

UNIVERSITA' DEGLI STUDI DI BRESCIA
Facoltà di Medicina e Chirurgia



L'impiego delle risorse tecnologiche ed umane: analisi ed ottimizzazione

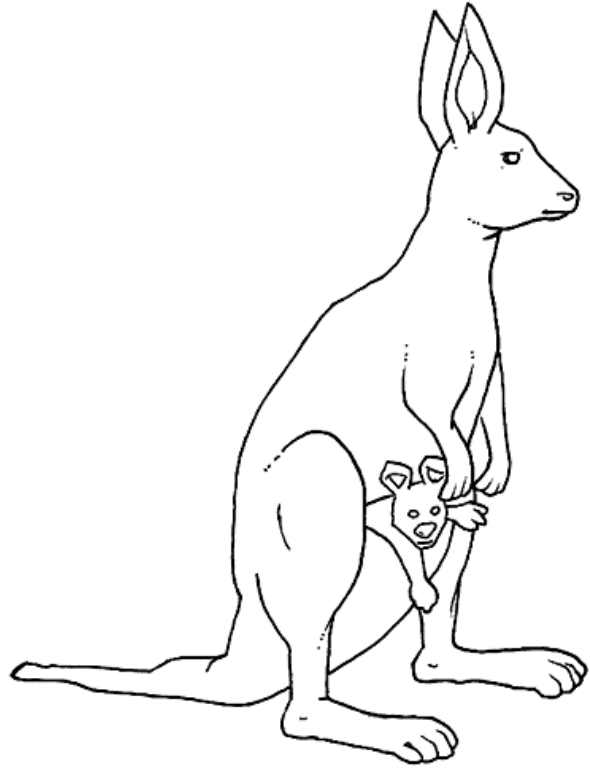
S. M. Magrini

Un ciclo virtuoso ...

- *Definire la natura e le dimensioni della domanda, chiarirne motivazione e obiettivi;*
- *Censire l'esistente*
- *Stabilire il fabbisogno, quantificare i costi*
- *Pianificare il razionale impiego delle risorse*
- *Verifica ex-post, riavvio del ciclo.*

In ambito radioterapico, motivazioni ed obiettivi sono chiari: il miglioramento della frazione dei pazienti guariti senza sequele.

Pertanto, la maggior parte dei lavori in questo ambito fonda l'analisi su dati epidemiologici per chiarire la natura e le dimensioni della domanda.



Una storia australiana ...



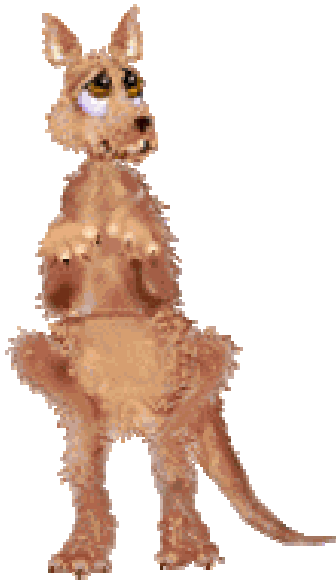
J Natl Cancer Inst (**2001**) 93 (20): 1516-1517.



Australian Report Urges Nationwide Radiation Therapy Plan

Issued as a strategic plan by the profession, the **report** flagged problems in waiting lists for radiation therapy, staff shortages, inattention to training, and a lack of planning and coordination at the federal and state level. An **“immediate crisis”** exists in the radiation therapy sector, charged the panel, recommending adoption of a national strategic plan to ensure a sustainable future.

The strategic plan was put together by the Royal Australian and New Zealand College of Radiologists, the Radiation Therapy Advisory Panel of the Australian Institute of Radiography, and the Australasian College of Physical Scientists and Engineers in Medicine. **Responding to the report, the government announced that it would launch an inquiry into the problems and act on that inquiry, frustrating the report’s authors.**



The government's new evidence inquiry will aim to develop a model to estimate the proportion of new cancer patients who should receive radiotherapy and brachytherapy at some time during their illness. The evidence-based panel, sponsored by the government's National Cancer Control Initiative, began its inquiry in March 2001, with a final report due in February 2003.



Leslie Peters



Liz Kenny

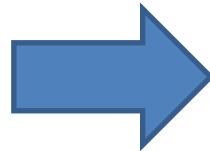


“We all know the problems. There is no argument. What we want is change, not more reports.”



“Whenever a new facility opens, it is immediately swamped,” said **Lester Peters**, M.D., chair of radiation oncology at Peter Mac Callum Cancer Institute in East Melbourne, who was not involved in the report. He attributed the **lack of adequate facilities** to the absence of a cohesive plan between federal and state government, **with inadequacy of resources extending to staffing and training.**

The 10,000-patient shortfall estimate hinges on a controversial assumption: a 50% to 55% national benchmark for patients with cancer getting radiation at some point in the course of their illness. About 38% of Australians with cancer are getting referred for radiation.



The 50% to 55% benchmark, which was suggested by the Australian Health Technology Advisory Committee in 1996 but questioned by the Australian government, approximates radiation use in many parts of the United States and other Western nations, said the report's authors and backers of the report. However, in these other nations—as in Australia—there is broad geographic variation in utilization, with uncertainty as to exactly what rate is best to ensure optimum outcomes.



In **June 2002**, the **Commonwealth's Radiation Oncology Inquiry**, which was chaired by Mr **Peter Baume**, reported that:

- **Only four-fifths of the patients** who should have received radiotherapy were receiving it;
- **Waiting times were too long;**
- There were **critical shortages of Radiation Oncologists, Radiation Therapists and Medical Physicists** to staff existing, let alone any new machines;
- ...

Baume, P. A vision for radiotherapy: report of the Radiation Oncology Inquiry. Commonwealth of Australia Department of Health and Aging: Canberra, 2002.



Un lieto fine ?

The Baume report precipitated substantial and rapid changes, although they were long overdue . Over the five year period after the report was handed down:

- **The number of radiotherapy units in regional and rural areas increased, including more single machine units.**
- **University places for radiation therapy students increased.**
- **The three radiotherapy professions (Radiation Oncologists, Radiation Therapists and Medical Physicists) developed CPD programmes.**
- **Funding has been provided by the Department of Health ... for Radiation Therapists and Medical Physicists to attend national and international conferences;**

Barton MB, Peters LJ, Kenny LM. Radiotherapy in Australia one year after the Baume report: vision or mirage? Med J Aust 2004; 180(2): 55-56

Rimane **difficile rispondere con esattezza** a **2 semplici interrogativi**, le cui risposte (“scientifiche”) hanno una evidente valenza (“politica”) e producono “*benchmarks*”:

1. Quanti pazienti/anno richiedono un trattamento radioterapico nella situazione data?

2. Di quanti professionisti (con le diverse competenze), **di quante e quali apparecchiature** vi è bisogno nella situazione data per raggiungere gli obiettivi prefissati?

