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**Lessons learned from brachytherapy
education in Italy**

IEO
Arc Advanced Radiotherapy Center



Associazione Italiana
Radioterapia e Oncologia clinica



Conflict of Interest Disclosure

- I have no conflicts of interest to disclose.



Introduction

- Over the past decades, BT has been facing a progressive decline in Italy
- The cause of this decline is multifactorial:
 - logistical challenges
 - advanced high-tech EBRT techniques
 - lower reimbursement
 - insufficient training of radiation oncology residents



Scientific Letter

Brachytherapy Training Survey of Radiation Oncology Residents

Samuel R. Marcrom, MD,^{*} Jenna M. Kahn, MD,¹ Lauren E. Colbert, MD,¹ Christopher M. Freese, MD,³ Kaleigh N. Doke, MD,² Joanna C. Yang, MD,⁴ Catheryn M. Yashar, MD,² Michael Luu, MPH,^{**} and Mitchell Kamrava, MD^{**}

Review > Bull Cancer. 2019 Jun;106(6):584-589. doi: 10.1016/j.bulcan.2019.03.017.

Epub 2019 May 10.

[Brachytherapy: When needs overtake care offer]

[Article in French]

Sophie Espenel¹, Elaine Limkin², Max-Adrien Garcia³, Julien Langrand-Escure⁴, Alexis Vallard⁴, Cyrus Chargari², Nicolas Magné⁵

Review > Semin Radiat Oncol. 2020 Jan;30(1):87-93. doi: 10.1016/j.semradonc.2019.08.007.

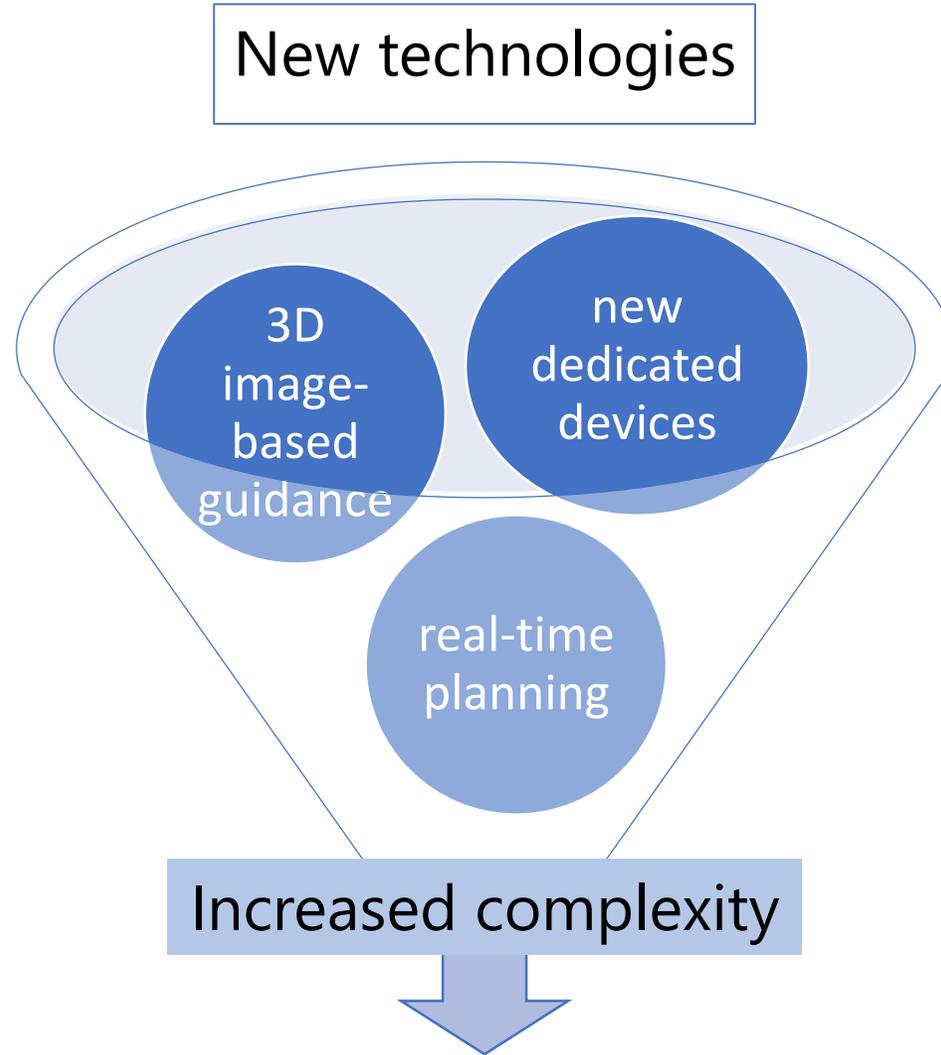
The Cost-Effectiveness and Value Proposition of Brachytherapy

