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Title: Hospice Providers Awareness of the Benefits and Availability of Single Fraction Palliative Radiotherapy

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4 **Title:** Hospice Providers Awareness of the Benefits and Availability of Single Fraction Palliative
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6 Radiotherapy
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12 **Background:** Radiotherapy is highly effective at palliating malignant sources of pain. However,
13 once enrolled on hospice, patients are rarely referred for this treatment. To develop effective
14 educational strategies that can increase access to care, a survey of hospice providers investigated
15 potential misconceptions about its' benefits and availability.
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23 **Methods:** Individual surveys to hospice administrators, nursing directors, and medical directors
24 at 16 licensed hospices within 25 miles of a radiation oncology facility.
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29 **Results:** 93% of hospice professionals stated radiotherapy provides pain relief, and is
30 appropriate for patients with > 1 month of life expectancy. However, less than 1% of their
31 cancer patients had been referred to a radiation oncologist over the past year, citing concerns
32 about travel burden and cost. While most medical directors (75%) were aware it is just as
33 effective when delivered in a single fraction, very few administrators (22%) and nursing
34 directors (21%) had this knowledge. Meanwhile, reluctance of a radiation oncologist to offer
35 single fraction palliative radiotherapy was experienced by 43%.
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47 **Conclusion:** Access to palliative radiotherapy for this unique population may be increased by
48 improving education for hospice administrators and nursing directors, and reminding radiation
49 oncologists that single fraction palliative radiotherapy is acceptable, and ideal, for patients with
50 limited financial resources who are near the end of life.
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59 **Key Words:** Hospice Care, Palliative Radiation, Single Fraction
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Introduction:

The majority of terminally-ill cancer patients enrolled in hospice suffer from poorly-controlled pain, despite the frequent use of opioids.¹ Meanwhile, palliative radiation therapy (RT) represents an appealing alternative that can deliver highly-effective anti-tumoral therapy to a focused area, is almost always able to shrink tumors, provides effective pain relief in 50-70% of patients, and is associated with minimal side effects that cannot be achieved with other medical treatments, including palliative chemotherapy.^{2,3}

However, palliative RT is severely underutilized by hospice providers, and patients are rarely referred.⁴ This phenomenon is associated with low daily hospice reimbursement rates, prohibitive costs, and the burden of travel for patients and caregivers which often consists of a minimum of 12-17 clinic appointments. The number of trips typically required includes one for the consultation session, a separate planning session (simulation), and often 10-15 daily treatments.⁵ Although there is no proven advantages to a more protracted course of therapy, some radiation oncologists may prescribe even more than 15 treatments, a practice that has inspired editorials questioning whether some are practicing reimbursement-based medicine, instead of evidence-based medicine.⁶

Yet, palliative RT delivered in a single fraction can actually be just as effective as multiple fractions, a well-known phenomenon that is supported by multiple phase III trials and national guidelines published by the American Society of Radiation Oncology (ASTRO),⁷ and the American College of Radiology (ACR).⁸ Thus, we sought to study whether hospice professionals were aware of single fraction palliative RT (SFPRT), and how this knowledge might influence access to care.

Methods:

A 27-question survey was administered in-person to hospice professionals, and designed to take about 10 minutes to complete. The questions were adopted from a similar 2004 national pattern of care survey by Lutz, et al that also focused on hospice professionals' perspectives about palliative RT.⁴

The survey targeted hospices in 2 areas of regional importance to the authors, and a total of 16 out of 19 (84%) centers agreed to participate. Hospices were selected to be within 25 miles of a radiation oncology center affiliated with either the Virginia Commonwealth University Health System (Richmond, VA), or the University of Arkansas for Medical Sciences, (Little Rock, AK). Whenever available, administrators, nursing directors, and medical directors at each center were solicited to complete the survey.

Responses were managed with REDCap (Research Electronic Data Capture) and descriptive statistics were performed using Microsoft Excel and REDCap. Given the limited number of responses, statistical comparisons of responses were considered underpowered to draw any meaningful conclusions, and thus omitted.

