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COMPUTED TOMOGRAPHY

Request and reporting models for computed tomography in the multidisciplinary management of cancer patients: consensus between the Italian Society of Medical and Interventional Radiology (SIRM) and the Italian Society of Medical Oncology (AIOM)

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Abstract

Background Multidisciplinary management of oncological patients has improved patient outcomes, responding effectively and efficiently to the patient's health needs. A critical element remains adequate communication, also between radiologist and oncologist, which promotes correct patient management. The Italian Society of Medical Oncology (AIOM) and the Italian Society of Medical and Interventional Radiology (SIRM) have created a working group of representative members to improve not only communication between the two categories but, above all, to allow each member of the different categories to benefit from guidelines of good clinical practice both for filling out the examination request form than the radiological report, and therefore, also allowing clinicians and radiologists who do not work in reference centers, to correctly manage patients in the various phases of their oncological path.

Materials and methods A panel of expert oncologists (AIOM members) and radiologists (SIRM members) was established. Multi-round consensus-building Delphi exercise was performed to create a comprehensive structured report (SR) template and a comprehensive requesting model for computed tomography (CT). The requesting model was divided into six sections: (a) oncological family history; (b) relevant clinical data; (c) staging; (d) re-staging; (e) other reason; and (f) follow-up. Regarding CT SR, 3 models were proposed: (1) for staging; (2) for treatment evaluation, and (3) for follow-up. CT SR in staging phase was divided into nine sections: (a) primary tumor; (b) lymph node metastases; (c) liver metastases; (d) lung metastases; (e) brain metastases; (f) other organs (incl. skeleton) metastases; (g) peritoneum; (h) incidental findings and complications; and (i) conclusion. CT SR in treatment evaluation phase was divided into ten sections: (a) primary tumor; (b) lymph node metastases; (c) liver metastases; (d) lung metastases; (e) brain metastases; (f) other organs (incl. skeleton) metastases; (g) peritoneum; (h) treatment-related complication; (i) incidental findings; and (l) conclusion. CT SR in follow-up phase was divided into six sections: (a) appearance of lesions; (b) node metastases; (c) liver lesions; (d) peritoneum; (e) incidental findings and complications; and (f) conclusion. Cronbach's alpha (Cα) correlation coefficient was used to evaluate internal consistency for each item and the quality analysis according to the average inter-item correlation. Each expert expressed individual comments for each specific template section by using a four-point scale (0 = strongly disagree, 1 = slightly disagree, 2 = modestly agree, 3 = strongly agree).

Results With regard to the 3 CT SR reports, at the first round, all sections achieved ratings above the "good" level. The staging items showing the highest level of agreement among experts in the first round were lung metastases and incidental findings and complications. For treatment evaluation, the items with the highest agreement were treatment-related complication and incidental findings. For follow-up, the items with the highest agreement were appearance of lesions and incidental findings and complications. At the first round, Cronbach's alpha (Cα) correlation coefficients were 0.92, 0.95, and 0.90 for staging, re-staging, and follow-up, respectively. At the second round, all sections achieved ratings at the "excellent" level. Regarding requesting model, at first round, all sections received an overall score equal to or greater than the level defined as "good" (score = 2).

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The item that showed the highest level of agreement in the first round was the follow-up section, with a mean value of 2.75 ± 0.62. The correlation coefficient, Cronbach's alpha (Cα), was 0.75.
In the second round, for both the CT SR report and the oncologist request template, all elements received "excellent" ratings. During the inter-society agreement, six AIOM members assessed the CT SR model developed by SIRM, while six SIRM members evaluated the CT requesting model proposed by AIOM. In this single Delphi round, all participants assigned the maximum score (3) to every item across all sections.
Conclusions The inter-society collaboration between AIOM and SIRM is a milestone in improving communication between radiologists and oncologists. The CT request and reporting documents meet the needs of quality care even outside of referral centers, and although do not represent an obligation, they can facilitate understanding between the different categories of professionals involved in patient management.

Keywords Multidisciplinary team · Communication · Radiological report · Good clinical practice · Computed tomography

Introduction

Multidisciplinary management of oncological patients has not only improved patient outcomes, driven by a growing awareness of the need to treat the patient rather than the disease (personalized medicine), but has also highlighted how the team, more than a single professional, can work together in caring for the patient, responding effectively and efficiently to the patient's health needs [1–4]. The onset of multidisciplinary teams (MDTs) has allowed a more effective and efficient definition of the diagnostic and therapeutic-assistance pathway of cancer patients in the various phases of their disease. Specifically, the MDT allows for optimal treatment planning for each patient through: (1) accurate tumor staging; (2) access to integrated multimodal therapies; (3) access to personalized systemic therapies based on molecular characteristics of the tumor, when standard; (4) accurate assessment of treatment response (re-staging); and 5) an accurate follow-up that takes into account the different risk categories with integrated imaging [5–7].

A critical element remains adequate communication, also between radiologist and oncologist, which can promote the most correct patient management.