Purtroppo, non dappertutto l'evoluzione storica è stata simile a quella “australiana” ... anche se gli strumenti di analisi si sono affinati.....



1. **Quanti pazienti/anno** richiedono un trattamento radioterapico nella situazione data?

Ci si deve basare sulla **incidenza delle neoplasie maligne (nuovi casi / 10^6 abitanti anno)**, possibilmente neoplasia per neoplasia, e quindi definire **quale % dei pazienti con quella data neoplasia necessitano di**

radioterapia nelle varie fasi della malattia; quanti di essi hanno bisogno di ritrattamenti. Da questo si ricava, sommando e “mediando” il dato per le varie patologie neoplastiche, il **n° tot / 10^6 ab. di ammalati che necessitano di radioterapia.**

E' ovvio che **queste stime sono soggette a variazioni** anche importanti, spesso **legate alla qualità dei dati piuttosto che a variazioni epidemiologiche.**

Incidenza neoplasie maligne / 10⁶ ab.:



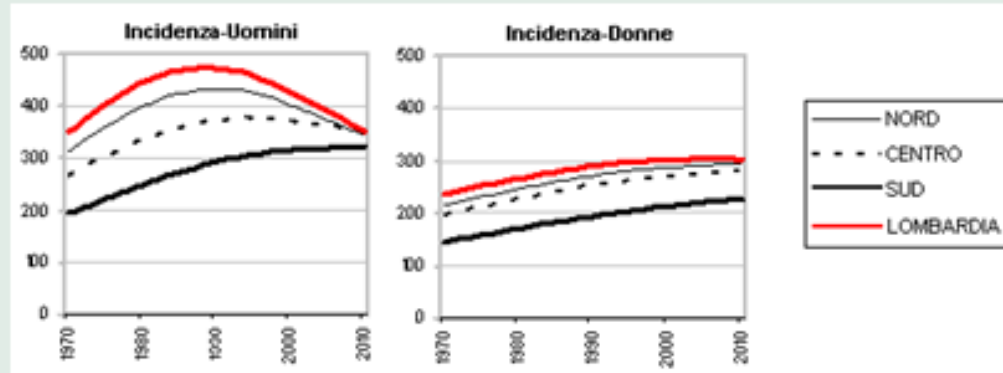
I Tumori in Lombardia

Tutti i tumori

A. Stime per la Lombardia

TREND DI INCIDENZA IN ITALIA E LOMBARDIA, Tutti i tumori.

Tassi standardizzati (std europeo) per 100.000, età 0-84.



Fonte: I Tumori in Italia, www.tumori.net

LOMBARDIA: Numero di nuovi casi, decessi e di casi prevalenti stimati per tutti i tumori. Donne. Età 0-84

| Anni | Incidenza N. nuovi casi | Mortalità N. decessi | Prevalenza N. persone con passato oncologico |
|------|----------------------------|-------------------------|---|
| 1990 | 38.000 | 23.400 | 175.700 |
| 2000 | 42.600 | 22.600 | 269.300 |
| 2005 | 45.400 | 22.600 | 328.000 |
| 2010 | 45.600 | 21.200 | 371.000 |

Fonte: I Tumori in Italia, www.tumori.net

B. Dati dai registri lombardi

Tasso di incidenza standardizzato (World Standard Population) per tutti i tumori. Tutte le età.

| Registro | Periodo | Tasso Std Maschi | Tasso Std Femmine |
|----------|-----------|---------------------|----------------------|
| Brescia | 1999-2001 | 399,5 | 280,6 |
| Milano | 1999-2002 | 345,4 | 258,2 |
| Sondrio | 1998-2002 | 399,8 | 262,6 |
| Varese | 1998-2000 | 375,2 | 253,6 |



CLINICAL INVESTIGATION

Prostate

**EVIDENCE-BASED ESTIMATE OF APPROPRIATE RADIOTHERAPY
UTILIZATION RATE FOR PROSTATE CANCER**

FARSHAD FOROUDI, M.B.B.S., F.R.A.N.Z.C.R.,* SCOTT TYLDESLEY, M.D., F.R.C.P.C.,†
LISA BARBERA, M.D., F.R.C.P.C.,* JENNY HUANG, M.D.,* AND
WILLIAM J. MACKILLOP, M.B., CH.B., F.R.C.P.C.*

*Division of Cancer Care and Epidemiology, Queen's Cancer Research Institute, Queen's University, Kingston Regional Cancer Centre

Results: It was estimated that **61.2%** of prostate cancer cases develop one or more indications for RT at some point in the course of the illness. The plausible range for this rate was 57.3%–69.8% on sensitivity analysis. Of all prostate cancer patients, 32.2% 3.8% should receive RT in their initial treatment and 29.0% 4.1% later for recurrence or progression. The proportion of cases that ever require RT is risk grouping dependent; 43.9% 2.2% in low-risk disease, 68.7% in intermediate-risk disease; and 79.0% in high-risk locoregional disease. For metastatic disease, the predicted rate was 66.4% 0.3%.

Estimating the Need for Radiotherapy for Patients With Prostate, Breast, and Lung Cancers: Verification of Model Estimates of Need With Radiotherapy Utilization Data From British Columbia

*International Journal of Radiation Oncology * Biology * Physics 79: 1507-15, 1 Apr 2011*

Methods and Materials

All cases of lung, breast, and prostate cancers in BC from **1997 to 2004** and **all patients** receiving **RT within 1 year (RT_{1Y}) and within 5 years (RT_{5Y}) of diagnosis** were identified. The RT_{1Y} and RT_{5Y} proportions in health regions with a cancer center for the most recent year were then calculated. RT rates were compared with CBB and EBEST estimates of RT needs. Variation was assessed by time and region.

Results

The RT_{1Y} in regions with a cancer center for lung, breast, and prostate cancers were 51%, 58%, and 33% compared with 45%, 57%, and 32% for C-EBEST and 41%, 61%, and 37% for CBB models. The RT_{5Y} rates in regions with a cancer center for lung, breast, and prostate cancers were 59%, 61%, and 40% compared with 61%, 66%, and 61% for C-EBEST and 75%, 83%, and 60% for A-EBEST models. The RT_{1Y} rates increased for breast and prostate cancers.



VOLUME 28 · NUMBER 35 · DECEMBER 10 2010

JOURNAL OF CLINICAL ONCOLOGY

ORIGINAL REPORT

The Future of Radiation Oncology in the United States From 2010 to 2020: Will Supply Keep Pace With Demand?

