

Original Research

COPD Exacerbation Recognition Tool: Translation, Linguistic, and Cross-Cultural Validation

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Preparation and Concept Definitions

We first conducted an internal assessment to investigate which countries were interested in having the Chronic Obstructive Pulmonary Disease (COPD) Exacerbation Recognition Tool (CERT) available in the target language. Subsequent translations were requested through the Global Allergy and Airways Patient Platform (GAAPP). Contact was then established with an in-country linguistic validation consultant (LVC), and a concept elicitation guide and forward translations were developed (Supplemental Table 1).

Cognitive Debriefing

During the interview, each participant was given a copy of the translated CERT and were asked a series of open-ended, probing questions about each instruction and item, question key words and response options to assess if the translation was understood clearly and as intended in the English translation of the CERT. The participants were also asked to provide general feedback regarding their impressions of the clarity and consistency of the language used in the CERT.

Analysis of Cognitive Debriefing Feedback and Expert Review

The LVC summarised all participant responses in a single report, along with any recommendations and/or comments they had regarding the translation, including suggestions for changes to the wording where appropriate. Participant anonymity was maintained throughout this process. The report was then reviewed by the project manager, who discussed any issues with the LVC until a satisfactory resolution was achieved, to ensure that the translation was clear.

Proofreading

The translation was sent for monolingual review by an independent linguist who was a native speaker of the target language, was fluent in English and had not previously worked on the translation project. The LVC carried out a review of the translation in parallel. Both linguists were asked to check the translation for errors (spelling, grammar, punctuation and typography) and to confirm the suitability of the language used for the intended purpose. The LVC then gave feedback on the suggested changes and implemented any that were relevant. The final instruments were then prepared and checked by the LVC to ensure accuracy of presentation and layout compared with the English source CERT.

Supplementary Table 1. Concept Elicitation Guide

	Wording of Source Instrument	Term/Phrase	Concept Explanation	Translation Tips	Possible Alternatives
1	Select the most accurate description for you today compared with your usual state		Select the closest representation for you to your normal condition on the current day.		
		Accurate	The quality of being correct, precise, or free from errors.		Reflective, representative
		Usual state	This concept implies a baseline or standard state against which variations or changes can be measured.		Typical or normal condition
2	Worsening cough		A cough that is getting worse/increasing in severity.		
		Cough	A sudden and often repetitive reflex action that helps to clear the airways of irritants, mucous, or foreign substances. It involves a forceful expulsion of air from the lungs through the mouth, accompanied by a distinctive sound.		
3	Increased volume of sputum		Greater amount of sputum.		
		Sputum	The material expelled from the lower respiratory tract, including the bronchi and lungs. It is often produced during coughing and is more likely to contain cellular debris,		Phlegm

	Wording of Source Instrument	Term/Phrase	Concept Explanation	Translation Tips	Possible Alternatives
			microorganisms, and other components beyond just mucous.		
4	Shortness of breath		A sensation of difficulty or discomfort in breathing, where an individual feels that they are not able to take in enough air.		Breathlessness, difficulty breathing
5	Laboured breathing		A type of breathing that requires more effort and is often accompanied by visible or audible difficulty. It is characterized by increased work of the respiratory muscles, making each breath more challenging and strenuous.		
6	Limitation of activity		Where an individual experiences restrictions or constraints in their ability to engage in certain physical or functional tasks/activities.		Limited activity
7	As usual		The same as normal (for the respondent).	Please ensure that this response option scales well with the following three and that they are well spaced.	
8	Mild		Slight		
9	Moderate		Medium	This response option is neither too severe	