In the radiological setting, communication to the referring clinicians occurs via report, which should be detailed, easily understandable, and adequately answer question posed by clinicians [8–15]. On the other hand, in order for a radiologist to satisfy the needs of the referring clinician, it is necessary that the examination request is adequately provided with clinical questions, data relating to the patient, such as symptoms, risk factors, and any laboratory features, which can not only help in the interpretation of the images, but also allow to optimize the acquisition technique [16, 17]. Ideally, this information should be easily accessible in the patient's referral letter, or through interoperability between medical records and electronic health records, but often this is not the case, and the information available to the radiologist when receiving the request is suboptimal.

To meet these needs, the Italian Society of Medical Oncology (AIOM) and the Italian Society of Medical and Interventional Radiology (SIRM) have created a working group of representative members. The aim of this interdisciplinary team is to improve not only communication between the two categories but, above all, to allow each member of the different categories to benefit from guidelines of good clinical practice both for filling out the examination request form than the radiological report and, therefore, also allowing clinicians and radiologists who do not work in reference centers, to correctly manage the patient in the various phases of his oncological path.

In this initial experience, the team focused its attention on the request for radiological investigation and on structured report (SR) of computed tomography (CT) in three different clinical phases: (1) staging, (2) evaluation of treatment activity, and (3) follow-up.

Materials and methods

Panel expert

A working group (WK 1) of 6 AIOM and 6 SIRM representative members was created. During a preparatory phase, the critical points of the two models regarding three different clinical scenarios: (1) the staging phase; (2) the evaluation of treatment activity phase, and (3) the follow-up phase, for requesting examinations and reporting, were shared. After three telematic meetings, reaching a unitary agreement, the two models were established.

The secretary of AIOM and the president of SIRM identified 12 members for the two scientific societies (WK2), as expert auditors who were invited to express their agreement on the two shared models.

Multi-round consensus-building Delphi exercise was performed to develop a comprehensive structured report (SR) template and a comprehensive requesting model for CT as a result of a critical discussion.

Selection of the Delphi domains and items

Working team 1 reviewed literature data on the main scientific databases, including PubMed, Scopus, and Google Scholar, to assess papers on SR and consensus among scientific societies from December 2010 to August 2025. The full text of the selected studies was evaluated, and the list of Delphi items during teleconference session was approved.

The requesting model was divided into six sections: (a) oncological family history; (b) relevant clinical data; (c) staging; (d) re-staging; (e) other reason, and (f) follow-up.

Regarding CT SR, 3 models were proposed: (1) for staging; (2) for treatment evaluation, and (3) for follow-up.

CT SR in staging phase was divided into nine sections: (a) primary tumor; (b) lymph node metastases, (c) liver metastases, (d) lung metastases, (e) brain metastases, (f) other organs (incl. skeleton) metastases, (g) peritoneum, (h) incidental findings and complications, and (i) conclusion (Table 1).

CT SR in treatment evaluation phase was divided into ten sections: (a) primary tumor, (b) lymph node metastases, (c) liver metastases, (d) lung metastases, (e) brain metastases, (f) other organs (incl. skeleton) metastases, (g) peritoneum, (h) treatment-related complication, (i) incidental findings, and (l) conclusion (Table 2).

CT SR in follow-up phase was divided into six sections: (a) appearance of lesions, (b) node metastases, (c) liver lesions, (d) peritoneum, (e) incidental findings and complications, and (f) conclusion (Table 3).

Two Delphi rounds were performed. Each WK2 panelist independently contributed to refining the SR draft by means of mail exchanges. The level of panelists' agreement for each model was tested, through a Google Form questionnaire shared by email. Each expert expressed individual comments for each specific template section by using a four-point scale (0 = strongly disagree, 1 = slightly disagree, 2 = modestly agree, 3 = strongly agree).

Statistical analysis

All ratings of the panelists for each section were analyzed using descriptive statistics measuring the mean score, the standard deviation value (STD), and the sum of scores. A mean score of 2 was considered good and a score of 3 excellent.

To measure the internal consistency of the panelist ratings for each section of the report, a quality analysis based on the average inter-item correlation was carried out using the Cronbach's alpha (Cα) correlation coefficient. The Cα test provides a measure of the internal consistency of a test or scale; it is expressed as a number between 0 and 1. Internal consistency describes the extent to which all the items in a test measure the same concept. The Cα correlation coefficient was determined after each round.

The closer to 1.0 the Cα coefficient, the greater the internal consistency of the items in the scale. An alpha coefficient (α) > 0.9 was considered excellent, $\alpha > 0.8$ good, $\alpha > 0.7$ acceptable, $\alpha > 0.6$ questionable, $\alpha > 0.5$ poor, and $\alpha < 0.5$ unacceptable. However, in the iterations, an α of 0.8 was considered to be a reasonable goal for internal reliability.

Results

Structured Report

The CT SR in staging phase was built by including n = 5 items in (a) primary tumor; n = 8 items in (b) lymph node metastases (n = 4 items in local nodes and n = 4 items in distant nodal metastases); n = 8 items in (c) liver metastases; n = 5 items in (d) lung metastases; n = 5 items in (e) brain metastases; n = 1 item in (f) Other organs (incl. skeleton) metastases; n = 1 item in (g) peritoneum; n = 1 item in (h) incidental findings and complications; and n = 1 item in (i) conclusion. Overall, 35 items were included in the final model (Table 1).