*Benjamin D. Smith, Bruce G. Haffty, Lynn D. Wilson, Grace L. Smith, Akshar N. Patel,
and Thomas A. Buchholz*

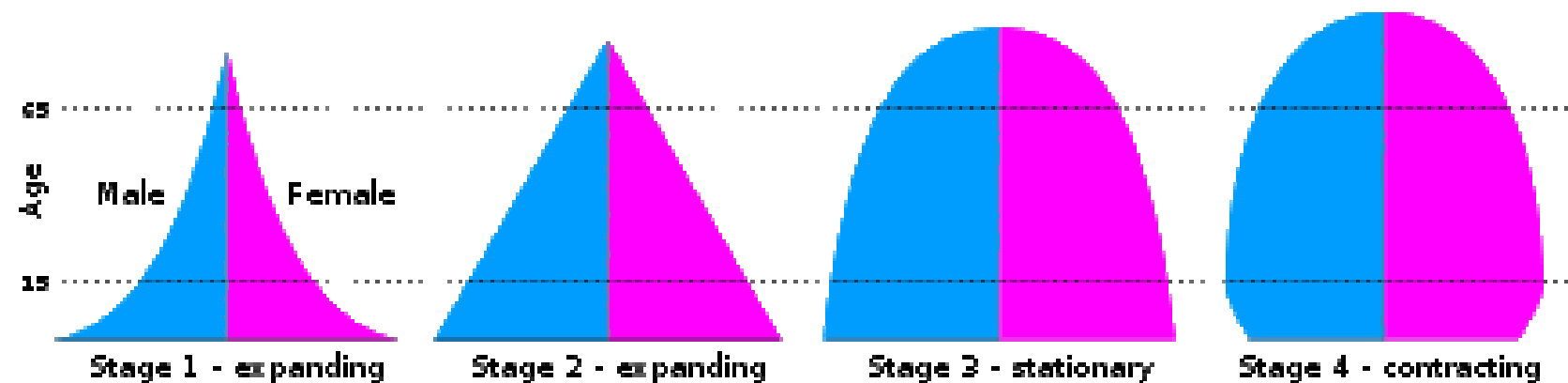
From The University of Texas M. D.
Anderson Cancer Center, Houston, TX;
Yale University School of Medicine,
New Haven, CT; and Cancer Institute of
New Jersey, New Brunswick, NJ.

Submitted June 28, 2010; accepted
August 23, 2010; published online
ahead of print at www.jco.org on

A B S T R A C T

Purpose

Prior studies forecasted an incipient shortage of medical oncologists as a result of the aging US population, but the radiation oncology workforce has not been studied. Accordingly, we projected demand for radiation therapy and supply of radiation oncologists in 2010 and 2020 to determine whether a similar shortage may exist for this specialty.



Methods

Demand for radiation therapy in 2010 and 2020 was estimated by multiplying current radiation utilization rates (as calculated with Surveillance, Epidemiology, and End Results data) by population projections from the Census Bureau. Supply of radiation oncologists was projected using data from the American Board of Radiology inclusive of current radiation oncologists and active residents, accounting for variation in full-time equivalent status and expected survival by age and sex.

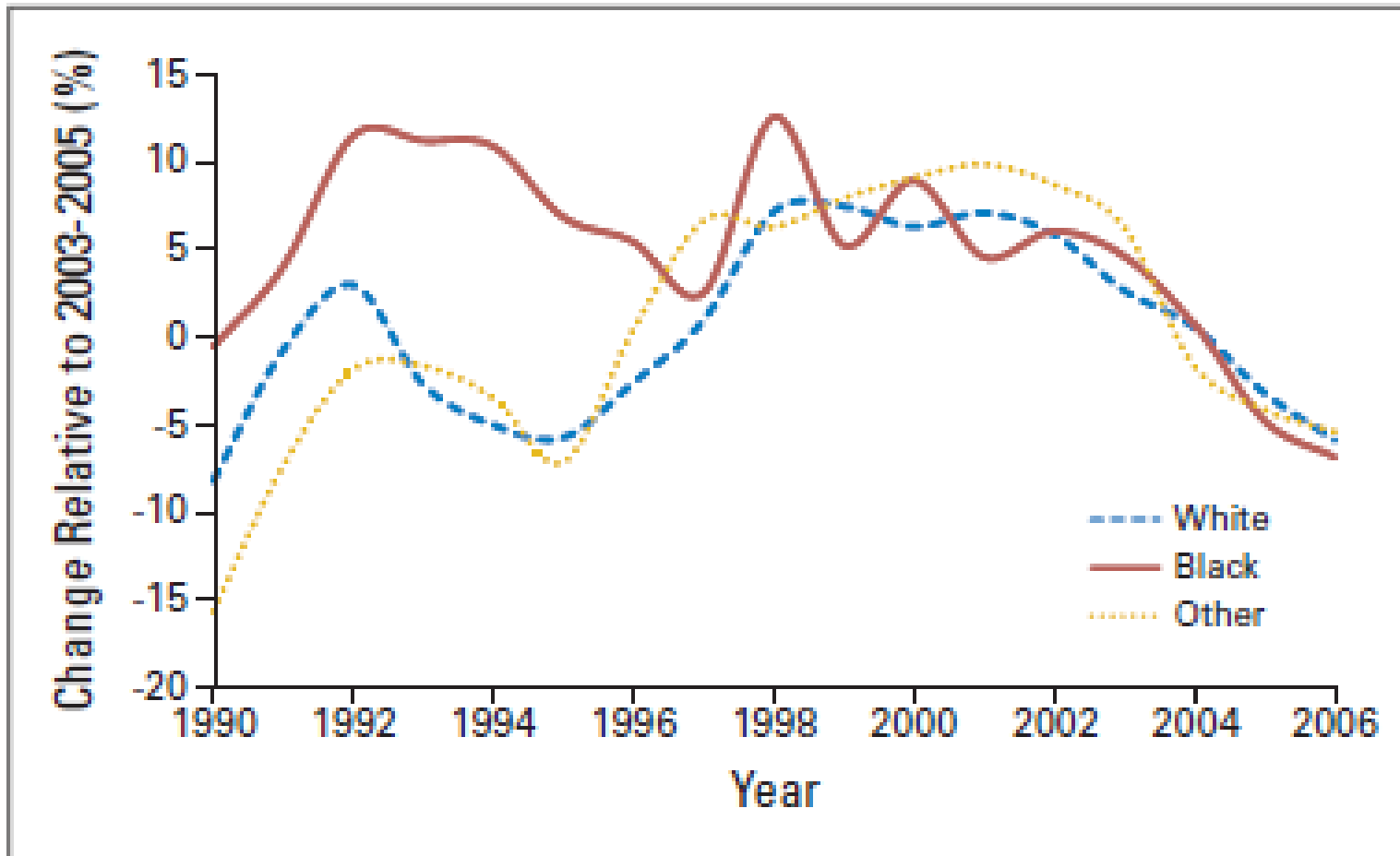


Fig 1. Age-adjusted use of radiation therapy from 1990 to 2006, by race, normalized to 2003 to 2005.

