Quality of Training in Radiation Oncology in Germany

Results of a 2006 Survey

Robert Semrau[1], Katja Hansemann[2], Markus Adam[3], Nicolaus Andratschke[4], Thomas Brunner[5], Frank Heinzelmann[6], Guido Hildebrandt[7], Dirk Vordermark[8], Daniel Zips[9]

Purpose: To evaluate residents' satisfaction with their training in radiation oncology, the first nationwide survey was done in 2006. Results were presented at the 2006 annual meeting of the German Society of Radiation Oncology (DEGRO).
Material and Methods: A questionnaire with 39 questions regarding training in radiation oncology in Germany was developed and sent by e-mail. Questionnaires were returned by mail and analyzed anonymously.
Results: 96 questionnaires were received. A total of 88% of respondents are pleased with their decision of training in radiation oncology. Residents are strongly motivated by their interest in oncology. Quality of training is heterogeneous and not optimal. Training in three-dimensional treatment planning, radiochemotherapy and intracavitary brachytherapy is judged adequate, whereas special techniques such as intensity-modulated radiotherapy (IMRT) and permanent prostate implants are not covered by the majority of institutions. Organization of training in the departments is often judged insufficient.
Conclusion: Radiation oncology is attractive for young doctors. However, training quality for radiation oncologists in Germany was judged to be heterogeneous and needs to be optimized. For this, results of this survey may be helpful. The overall positive judgment may help to attract more students into the field of radiation oncology, an issue that becomes increasingly important given the shortage of doctors and the strong competition with other disciplines. Modern techniques, such as IMRT, need to be integrated into training programs in order to maintain the high standard of radiation oncology in Germany.

Key Words: Education · Training quality · Radiation oncology · Residents

Strahlenther Onkol 2008;184:239–44
DOI 10.1007/s00066-008-1821-7

Ausbildungsqualität zum Facharzt für Strahlentherapie in Deutschland. Ergebnisse einer Umfrage aus dem Jahr 2006

Ziel: Die Qualität der Facharztausbildung im Fach Strahlentherapie war Gegenstand einer Untersuchung, die die Projektgruppe „Junge Radioonkologie" anlässlich des Jahreskongresses der DEGRO 2006 vorgestellt hat.
Material und Methodik: Anhand eines Fragebogens mit 39 Fragen wurden die allgemeinen Rahmenbedingungen, Inhalte und Dauer der Weiterbildung in Deutschland analysiert. Dazu wurde ein Fragenkatalog entwickelt, der detailliert Organisation, Umfang und Bestandteile der Weiterbildung zusammentrug. Außerdem wurden Motivation und Zufriedenheit der Ausbildungsassistentinnen und -assistenten mit der erhaltenen Ausbildung erfasst. Ebenfalls ein Schwerpunkt war die Einbindung von Weiterbildungsassistentinnen und -assistenten in Forschung und Lehre an akademischen Ausbildungseinrichtungen. Der Fragebogen wurde per E-Mail verschickt und auf dem Postweg zurückgesandt. Die Auswertung erfolgte anonym.
Ergebnisse: 96 Fragebögen wurden zurückgesandt und ausgewertet. Die Entscheidung zur Ausbildung im Fach Strahlentherapie wird grundsätzlich von 88% Antwortenden positiv gesehen. Ein Interesse an Onkologie ist der hauptsächliche Beweggrund zur Facharztausbildung. Das Medizinstudium vermag wenig zugunsten der Strahlentherapie zu motivieren. Die Ausbildungsqualität wird unterschiedlich bewertet. Die Ausbildung in dreidimensionaler Bestrahlungsplanung bzw. Radiochemotherapie und intrakavitärer Brachytherapie wird als niveauvoll eingeschätzt, während spezielle Verfahren wie Seedimplantation und intensitätsmodu-

[1] Department of Radiation Oncology, University Hospital Cologne, Germany
[2] Strahlentherapie Bonn-Rhein-Sieg/Gemeinschaftspraxis Bonn, Troisdorf, Germany,
[3] Praxis für Strahlentherapie und Radioonkologie Weilheim, Germany,
[4] Department of Radiotherapy and Radiologic Oncology, Technical University of Munich, Germany,
[5] Radiation Oncology and Biology, University of Oxford, Churchill Hospital Headington, Oxford, UK,
[6] Department of Radiooncology, Radiologic Clinic, University Hospital Tuebingen, Germany,
[7] Department of Radiotherapy and Radiooncology, University Hospital Leipzig, Germany,
[8] Department of Radiotherapy, University Hospital Wuerzburg, Germany,
[9] Department of Radiotherapy and Radiooncology, University Hospital and Medical Faculty, Technical University of Dresden, Germany.

