

## Scientific Article

# Is Oligometastatic Cancer Curable? A Survey of Oncologist Perspectives, Decision Making, and Communication



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## Abstract

**Purpose:** Oligometastatic disease (OMD) refers to a limited state of metastatic cancer, which potentially derives benefit from local treatments. Given the relative novelty of this paradigm, oncologist perspectives on OMD are not well established. We thus explored oncologist views on curability of and treatment recommendations for patients with OMD.

**Methods and Materials:** We developed a survey focused on oncologist views of 3 subtypes of OMD: synchronous, oligorecurrent, and oligoprogressive. Eligible participants included medical and radiation oncologists at 2 large cancer centers invited to participate between May and June 2022. Participants were presented with 3 hypothetical patient scenarios and asked about treatment recommendations, rationale, and demographic information.

**Results:** Of 44 respondents, over half (61.4%) agreed that synchronous OMD is curable. A smaller proportion (46.2% and 13.5%) agreed for oligorecurrence and oligoprogression, respectively. When asked whether they use the word "cure" or "curative" in discussing prognosis, 31.8% and 33.3% agreed for synchronous and oligorecurrent OMD, respectively, while 78.4% disagreed for oligoprogression. Views on curability did not significantly affect treatment recommendations. More medical oncologists recommended systemic treatment only compared with radiation oncologists for the synchronous OMD (50.0% vs 5.3%;  $P < .01$ ) and oligoprogression cases (43.8% vs 10.5%;  $P = .02$ ), not the oligorecurrent case. There were no significant differences in confidence in treatment recommendations by specialty.

**Conclusions:** In this exploratory study, we found notable divergence in oncologists' views about curability of OMD as well as variability in treatment recommendations, suggesting need for more robust research on outcomes of patients with OMD.

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Research data are stored in an institutional repository and may be shared upon request to the corresponding author.

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## Introduction

Oligometastatic disease (OMD) is a relatively recent oncology paradigm that refers to a limited form of metastatic cancer. While metastatic cancer has historically been considered largely incurable and treated primarily with palliative therapies, recent work suggests that patients with OMD can benefit from local treatments, such as stereotactic radiation.<sup>1-8</sup> In certain circumstances, these treatments can even be given with potentially curative intent.

Since this disease state was first described by Hellman and Weichselbaum in 1995,<sup>9</sup> the definition of OMD has been widely debated and revised.<sup>10,11</sup> Our current understanding of OMD encompasses several categories based on the timing of metastases development, including synchronous OMD, oligorecurrence, and oligoprogression.<sup>10,12</sup> A recent European Society for Radiotherapy and Oncology–American Society for Radiation Oncology consensus document defined these categories of OMD as follows: synchronous OMD, or OMD diagnosed at the time of initial presentation; oligorecurrence, or limited metastatic recurrence after initial diagnosis of nonmetastatic cancer; and oligoprogression, or progression of a limited number of lesions on a background of otherwise stable metastatic disease.<sup>10</sup>

The heterogeneity of OMD states, as well as the lack of comprehensive guidelines on the treatment of various types of OMD, remain a challenge for oncologists.<sup>10</sup> Moreover, to our knowledge, there are no studies of oncologists' perspectives on the curability of OMD or communication with patients with OMD. Understanding these perspectives could help elucidate areas of controversy requiring further research and development of more tailored consensus guidelines. Ultimately, this knowledge could affect how oncologists counsel and care for patients with OMD in the future. Therefore, we conducted an exploratory survey of oncologists' perspectives on curability of, and treatment recommendations, for patients with OMD.

## Methods and Materials

### Study design

This is a self-administered survey of oncologists on their perspectives on OMD. The survey instrument was adapted from prior survey studies that assessed physician comfort with managing various oncological conditions and making treatment recommendations.<sup>13,14</sup> The survey instrument consists of 3 sections focused on synchronous OMD, oligorecurrence, and oligoprogression. For each subtype, participants were asked general questions about their perspectives on the curability of disease using Likert scales. Participants were then presented with hypothetical patient scenarios for each subtype of OMD. These cases

aim to reflect representative scenarios of common disease states within each OMD subtype and were developed with input from all coauthors, including actively practicing oncologists with clinical expertise in the management of patients with OMD.

For each patient case, participants were asked questions about treatment recommendations for the hypothetical patient, importance of various factors in making their treatment recommendations using Likert scales, and their perspective on the curability of the hypothetical patient's cancer. Participants were permitted to skip the case-related questions if they did not "feel comfortable with this disease site or scenario." Factors were developed using prior studies looking at prognostic factors in patients with OMD.<sup>10,15-17</sup> Demographic information, including age, sex, race, ethnicity, specialty, level of training, years of practice, and primary disease site treated, was self-reported at the end of this survey.