Charles C Vu¹, Maha S Jawad¹, Daniel J Krauss²



Introduction

Renewed interest...



Specific training & advanced technical skills



The AIRO “Trilogy” project



A programmatic path to:

- identify causes of decline
- promote knowledge

The work flow

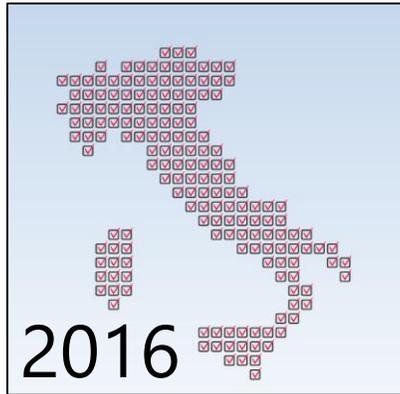
Step 1: Survey on “clinical state of the art”

Step 2: Survey on “educational state of the art”

Step 3: Discussion and strategy identification



Step 1: Survey on clinical "state of the art"



A national survey of AIRO (Italian Association of Radiation Oncology) brachytherapy (Interventional Radiotherapy) study group

Rosa Autorino, MD, PhD¹, Lisa Vicenzi, MD², Luca Tagliaferri, MD, PhD¹, Carlo Soatti, MD³, Prof. Gyeorgy Kovacs, MD, PhD⁴, Cynthia Aristei, MD⁵

J Contemp Brachytherapy 2018; 10, 3: 254-259



Equipment
Resources
Procedures

- number and model of BT units
- treatment planning systems
- personnel engaged in BT
- number of patients treated with BT



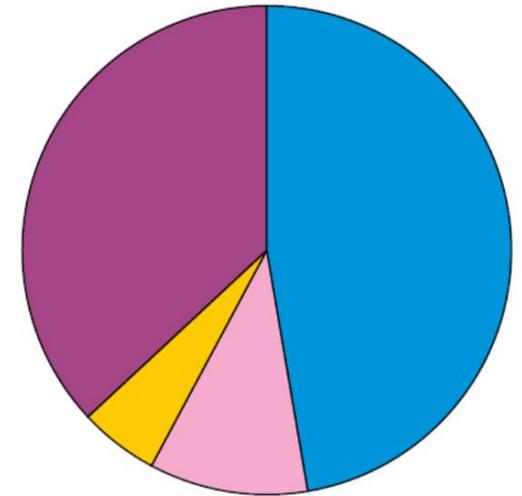
Step 1: Survey on clinical "state of the art"

197 radiation oncology centres

66 (33%) replied to the questionnaire

43/66 responding centres were equipped with BT devices

Number of treatments/ year : median 271 (5-1,013)

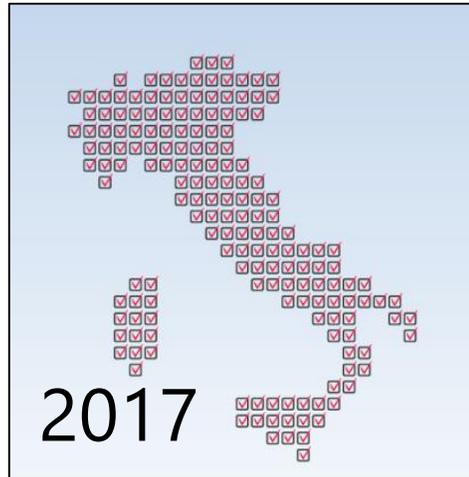


> 50% of centres did not deliver BT treatments because of lack of skilled personnel