Received: October 9, 2007; accepted: February 11, 2008

lierte Strahlentherapie (IMRT) nur bei wenigen Umfrageteilnehmern adäquat vermittelt werden. Die Organisation der Ausbildung in den einzelnen Abteilungen ist erheblich optimierbar.

Schlussfolgerung: Vor dem Hintergrund steigender Konkurrenz der Fachdisziplinen und gleichzeitig sinkender Zahlen junger Ärztinnen und Ärzte bleibt die Facharztausbildung in Strahlentherapie konkurrenzfähig. Trotzdem müssen die Qualität und Organisation der Ausbildung vergleichbar und verbessert werden. Moderne Verfahren, wie IMRT, müssen breit in die Ausbildung junger Fachärztinnen und Fachärzte integriert werden, um das hohe Niveau der Strahlentherapie in Deutschland zu erhalten.

Schlüsselwörter: Ausbildung · Ausbildungsqualität · Strahlentherapie · AssistenzärztInnen, -ärzte

Introduction

A documentation of educational quality, demographics, career motivations and opportunities of current residents in radiation oncology is regularly undertaken in several countries but still missing in Germany. This data may be useful for scientific societies and policy-making bodies (such as the German Society of Radiation Oncology [DEGRO]) and for clinical department chairs to improve personnel policy and to attract prospective radiation oncologists.

To especially evaluate residents' satisfaction with their training in radiation oncology, the first nationwide survey was done in 2006 in preparation of the 2006 annual meeting of the DEGRO.

Material and Methods

A questionnaire with a total of 39 questions regarding content, quality, duration and organization of training in radiation oncology and general demographic data was developed (Figure 1). Questions concerning research activities of residents were included as well. There is no nationwide database of residents in radiation oncology in Germany.

The questionnaire was therefore distributed via e-mail to all DEGRO members and further distribution to all residents in the professional surroundings of the addressed persons was asked.

To reply, the completed questionnaire was returned by mail, collected and analyzed anonymously. No further mail or telephone contact was performed to encourage response.

Statistics were done using Microsoft Excel® and Microsoft Access® software.

Results

General Information and Demographics

A total of 96 questionnaires from the whole country were received and analyzed. Of these, 51% were from female and 49% from male residents. 18% of respondents were < 30 years, 43% were between 30 and 34 years old, 22% between 35 and 39 years, and 18% were ≥ 40 years. 52% of replying residents were members of DEGRO for an average of 3.7 years. 35% of respondents were in their 1st or 2nd year of training, 25% in the 3rd or 4th year, and 31% in the 5th or 6th year of training. 9% were in training for > 6 years. The majority was trained at university hospitals (71%), 23% at non-university hospitals, and only 5% in private practices. A substantial amount of residents had gained experiences in other clinical specialties before entering radiation oncology (i.e., 29% in hematology/medical oncology, 27% in radiology, 22% in other subspecialties of internal medicine).

Motivation for Training in Radiation Oncology

The majority was pleased with their decision of training in radiation oncology (88%). Residents were motivated by their interest in oncology, radiation biology, physics, and medical research. A big proportion (82%) had a strong interest in oncology (90% of female residents and 67% of male residents). 32% had a strong and 56% a moderate interest in radiation biology, 20% had a strong and 54% a moderate interest in physics. 68% of residents with a strong interest in physics were men. 34% had a strong and 49% a moderate interest in medical research. The motivation to become a resident in radiation oncology was not predominantly shaped by experiences during undergraduate medical education. 61% found that those experiences were only of minor or no importance at all. The possibility to work in private practice after finishing residency was only little or no motivation for 65% of respondents. The expectancy of a good quality of life during and after their residency was a quite firm reason for choosing radiation oncology training (Figure 2).

Content and Quality of Training

In Germany, a federal state, the curriculum for radiation oncology follows European guidelines, is comparable throughout the country and mutually recognized between the different states.