SR CT in treatment evaluation phase was built by including n = 5 items in (*a*) Primary Tumor, n = 8 items in (*b*) lymph node metastases (n = 4 items in local nodes and n = 4 items in distant nodal metastases), n = 8 items in (*c*) liver metastases, n = 5 items in (*d*) lung metastases, n = 5 items in (*e*) brain metastases, n = 1 item in (*f*) other organs (incl. skeleton) Metastases, n = 1 item in (*g*) peritoneum, n = 8 items in (*h*) Treatment-related complication, n = 1 item in (*i*) Incidental Findings and n = 1 item in (*l*) conclusion. Overall, 43 items were included in the final model (Table 2).

SR CT in follow-up phase was built by including n = 4 items in (*a*) appearance of lesions, n = 4 items in (*b*) node metastases, n = 3 items in (*c*) liver lesions; n = 1 item in (*d*) peritoneum, n = 1 item in (*e*) incidental findings and complications, and n = 1 item in (*f*) conclusion. Overall, 14 items were included in the final model (Table 3).

CT requesting model

The CT requesting model was built by including 4 sections and n = 4 items in (a) patient clinical data, n = 2 items in (b) staging, n = 6 items in re-staging, n = 3 items in (c)

Table 1 CT report on staging phase

Primary Tumor		
Detectable (*tumor visible or not visible on CT)*	Yes	No
Site (for each lesion clarify site and number)		
Lung		
Stomach		
Breast		
Head-Neck		
Esophagus		
Liver		
Common bile duct		
Pancreas		
Small bowel		
Colon		
Rectum		
Spleen		
Peritoneum		
Uterus		
Ovaries		
Kidney		
Gallbladder		
Bladder		
Ureter		
Testicle		
Others (melanoma; sarcoma; lymphoma;..)		
Size	Maximum diameter on axial images (mm)	Diameter perpendicular to maximum diameter (mm)
Structure	isovascular/hypovascular/hypervascular for lung lesions clarify if solid, GGO, mixed or excavated	
Infiltration of neighboring structures (clarify involved structures as blood vessels, organs, diaphragm, peritoneum)	*Yes*	No
Lymph node metastases		
Locoregional		
Site (for lung clarify the involved station number)		
Number		
Size	Maximum diameter on axial images (mm)	Diameter perpendicular to maximum diameter (mm)
Structure		
Distant nodes		
Site		
Number		
Size	Maximum diameter on axial images (mm)	Diameter perpendicular to maximum diameter (mm)
Structure		
Metastases		
Liver	Yes specify: Number of visible lesions *[Numeric]* For each target lesion (max N = 2):	No

Table 1 (continued)

Site (clarify hepatic segment, parenchymal, peri-ductal o sub-capsular lesion)		
Size	Maximum diameter on axial images (mm)	Diameter perpendicular to maximum diameter (mm)
Structure	isovascular/hypovascular/hypervascular	
Infiltration of neighboring structures	Yes (suprahepatic veins, portal vein branches, biliary vessels, hepatic hilum, diaphragm, gallbladder, nearby organs	No
Distance from liver capsule and diaphragm	mm	
Distance from blood vessels	mm	
Distance from gallbladder	mm	
Lung	Yes specify: Number of visible lesions *[Numeric]* For each target lesion (max N = 2):	No
Site	Lung lobe and lung segment	
Size	Maximum diameter on axial images (mm)	Diameter perpendicular to maximum diameter (mm)
Structure	solid, GGO, mixed or excavated	
Infiltration of neighboring structures	Yes	No
Brain	Yes specify: Number of visible lesions *[numeric]* For each target lesion (max N = 2):	No
Site	Including if it is tissue or meningeal and the presence of meningeal carcinomatosis	
Size	Maximum diameter on axial images (mm)	Diameter perpendicular to maximum diameter (mm)
Structure		
Edema	Yes	No
Other organs (incl. skeleton)	Yes (specify) for solid organs Number of visible lesions *[Numeric]* For each target lesion (max N = 2): Site, size, structure and infiltration of neighboring structures	No

Table 1 (continued)

Peritoneum	Yes (PCI) For each quadrant report the numerical value for the quantification of carcinomatosis - R0: Middle abdomen, including the greater omentum and transverse colon; - R1: Right upper, including the right upper liver, right inferior diaphragmatic surface, and upper posterior surface of the right liver; - R2: Epigastrium, including the left hepatic lobe, lesser omentum, falciform ligament, and upper abdominal fat pad; - R3: Left upper, including the spleen, tail of pancreas, stomach, and left inferior diaphragmatic surface; - R4: Left flank, including the descending colon and left ventral groove; - R5: Left lower, including the sigmoid colon and lateral wall of the left pelvis; - R6: Pelvis, including the female internal genital organs, bladder, sigmoid colon, and Douglas bag; - R7: Right lower, including the cecum, vermiform appendix, and lateral wall of the right pelvis; - R8: Right flank, including the ascending colon and right abdominal cavity; - R9: Upper jejunum; - R10: Lower jejunum; - R11: Upper ileum; - R12: Lower ileum The assessment of several critical structures, as the first jejunal loop, the falciform ligament or the hepatic hilum, and epigastrium, should be evaluated	No
Incidental Findings and Complications	Yes (specify)	No
Conclusion		

follow-up. Overall, 15 items were included in the final model (Table 4).