Cognitive testing was performed by a member of the research team with 1 attending oncologist and 2 medical trainees (fellow and resident) before survey distribution to improve validity.

This study was approved by the institutional review board of Mass General Brigham. Participants provided implied consent prior to survey initiation.

### Participants

Participants were medical or radiation oncologists, or trainees (ie, oncology fellows or radiation oncology residents) affiliated with 2 large academic cancer centers in the northeastern United States with multidisciplinary tumor boards to guide cancer treatment decision making. Medical oncologists who specialized in hematologic malignancies were excluded from this study given the limited use of the OMD framework in this field. Potential participants were recruited via their institutional email 3 times over the course of a month (May to June 2022).

### Data analysis

Data were included in analysis if respondents had completed all the general questions or patient case-specific questions for each of the OMD subtypes. For example, if a respondent completed all general questions about their perspectives on the curability of synchronous OMD, this data was included in analysis even if they did not respond to the patient case-specific questions about synchronous OMD.

The raw data was coded for quantitative analysis. Oncologists' confidence in making treatment decisions and understanding of prognosis and perceptions of OMD curability were reported as categorical answers. Professional and demographic characteristics were reported as either

continuous or categorical variables. Frequencies of categorical variables were tabulated. The  $\chi^2$  and Fisher exact tests were used to compare categorical variables. The Kruskal-Wallis test was used to compare continuous variables. Statistical analysis was performed using Stata/BE 17.0 (Stata-Corp, College Station, TX). For respondents' rankings on the importance of various factors in treatment decision making, each response on the Likert score was given a numerical score (1 = strongly agree, 2 = somewhat agree, 3 = neutral, 4 = somewhat disagree, 5 = strongly disagree). Mean scores were calculated and tabulated.

## Results

Of 298 oncologists and trainees emailed, 44 oncologists participated in the survey, and 37 completed the survey (response rate, 14.8%; completion rate, 12.4%). Of those 37 respondents, 19 (51.4%) identified as radiation oncologists, 17 (46.0%) as medical oncologists, and 1 (2.7%) as other. The majority of respondents (75.7%) were attending physicians. Respondents reported a median length of training of 13 years (range, 3-36), and primary sites treated varied broadly, with the most common sites reported as breast (32.4%), genitourinary (29.7%), and gastrointestinal (24.3%). Respondent characteristics are summarized in Table 1.

### General perspectives on curability, understanding, and prognosis

Over half of 44 respondents (61.4%) strongly or somewhat agreed that synchronous OMD is curable, while 20.5% strongly or somewhat disagreed (Fig 1). A smaller proportion of 39 total respondents (46.2%) strongly or somewhat agreed that oligorecurrence is curable, while 30.8% strongly or somewhat disagreed. Of 37 total participants, 13.5% strongly or somewhat agreed that oligoprogression is curable, while the majority (78.4%) strongly or somewhat disagreed (Table 2). There were no significant differences between views on curability of each type of OMD between medical and radiation oncologists or by understanding of disease trajectory.

Most respondents also reported that they had a good understanding of the disease trajectory of all 3 OMD subtypes, with 65.9%, 74.4%, and 62.2% of respondents strongly or somewhat agreeing that they had a good understanding of the trajectory of synchronous OMD, oligorecurrence, and oligoprogression, respectively. Additionally, the majority reported strongly or somewhat being comfortable discussing prognosis with patients (72.7%, 84.6%, and 75.7% for synchronous OMD, oligorecurrence, and oligoprogression, respectively).

When asked whether they used the word "cure" or "curative" in discussing prognosis with patients,