- ➔ Lack of personnel (47%)
- ➔ Lack of expertise (11%)
- ➔ Need to update equipment (5%)
- ➔ CPSTS/TIME consuming (7%)
- ➔ Not specified (30%)



Step 2: Survey on educational "state of the art"



Current state of interventional radiotherapy (brachytherapy) education in Italy: results of the INTERACTS survey

Luca Tagliaferri, MD, PhD¹, György Kovács, MD, PhD², Cynthia Aristei, MD³, Vitaliana De Sanctis, MD⁴, Fernando Barbera, MD⁵, Alessio Giuseppe Morganti, MD⁶, Calogero Casà, MD⁷, Bradley Rumwell Pieters, MD, PhD⁸, Elvio Russi, MD⁹, Lorenzo Livi, MD¹⁰, Renzo Corvò, MD¹¹, Andrea Giovagnoni, MD¹², Umberto Ricardi, MD¹³, Vincenzo Valentini, MD^{14,15}, Stefano Maria Magrini, MD¹⁶ and the Directors of the Italian Radiation Oncology Schools**

J Contemp Brachytherapy 2019, 11, 1: 48-53

Schools' Directors

- Who teach your students?
- How do you teach your students?
- How do you rate students?



Step 2: Survey on educational “state of the art”

Wide heterogeneity in the learning activities available

- theoretical knowledge is homogeneously transmitted
- the types of practice varies significantly among different schools



Step 3: Discussion and strategy identification

Original paper

J Contemp Brachytherapy 2020, 12, 1: 1-6
DOI: <https://doi.org/10.5114/jcb.2020.92765>

Can brachytherapy be properly considered in the clinical practice? Trilogy project: The vision of the AIRO (Italian Association of Radiotherapy and Clinical Oncology) Interventional Radiotherapy study group

Luca Tagliaferri, MD, PhD¹, Andrea Vavassori, MD², Valentina Lancellotta, MD¹, Vitaliana De Sanctis, MD³, Fernando Barbera, MD⁴, Vincenzo Fusco, MD⁵, Cristiana Vidali, MD⁶, Bruno Fionda, MD¹, Giuseppe Colloca, MD¹, Maria Antonietta Gambacorta, MD, PhD^{1,7}, Cynthia Aristei, MD⁸, Renzo Corvò, MD⁹, Stefano Maria Magrini, MD⁴



Specific strategic interventions in the field of :

1. Clinical practice
2. Education
3. Research
4. Communication



"Clinical practice"

Domain	Issues	AIRO defined strategy
Clinical practice	Inadequate evidence about the role of BT in national clinical guidelines	Inclusion of representatives of IRT study group within the committees for the discussion of national guidelines Inclusion of IRT study group members in the AGENAS working group for national PDTA Series of systematic reviews and scientific papers Promoting synergies with other scientific societies

IORT

RAPPORTI ISTISAN 21|10

ISSN: 1123-3117 (cartaceo) • 2384-8936 (online)

Assicurazione di qualità nella radioterapia intraoperatoria

Aggiornamento del Rapporto ISTISAN 03/1

S. Andreoli, A. Ciabattoni, C. De Angelis, M.C. Leonardi, L. Menegotti, M. Pimpinella, A. Rosi

ENDOMETRIUM

J Contemp Brachytherapy 2020, 12, 1:1-6
DOI: <https://doi.org/10.5114/jcb.2020.92698>

Review paper

The role of vaginal brachytherapy in stage I endometrial serous cancer: a systematic review

