

Quality Assessment tool for Diagnostic Accuracy Studies (QUADAS)

診断精度に関する研究の質を評価
するためのツール

QUADASとQUADAS-2

QUADAS

#	項目	はい	不明	いいえ
1	患者の範囲は、実際の診療で検査を受けることになる患者を代表していたか？（代表的な範囲か）	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	参照基準は標的状態を正確に分類できると考えられるか？（参照基準は許容できるか）	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	参照基準と指標検査の間の期間が短く、合理的に考えて、検査と検査の間の期間で標的状態に変化はなかったといえるか（検査間の遅延は許容できるか）	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	診断の参照基準によって検証されたのは、サンプル全体かまたはサンプルから任意に選択された者か？（部分的検証が回避されたか）	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	患者は指標検査の結果に関わらず、同じ参照基準による検査を受けたか？（鑑別的検証が回避されたか）	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	参照基準は指標検査と独立していたか（すなわち、指標検査が参照基準の一貫として行われていなかったか）？（混同は回避されたか）	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	参照基準の結果の解釈は、指標検査の結果がわからない状態で行われたか？（指標検査の結果は盲検化されたか）	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	指標検査の結果の解釈は、参照基準の結果がわからない状態で行われたか？（参照基準の結果は盲検化されたか）	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	実際の診療で検査が使われる場合と同様の臨床データが入手可能だったか？（関連する臨床情報）	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	解釈不能または中間的な検査結果は報告されていたか？（解釈不能の結果は報告されたか）	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	研究からの脱落については説明があったか？（脱落は説明されたか）	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

QUADASオリジナルは14個、コクラン版では11個の質問から成っており、それぞれの質問に対して“Yes”か“No”、もしくは“Unclear”が回答する。判定結果をmethodological quality summary, graphとして提示する。

“診断検査にGRADEを適用する”Applying_grade_to_diagnosticTests.pptより（スライド #69）

RevMan 5.1 QUADAS

コクランハンドブックより

Figure 9.1
Methodological quality summary
 (from Leeflang 2008)

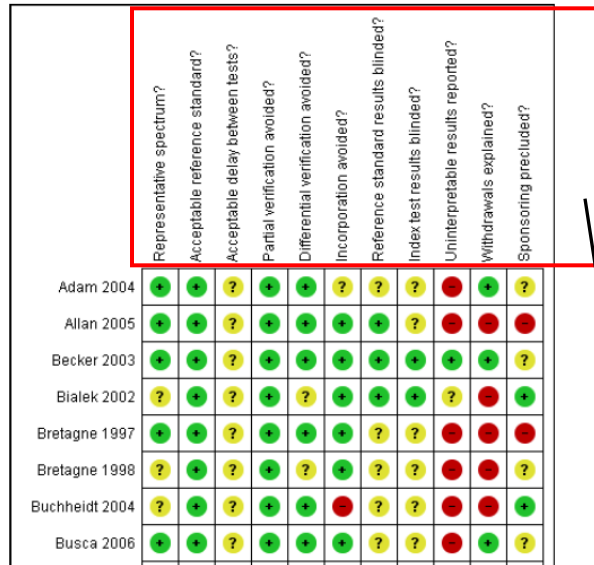
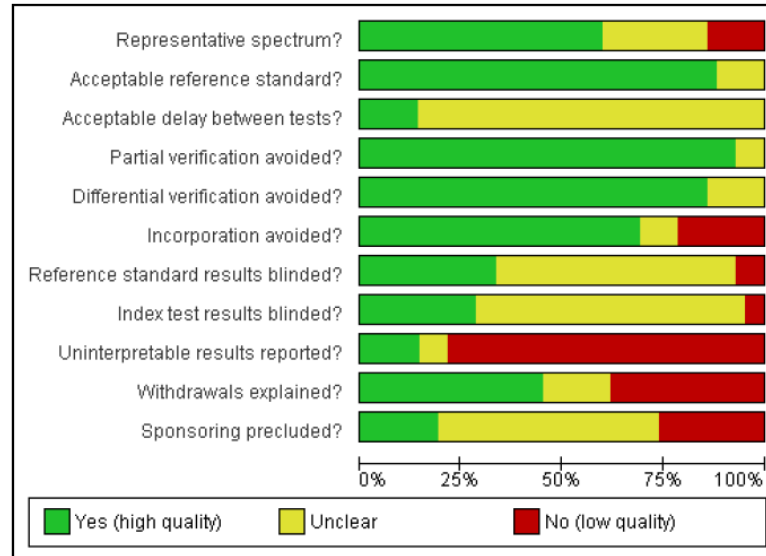


Figure 9.2
Methodological quality graph
 (from Leeflang 2008)



QUADAS評価項目

本図は、http://srdta.cochrane.org/sites/srdta.cochrane.org/files/uploads/ch09_Oct09.pdfより引用。
 治療介入におけるコクラン risk of bias評価と同じである。

“診断検査にGRADEを適用する”Applying_grade_to_diagnosticTests.pptより (スライド #70)

QUADAS-2

Annals of Internal Medicine | RESEARCH AND REPORTING METHODS

QUADAS-2: A Revised Tool for the Quality Assessment of Diagnostic Accuracy Studies

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In 2003, the QUADAS tool for systematic reviews of diagnostic accuracy studies was developed. Experience, anecdotal reports, and feedback suggested areas for improvement; therefore, QUADAS-2 was developed. This tool comprises 4 domains: patient selection, index test, reference standard, and flow and timing. Each domain is assessed in terms of risk of bias, and the first 3 domains are also assessed in terms of concerns regarding applicability. Signalling questions are included to help judge risk of bias.