	Wording of Source Instrument	Term/Phrase	Concept Explanation	Translation Tips	Possible Alternatives
				nor too mild but falls somewhere in the middle in terms of intensity or severity.	
10	Severe		Strong		
11	If you choose at least two items in red, you are probably experiencing a COPD exacerbation and should visit your doctor		In the event that you select two choices in red (that is moderate or severe) you are likely going through a COPD exacerbation and must go to see your doctor.	Please see formatted version for context around this instruction. In the event that there is confusion about which ones are the items in red, can be added between brackets '(answers "moderate" and "severe")'.	
		COPD	Chronic obstructive pulmonary disease. It is a progressive and chronic respiratory condition characterised by obstructed airflow to the lungs. The primary components of COPD are chronic bronchitis and emphysema.	This acronym should not be kept if not widely used in the target country. Please translate in full if necessary.	
		COPD exacerbation	A sudden worsening of symptoms in individuals with COPD. During an exacerbation, there is a notable increase in the severity of respiratory symptoms beyond		COPD flare-up

	Wording of Source Instrument	Term/Phrase	Concept Explanation	Translation Tips	Possible Alternatives
			the day-to-day variations that individuals with COPD may experience.		
		Doctor	A professional who holds a degree in medicine and is licensed to practice medicine.		
12	© 2023 GSK Group of companies			The copyright remains in English.	
		GSK	GlaxoSmithKline.	Please do not transliterate.	

COPD=chronic obstructive pulmonary disease

Supplemental Table 2. Demographics of Participants Included in the Cognitive Debriefing Stage of Five Separate CERT Translations

Characteristic	Indonesian Translation (Indonesia) (N=5)	Korean Translation (South Korea) (N=5)	Latin-American Spanish Translation (N=9; US=3, Argentina=3, Colombia=3)	Norwegian Translation (Norway) (N=5)	Universal ‘Modern Standard’ Arabic Translation (N=9; Egypt=3, Saudia Arabia=3, UAE=3)
Age bracket (years)	1 participant aged 51–60 3 participants aged 61–70 1 participant aged 71–80	2 participants aged 41–50 2 participants aged 61–70 1 participant aged 71–80	1 participant aged 18–24 1 participant aged 31–40 2 participants aged 41–50 3 participants aged 51–60 2 participants aged 61–70	1 participant aged 41–50 2 participants aged 51–60 1 participant aged 61–70 1 participant aged 71–80	3 participants aged 18–24 1 participant aged 25–30 1 participant aged 31–40 1 participant aged 41–50 3 participants aged 51–60
Sex	4 male participants 1 female participant	3 male participants 2 female participants	5 male participants 4 female participants	3 male participants 2 female participants	5 male participants 4 female participants
Pathologies of participants	5 participants with COPD	3 participants with chronic bronchitis ^a 1 participant with emphysema ^a 1 participant with COPD	9 participants with COPD	5 participants with COPD	9 participants with COPD
Education level	3 participants with a senior-high school level education 2 participants with an elementary school level education	2 participants with a college level education 1 participant with a technical college level education 2 participants with a high school level education	2 participants with a high school level education 2 participants with a university level education 1 participant with tertiary/college level education 2 participants with a technical college level	2 participants with a junior college level education 1 participants with a university level education 1 participant with a high school level education 1 participant who	3 participants with a college level education 4 participants with a university level education 1 participant with an intermediate level education

Characteristic	Indonesian Translation (Indonesia) (N=5)	Korean Translation (South Korea) (N=5)	Latin-American Spanish Translation (N=9; US=3, Argentina=3, Colombia=3)	Norwegian Translation (Norway) (N=5)	Universal 'Modern Standard' Arabic Translation (N=9; Egypt=3, Saudia Arabia=3, UAE=3)
			education 1 participant with secondary school education 1 participant with primary school level education	completed technical courses after high school	1 participant with a military academy education
Occupation	1 participant who patches tires 1 busker 1 housewife 1 pedicab driver 1 unemployed participant	1 engineer 1 cook 1 construction worker 1 landlord 1 nurse aide	1 student 1 driver 1 account manager 1 administrative clerk 1 business administrator 1 salesperson, 3 retired participants	1 administrative assistant 1 taxi driver 1 financial consultant 2 retired participants	3 unemployed participants 3 retired participants 1 IT support worker 2 housewives

^a As many patients are unfamiliar with the term 'COPD' in Korea, patients with chronic bronchitis and emphysema were also recruited

