

RECIST 1.1 Guidelines

	RECIST 1.0	RECIST 1.1	Rationale for Change
<ul style="list-style-type: none"> ● Measurable Tumor Burden 	<p>A maximum of 10 target lesions in total (and up to 5 per organ) can be identified at baseline and measured through the course of therapy.</p>	<p>A maximum of 5 target lesions in total (and up to 2 per organ) can be identified at baseline and measured through the course of therapy.</p>	<p>Data warehouse analyses showed no loss of information when the maximum measurable lesion count was reduced from 10 to 5. A maximum of 2 lesions per organ yields sufficient representation per disease site.</p>
<ul style="list-style-type: none"> ● Minimum Size of Measurable Lesions 	<ul style="list-style-type: none"> • ≥ 10 mm in longest diameter (LD) for spiral CT (nodal & extranodal lesions) • ≥ 20 mm in LD for non-spiral CT • ≥ 20 mm in LD for clinical lesions • ≥ 20 mm in LD for chest x-ray (if clearly defined & surrounded by aerated lung); CT is preferable • Ultrasound (US) may be an alternative to clinical measurement of superficial palpable nodes, subcutaneous lesions & thyroid nodules 	<ul style="list-style-type: none"> • ≥ 10 mm in LD and 2X the slice thickness for extranodal lesions • ≥ 15 mm in short axis diameter (SAD) for nodal lesions • ≥ 10 mm in LD for clinical lesions (must be measured using electronic calipers) • ≥ 20 mm in LD for chest x-ray (if clearly defined & surrounded by aerated lung); CT is preferable • US cannot be used to measure lesions 	<p>Additional guidance was necessary for CT scans with a slice thickness of > 5 mm. Lymph nodes are normal anatomic structures. The SAD of lymph nodes is more predictive of malignancy than the long axis. US exams cannot be reproduced in their entirety for independent review and since they are operator-dependent, it cannot be guaranteed the same technique & measurements will be made at all assessments.</p>
<ul style="list-style-type: none"> ● Lymph Nodes 	<p>Nodal lesions not distinguished from extranodal lesions</p> <p>The sum of the longest diameters of target lesions followed through the course of therapy</p>	<p>Lymph nodes are considered pathologically enlarged if ≥ 10 mm in SAD. To be measurable, nodal lesions must be ≥ 15 mm in SAD. Nodal lesions with SAD ≥ 10 mm and < 15 mm are non-measurable. The sum of the diameters (LD for extranodal target lesions, SAD for nodal lesions) is followed through the course of therapy.</p>	<p>It was necessary to define pathological enlargement of lymph nodes. The SAD of lymph nodes is more predictive of malignancy than the long axis.</p>
<ul style="list-style-type: none"> ● Bone Lesions 	<p>Bone lesions are non-measurable.</p>	<p>A lytic or mixed lytic-blastic bone lesion with a soft tissue component assessed on CT/MRI can be measurable if the minimum size criteria are met. Blastic bone lesions & bone lesions assessed on bone scan, PET, or plain films are non-measurable.</p>	<p>Certain bone lesions can be measured and at times, it may be appropriate to include them in the baseline target disease.</p>
<ul style="list-style-type: none"> ● Cystic Lesions 	<p>Cystic lesions are non-measurable.</p>	<p>Lesions that meet the criteria for radiographically defined simple cysts are not malignant. Cystic lesions thought to be metastases can be measurable if they meet the minimum size criteria. Non-cystic lesions are preferable.</p>	<p>Certain cystic lesions can be measured and at times, it may be appropriate to include them in the baseline target disease.</p>
<ul style="list-style-type: none"> ● Lesions with Prior Local Treatment 	<p>Lesions in previously irradiated areas may or may not be considered measurable (conditions should be defined in study protocols).</p>	<p>Lesions in previously irradiated areas (or areas treated with local therapy) are not measurable unless the lesion has progressed since therapy. Conditions should be defined in study protocols.</p>	<p>Some lesions that have progressed since local therapy can be measured and it may be appropriate to include them in the baseline target disease.</p>
<ul style="list-style-type: none"> ● Too Small To Measure 	<p>Not discussed</p>	<p>If a target lesion becomes too small to measure, a default value of 5 mm is assigned. If the lesion disappears, the measurement is recorded as 0 mm.</p>	<p>Measurement of small lesions is not reproducible. Providing a default value prevents assessments based upon measurement error.</p>