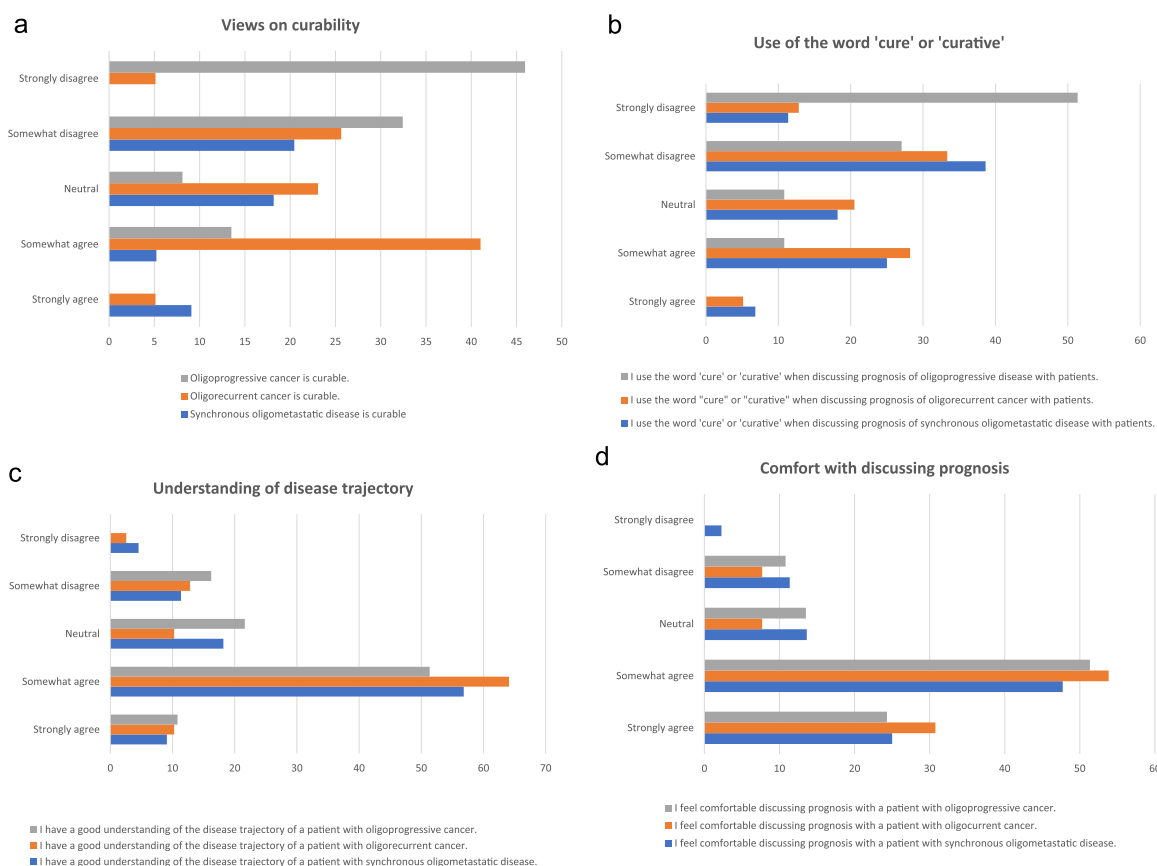
**Table 1** Respondent characteristics

Baseline characteristic	Value (n = 37*)
Age (y), median (range)	42 (32-62)
Sex	
Male	22 (59.5)
Female	14 (37.8)
Other	1 (2.7)
Race	
White	21 (56.8)
Asian	12 (32.4)
Black/African American	1 (2.7)
Other race	3 (8.1)
Ethnicity	
Non-Hispanic	32 (86.5)
Hispanic	0
Other race	5 (13.5)
Specialty	
Medical oncology	17 (46.0)
Radiation oncology	19 (51.4)
Other	1 (2.7)
Level of training	
Attending	28 (75.7)
Resident/fellow	9 (24.3)
Years of training, median (range)	13 (3-36)
Primary site treated	
Breast	12 (32.4)
Genitourinary (prostate, kidney, bladder)	11 (29.7)
Gastrointestinal (colon, rectum, pancreas, liver)	9 (24.3)
Thoracic	8 (21.6)
Central nervous system (brain, spine)	7 (18.9)
Head and neck	1 (2.7)
Skin	1 (2.7)
Sarcoma	1 (2.7)
Not specialized	4 (10.8)
Other	1 (2.7)

\* Percentages were calculated using the 37 of 44 total participants who completed the demographic information in full.

Data are presented as number (%) unless otherwise indicated.

around one-third of respondents (31.8% and 33.3%) strongly or somewhat agreed with the statement for synchronous OMD and oligorecurrence, respectively. Around half (50.0% and 46.2%, respectively) strongly or somewhat disagreed. Regarding oligoprogression, 78.4% of respondents reported that they did not use "cure" or "curative" in discussing prognosis, while 10.8% strongly or somewhat agreed. There were no significant differences between use of "cure" and "curative" by sex, age, specialty, years of practice, or level of training.



**Figure 1** Oncologists' views on curability of oligometastatic disease by proportion.

## Case-related questions: Treatment decision making

Respondents were asked to answer questions related to the 3 hypothetical patient cases (Table 3), including making broad treatment recommendations.