SIRM members Consensus Agreement

At the first round, all sections achieved ratings above the "good" level (Table 5).

The overall mean score assigned by the panel of 12 experts and the total sum of scores for the staging section were 2.5 (range 0–3) and 272 (mean value 22.67, STD 6.49), respectively.

For the treatment evaluation section, the overall mean score and total sum of scores were 2.7 (range 0–3) and 321 (mean value 26.75, STD 6.81), respectively.

For the follow-up section, the overall mean score and total sum of scores were 2.6 (range 0–3) and 151 (mean value 12.58, STD 4.27), respectively.

The staging items showing the highest level of agreement among experts in the first round were lung metastases and incidental findings and complications.

For treatment evaluation, the items with the highest agreement were complication treatment-related and incidental findings.

For follow-up, the items with the highest agreement were Appearance of Lesions and Incidental Findings and Complications.

At the first round, Cronbach's alpha (Cα) correlation coefficients were 0.92, 0.95, and 0.90 for staging, re-staging, and follow-up, respectively.

At the second round, all sections achieved ratings at the "excellent" level.

The overall mean score assigned by the panel of experts (12 experts) and the total sum of scores for the staging section was 3 and 324, respectively; for the re-staging section, 3 and 360; and for the follow-up section, 3 and 180.

Table 2 CT report at treatment evaluation phase

Primary Tumor		
Detectable (tumor visible or not visible on CT)	Yes	No
Site (for each lesion clarify site and number)		
Lung		
Stomach		
Breast		
Head-Neck		
Esophagus (clarify if a prosthesis is present and it is tumor free)		
Liver		
Common bile duct (clarify if a prosthesis is present and it is tumor free)		
Pancreas		
Small bowel		
Colon (clarify if a prosthesis is present and it is tumor free)		
Rectum (clarify if a prosthesis is present and it is tumor free)		
Spleen		
Peritoneum		
Uterus		
Ovaries		
Kidney		
Gallbladder		
Bladder		
Ureter		
Testicle		
Others (melanoma; sarcoma; lymphoma;..)		
Size	Maximum diameter on axial images (mm) The data must be compared with previous CT examination	Diameter perpendicular to maximum diameter (mm) The data must be compared with previous CT examination
Structure	isovascular/hypovascular/hypervascular for lung lesions clarify if solid, GGO, mixed or excavated The data must be compared with previous CT examination	
Infiltration of neighboring structures (clarify involved structures as blood vessels, organs, diaphragm, peritoneum)	Yes The data must be compared with previous CT examination	No
Lymph node metastases		
Locoregional		
Site (for lung clarify the involved station number)	The data must be compared with previous CT examination	
Number	The data must be compared with previous CT examination	
Size	Maximum diameter on axial images (mm) The data must be compared with previous CT examination	Diameter perpendicular to maximum diameter (mm) The data must be compared with previous CT examination

Table 2 (continued)

Structure	The data must be compared with previous CT examination	
Distant nodes		
Site	The data must be compared with previous CT examination	
Number	The data must be compared with previous CT examination	
Size	Maximum diameter on axial images (mm) The data must be compared with previous CT examination	Diameter perpendicular to maximum diameter (mm) The data must be compared with previous CT examination
Structure	The data must be compared with previous CT examination	
Metastases		
Liver	Yes specify: Number of visible lesions [Numeric] The data must be compared with previous CT examination For each target lesion (max N = 2):	No
Site (clarify hepatic segment, parenchymal, peri-ductal o sub-capsular lesion)	The data must be compared with previous CT examination	
Size	Maximum diameter on axial images (mm) The data must be compared with previous CT examination	Diameter perpendicular to maximum diameter (mm) The data must be compared with previous CT examination
Structure	isovascular/hypovascular/hypervascular The data must be compared with previous CT examination	
Infiltration of neighboring structures	Yes (suprahepatic veins, portaò vein branches, biliary vessels, hepatic hilum, diaphragm, gallbladder, nearby organs The data must be compared with previous CT examination	No
Distance from liver capsule and diaphragm	mm The data must be compared with previous CT examination	
Distance from blood vessels	mm The data must be compared with previous CT examination	
Distance from gallbladder	mm The data must be compared with previous CT examination	
Lung	Yes specify: Number of visible lesions [Numeric] The data must be compared with previous CT examination For each target lesion (max N = 2):	No
Site	Lung lobe and lung segment The data must be compared with previous CT examination	
Size	Maximum diameter on axial images (mm) The data must be compared with previous CT examination	Diameter perpendicular to maximum diameter (mm) The data must be compared with previous CT examination

Table 2 (continued)

Structure	solid, GGO, mixed or excavated The data must be compared with previous CT examination	
Infiltration of neighboring structures	Yes The data must be compared with previous CT examination	No
Brain	Yes specify: Number of visible lesions [Numeric] The data must be compared with previous CT examination For each target lesion (max N = 2):	No
Site	Including if it is tissue or meningeal and the presence of meningeal carcinomatosis The data must be compared with previous CT examination	
Size	Maximum diameter on axial images (mm) The data must be compared with previous CT examination	Diameter perpendicular to maximum diameter (mm) The data must be compared with previous CT examination
Structure		
Edema	Yes The data must be compared with previous CT examination	No
Other organs (incl. skeleton)	Yes The data must be compared with previous CT examination	No