Table 1. Projected Estimates of Patients Receiving Radiation Therapy in 2010 and 2020

| Tumor Site | No. of Patients Receiving Radiation Therapy | | % Increase in Demand for Radiation Therapy From 2010 to 2020 |
|-------------------------|---|---------|--|
| | 2010 | 2020 | |
| Total | 470,000 | 575,000 | 22 |
| Breast (invasive) | 103,000 | 119,000 | 15 |
| Prostate | 91,000 | 123,000 | 35 |
| Lung | 77,000 | 96,000 | 25 |
| Oral cavity and pharynx | 21,000 | 25,000 | 18 |
| Breast (in situ) | 20,000 | 23,000 | 15 |
| Colorectum | 19,000 | 23,000 | 22 |
| Esophagus | 19,000 | 23,000 | 22 |
| Thyroid | 15,000 | 16,000 | 10 |
| CNS | 12,000 | 14,000 | 16 |
| Non-Hodgkin's lymphoma | 11,000 | 13,000 | 18 |
| Uterus | 11,000 | 13,000 | 22 |
| Larynx | 9,300 | 12,000 | 24 |
| Cervix | 7,000 | 8,100 | 16 |
| Pancreas | 6,000 | 7,500 | 25 |
| Stomach | 5,300 | 6,800 | 27 |
| Myeloma | 4,700 | 5,800 | 25 |
| Bladder | 3,200 | 3,900 | 24 |
| Hodgkin's lymphoma | 3,200 | 3,300 | 6 |
| Testis | 3,000 | 3,000 | 2 |
| Kidney | 2,500 | 3,100 | 21 |
| Melanoma | 1,500 | 1,800 | 17 |
| Leukemia | 1,400 | 1,600 | 11 |
| Liver | 920 | 1,200 | 26 |
| Ovary | 380 | 440 | 16 |
| All other sites | 24,000 | 29,000 | 19 |

2. Di quanti professionisti (con le diverse competenze), **di quante e quali apparecchiature** vi è bisogno nella situazione data per raggiungere gli obiettivi prefissati?

Table 5. Sensitivity of Projected Total FTE Radiation Oncologists in 2020 to Variation in Residency Class Size and Sex Composition

| Size of Residency Classes in 2014-2019 (No. of residents) | % of Women in Residency Classes in 2014-2019 | Projected Total No. of FTE Radiation Oncologists in 2020 | % Increase in Supply Compared With 2010 |
|---|--|--|---|
| 140 | 35 | 4,022 | 2 |
| 160 | 35 | 4,134 | 5 |
| 180 | 35 | 4,259 | 8 |
| 200 | 35 | 4,359 | 11 |
| 250 | 35 | 4,640 | 18 |
| 280 | 35 | 4,820 | 22 |
| 300 | 35 | 4,921 | 25 |
| 140 | 50 | 4,004 | 2 |
| 160 | 50 | 4,114 | 4 |
| 180 | 50 | 4,224 | 7 |
| 200 | 50 | 4,334 | 10 |
| 250 | 50 | 4,609 | 17 |
| 280 | 50 | 4,791 | 22 |
| 300 | 50 | 4,883 | 24 |

Abbreviation: FTE, full-time equivalent.

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- *Verifica ex-post, riavvio del ciclo.*



Cultural and economic background, health services organization in the European countries are very different. This is true also for our specialty: radiation oncology.