Results:

Characteristics of Hospice Facilities

Between June 2011 and July 2012, professionals from 16 of 19 hospice centers responded to the survey request (11 for-profit centers and 5 non-profit centers). A total of 28 respondents completed the face-to-face survey, with 17 (61%) from for-profit centers. The respondents included 9 administrators (32.1%), 14 nursing directors (50%), and 8 medical directors (28.6%). Three professionals noted dual titles.

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4 The average patient census at each facility was 169 (range 20-605) with an average
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6 estimated 36% diagnosed with cancer (range 1-90%). The mean survival from time of enrollment
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8 for cancer patients was estimated to be 3 months (range 0-12 months). Additional demographic
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10 data is listed in Table 1.
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15 ***Access to Radiation Oncology Services***

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17 Only 7 of the 16 hospices reported any referrals for palliative RT over the past 12
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19 months. This represented an average of 1.4 patients per facility per year (range 0-6 referrals),
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21 providing an estimate of 20 patients out of a census of nearly 3,000 (<0.66%). Of the 7 referring
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23 centers, 4 were for-profit and 3 were non-profit. Radiation oncology consult and treatment costs
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25 were reported to have been usually paid for by the referring hospice, with 2 facilities noting
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27 partial payment by a patient's private insurance.
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32 Access to a radiation oncologist was reported as "adequate" by 57% of respondents. This
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34 included 88% of medical directors, 56% of administrators, and 26% of nursing directors. The
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36 majority of professionals (86%) denied difficulties communicating with a radiation oncology
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38 team, and 66% felt radiation oncologists communicated well with patients and their families.
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44 ***Awareness of Palliative Radiation Benefits***

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46 The majority of hospice professionals believed that palliative RT is appropriate for
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48 patients with a life expectancy of 1-3 months (93%) or 4-6 months (96%). The perceived average
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50 number of days for radiation to take full effect was 16 (range 3-180 days). There was 100%
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52 agreement by respondents that palliative RT can decrease opioids usage (Figure 1a).
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54 Additionally, 100% of hospice professionals acknowledged that RT has the potential to eliminate
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56 opioids requirements all together (Figure 1b). Hospice professionals generally agreed that
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4 palliative RT had various roles other than for bone pain, but less than half (40.7%) felt
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6 sufficiently trained to identify these situations.
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10 ***Awareness of SFPRT Delivery***

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12 The minimum perceived number of treatments required for successful palliative RT
13 ranged from 1-15 (average 4). Respondents reported observing palliative RT treatments for
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15 hospice patients ranging from 4-30, with an average of 12. A course of at least 10 treatments had
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17 been observed by 66% of respondents, while 24% had witnessed even more than 10 treatments
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19 prescribed.
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25 Only 39% of respondents reported awareness that a single fraction of radiotherapy was an
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27 option for palliation (Figure 2A). This included 22%, 21%, and 75% of surveyed administrators,
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29 nursing directors, and medical directors, respectively (Figure 1). Of the 7 respondents who were
30
31 aware of SFPRT, 43% had experienced reluctance by a radiation oncologist to offer this
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33 treatment, including 1 nursing director and 2 medical directors. The majority of respondents
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35 (64%) thought that SFPRT would be less expensive than longer courses, and 83% believed it
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37 would not cause more side effects.
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42 ***Barriers to Referral***

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45 Survey respondents estimated the cost of single fraction palliative radiotherapy at \$2,900
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47 (range \$300-15,000), and a course of 10 treatments at \$11,000 (range \$1,000 – 30,000). Of the 7
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49 hospices that had made radiation oncology referrals, the recalled cost of single-fraction delivery
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51 ranged from \$1,000 to \$6,000, while non-referring hospices estimated a cost range of \$300 to
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53 \$15,000. When hospice professionals were asked if a flat rate of \$2,000 might influence their
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55 decision to refer a patient for palliative RT, 58% stated it would increase their probability of
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4 referring. The influence of a \$2,000 flat-rate on increasing the probability of referral was more
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6 notable for non-profit (73%) versus for-profit agencies (41%), see Table 2.
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9 An open-ended question asked for comments about barriers to referral for palliative RT,
10 beyond cost. The most common response was “transportation”, followed by “frailty of patient”,
11 and “limitations in accessing care”. In a separate open-ended comment section, respondents
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13 expanded on challenges of transportation stemming from the number of radiation treatments
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15 and/or requirement for transportation by ambulance. An expanded list of cited barriers can be
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19 found in Table 3.
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24 **Discussion:**