Table 2 (continued)

Peritoneum	Yes (PCI) For each quadrant report the numerical value for the quantification of carcinomatosis - R0: Middle abdomen, including the greater omentum and transverse colon; - R1: Right upper, including the right upper liver, right inferior diaphragmatic surface, and upper posterior surface of the right liver; - R2: Epigastrium, including the left hepatic lobe, lesser omentum, falciform ligament, and upper abdominal fat pad; - R3: Left upper, including the spleen, tail of pancreas, stomach, and left inferior diaphragmatic surface; - R4: Left flank, including the descending colon and left ventral groove; - R5: Left lower, including the sigmoid colon and lateral wall of the left pelvis; - R6: Pelvis, including the female internal genital organs, bladder, sigmoid colon, and Douglas bag; - R7: Right lower, including the cecum, vermiform appendix, and lateral wall of the right pelvis; - R8: Right flank, including the ascending colon and right abdominal cavity; - R9: Upper jejunum; - R10: Lower jejunum; - R11: Upper ileum; - R12: Lower ileum The assessment of several critical structures, as the first jejunal loop, the falciform ligament or the hepatic hilum, and epigastrium, should be evaluated The data must be compared with previous CT examination	No
Treatment-related complication	Yes	No
Site		
Lung	Pneumonia Bronchiolitis Radiation recall pneumonitis Organizing pneumonia Nonspecific interstitial pneumonia Hypersensitivity pneumonitis Diffuse alveolar damage-acute respiratory Distress Sarcoid reaction	
Liver	Hepatitis CASH SOS	
Pancreas	Interstitial edematous pancreatitis (IEP) or a necrotizing pancreatitis (NP)	
Kidney	Nephritis or renal failure	

Table 2 (continued)

Gastrointestinal Complications	Colitis (diffuse; segmental; pseudomembranous colitis and neutropenic colitis) Enteritis Enterocolitis GI perforation Fistula Small bowel ischemia Graft-versus-host disease Pneumatosis	
Vessels	Arterial and venous thrombosis Hemorrhage	
Peritoneum	Fluid and stranding	
Incidental Findings	Yes (specify)	No
Conclusion		

During the second round, all items across all sections were rated as "excellent" by every expert, making the calculation of Cronbach's alpha (Cα) correlation coefficients not applicable.

AIOM members Consensus Agreement

At first round, all sections received an overall score equal to or greater than the level defined as "good" (Table 6).

The overall mean score provided by the 12 experts was 2.4 (range 0–3), with a total score of 171 (mean value 14.25; standard deviation 3.67).

The item that showed the highest level of agreement in the first round was the Follow-up section, with a mean value of 2.75 ± 0.62.

The correlation coefficient, Cronbach's alpha (Cα), was 0.75, indicating an acceptable level of internal consistency.

In the second round, all sections received "excellent" ratings. The overall mean score assigned by the expert panel (12 experts) and the total sum of the scores were 3 and 144, respectively. In the second round, all items in all sections were rated "excellent" by all experts, making the calculation of Cronbach's alpha correlation coefficients inapplicable.

Inter-Society Consensus Agreement

During the inter-society evaluation, six AIOM members assessed the CT SR model developed by SIRM, while six SIRM members evaluated the CT requesting model proposed by AIOM. In this single Delphi round, all participants assigned the maximum score (3) to every item across all sections.

For the SIRM CT SR models, the six AIOM members expressed full agreement for all three templates—staging, treatment evaluation, and follow-up—with a mean score of 3.00 for each section.

Similarly, for the AIOM CT requesting model, the six SIRM members also expressed complete consensus, assigning a mean score of 3.00 to all 4 sections.

Given the absence of variability in responses, Cronbach's alpha could not be calculated, as all items received identical maximum scores.

Discussion

The introduction of MDTs has certainly improved management of oncological patients in terms of effectiveness and efficiency, improving the quality of care and promoting diagnostic-therapeutic pathways built on the individual patient. Despite this, communication among different specialists remains a critical element, as inadequate information could compromise the patient management.

In this context, structured communication tools may help reduce ambiguity and improve consistency across disciplines.

In the radiological setting, the heart of the communication with the referring clinicians is the radiological report, which must meet clear requirements: detailed, easily understandable, and adequately answer the question posed by clinicians. This result is dependent on an appropriate clinical question. In fact, knowing the patient's clinical data also allows for optimizing the examination technique, considering the need for the appropriateness of the prescribed investigation and its sustainability [18–24]. The radiologist should have quick and easy access to all the information necessary to best interpret the objective of the requested examination and its results. The inter-society collaboration between AIOM and SIRM is a milestone in improving communication between radiologists and oncologists, with direct effects on improved multidisciplinary management of cancer patients.