Dirac (not updated) data - Western Europe

5 ml

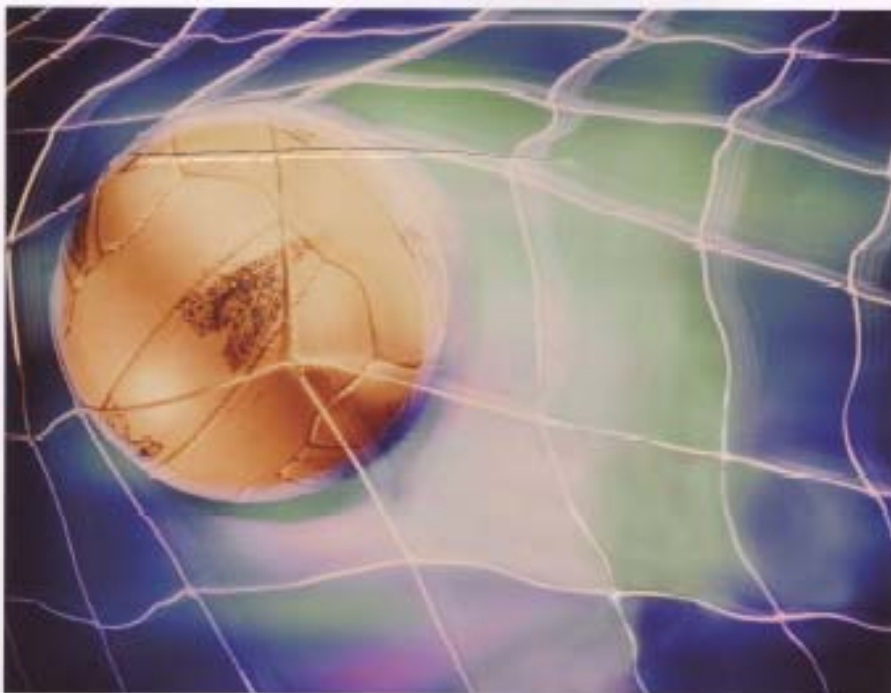
 10 ml


 60 ml

| Country | RT Centres | Clinical Accel. | Co60 | CT | Simul. | TPS | LDR Manual | LDR Remote | HDR Ir192 | HDR Co60 | Rad. Onc. | Med. Phys. | Rad. Tech. |
|---------------------|------------|-----------------|------------|------------|------------|------------|------------|------------|------------|-----------|-------------|-------------|-------------|
| Austria | 13 | 39 | 1 | 8 | 11 | 27 | | 1 | 12 | | 119 | 49 | 190 |
| Belgium | 25 | 55 | 11 | 5 | 11 | 28 | 20 | 4 | 6 | | 65 | 44 | 157 |
| Denmark | 6 | 49 | 1 | 6 | 6 | 6 | 1 | 1 | 3 | 1 | 74 | 56 | 177 |
| Finland | 12 | 39 | | 12 | 10 | 17 | | 1 | 6 | | 40 | 31 | 144 |
| France | 207 | 363 | 97 | 31 | 160 | 32 | 185 | 2 | 24 | 1 | 598 | 286 | 256 |
| Germany | 219 | 417 | 34 | 186 | 206 | 360 | | 2 | 23 | 5 | 835 | 626 | 1356 |
| Greece | 28 | 36 | 11 | 24 | 18 | 26 | | 1 | 8 | | 124 | 64 | 174 |
| Iceland | 1 | 2 | | 1 | 1 | | | | 1 | | 3 | 2 | 4 |
| Italy | 151 | 299 | 54 | 90 | 103 | 124 | 23 | 19 | 7 | 1 | 839 | 392 | 1093 |
| Luxembourg | 1 | 3 | | 1 | 1 | 4 | | | 1 | | 4 | 2 | 14 |
| Malta | 1 | 1 | 1 | 2 | | 4 | | | | | 2 | 3 | 8 |
| Monaco | 1 | | | | | | | | | | | | |
| Netherlands | 21 | 115 | | 20 | 20 | 36 | 8 | 12 | 14 | | 183 | 79 | 881 |
| Norway | 9 | 37 | 1 | 9 | 9 | 13 | | | 4 | 1 | 145 | 48 | 263 |
| Portugal | 12 | 24 | 7 | 8 | 12 | 18 | 1 | 2 | 6 | | 76 | 36 | 189 |
| Republic of Ireland | 10 | 25 | 1 | 7 | 5 | 10 | | | 5 | | 29 | 33 | 45 |
| Spain | 107 | 124 | 79 | 34 | 21 | 42 | 45 | 14 | 16 | | 248 | 108 | 395 |
| Sweden | 18 | 73 | | 6 | 16 | 17 | 3 | 9 | 6 | | 63 | 68 | 316 |
| Switzerland | 26 | 39 | 14 | 8 | 6 | 7 | | 3 | 9 | | 34 | 22 | 54 |
| United Kingdom | 71 | 267 | 23 | 13 | 15 | 29 | 20 | 3 | 16 | 1 | 153 | 131 | 187 |
| Total | 939 | 2007 | 335 | 471 | 631 | 800 | 306 | 74 | 167 | 10 | 3634 | 2080 | 5903 |

Interventi in campo oncologico

una rete per la vita



Dati 2004-2005

Pubblicato 2006



Tabella A.5

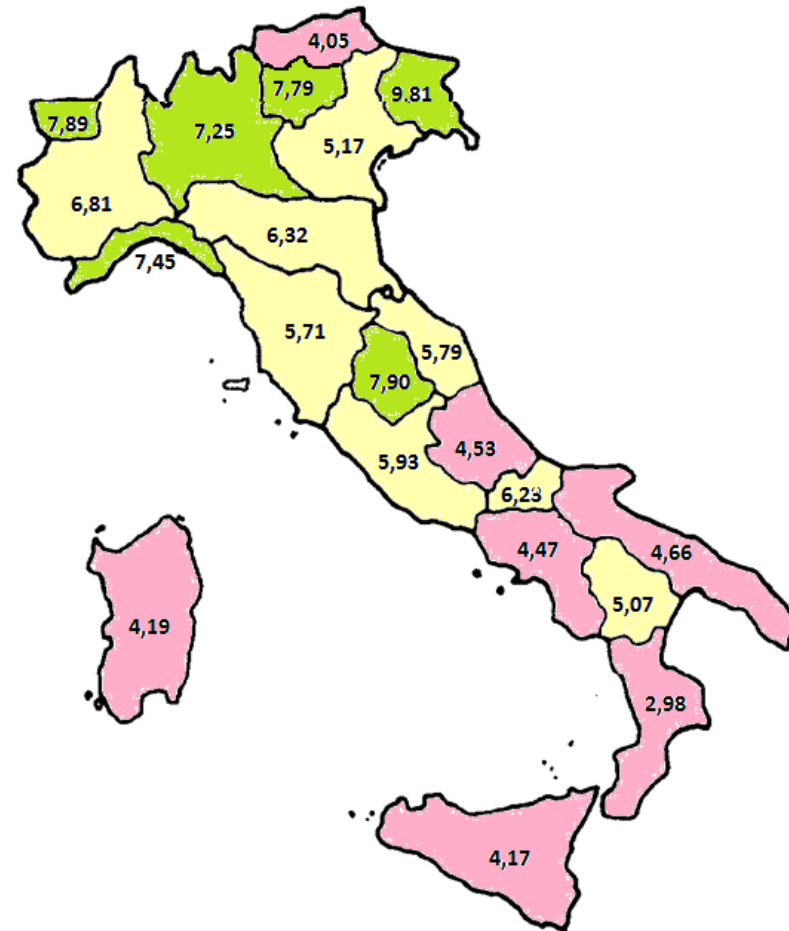
| Centro | Caratteristiche unità operativa | | | Dotazione per radioterapia con fasci esterni | | | | | | | | | |
|---|---------------------------------|----------------------|-----------|--|-----------------------|----------------------|------------------------|------------------------------|-----------------|---------------------|------------------------|------------------------|----------------------|
| | Pubblica | Degenza/ n. letti | N. Medici | N. TCT/ anno | N. AL el/ anno | N. AL no el/ anno | collimat. Multileaf | collimat. micro multileaf | potenz. IMRT | TC dedicata | N. simulat/ anno | TPS 2D/ anno | TPS 3D/ anno |
| Spedal Riuniti - Bergamo | SI | No | 8 | 1/1978 | 3/1990, 1992, 1996 | No | No | No | No | accesso a tc | 1/1996 | | SI, 1999 |
| Brescia Istituto del Radio | SI | SI/40 | 13 | 1/1990 | 3/1992 2002, 2002 | 1/1982 | SI | No | SI | SI | 2/1992, 1997 | | |
| Brescia S. Anna | No | No | 1 | no | 1/1994 | No | No | No | No | No | 1/1994 | Target serie 2 1994 | |
| AO S. Anna - Como | SI | SI/10 | 8 | no | 3/1990, 1998, 2002 | No | SI | No | SI | accesso a tc | 1/1990 | | S, 1997 2002 |
| Istituti Ospedalieri - Cremona | SI | SI/23 | 5 | No | 2/2002, 1998 | 1/1999 | SI | No | No | accesso a tc | 1/1991 | | SI, 1998 |
| Lecco Ospedale A. Manzoni | SI | No | 4 | no | 1/2000 | 1/2000 | SI | SI | SI | SI | 1/2000 | | SI, 2000-01 |
| Mantova AO C. Poma - Mantova | SI | No | 3 | no | 1/1995 | No | No | No | No | SI | 1/1995 | Plato 1995 | SI, 1998 |
| AO S. Gerardo - Monza | SI | Tempor. chiusa | 4 | no | 1/1994 | 1/1997 | No | No | No | SI | 1/1992 | | SI 1996 |
| IRCCS Policlinico S. Matteo - Pavia | SI | No | 7 | 1/1985 | 1/2002 | 1/1999 | SI | No | No | No, accesso a tc | 1/2002 | | SI |
| S. Donato Milanese Osp. Clinicizzato | No | No | 2 | no | 1/989 | No | No | No | No | accesso a tc | 1/1989 | | SI |
| Sondrio Ospedale | SI | No | 3 | no | 1/1993 | 1/2000 | No | No | No | accesso a tc | 1/1995 | | SI, 1995 |
| AO di Circolo - Varese | SI | SI/12 | 12 | No | 2/1992, 1998 | 1/1993 | SI | No | No | SI | 1/1996, Sim Tc 2001 | | S, 1994, '98,2000 |
| Milano Ist. Europeo di Oncologia | No | SI/Dipartim. | 7 | No | 2/1996 | 1/2000 | SI | SI | SI | SI | 1/1995 | | SI, 1998, 1998 |
| Milano Ist. Nazionale Tumori | SI | SI/12 | 18 | 1/1985 | 2/1992, 2002 | 2/1985, 1993 | SI | SI | SI | SI | 2/2002 | 2/1996 | SI, 2000 |
| Milano Ospedale Niguarda | SI | SI/12 | 9 | No | 3/1989, 1992, 2001 | 1/2001 | No | No | No | accesso a tc | 2/1994, 2001 | | SI 1999, 2001 |
| Milano S. Pio X | No | No | 4 | No | 1 | 1 | No | No | No | accesso a tc | SI | | SI |
| Milano S. Raffaele | No | SI | 13 | No | 1/1988 | 2/1988 | No | No | No | accesso a tc | 1/1988 | | SI |
| Pavia Fondazione Maugeri | No | ? | 3 | No | 1/2002 | 1/1998 | SI | No | SI | accesso a tc | 1/1998 | | SI |
| "Milano S. Ambrogio" | No | No | 3 | No | No | 1/1990 | No | No | No | accesso a tc | No | | SI 2001 |
| "Monza Nuovo Policlinico" | No | No | 4 | No | No | 1/2002 | SI | SI | SI | SI | ? | | SI, 2002 |
| "Milano Besta" | SI | No | 2 | No | No | 1/1991 | No | SI | SI | SI | SI | | SI |
| Busto A. | SI | No | 4 | No | 1/1996 | No | No | No | No | accesso a tc | No | | SI |
| Castellanza | No | No | 1 | No | 1/2002 | No | SI | No | SI | accesso a tc | No | | SI |