Valentina Lancellotta, MD¹, Francesca De Felice, MD, PhD², Lisa Vicenzi, MD, PhD³, Alfredo Antonacci, MD⁴, Valentina Carboneschi, MD⁵, Sara Costantini, MD⁶, Daniela di Cristina, MD⁶, Luca Tagliaferri, MD, PhD¹, Annamaria Geriotta, MD⁷, Andrea Vavassori, MD⁸, Sergio Giubauda, MD⁹, Alessandro Colombo, MD¹⁰, Francesco Lucà, MD¹, Raffaele Barbaia, MD², Monica Mangoni, MD, PhD³, Francesco Marampon, MD, PhD², Daniela Musio, MD², Filippo Bellati, MD, PhD⁴, Francesco Torcia, MD⁴, Vincenzo Tombolini, MD², Mattia Falchetto Osti, MD⁵, Vitaliana De Sanctis, MD⁵

SARCOMA

J Contemp Brachytherapy 2020, 12, 4: 397-404
DOI: <https://doi.org/10.5114/jcb.2020.98120>

Review paper

INTERACTS (INTERventional Radiotherapy Active Teaching School) consensus conference on sarcoma interventional radiotherapy (brachytherapy) endorsed by AIRO (Italian Association of Radiotherapy and Clinical Oncology)

Luca Tagliaferri, MD, PhD¹, Andrea Vavassori, MD², Valentina Lancellotta, MD¹, Vitaliana De Sanctis, MD³, Cristiano Vidali, MD⁴, Calogero Cozzà, MD⁵, Cynthia Aristei, MD⁶, Domenico Genovesi, MD⁷, Barbara Alkja Jereczek-Fossa, MD^{8,9}, Alessio Giuseppe Moriganti, MD⁹, György Kovács, MD, PhD⁵, Jose Luis Guinot, MD¹⁰, Agata Rzemielak, MD, PhD¹, Daniela Grieto, MD², Maria Antonietta Gambacorta, MD, PhD¹¹, Vincenzo Valentini, MD¹², Vittorio Donato, MD¹³, Renzo Corvo, MD¹⁴, Stefano Maria Magrini, MD¹⁵, Lorenzo Livi, MD² and Consensus Conference Board*

ESOPHAGUS

European Review for Medical and Pharmacological Sciences | 2020; 24: 7589-7597

The role of interventional radiotherapy (brachytherapy) in stage I esophageal cancer: an AIRO (Italian Association of Radiotherapy and Clinical Oncology) systematic review

V. LANCELLOTTA¹, F. CELLINI¹, B. FIONDA¹, V. DE SANCTIS², C. VIDALI³, V. FUSCO⁴, F. FRASSINE⁵, D. TOMASINI⁶, A. VAVASSORI⁸, M.A. GAMBACORTA^{1,7}, P. FRANCO⁹, D. GENOVESI¹⁰, R. CORVÒ¹⁰, L. TAGLIAFERRI¹

COVID-19

Radiotherapy and Oncology 149 (2020) 73-77

COVID-19 Rapid Letter

Practical indications for management of patients candidate to Interventional and Intraoperative Radiotherapy (Brachytherapy, IORT) during COVID-19 pandemic – A document endorsed by AIRO (Italian Association of Radiotherapy and Clinical Oncology) Interventional Radiotherapy Working Group*

Andrea Vavassori⁸, Luca Tagliaferri^{1,2,3,4}, Lisa Vicenzi⁵, Andrea D'Aviero⁶, Antonella Ciabattoni⁶, Sergio Giubauda⁷, Loredana Lapadula⁸, Gian Carlo Mattiucci^{1,4}, Lorenzo Vinante¹¹, Vitaliana De Sanctis¹, Cristiana Vidali¹, Rita Murri^{4,8}, Maria Antonietta Gambacorta^{1,4}, Marcello Mignogna¹, Barbara A. Jereczek-Fossa^{8,9}, Vittorio Donato⁹

“Education”

Domain	Issues	AIRO defined strategy
Education	Need for an adequate training (especially in residency programs)	Consensus conference promotion Training meeting promotion University Master promotion

MIOLive Webinar 01/2021 (Nurses & Technologists)

- Interventional Oncology & Covid
- Interventional Oncology & Psicologia



Interventional Oncology

- Multidisciplinary
- Quality Assurance



Associazione Italiana
Radioterapia e Oncologia clinica

CME Courses



SAPIENZA
UNIVERSITÀ DI ROMA

Master Gynaecological BT



Interventional Radiotherapy
INTERACTS
Active Teaching School



ROME INTER-MEETING



“Research”