Table 3 CT report at follow-up phase

Appearance of lesions	Yes	No
Site (for each lesion clarify site and number)		
Size	Maximum diameter on axial images (mm)	Diameter perpendicular to maximum diameter (mm)
Structure	isovascular/hypovascular/hypervascular for lung lesions clarify if solid, GGO, mixed or excavated	
Infiltration of neighboring structures (clarify involved structures as blood vessels, organs, diaphragm, peritoneum)	*Yes*	No
Node metastases		
Site (for lung clarify the involved station number)		
Number		
Size	Maximum diameter on axial images (mm)	Diameter perpendicular to maximum diameter (mm)
Structure		
For Liver Lesions *clarify*		
Distance from liver capsule and diaphragm	Mm	
Distance from blood vessels	Mm	
Distance from gallbladder	Mm	
Peritoneum	Yes (PCI) For each quadrant report the numerical value for the quantification of carcinomatosis - R0: Middle abdomen, including the greater omentum and transverse colon; - R1: Right upper, including the right upper liver, right inferior diaphragmatic surface, and upper posterior surface of the right liver; - R2: Epigastrium, including the left hepatic lobe, lesser omentum, falciform ligament, and upper abdominal fat pad; - R3: Left upper, including the spleen, tail of pancreas, stomach, and left inferior diaphragmatic surface; - R4: Left flank, including the descending colon and left ventral groove; - R5: Left lower, including the sigmoid colon and lateral wall of the left pelvis; - R6: Pelvis, including the female internal genital organs, bladder, sigmoid colon, and Douglas bag; - R7: Right lower, including the cecum, vermiform appendix, and lateral wall of the right pelvis; - R8: Right flank, including the ascending colon and right abdominal cavity; - R9: Upper jejunum; - R10: Lower jejunum; - R11: Upper ileum; - R12: Lower ileum The assessment of several critical structures, as the first jejunal loop, the falciform ligament or the hepatic hilum, and epigastrium, should be evaluated	No
Incidental Findings and Complications	Yes (specify)	No
Conclusion		

Table 4 CT requesting model

Patient clinical data	Histological Diagnosis	• No • Yes (specify: _____)
	Symptoms	• No • Yes (specify: _____) *If yes* • Time of appearance and intensity
	Laboratory data	• No • Yes (specify: _____)
	Personal cancer History	• No • Yes *If yes* • Histological diagnosis and staging (specify: _____) • Date of diagnosis (specify: _____) • Previous oncological treatment (specify: _____)
	Family Cancer History	• No • Yes (specify: _____)
Reason for CT Assessment		
☐ Staging	*Previous radiological exams*	• No • Yes *If yes* • PET • MRI • CT
☐ re-staging	*Histological diagnosis and staging*	• Histological diagnosis (specify: _____) • Staging at diagnosis (specify: _____) • Date of diagnosis (specify: _____)
	Ongoing therapies	• No • Yes (specify cycle number and last administration: _____)
	Radiotherapy	• No • Yes *If yes* • Treatment site • For ongoing, cycle number and type of treatment) • For previous treatment, how long ago the treatment ended
	Locoregional therapy (including surgery)	• No • Yes *If yes* • Type • Date • Treatment site
	Previous radiological exams	• No • Yes *If yes* • PET • MRI • CT
Follow-up		• Histological diagnosis (specify: _____) • Staging at diagnosis (specify: _____) • Date of diagnosis (specify: _____)
	Previous treatments	Clarify • Type of treatment • Last administration (specify:_____)
	Last/ previous radiological exams	• No • Yes (specify: _____) *If yes* • PET • MRI • CT

Table 5 Mean scores and sum of scores for the SIRM Members Consensus Agreement in the first round

Staging	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	Question 8	Question 9	Staging sum of scores	
Mean	2.33	2.25	2.42	2.33	2.67	2.58	2.58	2.50	3.00	22.67	
Std	0.85	1.09	1.11	0.94	0.85	0.86	0.86	0.87	0.00	6.49	
Treatment Evaluation	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*	*Question 6*	*Question 7*	*Question 8*	*Question 9*	*Question 10*	*Re-Staging sum of scores*
Mean	2.58	2.50	2.67	2.50	2.67	2.58	2.67	2.58	3.00	3.00	26.75
Std	0.86	0.96	0.85	0.96	0.85	0.86	0.85	0.86	0.00	0.00	6.81
Follow-up	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*	*Follow-up sum of scores*					
Mean	2.67	2.25	2.55	2.58	2.75	12.58					
Std	0.85	1.16	0.89	0.86	0.83	4.27					

CT represents a central radiological tool in the various stages of an oncology patient's disease and the choice of one treatment or another depends on its results. Therefore, the interpretation of CT information is crucial for proper patient management. However, for the results to be of high quality, it is necessary that the examination is performed according to good radiological practice standards, considering the principles of justification and optimization, subordinated to a clinical question adequately provided to the radiologist [25].

Advances in imaging technologies may further enhance diagnostic accuracy, although their effectiveness remains dependent on the quality of clinical information provided.

The approved CT Requesting Model was built by including 4 sections and n = 4 items in (a) patient clinical data, n = 2 items in (b) staging, n = 6 items in (re-staging), n = 3 items in (c) follow-up. Overall, 15 items were included in the final version. All items included in the model received an excellent level of agreement and provide the data necessary to perform a CT scan that meets the criteria of good clinical practice.