(segue)

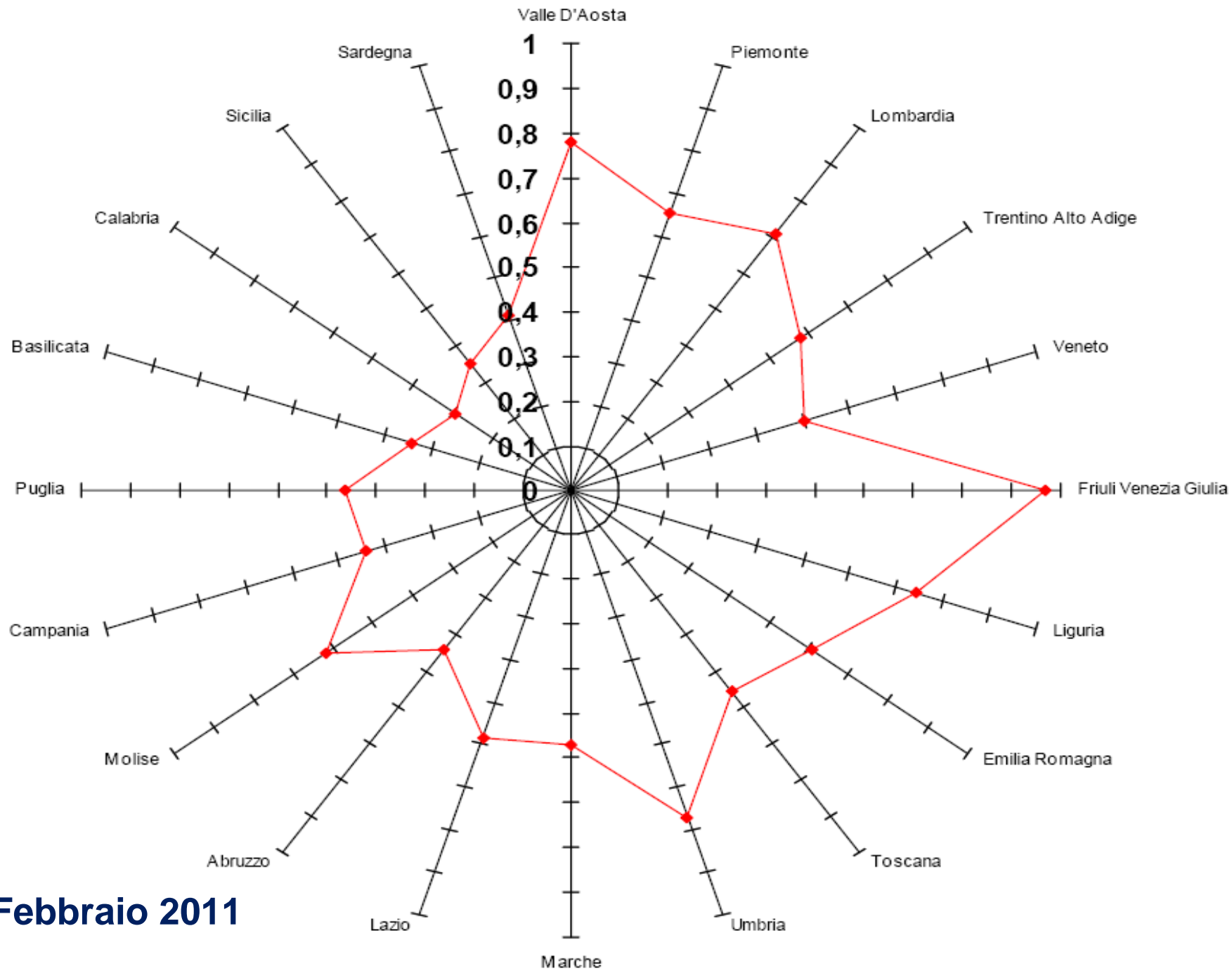
Censimento AIRO N° acceleratori/1 milione ab.