The QUADAS-2 tool is applied in 4 phases: summarize the review question, tailor the tool and produce review-specific guidance, construct a flow diagram for the primary study, and judge bias and applicability. This tool will allow for more transparent rating of bias and applicability of primary diagnostic accuracy studies.

Ann Intern Med. 2011;155:529-536. www.annals.org
 For author affiliations, see end of text.
 * For members of the QUADAS-2 Group, see the **Appendix** (available at www.annals.org).

<http://www.annals.org/content/155/8/529.full.pdf+html>

バイアスのリスク、ならびに研究疑問への適用可能性に関する懸念(上記にて定義されたもの)の観点から、**4つの各主要領域**を評価するよう構造化されている。各主要領域には、バイアスや適用可能性に関する判断を下す際のヒントとなる一連の疑問がある

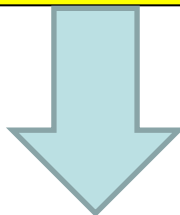
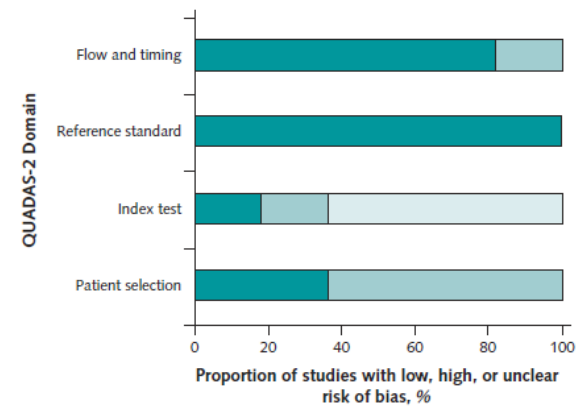
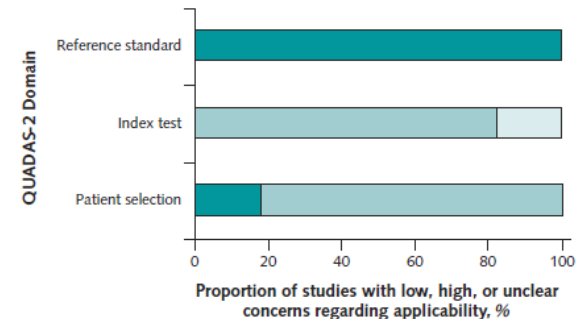


Figure 3. Suggested graphical display for QUADAS-2 results.



Legend:
 ■ Low
 ■ High
 □ Unclear



Risk of bias and applicability judgments

The following table summarises QUADAS-2 and lists all signalling, risk of bias and applicability rating questions.

DOMAIN	PATIENT SELECTION	INDEX TEST	REFERENCE STANDARD	FLOW AND TIMING
Description	Describe methods of patient selection: Describe included patients (prior testing, presentation, intended use of index test and setting):	Describe the index test and how it was conducted and interpreted:	Describe the reference standard and how it was conducted and interpreted:	Describe any patients who did not receive the index test(s) and/or reference standard or who were excluded from the 2x2 table (refer to flow diagram): Describe the time interval and any interventions between index test(s) and reference standard:
Signalling questions (yes/no/unclear)	Was a consecutive or random sample of patients enrolled?	Were the index test results interpreted without knowledge of the results of the reference standard?	Is the reference standard likely to correctly classify the target condition?	Was there an appropriate interval between index test(s) and reference standard?
	Was a case-control design avoided?	If a threshold was used, was it pre-specified?	Were the reference standard results interpreted without knowledge of the results of the index test?	Did all patients receive a reference standard?
	Did the study avoid inappropriate exclusions?			Did all patients receive the same reference standard?
				Were all patients included in the analysis?
Risk of bias: High/low/unclear	Could the selection of patients have introduced bias?	Could the conduct or interpretation of the index test have introduced bias?	Could the reference standard, its conduct, or its interpretation have introduced bias?	Could the patient flow have introduced bias?
Concerns regarding applicability: High/low/unclear	Are there concerns that the included patients do not match the review question?	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Are there concerns that the target condition as defined by the reference standard does not match the review question?	