Domain	Issues	AIRO defined strategy
Research	Difficulties in creating a network to gather strong evidence	Support to the COBRA project born in the framework of the GEC-ESTRO for a wide international research database

SKIN-COBRA (Consortium for Brachytherapy data Analysis) ontology: The first step towards interdisciplinary standardized data collection for personalized oncology in skin cancer

Valentina Lancellotta, MD¹, José Luis Guinot, MD², Bruno Fionda, MD¹, Agata Rembielak, MD, PhD^{3,4}, Alessandro Di Stefani, MD^{5,6}, Stefano Gentileschi, MD^{6,7}, Francesco Federico, MD^{6,8}, Ernesto Rossi, MD⁹, Benjamin Guix, MD¹⁰, Artur Jan Chyrek, MD¹¹, Arenas Meritxell, MD, PhD^{12,13}, Silvia Rodríguez Villalba, MD¹⁴, Giuseppe Ferdinando Colloca, MD¹, Nicola Dinapoli, MD, PhD¹, Carlotta Masciocchi, PhD¹, Jacopo Lenkowitz, PhD¹, Nicola Dino Capocchiano, PhD¹, Andrea Damiani, PhD¹, Vincenzo Valentini, MD^{1,6}, György Kovács, MD, PhD^{15,16}, Luca Tagliaferri, MD, PhD¹

J Contemp Brachytherapy 2020; 12, 2: 105-110



ENT COBRA ONTOLOGY: the covariates classification system proposed by the Head & Neck and Skin GEC-ESTRO Working Group for interdisciplinary standardized data collection in head and neck patient cohorts treated with interventional radiotherapy (brachytherapy)

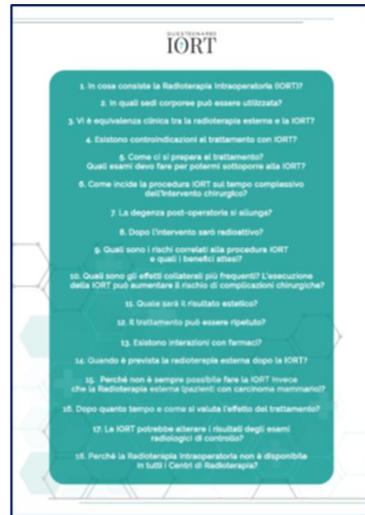
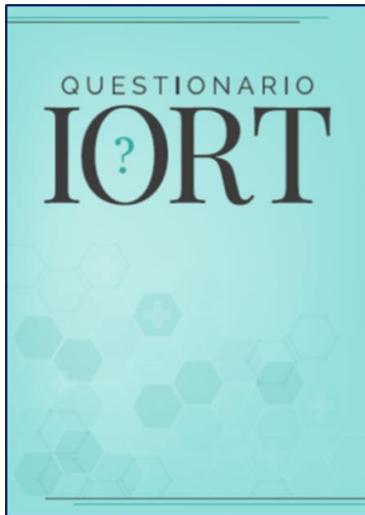
Luca Tagliaferri, MD, PhD¹, Ashwini Budrukhar, MD², Jacopo Lenkowitz, MD³, Mauricio Cambeiro, MD⁴, Francesco Bussu, MD⁵, José Luis Guinot, MD⁶, Guido Hildebrandt, MD⁷, Bengt Johansson, MD⁸, Jens E. Meyer, MD⁹, Peter Niehoff, MD¹⁰, Angeles Rovirosa, MD¹¹, Zoltán Takácsi-Nagy, MD¹², Luca Boldrini, MD³, Nicola Dinapoli, MD¹, Vito Lanzotti¹, Andrea Damiani³, Roberto Gatta¹, Bruno Fionda, MD¹, Valentina Lancellotta, MD¹³, Tamer Soror, MD¹⁴, Rafael Martínez Monge, MD⁴, Prof. Vincenzo Valentini, MD³, Prof. György Kovács, MD, PhD¹⁴

J Contemp Brachytherapy 2018; 10, 3: 260-266

“Communication”