For the synchronous OMD case, of 41 respondents, most (68.3%) chose a treatment regimen that combined systemic and local therapy (Fig. 2). Ten respondents (24.4%) elected systemic treatment only, while 2 (4.9%) chose local therapy to all sites of disease. For the oligorecurrent case, of 37 respondents, most (67.6%) elected to treat with a combination of systemic and local therapy to all sites of metastatic disease, while 10 (27.0%) chose systemic therapy only. Two respondents (5.4%) stated they would treat with local therapy only to all sites of metastatic disease. There were no significant differences in treatment recommendations based on respondents' views on curability of disease.

For the oligoprogression case, 22 of 36 respondents (61.1%) elected a treatment regimen combining systemic and local therapy. Of those 22, 47.2% stated they would locally treat all sites of growing metastatic disease, while 13.9% stated they would treat all sites of metastatic

disease. Of 36 respondents for this case, 25.0% stated they would treat with systemic treatment only. Five (13.9%) stated they would treat with local therapy only, with 3 (8.3%) electing to treat all sites of metastatic disease and 2 (5.5%) electing sites of growing metastatic disease only. There were no significant differences in responses by sex, age, years of practice, or level of training.

There was a significant difference in treatment recommendations between medical and radiation oncologists for the synchronous OMD and oligoprogression cases, but not the oligorecurrence case ( $P = .62$ ). A smaller proportion of medical oncologists stated they would treat the patient with synchronous OMD with systemic treatment and local therapy to all sites of disease compared with radiation oncologists (37.5% vs 89.5%;  $P < .01$ ). For the patient with oligoprogression, a smaller proportion of medical oncologists stated they would treat with systemic treatment and local therapy to sites of growing metastatic disease compared with radiation oncologists (37.5% vs 57.9%;  $P = .02$ ). A larger proportion of medical oncologists stated they would treat the patient with synchronous OMD and oligoprogression with systemic treatment only compared with radiation oncologists (50.0% vs 5.3% for synchronous OMD, 43.8% vs 10.5% for oligoprogression).

**Table 2** Oncologists' views on curability of oligometastatic disease

Item	Strongly/ somewhat agree	Neutral	Strongly/ somewhat disagree
Synchronous oligometastatic disease (n = 44)			
Synchronous oligometastatic disease is curable.	27 (61.4)	8 (18.2)	9 (20.5)
I use the word “cure” or “curative” when discussing prognosis of synchronous oligometastatic disease with patients.	14 (31.8)	8 (18.2)	22 (50.0)
I have a good understanding of the disease trajectory of a patient with synchronous oligometastatic disease.	29 (65.9)	8 (18.2)	7 (15.9)
I feel comfortable discussing prognosis with a patient with synchronous oligometastatic disease.	32 (72.7)	6 (13.6)	6 (13.6)
Oligorecurrent disease (n = 39)			
Oligorecurrent cancer is curable.	18 (46.2)	9 (23.1)	12 (30.8)
I use the word “cure” or “curative” when discussing prognosis of oligorecurrent cancer with patients.	13 (33.3)	8 (20.5)	18 (46.2)
I have a good understanding of the disease trajectory of a patient with oligorecurrent cancer.	29 (74.4)	4 (10.3)	6 (15.4)
I feel comfortable discussing prognosis with a patient with oligorecurrent cancer.	33 (84.6)	3 (7.7)	3 (7.7)
Oligoprogressive disease (n = 37)			
Oligoprogressive cancer is curable.	5 (13.5)	3 (8.1)	29 (78.4)
I use the word “cure” or “curative” when discussing prognosis of oligoprogressive disease with patients.	4 (10.8)	4 (10.8)	29 (78.4)
I have a good understanding of the disease trajectory of a patient with oligoprogressive cancer.	23 (62.2)	8 (21.6)	6 (16.2)
I feel comfortable discussing prognosis with a patient with oligoprogressive cancer.	28 (75.7)	5 (13.5)	4 (10.8)

When asked to rate importance of various factors in their treatment decision making, number of metastases, risk of toxicity from local treatment or systemic therapy, and patient preference ranked in the top 3 most important factors in all 3 cases. Cost, followed by nodal versus non-nodal involvement, were ranked as the least important factors in all 3 scenarios. Risk of harm due to delay of systemic therapy, biomarkers of primary cancer, and benefit of increased time off systemic therapy were ranked as the third least important factors for synchronous OMD, oligorecurrence, and oligoprogression, respectively. Complete lists of ranked factors with mean ratings are available in [Table 4](#).

