1 (0–2) | 1 (0–2) | 1 (0–2) | 1 (0–2) | 0.45    |
| Liver ultrasound, No. 87 | 2 (0–2) | 2 (0–2) | 1 (0–2) | 1 (0–2) | 1 (0–2) | <0.0001 |
| Bone scan, No. 65 | 1 (0–2) | 1 (0–2) | 1 (0–2) | 0 (0–2) | 0 (0–2) | <0.0001 |
| Whole-body CT scan, No. 46 | 0.5 (0–2) | 0 (0–2) | 0 (0–1) | 0 (0–1) | 0 (0–1) | <0.0001 |
| Whole-body PET/CT scan, No. 46 | 0 (0–1) | 0 (0–1) | 0 (0–1) | 0 (0–1) | 0 (0–1) | 0.57    |

| Independence from Risk of Disease Progression |        |        |        |        |        |         |
| Blood chemistry tests, No. 19 | 2 (0–4) | 2 (0–3) | 2 (0–3) | 1 (0–2) | 1 (0–2) | <0.0001 |
| Tumor markers, No. 20 | 3 (1–4) | 3 (1–4) | 2 (1–4) | 2 (1–3) | 1.5 (1–3) | <0.0001 |
| Chest radiograph, No. 14 | 0.5 (0–2) | 0 (0–2) | 0 (0–1) | 0 (0–1) | 0 (0–1) | 0.003   |
| Liver ultrasound, No. 16 | 1 (0–2) | 1 (0–2) | 1 (0–2) | 1 (0–2) | 1 (0–2) | 0.45    |
| Bone scans, No. 12 | 0 (0–1) | 0 (0–1) | 0 (0–1) | 0 (0–1) | 0 (0–1) | 0.48    |
| Whole-body CT scan, No. 10 | 0 | 0 | 0 | 0 | 0 | - |
| Whole-body PET/CT scan, No. 10 | 0 | 0 | 0 | 0 | 0 | - |

No: number of responses.
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Further research is needed even if ongoing guidelines advise against routine search for distant metastases, since no advantage exists in early diagnosis and treatment [3,4,5,32]. However, considering the plethora of novel active agents that have entered clinical practice for metastatic breast cancer in the last years, randomized clinical trials should be performed to determine the comparative effectiveness of different follow-up modalities, their ideal frequency and duration, and the development of risk-based guidelines [16,36].

Supporting Information
Appendix S1 Members of the “FOLLOW-UP” Study Group. (DOCX)

Author Contributions
Conceived and designed the experiments: CN TG PV. Performed the experiments: DB AN NT MDT AG. Analyzed the data: IS. Contributed reagents/materials/analysis tools: LM SI. Wrote the paper: CN.

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## Appendix I. Members of the “FOLLOW-UP” Study Group

| Surname and Name          | Institution                                                                 | City                       | Region     |
|---------------------------|------------------------------------------------------------------------------|----------------------------|------------|
| Natoli Clara              | Dipartimento di Scienze Sperimentali e Cliniche, Università "G. D'Annunzio" | Chieti                     | Abruzzo    |
| Adomo Vincenzo            | Azienda Ospedaliera Universitaria Policlinico "Gaetano Martino"             | Messina                    | Sicilia    |
| Airoldi Mario             | Azienda Ospedaliero - Universitaria "San Giovanni Battista"                 | Torino                     | Piemonte   |
| Amoroso Domenico          | Ospedale "Versilia"                                                          | Lido di Camaiore           | Toscana    |
| Angelini Francesco        | Ospedale "Regina Apostolorum"                                                | Albano Laziale             | Lazio      |
| Angiolini Catia           | Ospedale "Santa Maria Annunziata"                                           | Firenze                    | Toscana    |
| Angiolucci Giovanni       | Ospedale "San Donato"                                                        | Arezzo                     | Toscana    |
| Ardizzoia Antonio         | Ospedale "Alessandro Manzoni"                                                | Lecco                      | Lombardia  |
| Baldini Editta            | Ospedale "Campo di Marte"                                                     | Lucca                      | Toscana    |
| Ballardini Pierluigi      | Ospedale del Delta                                                           | Lagosanto                  | Emilia Romagna |
| Barni Sandro              | Ospedale "Treviglio-Caravaggio"                                              | Treviglio                  | Lombardia  |
| Barone Carlo              | Policlinico Universitario "A. Gemelli"                                       | Roma                       | Lazio      |
| Battelli Nicola           | Azienda Ospedaliero - Universitaria "Umberto I"                              | Ancona                     | Marche     |
| Bernardi Daniele          | Ospedale Civile                                                              | San Donà di Piave          | Veneto     |
| Bianchetti Sara           | Ospedale "Regina Apostolorum"                                                | Albano Laziale             | Lazio      |