Domain	Issues	AIRO defined strategy
Communication	Difficulties in communication with other specialists, patients, and also institutional representatives	Development of specific printed or web-based booklets for patients The term “interventional radiotherapy” was introduced in the name of the study group and in routine clinical practice

- Booklet



The term “**interventional radiotherapy**” was introduced to better explains the effective operational aspects of the technique



A snapshot of Italian Radiation Oncology Schools

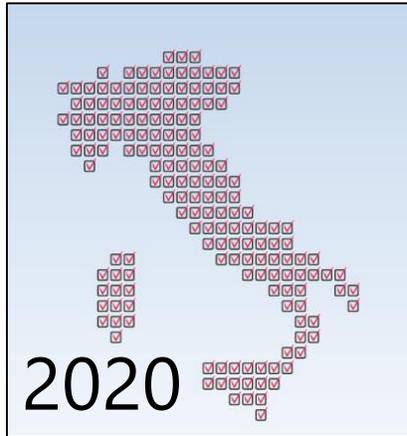


In 2021 the number of available places is been increased
(Recovery and Resilience Plan)

<i>Radioterapia</i>				
N°	Università	Contratti coperti con fondi statali 2020-2021 (13.200)	Contratti coperti con fondi del PNRR 2020-2021 (4.200)	Totale Contratti 2020-2021 coperti con fondi statali e del PNRR (17.400)
1	BOLOGNA	5	3	8
2	BRESCIA	4	3	7
3	CAMPANIA - "L. VANVITELLI"	5	3	8
4	Cattolica del Sacro Cuore	6	4	10
5	FIRENZE	7	5	12
6	GENOVA	3	2	5
7	HUMANITAS University	1	1	2
8	L'AQUILA	3	2	5
9	MESSINA	6	4	10
10	MILANO	7	5	12
11	MILANO-BICOCCA	7	5	12
12	MODENA e REGGIO EMILIA	2	2	4
13	NAPOLI "Federico II"	7	5	12
14	PADOVA	7	5	12
15	PAVIA	1	1	2
16	PERUGIA	3	2	5
17	PIEMONTE ORIENTALE	2	2	4
18	PISA	4	3	7
19	ROMA "Sapienza" Fac. F-M/M-O	5	3	8
20	ROMA "Sapienza" Fac. F-M-P	4	3	7
21	ROMA "Tor Vergata"	3	2	5
22	SIENA	2	2	4
23	TORINO	8	4	12
24	Univ. "Campus Bio-Medico" di ROMA	3	2	5
	TOTALE	105	73	178



"Technologists... what else?"



The role of Radiation Therapy Technologist (RTT) in Interventional Radiotherapy (brachytherapy) in Italy: an Italian Association of Radiotherapy and Clinical Oncology (AIRO) - Italian Association of Radiation Therapy and Medical Physics Technologists (AITRO) joint project.

Patrizia Cornacchione¹, Luca Tagliaferri¹, Andrea D'Aviero¹ (Corresponding), Antonella Ciabattoni², Carmela Galdieri³, Vitaliana De Sanctis⁴, Francesco Fellin⁵, Sergio Gribaudo⁶, Daniele Lambertini⁷, Maria Antonietta Gambacorta^{1,8}, Barbara Alicja Jereczek-Fossa^{9,10}, Vittorio Donato¹¹, Andrea Vavassori¹⁰.