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<ul style="list-style-type: none"> Lesions which Split or Coalesce 	Not discussed	<p>If extranodal target lesions fragment, the LDs of the fragmented portions are added to the sum.</p> <p>If target lesions coalesce and cannot be distinguished, the LD of the coalesced lesion is added to the sum.</p>	Use cases which were not defined in RECIST 1.0
<ul style="list-style-type: none"> Definition of Complete Response (CR) 	CR requires the disappearance of all lesions and the normalization of tumor marker level.	CR requires the disappearance of all extranodal lesions, the regression of all nodal lesions to < 10 mm SAD & the normalization of tumor marker level.	Lymph nodes are normal anatomic structures and are no longer considered pathologically enlarged if the SAD regresses to < 10 mm.
<ul style="list-style-type: none"> Definition of Progressive Disease (PD) 	<p>PD is assessed if the sum of the longest diameters increases by $\geq 20\%$ from nadir (smallest sum on treatment).</p> <p>PD is assessed if there is "unequivocal progression" of existing non-target lesions.</p>	<p>PD is assessed if the sum of the diameters has increased by $\geq 20\%$ and ≥ 5 mm from nadir (including baseline if it is the smallest sum).</p> <p>Patients with measurable disease: for "unequivocal progression" based on non-target disease, there must be an overall level of substantial worsening that merits discontinuation of therapy (if target disease is SD/PR).</p> <p>Patients without measurable disease: for "unequivocal progression" of non-target disease, the increase in overall tumor burden must be comparable to the increase required for PD of measurable disease.</p>	<p>Clarification that if baseline is the smallest sum, it is the reference against which PD is assessed. The PD requirement of a ≥ 5 mm increase guards against PD when the total sum is small and a 20% increase is within measurement error.</p> <p>There was confusion with RECIST 1.0 as some were assessing PD based on an increase in any non-target lesion even when the target disease was stable or responding.</p>
<ul style="list-style-type: none"> Assessment of New Lesions 	Not specifically defined	<p>New lesions should be unequivocal and not attributable to differences in scanning technique or findings which may not be tumor (i.e. 'new' bone lesions may be healing or flare of pre-existing lesions). If a new lesion is equivocal, repeat scans are needed to confirm. If confirmed, PD is assessed at the date of the initial scan.</p> <p>Lesions identified in anatomic locations not scanned at baseline are considered new.</p> <p>New lesions on US should be confirmed on CT/MRI.</p>	The appearance of new malignant lesions results in PD; therefore additional guidance regarding the detection of new lesions is important.
<ul style="list-style-type: none"> FDG-PET 	No specific recommendations	<p>New lesions can be assessed using FDG-PET:</p> <p>(-) PET at baseline and (+) PET at follow-up is PD based on a new lesion</p> <p>No PET at baseline and (+) PET at follow-up is PD if the new lesion is confirmed on CT. If a subsequent CT confirms the new lesion, the date of PD is the date of the initial PET scan.</p> <p>No PET at baseline and (+) PET at follow-up corresponding to a pre-existing lesion on CT that is not progressing: not PD</p>	While RECIST 1.1 is not yet incorporating FDG-PET into the response assessment, it is reasonable to use PET to complement CT scanning in the assessment of PD (particularly for the identification of new disease).
<ul style="list-style-type: none"> Recurrence of Lesions 	Not discussed	For a patient with SD/PR, a lesion which disappears & then reappears will continue to be measured and added to the sum. Response will depend upon the status of the other lesions. For a patient with CR, reappearance of a lesion would be considered PD.	Most lesions have not disappeared but are not visualized because they are beyond the resolving power of the imaging modality employed.
<ul style="list-style-type: none"> Overall Response 	Overall response table integrates target, non-target & new lesions	One overall response table integrates target, non-target & new lesions and another table integrates non-target & new lesions for the assessment of subjects without measurable disease.	RECIST is being used in trials where PFS is the primary endpoint and not all patients have measurable disease at baseline.
<ul style="list-style-type: none"> Confirmation of Response 	CR and PR require confirmation by a repeat assessment no earlier than 4 weeks after the criteria for response is first met.	Confirmation of PR/CR is ONLY required for non-randomized trials where response is the primary endpoint. In these trials, subsequent confirmation of PR with one interim time point of SD is acceptable.	Data warehouse analyses showed response rates rise when confirmation is eliminated, however the only circumstance where this is important is in trials with no concurrent comparative control & where response is the primary endpoint.