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27 Most cancer patients enrolled in hospice have severe pain, and 75-90% are on opioids by
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29 the last day of life.¹ When their pain is poorly controlled, and opioid doses need to be increased,
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31 patients can develop debilitating side-effects that can further deteriorate quality of life. These
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33 include nausea, abdominal cramping, constipation, cognitive impairment, and hallucinations.
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37 Meanwhile, palliative RT is able to relieve pain in 50-70% of patients, and even able to
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39 eliminate the need for opioids in 10-30% of cases.⁹ This alternative approach, while more
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41 clinically effective than opioids, is unfortunately rarely used for hospice patients due to the
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43 expense and travel burden of multiple visits. Meanwhile, SFPRT is well-known to have
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45 equivalent benefits for pain relief compared to longer courses, and may be the most ideal
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47 approach for this patient population.^{7,8} Thus, given the limited resources of hospice agencies,
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49 SFPRT should be considered the most preferred strategy for patients at the end of life,
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51 particularly for those with <6 months to live. However, findings from this study corroborate
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53 prior reports that have demonstrated an unwillingness of many radiation oncologists to offer
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55 SFPRT, even for patients enrolled in hospice.⁴
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4 Unfortunately, as in prior reports that reported <10% of hospice agencies utilize
5 radiotherapy in any of their patients,¹⁰ very few patients (<1%) from the surveyed agencies were
6 referred for palliative RT over the past year. The paucity of referrals was multi-factorial, but
7 surprisingly not attributed to a lack of education about the benefits of RT. There was almost
8 unanimous agreement that palliative RT is appropriate for cancer hospice enrollees with a life
9 expectancy of greater than 1 month, and has the ability to reduce opioids usage. Most also
10 reported good communication with radiation oncology teams, and felt radiation oncologists
11 communicated well with patients and their families.
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23 However, palliative RT was simply perceived as too expensive, and burdensome. Most
24 had observed >10 treatments delivered, and some even believed 15 treatments was the minimum
25 required for it to control malignant pain. While 75% of medical directors were aware of SFRT as
26 an equally effective, but more affordable and less burdensome option, less than one-quarter of
27 hospice administrators and nursing directors reported this knowledge. In a related finding, 58%
28 of all respondents stated they would not only be more willing to refer patients if the total cost
29 could be reduced to \$2,000, but 78% would also alter their intake process to better identify those
30 that could benefit from palliative RT.
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43 The findings in this survey are similar to prior studies sponsored by the American
44 Academy of Hospice and Palliative Medicine (AAHPM), ASTRO, and American Society of
45 Clinical Oncology (ASCO).^{4,11} Those surveys also showed that palliative care professionals
46 recognized the effectiveness of RT, but that rarely were any hospice patients ever referred.^{2,4,11}
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48 Disappointingly, a decade later similar barriers to referral are relatively unchanged: low daily
49 Medicare reimbursement, transportation, and a perception that radiation oncologists are
50 unwilling to deliver reduced-fraction treatments.⁴
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4 The issue of cost as a barrier represents a complex one that involves factors involving
5 both direct and indirect costs.¹² Regardless of how effective palliative RT can be, hospice
6 agencies have limited financial ability to refer patients who might benefit from this “high cost”
7 treatment.^{13,14} The current 2012 Medicare Hospice Benefit per diem is \$153 for general home
8 care, and \$158 for inpatient respite, with an approximate \$25,000 cap.¹³ With a perceived cost of
9 \$11,000 for a course of palliative RT, and erroneously considered to be as high as \$15,000 for a
10 single-fraction treatment, referrals would seem nearly impossible. The actual billable costs,
11 which are not dissimilar depending on private vs. Medicare payer, are ultimately difficult to
12 reduce if radiation oncologists are unwilling to offer shorter courses, including SFRT which
13 would be the most affordable.¹⁵ A recent report using Medicare claims data estimated the mean
14 expenditures for a single or multiple fraction course of palliative radiotherapy at \$1,873 vs
15 \$4,967, respectively.⁵