Section 1: Basic information about the hospital

Section 2: Role of RTT in IRT units

Section 3: Background information on IRT team and type of work

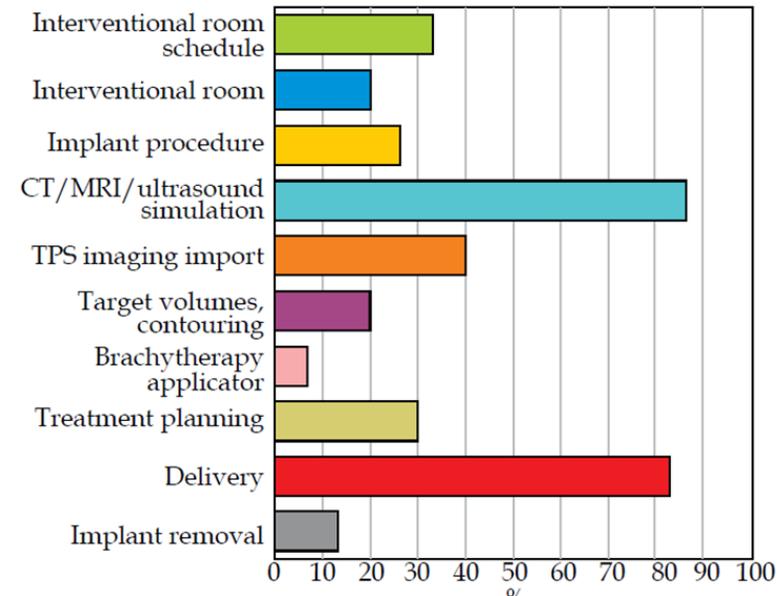


"Technologists... what else?"

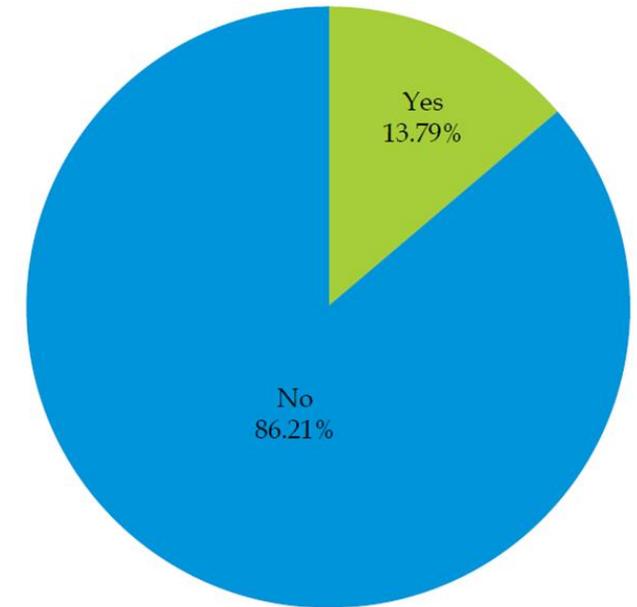
Do you perform interventional radiotherapy treatments (brachytherapy) in your radiotherapy department?



In which phases of IRT treatments (brachytherapy) is RTT active participation expected?



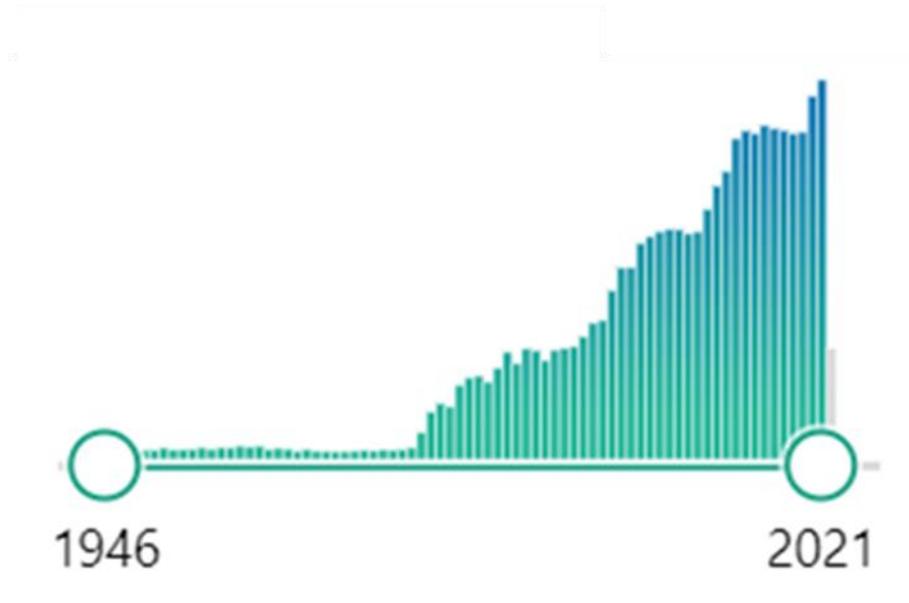
If "no", do you consider the three-year training of a radiographer/radiation technologist course sufficient to perform activities in IRT units?