COPD=chronic obstructive pulmonary disease; UAE=United Arab Emirates; US=United States

Supplemental Table 3. Translation History Example: Indonesian CERT Translation

	Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
				1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
1	Select the most accurate description for you today compared with your usual state.	Pilih {MQ} gambaran yang paling tepat mengenai kondisi Anda hari ini dibandingkan dengan kondisi Anda biasanya.	Select {MQ} the illustration that is most accurate regarding your condition today, compared to your usual condition.	<p>R1: Choose the description that fits today condition compared to usual condition.</p> <p>R2: Choose the illustration that describe the change in the current condition from the usual condition.</p> <p>R3: Choose the illustration that fits current condition compared to usual situation.</p> <p>R4: Choose the option that describe the difference</p>	<p>R1: No.</p> <p>R2: No.</p> <p>R3: No.</p> <p>R4: No.</p> <p>R5: No.</p>	<p>BTR: Fine.</p> <p>BTR-LSP-PM: Okay</p> <p>CDR: No changes needed.</p> <p>CDR-PM: Is the translation of “most accurate” clear in the translation? The participants do not mention it.</p> <p>CDR-LVC: Yes, they understand the instruction, although they didn’t mention the “most accurate” but what they said already described what they supposed to do,</p>

Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
			1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
			<p>between your current situation and usual.</p> <p>R5: Choose the illustration that describe current condition compared to usual condition.</p>		<p>and they could do the following instructions.</p> <p>CDR-PM: Okay no change.</p>

Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments	
			1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?		
2	Worsening cough	Batuk semakin parah	Coughing of increasing seriousness	<p>R1: Is there Frequent coughing?</p> <p>R2: Is the cough more often?</p> <p>R3: Is the cough getting worse?</p> <p>R4: Is the cough increases from previous days?</p> <p>R5: Do I experience coughing more often?</p>	<p>R1: No.</p> <p>R2: No.</p> <p>R3: No.</p> <p>R4: No.</p> <p>R5: No.</p>	<p>BTR: It has the same meaning as the concept: A cough that is getting worse/increasing in severity.</p> <p>BTR-LSP-PM: Okay thanks for explaining.</p> <p>CDR: No changes needed.</p> <p>CDR-PM: Was this also understood as the intensity of the cough getting worse?</p> <p>CDR-LVC: Yes.</p> <p>CDR-PM: Okay no change.</p>
3	Increased volume of sputum	Dahak bertambah banyak	Greater amount of phlegm	<p>R1: Is there more phlegm or not?</p> <p>R2: Is the phlegm stubborn?</p> <p>R3: Is the phlegm</p>	<p>R1: No.</p> <p>R2: No.</p> <p>R3: No.</p> <p>R4: No.</p>	<p>BTR: Fine, it uses the possible alternative mentioned.</p> <p>BTR-LSP-PM: Would it not be preferable to use “large” increase of “Greater”? “Greater” is in the comparative form that</p>

Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
			1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
			<p>increases?</p> <p>R4: Is there any increasing phlegm expelled?</p> <p>R5: Is the phlegm increases as coughing?</p>	<p>R5: No.</p>	<p>implies that there is more sputum compared to something. Please advise.</p> <p>BTR-LVC: Well, in that sense, I think increased is also comparative, and this questionnaire indeed compares the condition of the respondents today with their usual state.</p> <p>BTR-LSP-PM: Okay no change.</p> <p>CDR: No changes needed.</p> <p>CDR-PM: What does R2 mean by the phlegm being “stubborn”?</p> <p>CDR-LVC: The phlegm that can’t be eliminated as usual.</p> <p>CDR-PM: Okay. In general, this is therefore well</p>

	Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
				1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
						understood then.
4	Shortness of breath	Kesulitan bernapas	Difficulty breathing	R1: Do you short of breath or not? R2: Is there tightness? R3: Is there difficulty breathing or not? R4: Is there shortness of breath or not? R5: Do you have difficulty breathing or not?	R1: No. R2: No. R3: No. R4: No. R5: No.	BTR: Fine. BTR-LSP-PM: Okay. CDR: No changes needed. CDR-PM: What does R2 mean by “tightness”? CDR-LVC: It’s the feeling of difficult to breath like the chest is being tied. CDR-PM: Okay.
5	Labored breathing	Napas terengah - engah	Panting	R1: Do you often felt panting? R2: Is there a feeling of breathlessness? R3: Do you gasping for breath?	R1: No. R2: No. R3: No. R4: No. R5: No.	BTR: I tried to choose a word that could describe the concept as simple as possible. And I think panting is the sign of labored breathing that will easily comprehended by the respondent, I hope it would

Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
			1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
			<p>R4: Do you feel panting?</p> <p>R5: Do I have panting more often?</p>		<p>be acceptable.</p> <p>BTR-LSP-PM: I think “panting” refers to the source meaning. Can you just clarify if the BT a direct translation of the Indonesian version? The translation has 3 words?</p> <p>BTR-LVC: Actually the Indonesian version has two words, the last word uses the hyphen to make it clear that it is one word. The back translation for Indonesian version would be panting breathing.</p> <p>BTR-LSP-PM: Okay no change. Thanks for explaining.</p> <p>AR: Can they offer alternatives to ‘panting’ for us to cognitively debrief please? We can try the panting one too, but I’d like a</p>

Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
			1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
					<p>2nd option.</p> <p>AR-V2: napas megap-megap.</p> <p>AR-BT: gasping for breath.</p> <p>AR-V3: napas mengi.</p> <p>AR-BT: wheezing breath.</p> <p>AR-V4: mengeluarkan usaha tambahan ketika bernapas.</p> <p>AR-BT: exerting additional effort when breathing.</p> <p>AR-DEV: Thanks – let’s debrief both the original translation of “panting” and the above V4 (highlighted).</p> <p>CDR: No changes needed.</p> <p>CDR-PM: Was there a clear difference for the participants between the translation in row 4</p>

Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments	
			1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?		
					and here? CDR-LVC: Yes there was. They understood it. CDR-PM: Okay.	
6	Limitation of activity	Keterbatasan aktivitas	Limitation of activity	<p>R1: Does the daily work disrupted?</p> <p>R2: Does the symptoms interfere with daily activities?</p> <p>R3: Is there any disruption of activities from breathlessness?</p> <p>R4: Does the homework got disturbed from short of breath?</p> <p>R5: Can I still walk long distances or climb stairs?</p>	<p>R1: No.</p> <p>R2: No.</p> <p>R3: No.</p> <p>R4: No.</p> <p>R5: No.</p>	<p>BTR: Fine.</p> <p>BTR-LSP-PM: Okay.</p> <p>CDR: No changes needed.</p> <p>CDR-PM: This seems clearly understood with the participants referring to their own personal experiences it seems. Can you confirm?</p> <p>CDR-LVC: Yes, they usually refer it with the activities they usually can do.</p> <p>CDR-PM: Okay.</p>

	Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
				1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
7	As usual	Seperti biasa	As usual	<p>R1: No additions.</p> <p>R2: Same as before.</p> <p>R3: Complaints do not get worse.</p> <p>R4: Complaints are not annoying.</p> <p>R5: Complaints do not interfere with daily activities.</p>	<p>R1: No.</p> <p>R2: No.</p> <p>R3: No.</p> <p>R4: No.</p> <p>R5: No.</p>	<p>BTR: Fine.</p> <p>BTR-LSP-PM: Okay.</p> <p>CDR: No changes needed.</p> <p>CDR-PM: Was this clearly understood as the symptoms as the same as before?</p> <p>CDR-LVC Yes, it is. They also think about it as their normal.</p> <p>CDR-PM: Okay.</p>
8	As usual	Seperti biasa	As usual	<p>R1: There is no phlegm.</p> <p>R2: Same amount of phlegm.</p> <p>R3: Phlegm does not increase.</p> <p>R4: Slight phlegm is felt.</p> <p>R5: Phlegm is still often felt.</p>	<p>R1: No.</p> <p>R2: No.</p> <p>R3: No.</p> <p>R4: No.</p> <p>R5: No.</p>	<p>BTR: Fine.</p> <p>BTR-LSP-PM: Okay.</p> <p>CDR: No changes needed.</p>

	Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
				1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
9	As usual	Seperti biasa	As usual	R1: No difficulty breathing. R2: Normal breath. R3: No shortness of breath. R4: No shortness of breath. R5: No shortness of breath.	R1: No. R2: No. R3: No. R4: No. R5: No.	BTR: Fine. BTR-LSP-PM: Okay. CDR: No changes needed.
10	As usual	Seperti biasa	As usual	R1: [No response] R2: Just walk normally. R3: Don't feel short of breath. R4: Able to do housework. R5: Does not interfere with daily activities.	R1: No. R2: No. R3: No. R4: No. R5: No.	BTR: Fine. BTR-LSP-PM: Okay. CDR: No changes needed.
11	As usual	Seperti biasa	As usual	R1: Able to work. R2: Able to work.	R1: No. R2: No.	BTR: Fine. BTR-LSP-PM: Okay.

	Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
				1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
				R3: Can do daily activities. R4: Daily activities are not disturbed (cooking, bathing). R5: Able to do daily work.	R3: No. R4: No. R5: No.	CDR: No changes needed.
12	Mild	Ringan	Mild	R1: Coughing increases. R2: Cough more often. R3: Coughing is felt more often. R4: Coughing more often than usual. R5: Coughing sometimes.	R1: No. R2: No. R3: No. R4: No. R5: No.	BTR: Fine. BTR-LSP-PM: Okay. CDR: No changes needed. CDR-PM: Was this clearly understood as the symptoms are mild/minor? The respondents do not refer to this notion but mainly talk about increase in the symptom. Please advise. CDR-LVC: Well, they think it's a slight increase from their

	Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
				1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
						usual/normal state. CDR-PM: Okay.
13	Mild	Ringan	Mild	R1: Phlegm starts increasing. R2: More phlegm than usual. R3: More phlegm collected. R4: Phlegm starts annoying. R5: Phlegm increases than usual.	R1: No. R2: No. R3: No. R4: No. R5: No.	BTR: Fine. BTR-PM: Okay. CDR: No changes needed.
14	Mild	Ringan	Mild	R1: A little tired. R2: Sometime difficult to inhale. R3: Feels a bit breathless. R4: Breathing feels heavy.	R1: No. R2: No. R3: No. R4: No.	BTR: Fine. BTR-PM: Okay. CDR: No changes needed.

	Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
				1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
				R5: Feeling short of breath during heavy activity.	R5: No.	
15	Mild	Ringan	Mild	R1: A little breathless. R2: Feels a little tired. R3: Inhale feels heavy. R4: Breathing feels heavier. R5: Gasping for heavy activity (long walks).	R1: No. R2: No. R3: No. R4: No. R5: No.	BTR: Fine. BTR-PM: Okay. CDR: No changes needed.
16	Mild	Ringan	Mild	R1: Work is slightly disturbed. R2: if the road is crowded. R3: Homework is slightly disturbed. R4: Activities are sometimes disrupted. R5: Activities at home are	R1: No. R2: No. R3: No. R4: No. R5: No.	BTR: Fine. BTR-PM: Okay. CDR: No changes needed.

	Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
				1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
				slightly disturbed.		
17	Moderate	Sedang	Moderate	<p>R1: Coughing more often.</p> <p>R2: Slight increase in coughing.</p> <p>R3: Coughing sometimes interferes with activities.</p> <p>R4: Cough feels persistent.</p> <p>R5: Coughing is felt more often.</p>	<p>R1: No.</p> <p>R2: No.</p> <p>R3: No.</p> <p>R4: No.</p> <p>R5: No.</p>	<p>BTR: Fine.</p> <p>BTR-LSP-PM: Okay.</p> <p>CDR: No changes needed.</p> <p>CDR-PM: Was this clearly understood as the symptoms are moderate, between severe and mild? The respondents do not refer to this notion but mainly talk about increase in the symptom. Please advise.</p> <p>CDR-LVC: Yes, indeed, it's an increase from what they think as mild.</p> <p>CDR-PM: Okay.</p>
18	Moderate	Sedang	Moderate	R1: Cough always contains phlegm.	<p>R1: No.</p> <p>R2: No.</p>	<p>BTR: Fine.</p> <p>BTR-PM: Okay.</p>

	Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
				1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
				<p>R2: More phlegm felt in the chest.</p> <p>R3: More and more phlegm starts make shortness of breath.</p> <p>R4: Chest felt almost full with phlegm.</p> <p>R5: More phlegm felt in the chest.</p>	<p>R3: No.</p> <p>R4: No.</p> <p>R5: No.</p>	CDR: No changes needed.
19	Moderate	Sedang	Moderate	<p>R1: Breathing feels heavier, more tiresome.</p> <p>R2: More often in difficult taking breath.</p> <p>R3: Breathing feels heavier.</p> <p>R4: It feels more difficult to breathe.</p>	<p>R1: No.</p> <p>R2: No.</p> <p>R3: No.</p> <p>R4: No.</p> <p>R5: No.</p>	<p>BTR: Fine.</p> <p>BTR-PM: Okay.</p> <p>CDR: No changes needed.</p>

	Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
				1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
				R5: Shortness of breath is felt more often.		
20	Moderate	Sedang	Moderate	R1: Gaspings. R2: Breathing faster than usual. R3: Taking a shower and taking water feels breathless. R4: Walking inside the house feels suffocating. R5: Breathless, unable to walk around the house.	R1: No. R2: No. R3: No. R4: No. R5: No.	BTR: Fine. BTR-PM: Okay. CDR: No changes needed.
21	Moderate	Sedang	Moderate	R1: If you walk it feels tight. R2: If you walk, you feel panting. R3: Walk with tight breathing.	R1: No. R2: No. R3: No. R4: No.	BTR: Fine. BTR-PM: Okay. CDR: No changes needed.

	Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
				1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
				R4: Walk with short breathing. R5: Shortness of breath and tired quickly.	R5: No.	
22	Severe	Berat	Severe	R1: Continuous coughing. R2: Always coughing. R3: Continuous cough. R4: Cough until you feel very tired. R5: Severe cough, until you feel tired.	R1: No. R2: No. R3: No. R4: No. R5: No.	BTR: Fine. BTR-LSP-PM: Okay. CDR: No changes needed. CDR-PM: Okay.
23	Severe	Berat	Severe	R1: A lot of phlegm comes out and cannot be relieved. R2: Phlegm comes out frequently. R3: Phlegm felt full in the	R1: No. R2: No. R3: No. R4: No.	BTR: Fine. BTR-PM: Okay. CDR: No changes needed.

	Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
				1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
				chest. R4: Collected phlegm cannot be expelled and make breathing difficult. R5: Chest full of phlegm.	R5: No.	
24	Severe	Berat	Severe	R1: Inhale very heavy. R2: can't take a breath. R3: Inhale very hard. R4: Shortness of breath, look for a position to breathe (bend over). R5: Inhale and exhale feel very heavy.	R1: No. R2: No. R3: No. R4: No. R5: No.	BTR: Fine. BTR-PM: Okay. CDR: No changes needed.
25	Severe	Berat	Severe	R1: can't do anything because of tightness. R2: Difficult breathing.	R1: No. R2: No. R3: No.	BTR: Fine. BTR-PM: Okay. CDR: No changes needed.

	Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
				1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
				<p>R3: Breathing feels very heavy.</p> <p>R4: Difficulty breathing to the point of not being able to talk.</p> <p>R5: Shortness of breath feels very severe.</p>	<p>R4: No.</p> <p>R5: No.</p>	
26	Severe	Berat	Severe	<p>R1: Can't do activities.</p> <p>R2: Can't do anything.</p> <p>R3: sitting, unable to do activities.</p> <p>R4: Can't do anything.</p> <p>R5: Shortness of breath, feeling tired and unable to do activities.</p>	<p>R1: No.</p> <p>R2: No.</p> <p>R3: No.</p> <p>R4: No.</p> <p>R5: No.</p>	<p>BTR: Fine.</p> <p>BTR-PM: Okay.</p> <p>CDR: No changes needed.</p>
27	If you choose at	Jika Anda {MQ}	If you {MQ}	R1: See a doctor	R1: No.	BTR: PPOK is the Indonesian

Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
			1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
least 2 items in red {MQ} you are probably experiencing a COPD exacerbation, and should visit your doctor.	memilih setidaknya 2 jawaban dalam kotak merah, {MQ} mungkin Anda mengalami perburukan gejala PPOK, dan harus berobat ke dokter Anda.	selected at least two answers in the red box, {MQ} you might have worsening PPOK symptoms, and must go to your doctor.	immediately. R2: Return to the pulmo clinic. R3: Come to the ER because of shortness of breath. R4: Come for treatment to a pulmonary doctor. R5: Return to my pulmonary doctor.	R2: No. R3: No. R4: No. R5: No.	term for COPD; BTR: Red box in here is to give a clear instruction for the respondent; BTR: The term exacerbation was translated as worsening of symptoms to deliver the concept with the most simple language that familiar with the respondent. BTR-LSP-PM: Okay thanks for clarifying. Is it necessary to have “symptoms” in the translation though? It is not included in the source. Here we are talking about the diseases worsening, not just the symptoms, which are different things. BTR-LVC: It actually uses the concept explanation of COPD exacerbation (A sudden

Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
			1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
					<p>worsening of symptoms in individuals with Chronic Obstructive Pulmonary Disease (COPD)).</p> <p>BTR-LSP-PM: Okay we'll check with the author if it is okay to leave symptoms.</p> <p>AR-DEV: OK with leaving "symptoms" in.</p> <p>CDR: No changes needed.</p> <p>CDR-PM: Was the translation of "If you choose at least 2 items in red you are probably experiencing a COPD exacerbation" clear to all respondents? They do not rephrase this part. Please advise.</p> <p>CDR-LVC: Yes, they</p>

	Source	Indonesia – Indonesian (Bahasa)	First Back Translation	Cognitive debriefing stage		Comments
				1. What does the instructions/question/response choice mean for you? (encourage the respondent to reword the item using other words than those used and if this is not sufficient, to give examples)	2. Did you have difficulty understanding the instructions/question/response choice? Are there words that you find difficult to understand? If yes, how would you change the wording?	
						understand it and they know what should they do if that happen. CDR-PM: Okay.
28	Country/Language	Indonesia/Bahasa	County/ Language	R1: Indonesia. R2: Indonesia. R3: Indonesia. R4: Indonesia. R5: Indonesia.	R1: No. R2: No. R3: No. R4: No. R5: No.	BTR: Fine CDR: No changes needed. CDR-PM: This stays in English as our internal reference.

AR=author review; BT=back-translator; BTR=back-translation review; CDR=cognitive debriefing review; COPD=chronic obstructive pulmonary disease; DEV=developer; LSP=language service provider; LVC=linguistic validation consultant; PM=project manager

Supplementary Table 4. All available translations of the CERT as of November 2025