Only 12% of respondents thought that the content of the curriculum was completely covered by their training institution. For 59% this was the case with some exceptions, 29% of responding residents found the educational experience insufficient to fulfill the content of the curriculum. The experience with certain techniques and procedures is analyzed in Figure 3. The education level reached in three-dimensional treatment planning and radiochemotherapy was judged good. The best-trained brachytherapy procedure was the intracavitary technique, whereas the application of permanent prostate implants was only practiced by a small minority of responding residents (10% very or mostly adequate). Other interstitial brachytherapy techniques were present only in some educating institutions, 22% of respondents felt ade-

quately trained for this procedure. Intensity-modulated radiotherapy (IMRT) was not covered by the majority of residents (only 27% stated to be adequately trained during residency for IMRT techniques). Sufficient training in radiobiology was experienced only by 38% of respondents. Approximately half of the responding residents were adequately trained in stereotactic procedures, 53% had little or no radiosurgery experiences.

Organization of Training in the Department

56% of respondents missed a fixed and reliable long-term rotation plan in their department, 75% had no time schedule coordinating the different training sections, and for 71% there was no person responsible for residency training in the department. Nevertheless, about 54% were confident that constructive criticism was welcome and recommendations for better training organization were translated into action. 65% experienced regular lectures in oncology topics and for 81% the working day reserved fix points useful for learning and teaching (such as clinical visits and discussions of treatment plans).

Improvement of Educational Quality and Organization – the Residents' Opinion

Residents were asked for possible improvements of organization and quality of training (Figure 4). About 89% wished more time for self-study during workdays, 55% thought the DEGRO could improve their support for residents' issues, 79% stated that active participation in meetings etc. improved educational quality, 60% found that the training guidelines of the German Medical Council ("Bundesärztekammer") were useful and should form the basis of the institution's training process. Other recommendations by residents included a central educational curriculum organized by the DEGRO and a regular evaluation of educational quality of the institution according to nationwide standards.

Research and Academic Careers

79% of residents were interested in clinical and/or experimental research in radiation oncology. Only 41% found that they got institutional support and time for their research activities, despite the fact that almost three quarters of residents in this survey got trained at university hospitals.

Career Perspectives of Ongoing Radiation Oncologists

Asked for career perspectives after their residency, 74% of respondents saw themselves as employed physicians and only 18% planned to work in the private sector. 31% thought of an

General and demographic data

- Age, sex, year of training
- Department's staff (number of consultants, experienced doctors etc.)
- Training in university hospital, community hospital or private practice
- Member of the German Society of Radiation Oncology (DEGRO)?
- Resident's experience in medical specialties other than radiation oncology before specializing in radiation oncology
- Factors which contributed to the decision to start training in radiation oncology
  - Medical school, friends, work experience in oncology, interest in radiobiology or medical research, quality of life, expected income after training, option for an academic career, option to run a private practice after finishing training
- Resident's judgment on perspectives after completion of training
  - Private practice, academic career, employed doctor/consultant in hospitals, work abroad, different medical specialty

Resident's evaluation of the quality of training

- Binding rotational/educational plan for each resident
- Inpatient treatment carried out, experiences in chemotherapy
- Regular teaching sessions
- Support to visit DEGRO annual meetings and other scientific conferences with educational content
- Resident's own judgment of education level reached in HDR/LDR brachytherapy, radiochemotherapy, IMRT, 3-D treatment planning, stereotactic radiotherapy
- Sufficient time for self-study
- Average daily working hours, average nights on call per month
- Daily time spent for administrative work

Resident's suggestion on improving the quality of training

- Are suggestions for improvement of training quality in the department welcome?
- Resident's proposals how to improve quality of training
  - More consultants-led teaching in the department
  - More time for self-study
  - More active participation in scientific meetings
  - More guidance from DEGRO
  - Consequent use of the German Training Guideline

Duration of training

- Average time to complete training
- Length of contract of employment

Research and teaching activities

- Resident's interest in clinical or experimental medical research
- Regular research periods included in rotation plan
- Resident's inclusion in teaching programs for medical students

Figure 1. Detailed content of the questionnaire used in this study, 39 questions.

Abbildung 1. Detaillierter Inhalt des für die Studie entwickelten Fragebogens, insgesamt 39 Fragen.

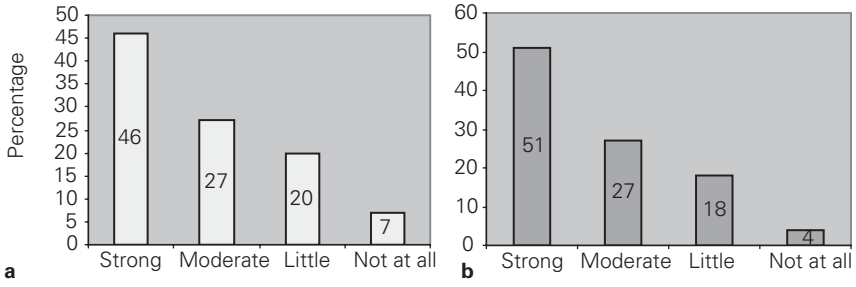
academic career, and 31% could imagine working abroad in the future. Only 16% wished to work in a different specialization. Two thirds oft residents had the perspective to continue working in their training institution.