Regarding CT SR, working group approved 3 models: one for staging phase, one for treatment evaluation, and the last for follow-up. The model in staging phase was built by including n = 5 items in (a) primary tumor, n = 8 items in (b) lymph node metastases (n = 4 items in local nodes and n = 4 items in distant nodal metastases), n = 8 items in (c) liver metastases; n = 5 items in (d) lung metastases, n = 5 items in (e) brain metastases, n = 1 item in (f) other organs (incl. skeleton) metastases, n = 1 item in (g) peritoneum, n = 1 item in (h) incidental findings and complications, and n = 1 item in (i) conclusion. These structured templates may also facilitate greater consistency and reproducibility in radiological reporting.

The model in treatment evaluation phase was built by including n = 5 items in (a) primary tumor, n = 8 items in (b) lymph node metastases (n = 4 items in local nodes and n = 4 items in distant nodal metastases), n = 8 items in (c) liver metastases, n = 5 items in (d) lung metastases, n = 5 items in (e) brain metastases, n = 1 item in (f) other organs (incl. skeleton) metastases, n = 1 item in (g) peritoneum, n = 8 items in (h) treatment-related complications, n = 1 item in (i) incidental findings, and n = 1 item in (l) conclusion.

The model in follow-up phase was built by including n = 4 items in (a) appearance of lesions, n = 4 items in (b) node metastases, n = 3 items in (c) liver lesions; n = 1 item in (d) peritoneum, n = 1 item in (e) incidental findings and complications, and n = 1 item in (f) conclusion.

Although these models may appear complex, they allow to identify, in the different phases of the disease, all those parameters that allow for adequate patient management, allowing to choose the most appropriate treatment for each individual case, in relation to the characteristics of the disease spread [26, 27]. Indeed, both during the second round

Table 6 Mean scores and sum of scores for the AIOM Members Consensus Agreement in the first round

	Oncological family history	Relevant clinical data	Staging	Re-staging	Other reason	Follow-up	Sum of Score
Mean	2.00	2.33	2.42	2.33	2.42	2.75	14.25
Std	1.21	1.07	0.67	0.98	0.79	0.62	3.67

of the SIRM members, and during Inter-Society Consensus Agreement, full agreement was expressed for all three templates, with a mean score of 3.00 for each section.

With regard to staging phase, knowing the number and structural characteristics of a lung metastasis allows to include research patients in study protocols that can improve their survival [28, 29], so as providing clear information on the number, deep intra-parenchymal rather than sub-capsular distribution of liver metastases, as well as their relationships with vascular structures, opens the possibility of robotic interventions [30, 31] or combined approaches of surgery and ablative techniques, which improve patient outcome [32, 33]. In addition, an adequate representation of the extent of peritoneal carcinomatosis allows the identification of those patients who can benefit from an upfront surgical approach [34–37]. Yet these data are often not reported adequately in a radiological report, with consequent negative effects on the patient management. So, although these models may seem complex and laborious, it is necessary to provide all these features for a better patients stratification, for a personalized approach.

With regard to treatment evaluation phase, the working group considered two central elements: treatment response and treatment-related complications. The importance of evaluating treatment efficacy beyond individual criteria [38–42] was emphasized, and this is closely related to the therapeutic approach that most often involves several treatments simultaneously, such as radiotherapy combined with conventional chemotherapy, rather than targeted therapy, immunotherapy or ablative therapies [43, 44]. This approach determines the need not to be tied to individual response criteria, but to evaluate comprehensively the expected responses, as dimensional reduction, necrosis, fibrosis, etc. [45–48]. Structured reporting may also support consistent longitudinal assessment across sequential examinations.

Regarding treatment-related complications, although there are conditions with which a radiologist is more familiar, such as immunotherapy-related pneumonia [49], more complex conditions, such as recall pneumonia [50], or infections in immunosuppressed patients, not treatment-related, must be identified promptly, to avoid treatment being suspended or that progression be diagnosed where there is none. So, it appears evident that a checklist can guide less-experienced radiologists in the correct identification of such conditions.

In modern medicine, inter-society collaborations are considered the basis of the quality of patients' diagnostic-therapeutic pathways. The collaboration between SIRM and AIOM responds to this request and the proposed models, for CT request and reporting, meet the needs of quality care even outside of referral centers. These models do not represent an obligation but can certainly facilitate understanding between the different categories of professionals involved in patient management precisely because they represent the result of a multidisciplinary evaluation according to a structured approach. They can also be a guide for young oncologists and radiologists, educating them in filling out request forms or in radiological reports. We recognize that completing requests and reports in accordance with the recommendations in this document is time-consuming and can add to healthcare professionals' already demanding workloads. However, we believe this document has significant cultural value, raising awareness among healthcare professionals of the importance of providing their colleagues with complete, high-quality information. It is hoped that the improving interoperability of electronic clinical records will promote the completeness and quality of information, simplifying healthcare professionals' work.