Ultimately, most respondents felt confident in their treatment recommendations for all 3 OMD subtypes (85.4%, 67.6%, and 66.7% for synchronous OMD, oligorecurrence disease, and oligoprogression disease, respectively). However, respondents were divided when asked whether they believed the hypothetical patients in each of the cases had curable disease. For the synchronous OMD case, over half the respondents (63.4%) strongly or

somewhat disagreed that the hypothetical patient had curable disease, while 22.0% strongly or somewhat agreed. Six respondents (14.6%) were neutral. For the oligorecurrence case, 45.9% of respondents felt that the hypothetical patient had incurable disease, while 32.4% felt that their disease is curable. Eight (21.6%) respondents were neutral. No respondents strongly or somewhat agreed that the hypothetical patient in the oligoprogressive case had curable disease, while 88.9% strongly or somewhat disagreed with the statement. Four respondents (11.1%) were neutral. There were no significant differences in responses by sex, age, specialty, years of practice, or level of training.

## Discussion

In this exploratory study, we surveyed oncologists about their perceptions on curability of and treatment decision making for patients with OMD. To our knowledge, this is the first study examining oncologists' views on OMD within day-to-day clinical decision making. Our

**Table 3 Hypothetical patient scenarios provided in survey**

<p><b>Synchronous oligometastatic disease</b></p> <p>A 75-year-old otherwise healthy man is incidentally found to have a prostatic nodule on digital rectal examination. PSA is found to be elevated at 21 ng/mL. Prostate MRI reveals a globally enlarged prostate with a 3-cm nodule in the left median lobe with evidence of capsular invasion (PI-RADS 4). Biopsy reveals Gleason 4+3 disease in 5 of 12 core biopsies. Staging with PSMA PET scan shows 2 subcentimeter lesions in the bones (1 in the vertebrae and 1 in the left femur) as well as a 1.2-cm lesion in his left lung, all of which are consistent with metastatic disease. He is referred to you as part of a multidisciplinary evaluation considering treatment recommendations. He reports good urinary function; ECOG performance status is 0. Regarding this patient’s goals of care, he would prefer to be “as aggressive as possible” with his treatment.</p>
<p><b>Oligorecurrent disease</b></p> <p>A 65-year-old woman with a stage IIA colorectal adenocarcinoma (pT3N0M0) was treated with definitive surgical resection without adjuvant chemotherapy. Her baseline CEA was 10 ng/mL, with postsurgical CEA at 2 ng/mL. Ten months following surgery, she develops mild fatigue and a 5-pound weight loss, and is noted to have increasing CEA up to 12 ng/mL. Staging scans reveal metastatic disease in the lung (2 cm) and 2 sites in the liver (2 cm and 2.5 cm, respectively), but no concerning findings in the colon. Biopsy of one of the liver lesions revealed pathology consistent with metastatic disease of primary colorectal adenocarcinoma. ECOG performance status is 1. Regarding this patient’s goals of care, she indicates she wishes to be aggressive in her cancer treatment to live as long as possible, but not at the expense of her quality of life.</p>
<p><b>Oligoprogressive disease</b></p> <p>A 50-year-old man with limited smoking history is incidentally found to have a 2-cm mass in his RUL on a CT scan of his chest. Biopsy demonstrated lung adenocarcinoma without the presence of targetable mutations, such as EGFR mutation or ALK rearrangement. Staging scans reveal a 2-cm metastatic lesion to the contralateral pleura, multiple 1- to 1.5-cm liver lesions, and 2 subcentimeter brain metastases from which he is currently asymptomatic. Genetic profiling of the biopsy reveals PD-L1 expression of 10%. He is treated with combination chemotherapy and immunotherapy. Interval PET/CT scan shows marked reduction in the size and avidity of other sites of disease except in 2 of the 1- to 1.5-cm liver metastases, which have now both grown slightly to 1.6 and 1.8 cm with increasing avidity. He is referred to you as part of a multidisciplinary evaluation considering treatment recommendations. ECOG performance status is 1. His goal is to extend life as long as possible, even if it means he loses some quality of life.</p>

*Abbreviations:* ALK = anaplastic lymphoma kinase; CEA = carcinoembryonic antigen; CT = computed tomography; ECOG = Eastern Cooperative Oncology Group; EGFR = epidermal growth factor receptor; MRI = magnetic resonance imaging; PD-L1 = programmed death ligand 1; PET = positron emission tomography; PSA = prostate-specific antigen; PSMA = prostate-specific membrane antigen; RUL = right upper lobe.