General Working Condition

Residents had in average 9.2 working hours per day. 83% needed more than 1 h per day to do administrative procedures (DRG codes, letters to health insurances, etc.). There were on average 3.8 on-call nights per month.

Discussion

The situation of residents in radiation oncology in Germany has not yet been documented on the basis of a questionnaire. There are several reports on residents' education done in the USA [6–8, 12, 13] and Canada [16]. Training system and organization structures are very different in these countries making own results not easy to compare [10]. We conducted the first survey of training quality and career motivations in German residents of radiation oncology. The survey was mostly descriptive, comparative statistics were very limited because of small sample size. Direct information about the total number of residents in radiation oncology in Germany is not available. Taking the number of residents registered at the DEGRO office (not every resident in Germany is a DEGRO member) and the estimated number of residents encouraged to fill in the questionnaire by their colleagues into account, approximately 300 residents may have received the questionnaire.



Figures 2a and 2b. Answers to question 8 of the questionnaire: "How does expected quality of life during (a) and after (b) training influence resident's decision for training in radiation oncology?"

Abbildungen 2a und 2b. Antworten auf die Frage 8 des Fragebogens: „Welche Faktoren haben Ihre Entscheidung, die Ausbildung im Fach Strahlentherapie zu absolvieren, wie stark beeinflusst? Aussicht auf gute Lebensqualität während (a) und nach (b) der Ausbildung."

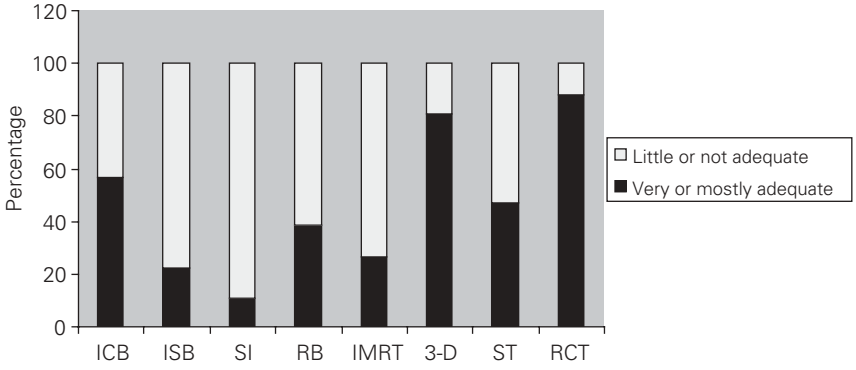


Figure 3. Residents' own judgment of experience gained during training with certain techniques and procedures; percentage of answers judged very/mostly or little/not adequate to fulfill German curriculum in radiation oncology. 3-D: three-dimensional treatment planning; ICB: intracavitary brachytherapy; IMRT: intensity-modulated radiotherapy; ISB: interstitial brachytherapy; RB: radiobiology; RCT: radiochemotherapy; SI: permanent prostate implant; ST: stereotactic radiosurgery.

Abbildung 3. Einschätzung der Ausbildungsqualität in bestimmten Verfahren durch die Ausbildungsassistenten: sehr gut/ausreichend bzw. gering/unzureichend, bezogen auf die gültige Weiterbildungsordnung. 3-D: dreidimensionale Bestrahlungsplanung; ICB: intrakavitäre Brachytherapie; IMRT: intensitätsmodulierte Strahlentherapie; ISB: interstitielle Brachytherapie; RB: Strahlenbiologie; RCT: Radiochemotherapie; SI: Seedimplantation der Prostata; ST: stereotaktische Radiochirurgie.

In 2002, a survey by Guttenberger & Witucki mainly focused on number of physicians per therapy unit and on workload of German radiation oncologists [5]. Doctors in training have not been analyzed separately. Thus, it remains unclear whether the 96 respondents are representative of the residents as a whole. This is a major limitation of our analysis and should be considered for future surveys.