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34 Ultimately, surveyed hospice professionals recognize the benefit of palliative RT and
35 wish to increase referrals. The data presented here suggest that increased awareness and
36 availability of SFPRT could help make that happen. It is likely that increased dialogue and
37 interaction between radiation oncologists and Hospice professionals can illuminate the
38 challenges that Hospice patients and agencies face, and hopefully increase a willingness among
39 radiation oncologists to offer the simpler course of single fraction palliative radiotherapy that can
40 help patients who are suffering from the symptoms of this awful disease. At our institution, we
41 currently offer a simple same-day evaluation and delivery of a single fraction of palliative
42 radiotherapy for any patient enrolled on Hospice, and can often get them in and out of the office
43 within 4 hours. General satisfaction has been high, and we have been pleased with the response
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4 of this humanitarian approach when presenting our experience at local and national meetings
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6 focused on hospice and palliative care.¹⁶
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10 11 ***Limitations***

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14 As this survey was only conducted in a small number of facilities, limited to 2 regional
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16 areas, the results may not accurately represent the perceptions of hospice professionals across the
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18 country. We recognize that this study could be strengthened with additional survey participants.
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20 However, the real focus and call to action should be to design trials evaluating infrastructure and
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22 better ways to facilitate communication to best care for cancer patients with hospice enrollment.
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26 27 **Conclusion:**

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30 Hospice professionals are well aware about the benefit of palliative RT, but concerns
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32 about the cost and burden of travel, as well as a perceived reluctance of radiation oncologist to
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34 offer SFRT, remain barriers that have not changed over the past decade. While the majority of
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36 hospice medical directors are aware of SFRT, less than one-quarter of hospice administrators and
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38 nursing directors were knowledgeable about this less burdensome, more affordable, and equally
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40 effective option.
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45 Encouraging dialogue between radiation oncologists and hospice professionals may help
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47 illuminate the challenges that hospice patients and agencies face, increase radiation oncologists'
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49 willingness to offer SFRT, and provide opportunities to educate those who work within hospice
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51 agencies about this single-day treatment. Taken together, this could increase patients' access to
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53 this simple, safe, and effective palliative treatment.
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4 **LEGENDS**
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9 **Table 1:** Demographics of survey respondents

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11 **Table 2:** Hospice professionals' knowledge about Single-Fraction Palliative Radiation Therapy

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14 **Table 3:** Barriers to Referral for Palliative RT

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16 **Table 4:** Tumor-related symptoms that can be palliated with radiotherapy

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21 **Figure 1:** Percent of respondents who are aware that palliative radiotherapy can be delivered in
22 a single fraction.
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Figure 1: Percent of respondents who are aware that palliative radiotherapy can be delivered in a single fraction.