| Bianco Nadia              | Policlinico                                                                  | Monza                      | Lombardia  |
| Biglia Nicoletta          | Ospedale Mauriziano "Umberto I"                                              | Torino                     | Piemonte   |
| Bilancia Domenico         | Ospedale "San Carlo"                                                         | Potenza                    | Basilicata |
| Biti Gianpaolo            | Azienda Ospedaliera Universitaria Careggi                                    | Firenze                    | Toscana    |
| Boni Corrado              | Arcispedale "Santa Maria Nuova"                                             | Reggio Emilia              | Emilia Romagna |
| Bordonaro Roberto         | A.r.n.a.s. Garibaldi - Presidio Ospedaliero Nesima                            | Catania                    | Sicilia    |
| Botta Mario               | Ospedale "Santo Spirito"                                                     | Casale Monferrato          | Piemonte   |
| Betti Sergio              | Presidio Riunito di Ivrea - Cuorgnè - Castellamonte                          | Ivrea                      | Piemonte   |
| Brunello Antonella        | Istituto Oncologico Veneto                                                   | Padova                     | Veneto     |
| Brunetti Cosimo           | Ospedale "Mariana Giannuzzi"                                                 | Manduria                   | Puglia     |
| Bruno Daniele             | Azienda Ospedaliera "Gaetano Rummo"                                          | Benevento                  | Campania   |
| Bucci Eraldo              | Istituto Ospedaliero Multimedica                                             | Castellanza                | Lombardia  |
| Buzzoni Roberto           | Fondazione I.R.C.C.S. Istituto Nazionale dei Tumori                          | Milano                     | Lombardia  |
| Cagossi Katia             | Ospedale "Ramazzini"                                                         | Carpi                      | Emilia Romagna |
| Cappelletti Claudia       | Ospedale "S. Croce"                                                          | Fano                       | Marche     |
| Cappuzzo Federico         | Ospedale Civile                                                              | Livorno                    | Toscana    |
| Cardillo Franca           | Presidio Ospedaliero Sud                                                     | Gaeta                      | Lazio      |
| Name                  | Institution                                                                 | City          | Region   |
|-----------------------|------------------------------------------------------------------------------|---------------|----------|
| Carroccio Rosalia     | Presidio Ospedaliero "Umberto I"                                             | Enna          | Sicilia  |
| Cascinu Stefano       | Azienda Ospedaliero-Universitaria "Umberto I"                               | Ancona        | Marche   |
| Cavanna Luigi         | Ospedale "Guglielmo Da Saliceto"                                            | Piacenza      | Romagna  |
| Cianchetti Ettore     | Ospedale "G. Bernabeo"                                                       | Ortona        | Abruzzo  |
| Clerico Mario         | Ospedale degli Infermi                                                       | Biella        | Piemonte |
| Contu Antonio         | Ospedale Civile "SS. Annunziata"                                            | Sassari       | Sardegna |
| Corsi Domenico        | Ospedale "San Giovanni Calibita - Fatebenefratelli"                          | Roma          | Lazio    |
| Cortesi Laura         | Azienda Ospedaliera Policlinico                                              | Modena        | Romagna  |
| Cretella Elisabetta   | Ospedale centrale                                                           | Bolzano       | Trentino Alto Adige |
| Crispino Sergio       | Ospedali Riuniti "Valdichiana Senese"                                       | Montepulciano | Toscana  |
| Di Lieto Marco        | Ospedale "Il Ceppo"                                                          | Pistoia       | Toscana  |
| Di Lullo Liberato     | Ospedale "F. Veneziale"                                                      | Isernia       | Molise   |
| Durini Ernesto        | Ospedale "Cardinale G. Panico"                                               | Tricase       | Puglia   |
| Fabi Alessandra       | Istituto Nazionale Tumori Regina Elena I.R.C.C.S. - I.F.O.                   | Roma          | Lazio    |