However, the current survey collected basic demographic data that will be useful for further studies. To monitor changes in the residents' situation and to improve data quality, authors share the opinion that repeated surveys should be done every 2nd year. The future questionnaire should also be made available for completion at the DEGRO annual meeting to get more response, because many residents use this meeting for education purposes. Future surveys in Germany will open the possibilities to evaluate development progressively.

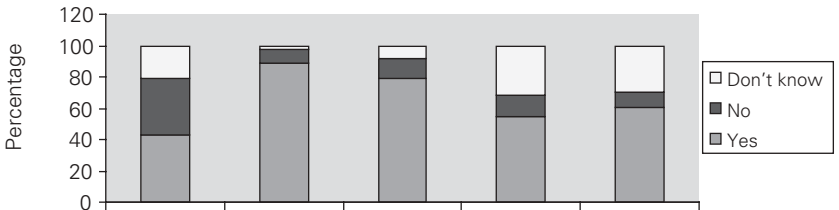
Career Perspectives

The German medical system runs out of qualified hospital doctors in almost any specialty due to working conditions and payment level not comparable to other European countries. Especially many training hospitals are underfunded and do not get reimbursement for their effort to educate medical specialists [14] which results in suboptimal training conditions for residents.

For many small disciplines such as radiation oncology it becomes increasingly difficult to recruit motivated and

committed graduates for resident programs which might, in the long run, endanger radiation oncology as a clinical and academic discipline. A key result of the presented survey is that an overwhelming majority of respondents seems content with their decision to get trained in radiation oncology. Besides clinical and research aspects, "soft criteria" such as working hours per day or expected quality of life are more and more important for medical graduates at the beginning of their training. Radiation oncology, from this point of view, is obviously a good choice – a fact that German medical students need to know.

Effective strategies by DEGRO to attract young doctors for training in radiation oncology will be very helpful. The DEGRO is asked to guide this process and to monitor improvements by regular surveys.



	More consultants	Self-study	Meetings	DEGRO support	Curriculum
Don't know	21	2	8	32	30
No	36	9	13	14	9
Yes	43	89	79	55	60

Figure 4. Residents' opinion what can improve individual quality of training. More consultants: can a higher number of consultants in the department improve training? Self-study: is more daily self-study during working hours necessary to improve quality? Meetings: is active participation in oncology meetings helpful? DEGRO support: is more support by the Radiation Oncology Society necessary? Curriculum: should the training guidelines of the German Medical Association be observed more strictly?

Abbildung 4. Verbesserungsmöglichkeiten der Weiterbildung nach Meinung der Auszubildenden. More consultants: durch größeres Verhältnis Facharztstellen/Assistenzarztstellen. Self-study: durch gesicherte Zeiten zu Ausbildungszwecken (Selbststudium, Seminare etc.) während der Arbeitszeit. Meetings: durch stärkere aktive Teilnahme an Konferenzen, Vorstellungen, Seminaren. DEGRO support: durch mehr Unterstützung durch die Fachgesellschaft (DEGRO). Curriculum: durch konsequente Umsetzung der neuen Weiterbildungsrichtlinie.

Content and Quality of Training

Despite the high level of satisfaction according to the results of this survey the quality of training in Germany is quite heterogeneous, and often does not match with the current DEGRO guidelines.

1. Respondents feel that there is a lack of training in new and special techniques. Only a minority of residents gets adequate training in IMRT, stereotactic techniques and other procedures such as interstitial brachytherapy. These techniques are integral components of modern radiation oncology and essential for high-quality patient care [1, 4, 9]. One possible explanation is the small number of training institutions which cover all these techniques at a high standard. According to this study it seems that the current training system is not able to qualify enough specialized radiation oncologists to fulfill future demands.

By contrast, training in more basic techniques (such as radiochemotherapy and three-dimensional treatment planning) is well covered by most training institutions.

2. Respondents feel that organization of training curriculum is not optimal. A majority of respondents complained about missing support by their departments (time schedules, reliable long-term rotation plans, etc.). Indeed, health-service authorities do not adequately fund education of residents. Therefore, teaching hospitals do not get extra money for their residents and employ them mainly for doing routine work. This is in contrast to other countries. For instance, the training of residents in the USA is much more regarded as an integral part of the duties of the department. Education of specialized doctors cannot be seen as a side effect of medical practice and needs to be recognized by hospital authorities [14].

Training in the department can be optimized very easily by appointing responsible training coordinators. So, a standardized training can be achieved using rotation plans and logbooks giving every resident the opportunity to know what she/he will learn in the department and how long this will take.