- Troppe sono ancora le differenze tra le varie regioni con situazioni inveterate, soprattutto al Sud, che limitano fortemente l'accesso dei pazienti alla radioterapia

Dotazione di Acceleratori Lineari (Linac)



Con meno di 5 Linac Tra 5 e 7 Linac Con più di 7 Linac
per milione di abitanti



Febbraio 2011

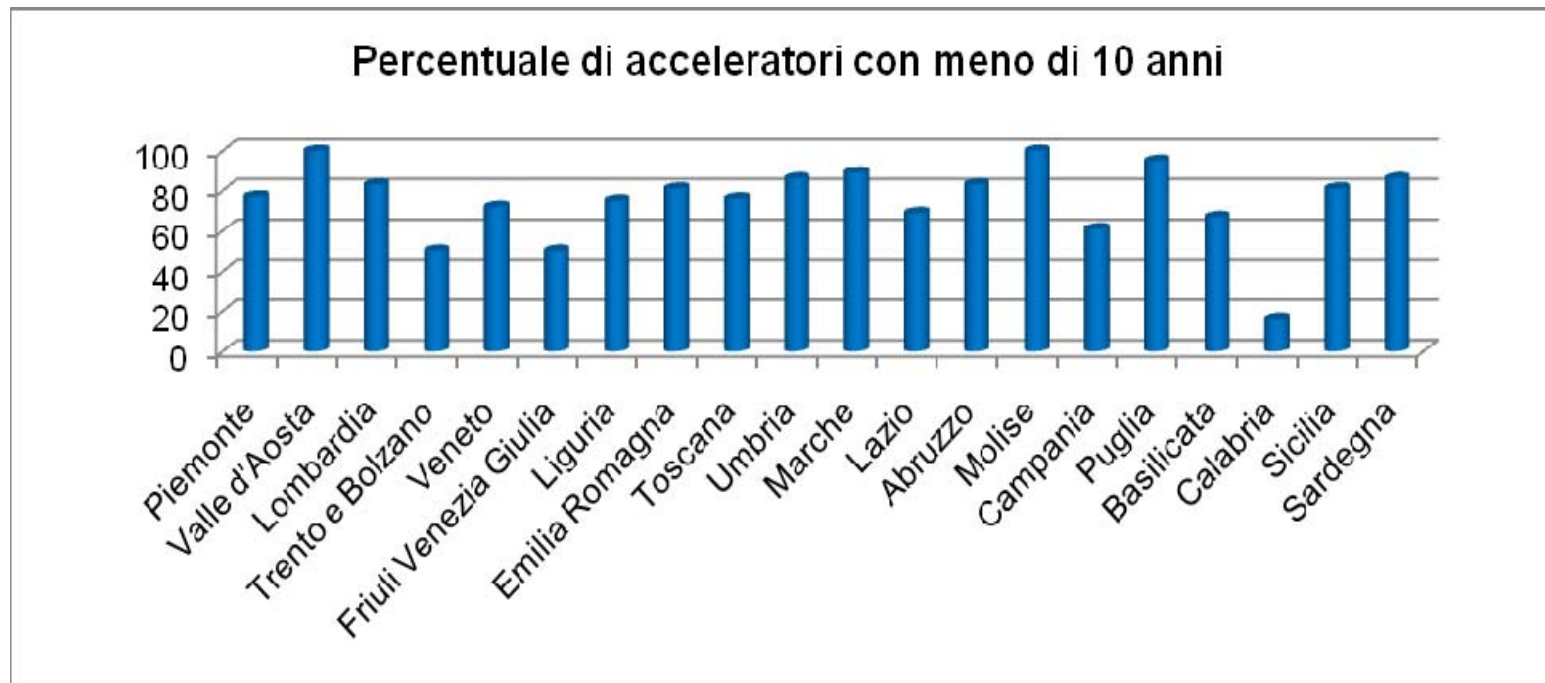
Obsolescenza ? La “187” e il radioterapista oncologo



London's Royal Marsden Hospital bids farewell (2005) to its first SL25 linac, which had been state-of-the-art when it started service 20 years ago. The machine was pensioned off this June as part of a major revamp of the UK's radiotherapy services

Censimento AIRO - Vetustà apparecchiature

Anche se la percentuale di “nuovi” acceleratori si attesta globalmente al 75%, non tutti sono in grado di erogare trattamenti sofisticati quali:
IMRT, Stereotassi, IGRT

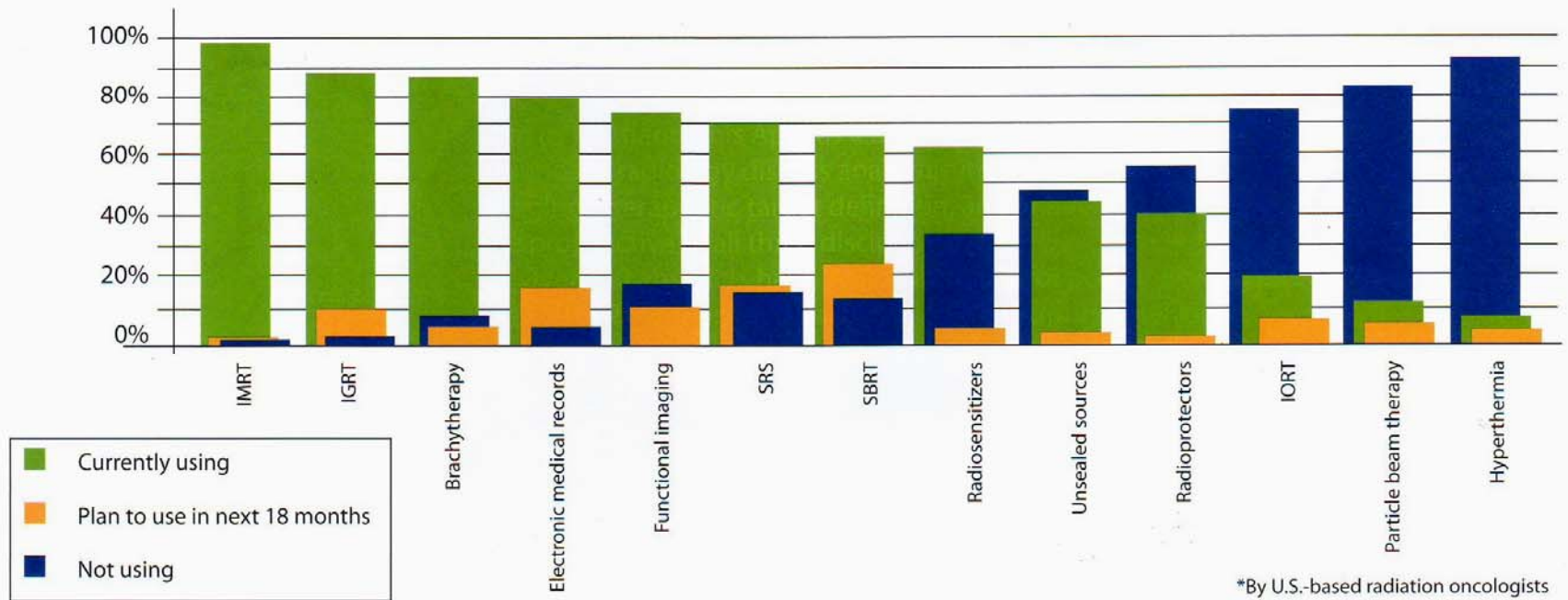


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- *Pianificare il razionale impiego delle risorse*
- *Verifica ex-post, riavvio del ciclo.*

Member survey | continued from Page 21

CHART 3: Modes of therapy currently used*



TECNICHE SPECIALI

**finalizzate all'incremento della dose al tumore
associate (?) a maggiore risparmio dei tessuti sani
limitrofi ad esso**