Country	Language
Belgium	Dutch, French, German
Brazil	Portuguese
Bulgaria	Bulgarian
Canada	English, French
China	Chinese (Simplified), Chinese (Traditional)
Czechia	Czech
Denmark	Danish
Estonia	Estonian, Russian
Finland	Finnish
France	French
Germany	German
Greece	Greek
Hungary	Hungarian
India	Assamese, Bengali, Gujarati, Hindi, Kannada, Malayalam, Marathi, Oriya, Punjabi, Tamil, Telugu, Urdu
Indonesia	Indonesian
Israel	Arabic (Universal 'Modern Standard'), English, Hebrew, Russian
Italy	Italian
Korea	Korean
Latin America	Spanish
Latvia	Russian
Lithuania	Lithuanian
Netherlands	Dutch
Norway	Norwegian
Philippines	Cebuano, Filipino, Hiligaynon, Ilocano, Tagalog
Poland	Polish
Russia	Russian
Serbia	Serbian, Serbian (Latin)
Slovakia	Slovak
Slovenia	Slovenian
Spain	Spanish
Sweden	Swedish
Thailand	Thai
Turkey	Turkish
UK	English
Ukraine	Russian, Ukrainian

USA

English

Vietnam

Vietnamese

Requests for translations are received via GAAPP

This list includes translations that were linguistically and culturally validated during this study
(indicated with bold text)

CERT=Chronic Obstructive Pulmonary Disease Exacerbation Recognition Tool; UK=United Kingdom;

USA=United States of America

Supplementary Table 5. Narrative of the Published CERT Translations from Patients with COPD

A

Why the CERT is needed
“Early in my diagnosis I was unsure what an exacerbation was. This meant it took longer to book an appointment with my doctor. By the time I have seen my doctor and started taking the prescribed medication I had become quite ill. Now I am fully aware of an exacerbation I can access medication well before my symptoms become severe.”
“I have lived with COPD since 2006. Through that period of time, I've self-empowered myself to manage my disease and keep on top of it. I do get flare ups, but I can tell which ones are causing me a problem and coughing up blood caused by a bacterial infection. Exercise is key. Pain in upper chest and tightness of chest are a sign of an exacerbation. It is important to find out what type of exacerbation is being experienced.”

B

Translation and validation of the CERT
“I think both the wording and imagery work well and are easily understood. I would argue sometimes a worsening in one of those symptoms would be reason enough to visit doctor.”
“I understand the CERT completely, PPI do understand the terminology as researchers have tailored documentation to a level the general public can understand. Any imagery connected with text is especially helpful for patients with COPD. Having any patient involved in research documentation is very important; it's the patient who is going to benefit at the end of the day and their input is very important.”

C

Cultural adaptation of the images
“This is not so important to me. The importance for me is the ease of understanding CERT.”
“A picture paints a thousand words, any image helps you to understand any of the terminology, especially medical terminology. Images are perfect, I don't have a problem with any of them. They are well decided and well thought through.”

D

Impression of the tool overall

"I think the tool is more relevant to newly diagnosed patients or patients not able to access care easily. It's important not to make things overly complicated and I believe this tool achieves this."

"The tool is extremely useful and something which patients like myself should seriously look at and take on board what's been put forward and what's been suggested. It is important to translate the CERT as COPD is global. The GAAPP is a global organisation. People with COPD are not only English speaking and are placed all around the world. Translation into every language, to the cover the basics, is important."

E

Visions for the CERT in the future

"It needs to be easily accessible and widely disseminated. Any tools which a patient relies on should be stepped through with their doctor and personalised to their COPD."

"The 5 Symptoms are obviously essential and very useful for COPD patients. However, as a COPD patient who has had numerous exacerbations over the last few years there are 3 more symptoms that I believe should be considered which I have personally experienced.

1. Tightness in the chest no matter how slight.
2. Any pain or ache usually in the upper front chest area.
3. Lastly: If a COPD patient coughs up blood in their mucus, no matter how small, it should be taken very seriously and medical help sort.

If the colour of your mucus changes to green, this means there is an infection and is a sign of a flare up. There are many indications that you could be getting a flare-up. Older generations live on their own and rely on carers and family members and it is essential for them to understand their disease as they're not always told this information."

Patients who provided narrative were not involved in the linguistic and cross-cultural validation of the CERT

CERT=COPD Exacerbation Recognition Tool; COPD=chronic obstructive pulmonary disease;

GAAPP=Global Allergy and Airways Patient Platform; PPI=patient and public involvement