Although several inter-society consensuses are currently available for the management of oncology patients with genetic mutations [51] and/or characteristic settings, such as oligometastatic patients [52], so as consensus on reporting and optimization of radiological investigations have been proposed by several working groups [53–56], to the best of our knowledge, this is the first time that oncologists and radiologists have expressed a consensus on CT request and reporting templates. The advantages of this project are related to the involvement of experts who have transversal knowledge of oncological pathology, so that the project is as comprehensive as possible and that the final phase has seen an inter-society consensus, so that the models are considered "correct" for the clinicians and radiologists for whom they are intended. The limitation is the lack of involvement of radiation oncologists and surgeons, who represent actors of equal dignity as radiologists and oncologists in the management of cancer patients. A consensus that also involves radiation oncologists and surgeons is the future objective of this working group.

Conclusion

The inter-society collaboration between AIOM and SIRM is a milestone in improving communication between radiologists and oncologists, with direct effects on improved multidisciplinary management of oncological patients. The CT request and reporting documents meet the needs of quality care even outside of referral centers. These models do not represent an obligation but can certainly facilitate understanding between the different categories of professionals involved in patient management precisely because they represent the result of a multidisciplinary evaluation according to a structured approach.

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Declarations

Conflict of interest Vincenza Granata is Assistant Editor of La Radiologia Medica. Roberta Fusco, Damiano Caruso, Ginevra Danti and Alessandro Serafini are Deputy Junior Editors of La Radiologia Medica. Luca Brunese, Carlo Catalano, Gianpaolo Carrafiello, Andrea Laghi, Vittorio Miele, Luca Maria Sconfienza are Consultant to the Editor of La Radiologia Medica. Andrea Giovagnogni is honorary editor of La Radiologia Medica. Nicoletta Gandolfo is member of Scientific Editorial Board. Francesco Perrone has had the following relationships including funding, with entities with commercial interests in the healthcare field: Viatris; and he is President of the AIOM Foundation. Carmine Pinto has had the following relationships, including funding, with entities with commercial interests in the healthcare field: Accord, Amgen, Astellas, AstraZeneca, Bayer, BeOne, BMS, Daichi Sankyo, GSK, Ipsen, Incyte, Janssen, Jazz, Lilly, Menarini Stemline, Merck, MSD, Novartis, Roche, Sandoz, Servier, and Takeda. Massimo Di Maio has had the following relationships, including financial ones, with entities with commercial interests in the healthcare field: AstraZeneca, Eisai, Janssen, Pfizer, Roche, Novartis, GlaxoSmithKline, Viatris, Ipsen, Johnson & Johnson, Astellas, Resilience, Daiichi Sankio and institutional funding for participation in clinical trials: Beigene, Exelixis, MSD, Pfizer, Roche, Daiichi Sankyo; and he is president of AIOM. Roberto Bordonaro has had the following relationships, including financial ones, with entities with commercial interests in the healthcare field: Bayer, AstraZeneca, Sanofi, Novartis, Amgen, Roche, Pfizer, Janssen Cilag, Bristol Mayer Squibb. Saverio Cinieri has had the following relationships, including financial ones, with entities with commercial interests in the healthcare field: Lilly Oncology, Roche, Novartis, Menarini; Saverio Cinieri is also past president of the AIOM Foundation. Lorenza Rimassa received consulting fees from AbbVie, AstraZeneca, Basilea, Bayer, BMS, Boehringer Ingelheim, Eisai, Elevar Therapeutics, Exelixis, Genenta, Guerbet, Hengrui, Incyte, Ipsen, Jazz Pharmaceuticals, MSD, Nerviano Medical Sciences, Roche, Servier, Taiho Oncology, Zymeworks; lecture fees from AstraZeneca, Bayer, Biologix, BMS, Eisai, Guerbet, Incyte, Ipsen, Roche, Servier; travel expenses from AstraZeneca and Servier; research grants (to Institution) from AbbVie, AstraZeneca, BeiGene, Exelixis, Fibrogen, Incyte, Ipsen, Jazz Pharmaceuticals, MSD, Nerviano Medical Sciences, Roche, Servier, Taiho Oncology, TransThera Sciences, Zymeworks. Andrea Laghi was Speakers' fees for: Bracco, Bayer, GE Healthcare, Guerbet; Andrea Laghi is Advisory board of GE Digital Imaging. Nicola Silvestris received Honoraria, Institutional Grants/Research Support, Advisory Boards, Scientific National and International Meeting Support: Editree, Affari, Sanitanova, Vihtal, Aristea, Pharmalex, Agorà, LeoPharma, Menarini, Servier, Bristol, Glaxo, Isheo, MSD; Nicola Silvestris was Member of AIFA Working Group; Member of the Ethics Committee of the Cancer Institute of Bari; National secretary of AIOM. Andrea Giovagnoni was Past President of Italian Society of Medical and Interventional Radiology (SIRM). Nicoletta Gandolfo was President of Italian Society of Medical and Interventional Radiology (SIRM). Rosanna Berardi has had the following relationships, including funding, with entities with commercial interests in the healthcare field: Astellas, Bayer, BMS, Boeringher Ingelheim, EISAI, J&J, Lilly, GSK, Incyte, Lionhealth. Mirko D'Onofrio has had the following relationships, including funding, with entities with commercial interests in the healthcare field: Samsung, Canon, Siemens, Hitachi, Fujifilm, Bracco, Mindray.

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