| Failla Giuseppe       | Centro Clinico e Diagnostico G.B. Morgagni                                   | Catania       | Sicilia  |
| Fattorusso Silvia     | Presidio Ospedaliero Centro                                                  | Terracina     | Lazio    |
| Ferrara Francesco     | Ospedale "San Vincenzo"                                                      | Taormina      | Sicilia  |
| Ferro Antonella       | Ospedale "Santa Chiara"                                                      | Trento        | Trentino Alto Adige |
| Ficorella Corrado     | Ospedale "San Salvatore"                                                     | L'Aquila      | Abruzzo  |
| Fogazzi Gianluca      | Istituto Clinico "S. Anna"                                                    | Brescia       | Lombardia |
| Foglietta Jennifer    | Ospedale "S. Maria della Misericordia"                                      | Perugia       | Umbria   |
| Francini Guido        | Azienda Ospedaliera Universitaria Senese                                     | Siena         | Toscana  |
| Fusco Ornella         | Ospedale civile                                                             | Sondrio       | Lombardia |
| Gennari Alessandra    | E. O. Ospedali "Galliera"                                                    | Genova        | Liguria  |
| Ghiani Massimo        | Ospedale Oncologico "Armando Businco"                                        | Cagliari      | Sardegna |
| Gianni Lorenzo        | Ospedale "Infermi"                                                           | Rimini        | Emilia Romagna |
| Giordano Monica       | Ospedale "Sant'Anna"                                                         | Como          | Lombardia |
| Giotta Francesco      | IRCCS "Giovanni Paolo II"                                                     | Bari          | Puglia   |
| Giuliani Rosa         | Ospedale "San Camillo-Forlanini"                                             | Roma          | Lazio    |
| Gori Stefania         | Ospedale "Sacro Cuore - Don Calabria"                                        | Negar         | Veneto   |
| Graiff Claudio        | Ospedale Centrale                                                           | Bolzano       | Trentino Alto Adige |
| Guarneri Valentina    | Azienda Ospedaliera Policlinico                                               | Modena        | Emilia Romagna |
| Guarneri Domenico     | Ospedale Civile "G. Borea"                                                    | Sanremo       | Liguria  |
| Guglielmi Flavio      | Ospedale "SS: Annunziata"                                                    | Sulmona       | Abruzzo  |
| Landriscina Matteo    | Università degli Studi di Foggia, Dipartimento Scienze Mediche e Chirurgiche | Foggia        | Puglia   |
| Laudadio Lucio        | Ospedale "F. Renzetti"                                                       | Lanciano      | Abruzzo  |
| Lombardo Marco        | Ospedale "Spirito Santo"                                                      | Pescara       | Abruzzo  |
| Longo Flavia          | Azienda Policlinico Umberto I                                                | Roma          | Lazio    |
| Name              | Institution                                                | City           | Region       |
|-------------------|------------------------------------------------------------|----------------|--------------|
| Macellari Giorgio | Ospedale "Guglielmo Da Saliceto"                           | Piacenza       | Emilia Romagna |
| Madeddu Clelia    | Azienda Ospedaliero Universitaria                          | Cagliari       | Sardegna     |
| Magnanini Simonetta| Ospedale "San Donato"                                      | Arezzo         | Toscana      |
| Maiorino Luigi    | Ospedale "San Gennaro"                                     | Napoli         | Campania     |
| Mangiameli Alessandra | Casa di Cura Musumeci                                    | Gravina di Catania | Sicilia |
| Minini Giovannii  | Istituto Clinico Sant'Anna                                | Brescia        | Lombardia    |
| Massida Bruno     | Azienda Ospedaliero Universitaria                          | Cagliari       | Sardegna     |
| Mattioli Rodolfo  | Ospedale "S. Croce2"                                       | Fano           | Marche       |
| Michelotti Andrea | Azienda Ospedaliero-Universitaria Pisana                    | Pisa           | Toscana      |
| Molino Annamaria  | Azienda Ospedaliera Universitaria Integrata                | Verona         | Veneto       |