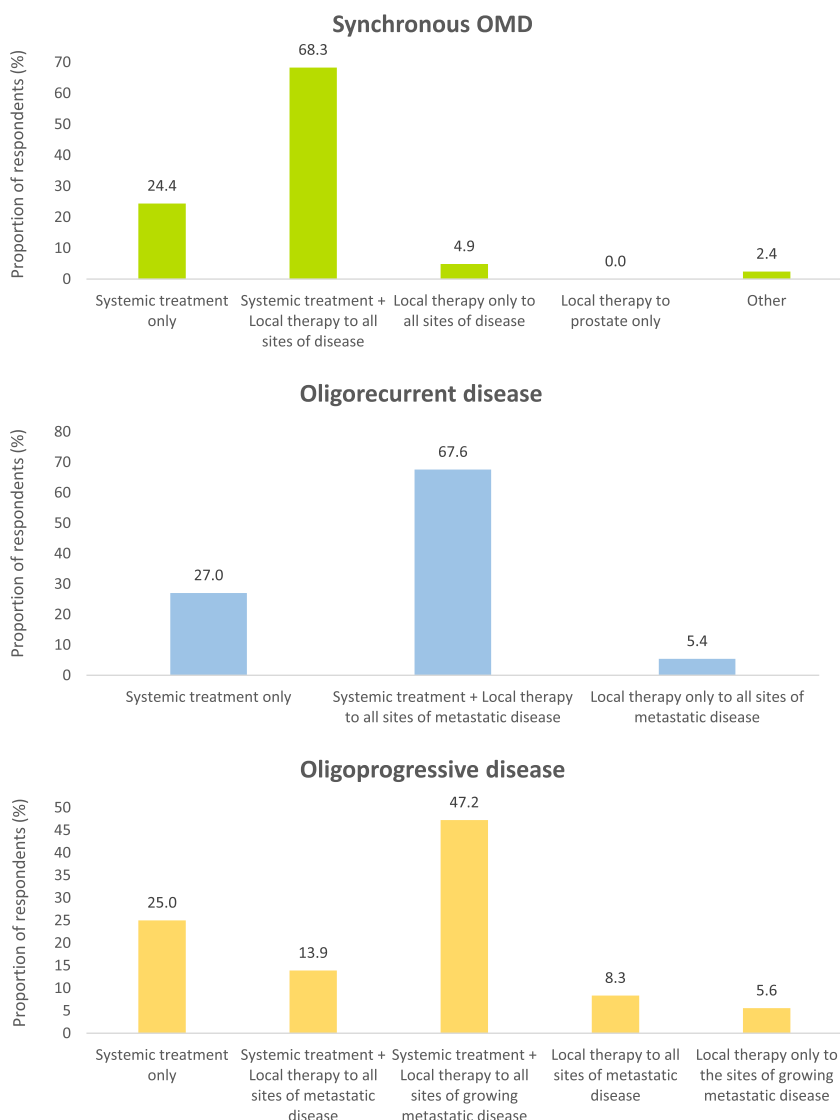
findings contribute to understanding of oncologists’ beliefs, decision making, and communication around this relatively new disease paradigm.

Respondents held variable views on curability of all 3 OMD subtypes. While a majority agreed that synchronous OMD is curable, a considerable minority (around 20%) strongly or somewhat disagreed. Respondents were nearly evenly split on their views regarding oligorecurrence, with the plurality strongly or somewhat agreeing that oligorecurrence is curable. On the other hand, there seemed to be more consensus that oligoprogression is not curable among nearly 80% of respondents. For the general questions, respondents rated synchronous OMD as more curable than oligorecurrence and oligorecurrence more curable than oligoprogression.

Notably, these trends were not reflected in the case-based questions. Similar to the general questions, respondents rated the hypothetical patient with oligoprogression to have the least curable subtype of OMD. However, more respondents agreed that the hypothetical patient with oligorecurrence has curable disease compared with those who agreed for the hypothetical patient with synchronous OMD (32.4% vs 22.0%, respectively). This discrepancy could suggest that oncologists may believe OMD is curable in principle but can be influenced by past cases of patients who did not achieve remission or cure in practice. The nontrivial proportion of patients with OMD progress despite treatment may create an availability bias that affects oncologists’ views on OMD curability.<sup>18,19</sup>

This uncertainty around the curability of OMD is mirrored in the recent European Society for Radiotherapy and Oncology–American Society for Radiation Oncology consensus document that defines OMD.<sup>10</sup> While the document states that certain OMD subtypes can be treated with “curative intent,” it neither concludes whether certain OMD subtypes are curable nor specifies rates of cure or complete response. However, both our respondents and the existing literature (including the consensus document) suggests that oligoprogression might differ from synchronous OMD and oligorecurrence, and that it portends a poorer prognosis consistent with that of more widespread metastatic cancer.<sup>10,11</sup>