- **Radioterapia con modulazione di intensità (IMRT intensity modulated radiation therapy)**
- **stereotassi**
- **IORT (radioterapia intraoperatoria)**
- **utilizzo particelle ad alto LET : adroni (protoni, ioni di elio e carbonio)**
- **Radioterapia immagine guidata e adaptive radiotherapy (IGRT Image guided radiotherapy)**
- **Brachiterapia**

Da 182 a 208 negli ultimi due anni

Censimento 2008

| | | | | | |
|--------------------|----|----|----|----|----|
| Stereo encefalo | 30 | 16 | 20 | 66 | 73 |
| Stereo testa-collo | 20 | 13 | 18 | 51 | 60 |
| Stereo body | 23 | 20 | 22 | 65 | 75 |

FEBBRAIO 2011

Apparecchiature dedicate

Cyberknife da 4 a 4

Gammaknife da 3 a 4

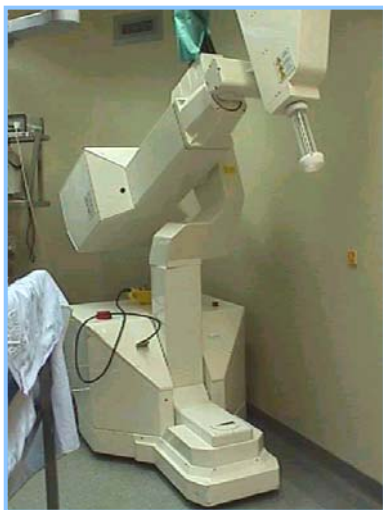
“IMRT elicoidale” da 8 a 11

Censimento 2008

**FEBBRAIO
2011**

33

| | | | | |
|-------------|-----------|-----------|----------|-----------|
| IORT | 13 | 10 | 3 | 26 |
|-------------|-----------|-----------|----------|-----------|



**Mammella
Pancreas
Stomaco
Retto
Ginecologia
Sarcomi**

| | | | | | |
|----------------------|-----------|-----------|-----------|-----------|-----------|
| BRACHITERAPIA | 54 | 14 | 19 | 87 | 76 |
|----------------------|-----------|-----------|-----------|-----------|-----------|

FORTI RACCOMANDAZIONI

- Le nuove tecnologie richiedono un nuovo approccio verso gli organi critici
- Importanza di
 - Prevenzione
 - Identificazione
 - Classificazione
 - Trattamento
- Richiedono inoltre
 - Che le Società scientifiche producano documenti di appropriatezza sul loro impiego nelle diverse situazioni cliniche





UPDATE OF THE ESTRO CORE CURRICULUM FOR RADIATION ONCOLOGISTS



The Future of Radiation Oncology: The Evolution, Diversification, and Survival of the Specialty

Anthony Zietman, MD

If the radiation oncologists become simply the guardians of a single therapeutic modality they may find that time marches by; and, while the techniques will live on, the speciality may not

diversify, and thrive.

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Strategies for Change: The Survival of Radiation Oncology as a Specialty

“... the radiation oncologist must overcome his/her current aversion to any form of medical therapy and rapidly embrace and co-own the new biological strategies that enhance the action of radiation. This means diversifying the portfolio.”

Un ciclo virtuoso ...

- *Definire la natura e le dimensioni della domanda, chiarirne motivazione e obiettivi;*
- *Censire l'esistente ?*
- *Stabilire il fabbisogno, quantificare i costi*
- ***Pianificare il razionale impiego delle risorse***
- *Verifica ex-post, riavvio del ciclo.*

Censimento AIRO - Necessità Radioterapia Italiana

- **Adeguamento del numero totale di LINAC e loro distribuzione sul territorio nazionale**
- **Sostituzione dei LINAC più vecchi (>10 aa)**
- **Aggiornamento dei LINAC più recenti perché siano in grado di erogare trattamenti sofisticati**



In Italia vi sono **trenta** Scuole di Specializzazione in Radioterapia, organizzate e **gestite dalle Università, finanziate dal SSN** attraverso le Regioni; sono **assegnabili 98 contratti/anno** (negli ultimi anni) , che vengono effettivamente siglati nella maggioranza dei casi. Data la quasi totale assenza di *drop out* , questo è anche il numero approssimativo di diplomati / anno.

Rete formativa che si basa ampiamente sulle strutture del SSN.

Ammissione per **esame realizzato su base locale con modalità univoche definite a livello nazionale.** Graduatorie locali per l'ammissione.

| Learning Outcomes | Knowledge | Skills/Expertise |
|---|--|---|
| 21. Able to assess and manage patients undergoing external beam radiotherapy and brachytherapy | Understands early reactions to radiotherapy and their management | Able to assess and treat patients in an on-treatment clinic |
| 22. Be able to modify course of radiotherapy treatment for individual patients according to severity of reactions including adjustment for gaps in treatment | Understands the radiobiology associated with curative radiotherapy | Able to modify course of radiotherapy treatment for individual patients |
| 23 Be able to assess patients for combined modality therapy | Understands the circumstances in which this might be considered | Able to elicit the patient's wishes with regard to the aims of treatment Able to discuss the side effects and risk/benefit ratio with patients |
| 24 Able to administer and take clinical responsibility for the delivery of radiation therapy together with systemic agents (and where necessary to work in collaboration with other medical specialists involved in systemic therapies) on an in- or out-patient basis | Understand the implications of systemic treatments | Able to modulate the treatment with drugs and radiation according to the patient situation - if needed, in collaboration with other specialists |

Censimento AIRO

Incremento della richiesta/personale medico

- **La dotazione di personale, soprattutto medico e tecnico, è stimata essere in netta diminuzione rispetto alla domanda**
- **È previsto un incremento della richiesta di trattamenti radioterapici nei prossimi 10 anni del 20% circa**
- **Se a questo prevedibile aumento della domanda non corrisponderà un adeguamento anche del personale medico e tecnico, oltre che della dotazione tecnologica, sarà difficile offrire trattamenti adeguati dal punto di vista qualitativo in relazione al carico di pazienti.**

In conclusione, è prevedibile un **aumento del fabbisogno di oncologi radioterapisti che devono assumere la responsabilità di trattamenti integrati e di dotazioni tecnologiche moderne. Il fabbisogno formativo crescerà probabilmente almeno del 10% nei prossimi 10 anni e presuppone un profondo rinnovamento delle Scuole di Specializzazione in Radioterapia.**

La disciplina è ad un bivio anche dal punto di vista culturale e gli **strumenti programmatori** possono giovare di dati scientificamente consolidati, epidemiologici e clinici, più che di complessi calcoli econometrici.

Il rapporto con l'Autorità Sanitaria è complesso, specie in una realtà "povera" di risorse. **Le Società scientifiche hanno responsabilità crescenti nella definizione di criteri di appropriatezza, senza sudditanze psicologiche nei confronti delle amministrazioni e degli altri specialisti.**