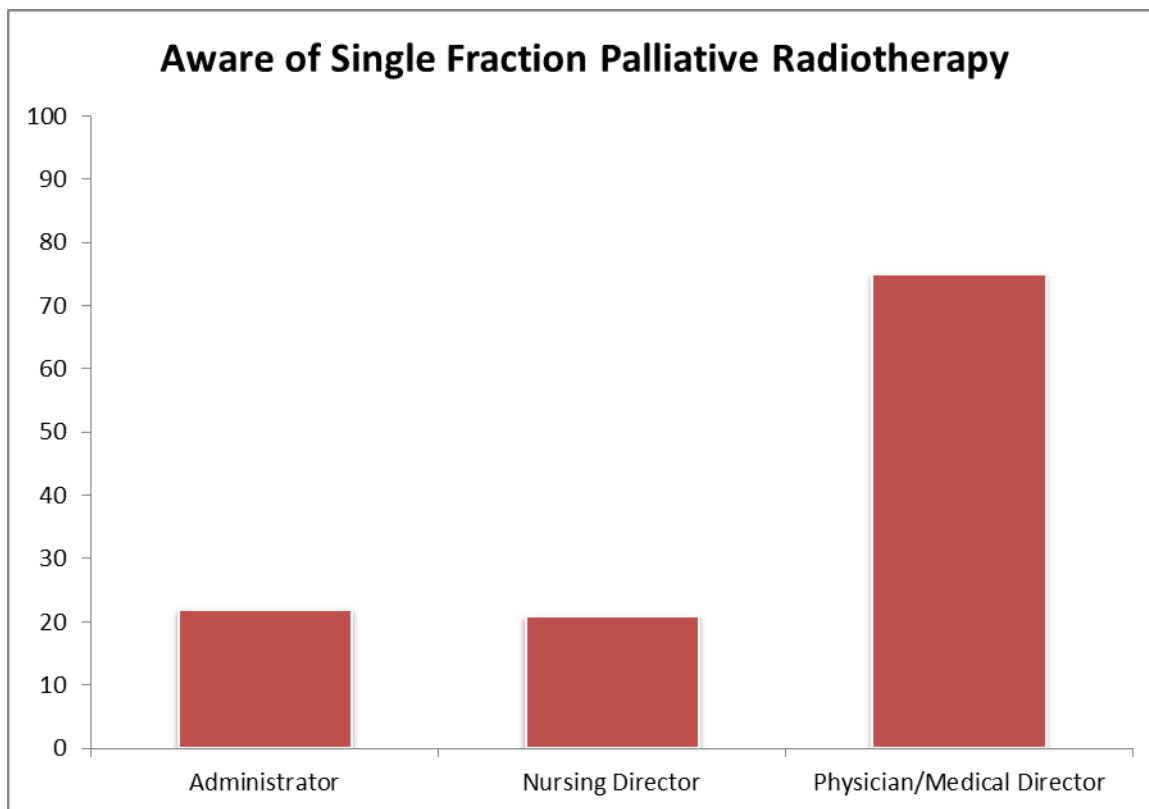


Table 1. Demographics of survey respondents.

Question	Frequency	%
Title*		
Medical Director	8	28.6
Nursing Director	14	50.0
Administrator	9	32.1
Geographic Area		
Little Rock, Arkansas	8	50.0
Richmond, Virginia	8	50.0
Financial Arrangement		
For-profit	17	60.7
Non-profit	11	39.3
Average Daily Patient Census		
0-50	2	12.5
50-100	4	25.0
100+	10	62.5
Estimated % Cancer Patients Enrolled		
1-10	3	18.8
10-50	6	37.5
50+	7	43.8

*Multiple professional roles were identified by several respondents

Table 2: Hospice professionals' knowledge about Single-Fraction Palliative Radiation Therapy

Question	% answering yes
Have you ever heard about 'single-fraction' palliative radiotherapy	39.3
Have you experienced any reluctance by radiation oncologists to use single fraction?	42.9
Do you think a single fraction of radiotherapy may be less effective?	18.2
Do you think a single fraction is more toxic than the more traditional 10-15 day course?	16.7
Do you think a single fraction will be less expensive?	63.6
Would you be more likely to refer a hospice patient with painful bony metastases if a single fraction was available, and cost only \$2000?	57.7
Would you consider modifying your intake procedures to identify and encourage referral of patients with single-fraction palliative radiotherapy?	88.0

Table 3: Barriers to Referral for Palliative RT

Other than cost, what is the #1 barrier to referring an appropriate patient for palliative RT?*	
	Respondents
Transportation - costs, availability, and number of treatments	15
Access - another doctor, another trip to appointment	6
Patient frailty	4
Lack of experience	1
Treating early enough to ensure benefit	1
Number of treatments	1
Family getting false hope	1
Patient and doctor communication	1
Radiation oncologists will not do single-fraction therapy	1
Hospice delays	1
Side effects	1

* Asked as an open-ended question, leading to overlapping responses.

Table 4: Tumor-related symptoms that can be palliated with radiotherapy.

Earlier intervention increases the likelihood of complete symptom relief

- Poorly controlled pain
- Dyspnea
- Dysphagia
- Hemoptysis
- Vaginal bleeding from pelvic malignancies
- Skin ulceration and bleeding
- Blindness from ophthalmologic metastasis

The following symptoms require emergent attention for radiotherapy to be effective

- Weakness related to new spinal cord compression*
- SVC syndrome

* Complicated spine metastasis is considered best treated with multiple treatments