3. Respondents feel that supervision of national training guidelines helps to ensure training quality of residents. The DEGRO has launched and published training guidelines for radiation oncologists [3]. These guidelines include recommendations for content and organization of training which – according to this survey – are not fulfilled by all training institutions in Germany.

A major field of activity of the DEGRO is performance and quality assurance of therapy standards in Germany. Indeed, there are many nationwide or supraregional programs supervising treatment quality of various diseases [2, 11, 15]. The DEGRO as the leading organization for radiation oncologists in Germany should also take measures to encourage nationwide surveillance programs for residents' training.

Conclusion

This survey expresses assets and drawbacks of training in radiation oncology in Germany and provides basic data about training quality and career plans of residents and young radiation oncologists. The DEGRO as the organ of professionals in radiation oncology is asked to represent the group of young

radiation oncology doctors more carefully. Acquiring motivated and highly qualified specialists will be of growing and existential importance for the society and for cancer care in Germany.

References

1. Block T, Czempiel H, Zimmermann F. Transperineal permanent seed implantation of "low-risk" prostate cancer. 5-year-experiences in 118 patients. Strahlenther Onkol 2006;182:666–71.
2. Bolling T, Schuck A, Rube C, et al. [Therapy-associated late effects after irradiation of malignant diseases in childhood and adolescence. Feasibility analyses of a prospective multicenter register study.] Strahlenther Onkol 2006;182:443–9.
3. DEGRO. Leitlinie zur Weiterbildung zum Facharzt für Strahlentherapie. Berlin: DEGRO, 2006 (*http://www.degro.org/dav/html/download/pdf/Leitlinie_Weiterbildung.pdf*, accessed 09/2007).
4. Guckenberger M, Flentje M. Intensity-modulated radiotherapy (IMRT) of localized prostate cancer. A review and future perspectives. Strahlenther Onkol 2007;183:57–62.
5. Guttenberger R, Witucki G. [Analysis of the actual number of physicians in radiotherapy units in Germany.] Strahlenther Onkol 2002;178:688–700.
6. Jagsi R, Buck DA, Singh AK, et al. Results of the 2003 Association of Residents in Radiation Oncology (ARRO) surveys of residents and chief residents in the United States. Int J Radiat Oncol Biol Phys 2005;61:642–8.
7. Jagsi R, Chronowski GM, Buck DA, et al. Special report: results of the 2000–2002 Association of Residents in Radiation Oncology (ARRO) surveys. Int J Radiat Oncol Biol Phys 2004;59:313–8.
8. Ling SM, Flynn DF. Results of the 1993 association of residents in radiation oncology survey. Int J Radiat Oncol Biol Phys 1996;34:221–6.
9. Milker-Zabel S, Zabel-du Bois A, Huber P, et al. Fractionated stereotactic radiation therapy in the management of benign cavernous sinus meningiomas: long-term experience and review of the literature. Strahlenther Onkol 2006;182:635–40.
10. Muensterer OJ. Facharztweiterbildung: Vorbild Amerika. Dtsch Ärztebl 2006;103:2096.
11. Muller RP, Eich HT. The development of quality assurance programs for radiotherapy within the German Hodgkin Study Group (GHSG). Introduction, continuing work, and results of the radiotherapy reference panel. Strahlenther Onkol 2005;181:557–66.
12. Patel S, Jagsi R, Wilson J, et al. Results of the 2004 Association of Residents in Radiation Oncology (ARRO) Survey. Int J Radiat Oncol Biol Phys 2006;66:1199–203.
13. Schilling PJ, Wall TJ. Results of the 1992 association of residents in radiation oncology (ARRO) survey. Int J Radiat Oncol Biol Phys 1994;28:1267–70.
14. Van Aken H, Hiddemann W, Steinau HU. [Bad times for good medicine.] Frankfurter Allgemeine Zeitung 2007;113:8.
15. Vordermark D, Marold D, Wirth S, et al. Patterns of care in the radiotherapy of prostate cancer in Northern Bavaria 1998–2000. Strahlenther Onkol 2007;183:314–20.
16. Yee D, Fairchild A, Keyes M, et al. 2003 survey of Canadian radiation oncology residents. Int J Radiat Oncol Biol Phys 2005;62:526–34.

Address for Correspondence
Robert Semrau, MD
Department of Radiation Oncology
University of Cologne
50924 Köln
Germany
Phone (+49/221) 478-5449, Fax -6648
e-mail: Robert.Semrau@uk-koeln.de