| Montesarchio Vincenzo | Azienda Ospedaliera "Domenico Cotugno"                | Napoli         | Campania     |
| Morale Antonella  | Azienda Ospedaliera "Mazzoni"                              | Ascoli Piceno  | Marche       |
| Murgo Roberto     | IRCCS Ospedale "Casa Sollievo della Sofferenza"            | San Giovanni Rotondo | Puglia |
| Naso Giuseppe     | Azienda Policlinico Umberto I                              | Roma           | Lazio        |
| Natale Donato     | Ospedale "S. Massimo"                                      | Penne          | Abruzzo      |
| Orditura Michele  | Azienda Ospedaliera Seconda Università Degli Studi         | Napoli         | Campania     |
| Orrù Sandra       | Ospedale Oncologico "A. Businco"                           | Cagliari       | Sardegna     |
| Pace Roberta      | Ospedale "S. Camillo de' Lellis"                           | Rieti          | Lazio        |
| Palazzo Antonella | Azienda Policlinico Umberto I                              | Roma           | Lazio        |
| Palma Fedele      | Ospedale "Antonio Perrino"                                 | Brindisi       | Puglia       |
| Pancotti Amedeo   | Ospedale Civile "Giuseppe Mazzini"                         | Teramo         | Abruzzo      |
| Pandoli Giuliano  | Ospedale " Spirito Santo"                                  | Pescara        | Abruzzo      |
| Papalda Paola     | Istituto Nazionale Tumori Regina Elena I.R.C.C.S. - I.F.O. | Roma           | Lazio        |
| Parisi Anna Maria | Ospedale "S.Camillo-Forlanini"                             | Roma           | Lazio        |
| Passalacqua Rodolfo| Istituti Ospitalieri                                       | Cremona        | Lombardia    |
| Pellegrino Arianna| Ospedale "San Pietro"                                      | Roma           | Lazio        |
| Perrucci Bruno    | Istituti Ospitalieri                                       | Cremona        | Lombardia    |
| Proietti Emanuela | Ospedale "San Giovanni Calibita - Fatebenefratelli"        | Roma           | Lazio        |
| Recchia Francesco | Ospedale "SS. Nicola e Filippo"                            | Avezzano       | Abruzzo      |
| Riccardi Ferdinando| AORN "Cardarelli"                                           | Napoli         | Campania     |
| Rispoli Anna Iolanda | Azienda Ospedaliera Universitaria Careggi               | Firenze        | Toscana      |
| Rocca Andrea      | IRCCS-IRST                                                 | Meldola        | Emilia Romagna |
| Romaniello        | Presidi Ospedalieri Riuniti                                | Borgomanero    | Piemonte     |
| Rossetti Riccardo | Presidio Unificato AUSL 2                                  | Perugia        | Umbria       |
| Rossi David       | Ospedale "S. Salvatore"                                    | Pesaro         | Marche       |
| Rosti Giovanni    | Ospedale "San Maria di Cà Foncello"                        | Treviso        | Veneto       |
| Ruggeri Enzo Maria| Complesso Ospedaliero "Belcolle"                           | Viterbo        | Lazio        |
| Russo Antonio     | Azienda Ospedaliera Universitaria Policlinico "Paolo Giaccone" | Palermo   | Sicilia     |
| Savarino Antonino | Ospedale "Barone Lombardo"                                 | Canicatti      | Sicilia     |
| Savastano Clementina | Azienda Ospedaliera Universitaria "San Salerno"            | Salerno        | Campania     |
| Scognamiglio Giovanni | Ospedale Valduce | Como | Lombardia |
|----------------------|-----------------|------|-----------|
| Scognamiglio MariaTeresa | Ospedale”G. Barnabeo” | Ortona | Abruzzo |
| Seminara Patrizia | Azienda Policlinico Umberto I | Roma | Lazio |
| Serrachini Silvia | Azienda Ospedaliera "S. Maria degli Angeli" | Pordenone | Friuli Venezia Giulia |
| Sidoti Vincenzo | Ospedale Civile “Edoardo Agnelli” | Pinerolo | Piemonte |
| Silva Rosa Rita | Ospedale "Egles Profili” | Fabriano | Marche |
| Surace Giuseppe | Presidio Ospedaliero di Ostuni - Fasano - Cisternino | Ostuni | Puglia |
| Tomao Silverio | Ospedale "S. Maria Goretti" | Latina | Lazio |
| Tonini Giuseppe | Università Campus Biomedico | Roma | Lazio |
| Trenta Patrizia | Azienda Policlinico Umberto I | Roma | Lazio |
| Turazza Monica | Ospedale "Sacro Cuore - Don Calabria" | Negrar | Veneto |
| Valenza Roberto | Azienda Ospedaliera "Vittorio Emanuele” | Gela | Sicilia |
| Veltri Enzo | Presidio Ospedaliero Centro | Latina | Lazio |
| Zampa Germano | Ospedale "Regina Margherita" | Roma | Lazio |
| Zaniboni Alberto | Fondazione Poliambulanza - Istituto Ospedaliero | Brescia | Lombardia |
| Zanirato Sonia | AO Pavia - Ospedale Civile Vigevano | Pavia | Lombardia |