Our study also found variability regarding treatment recommendations across all 3 OMD subtypes. Around two-thirds of respondents elected to treat with a combination of systemic therapy and local treatment, while around one-fourth chose systemic treatment only. Only a minority of respondents chose to treat solely with local treatment. For oligoprogression, most respondents chose to treat only sites of growing metastatic disease with local therapy. Importantly, respondents’ perspectives on curability of OMD did not seem to affect treatment recommendations. There was also a significant difference in treatment recommendations among medical and radiation oncologists for the hypothetical patients with synchronous OMD and oligoprogression, with more radiation oncologists electing to use a combination of systemic treatment and local therapy than medical oncologists did. Despite this variability, most oncologists reported confidence about their understanding of the



**Figure 2** Case-based treatment recommendations.

trajectory of all 3 OMD subtypes and their ability to discuss prognosis with patients.

The lack of consensus regarding treatment recommendations for each of the 3 hypothetical patient cases corroborates data from a recent survey of radiation oncologists in Italy, which also found disagreements in treatment recommendations for certain cases of OMD.<sup>11</sup> This disagreement likely reflects the lack of strong clinical data on the outcomes of patients with OMD and highlights need for more robust research on this topic. Future studies should also assess the role of various factors in patient outcomes, such as biomarkers and nodal involvement, to help clarify the definitions of the OMD subtypes.

Notably, fewer respondents reported using the word “cure” or “curative” in discussing prognosis of synchronous OMD and oligorecurrence than those who felt that these disease subtypes are curable. For oligoprogression,

most respondents reported not using “cure” or “curative,” in line with their views on its curability. These findings corroborate data from prior studies, which demonstrate that oncologists hesitate to use words like “cure” or “curative” when counseling patients.<sup>20-22</sup> This avoidance likely stems from these words’ emotional significance and concerns about giving unrealistic hope to patients and loved ones.<sup>20-24</sup> However, most prior studies on oncologist communications have focused on patients with advanced metastatic disease in which treatment was given with palliative intent.<sup>20,24</sup> Our study expands on this known reluctance of oncologists to use the word “cure” by finding that they may not use these words to discuss disease prognosis even when they believe cure is possible—suggesting that the OMD paradigm might have shifted how oncologists treat metastatic cancer but not how they counsel patients about prognosis.

**Table 4 Factors for treatment decision making in OMD**

Synchronous OMD (prostate)	Rating (mean)*	Oligorecurrent disease (colorectal)	Rating (mean)*	Oligoprogressive disease (lung)	Rating (mean)*
Number of metastases	4.634	Number of metastases	4.568	Risk of toxicity from local treatment or systemic therapy	4.444
Risk of toxicity from local treatment or systemic therapy	4.488	Patient preference	4.459	Number of metastases	4.333
Patient preference	4.463	Risk of toxicity from local treatment or systemic therapy	4.432	Patient symptoms/quality of life	4.306 <sup>†</sup>
Primary cancer histology	4.341	Comorbidities and performance status	4.378	Patient preference	4.306 <sup>†</sup>
Comorbidities and performance status	4.268	Patient symptoms/quality of life	4.324	History of treatments for metastatic sites	4.200
Patient symptoms/quality of life	4.122	Primary cancer histology	4.189	Comorbidities and performance status	4.111
Locoregional versus distant metastases	4.073	Time to progression	4.162	Time to progression	4.056
Osseous versus extraosseous location	4.000	History of treatments of primary cancer	4.135	Patient age	4.028 <sup>‡</sup>
Extracranial versus intracranial location	3.927	Locoregional versus distant metastases	3.865	History of treatments of primary cancer	4.028 <sup>‡</sup>
Benefit of increased time off systemic therapy	3.610	Patient age	3.838	Primary cancer histology	3.944
Extent of primary tumor	3.561	Risk of harm due to delay of systemic therapy	3.703	Extracranial versus intracranial location	3.833
Patient age	3.390	Benefit of increased time off systemic therapy	3.676	Locoregional versus distant metastases	3.750
Biomarkers of primary cancer	3.293 <sup>§</sup>	Extracranial versus intracranial location	3.541	Osseous versus extraosseous location	3.639
Risk of harm due to delay of systemic therapy	3.293 <sup>§</sup>	Osseous versus extraosseous location	3.459	Risk of harm due to delay of systemic therapy	3.600
Nodal versus nonnodal involvement	3.171	Extent of primary tumor	3.243 <sup>  </sup>	Biomarkers of primary cancer	3.583
Cost	2.512	Biomarkers of primary cancer	3.243 <sup>  </sup>	Extent of primary tumor	3.389
		Nodal versus nonnodal involvement	3.189	Benefit of increased time off systemic therapy	3.314
		Cost	2.649	Nodal versus nonnodal involvement	3.194
				Cost	2.694

*Abbreviation:* OMD = oligometastatic disease.  
 \* Likert scale scoring: 1 = strongly disagree, 2 = somewhat disagree, 3 = neutral, 4 = somewhat agree, 5 = strongly agree.  
<sup>†,‡,§,||</sup> Equal average score.