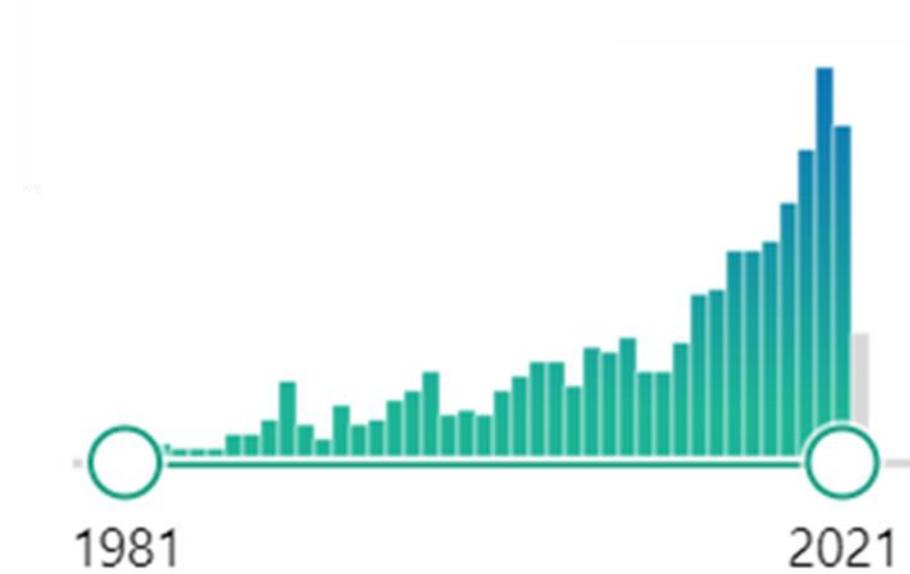
This survey underlines the need of additional education and training for RTTs



"Publications"



Brachytherapy

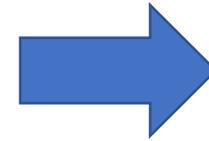


Brachytherapy AND Italy

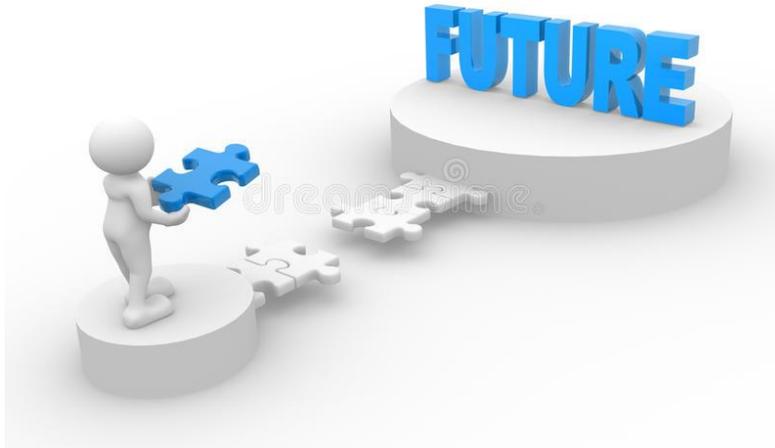


Conclusions: "It's time to look to the future..."

- Webinar
- On-site staging program
- Contouring-LAB
- Educational movies
- Unified core curriculum



New survey



The reimbursement disparity between IRT/BT and IMRT or SBRT should be reduced as quickly as possible (bias treatment selection)



Acknowledgments

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Radiation Oncology Section, Perugia General Hospital, Perugia, Italy
- L. Tagliaferri Chair of AIRO-IRT/IORT-WG (2018-2019)
Interventional Oncology Center (IOC) - Policlinico Gemelli, Roma, Italy
- R. Mazzarotto Chair of AIRO-IRT/IORT-WG (2022-2023)
Radiation Therapy Unit, Verona University Hospital, Verona, Italy