This carries significant implications for patients' treatment decision making. Patients' perceptions of the likelihood of cure can affect their treatment regimens.<sup>20,25</sup> In fact, one study found that patients with inaccurate perceptions of their prognosis elected for more life-extending therapy and underwent more hospitalizations.<sup>25</sup> In this way, avoiding "cure" in discussing OMD may dissuade patients from choosing more aggressive treatment regimens. However, there is other evidence to suggest that providing hope of cure may have benefits for patients, improving quality of life and lessening anxiety.<sup>26</sup> Moreover, while patients have different preferences regarding prognostic conversations, many emphasize the importance of balancing hope with realism during prognostic conversations.<sup>20,23,27</sup>

If this is the case, our study suggests that oncologists who believe that the evidence suggests OMD is curable might reasonably use "cure" and "curative" when speaking with their patients about prognosis. How to best balance these competing factors and allow patients to hope for, but not necessarily expect, the best outcome is difficult. One possible strategy could be to provide patients with the full range of potential outcomes, including "cure" as the best-case scenario if appropriate, rather than providing estimates of patients' prognosis which are often inaccurate.<sup>28-31</sup> Future studies could further assess patients' preferences, specifically how those with OMD understand their disease and chances of curability or how their views on curability might affect treatment preferences.

## Limitations

Our survey had a relatively small number of respondents and low response rate, which could introduce selection bias. However, our study was designed to be exploratory in nature with a goal to probe a small sample of oncologists on their perspectives on the curability of OMD, which has not yet been reported in the literature. Moreover, we used a convenience sampling method. However, the demographic makeup of our respondents reflects that of a recent study of practicing oncologists and oncology trainees.<sup>32</sup> Despite the limitations, we believe that our data demonstrates the existence of diverse perspectives on the curability of OMD and treatment recommendations even within 1 academic medical center and could suggest insufficient data on patient outcomes in OMD. Thus, a wider national or international study of oncologists to confirm and extend upon our findings could be valuable.

Additionally, this study employed case-based questions, and certain case details could bias respondents' answers or be difficult to answer for those who do not treat that site. For this reason, we allowed respondents to skip the case-related questions if they did not "feel comfortable with this disease site." This contributed to some of the missing data, along with a

degree of general survey noncompletion. However, we attempted to include all portions of completed data to minimize potential bias. The cases also contained multiple details about disease status and patient values, each of which could influence the treatment recommendation. However, we asked respondents to rate the importance of various factors in their treatment recommendations for this reason. We also designed the cases and list of various factors with input from practicing oncologists and performed cognitive testing with participants of various levels of training to ensure interpretability and clinical plausibility of the patient cases.

Finally, while we included an option for participants to write in additional factors considered in their treatment decision making, our list was not exhaustive and did not ask participants to rate the importance of level of evidence available. Future studies that focus on disease specific sites may be able to better assess evidence levels for decision making.

## Conclusion

In this study, we surveyed oncologists about their perspectives on the curability of and treatment decision making for 3 OMD subtypes: synchronous OMD, oligorecurrence, and oligoprogression. There was no consensus about the curability of synchronous OMD or oligorecurrence, but the majority agreed that oligoprogression is not curable. Fewer oncologists reported using the words "cure" or "curative" when discussing prognosis with patients than those who believed OMD is curable. While views on curability did not seem to significantly affect treatment recommendations, there were significant differences in treatment recommendations for synchronous OMD and oligorecurrence between medical and radiation oncologists despite lack of significant differences in confidence in treatment recommendations. Ultimately, our findings provide insight into oncologist perceptions, decision making, and communication around OMD. The divergence in views about curability and variability in treatment recommendations reflects the insufficient data on outcomes of patients with OMD and suggests need for further research on this topic as well as further exploration of oncologist understanding of OMD.

## Supplementary materials

Supplementary material associated with this article can be found in the online version at [doi:10.1016/j.adro.2023.101221](https://doi.org/10.1016/j.adro.2023.101221).

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