To convert to QUADAS-2 from QUADAS

Study characteristics		
RevMan 5.1	RevMan 5.2 – Text boxes for QUADAS-2 Domains	
Study design	Patient sampling	
Participants Clinical features and setting	Both fields in 5.1 merged into one called Patient characteristics and setting	
Index and comparator tests	Index tests	
Target condition and reference standard(s)	Target condition and reference standard(s)	
Follow up	Flow and timing	
Notes	Notes	
User defined fields	Notes	
Methodological quality		
QUADAS item	QUADAS-2 signalling question	QUADAS-2 Domain
Representative spectrum?		Patient selection
Acceptable reference standard?		Reference standard
Partial verification avoided?		Flow and timing
Differential verification avoided?	Did all patients receive the same reference standard?	Flow and timing
Incorporation avoided?		Reference standard
Reference standard results blinded?	Were the reference standard results interpreted without knowledge of the results of the index test?	Reference standard
Index test results blinded?	Were the index test results interpreted without knowledge of the results of the reference standard?	Index test
Relevant clinical information?		No related domain so added to Notes field
Uninterpretable results reported?		Flow and timing
Withdrawals explained?		Flow and timing



QUADAS-2

QUADAS-2においては、4段階がある。

第1段階：レビューの疑問を明記する

第2段階：QUADAS-2を、当該レビューに合わせた指針にする

第3段階：一次研究のフローチャートを作る

第4段階：バイアスのリスク、判断結果の適用可能性

QUADAS-2: 第1段階

<http://www.bris.ac.uk/quadas/quadas-2/>

Phase 1: State the review question:
(レビューの疑問を明記する)

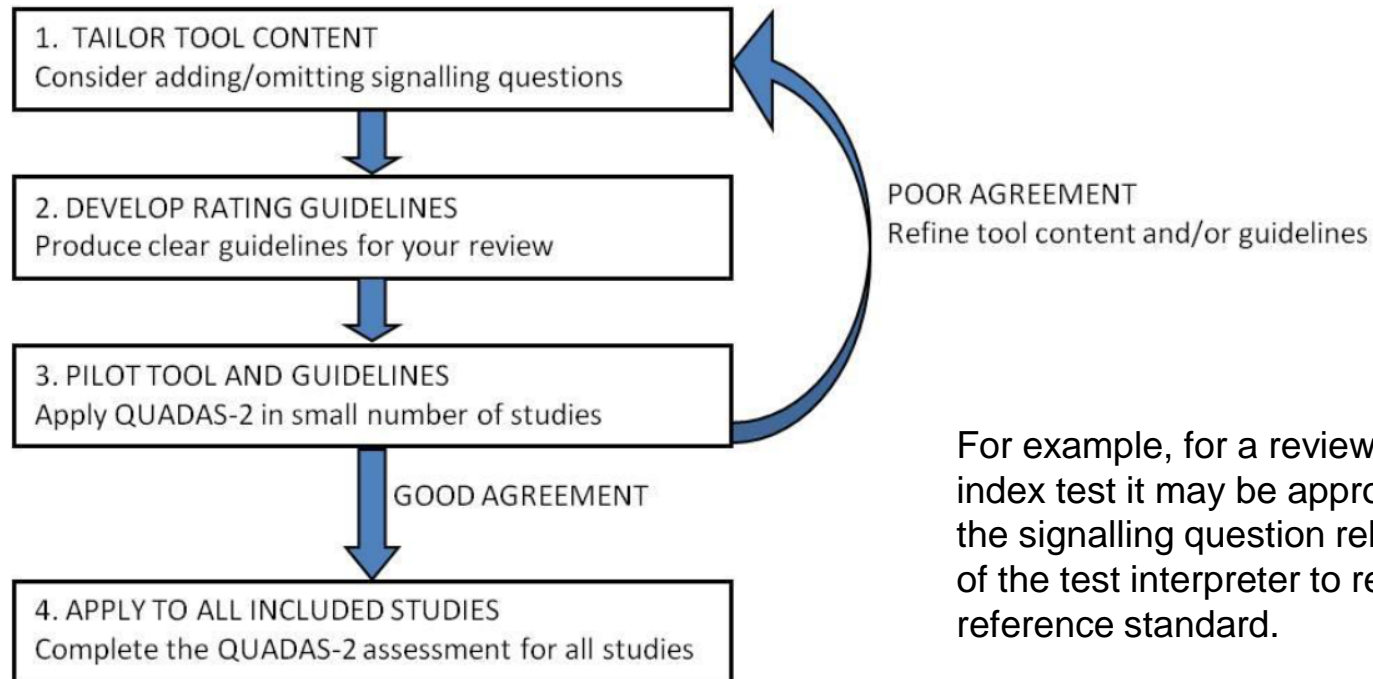
<i>Patients (setting, intended use of index test, presentation, prior testing):</i>
<i>Index test(s):</i>
<i>Reference standard and target condition:</i>

QUADAS-2: 第2段階

Phase 2: Review Specific Tailoring (Figure 1) (レビューに特化した調整をする)

システマティックレビューにあわせてQUADAS-2を調整する

Figure 1: Process for tailoring QUADAS-2 to your systematic review

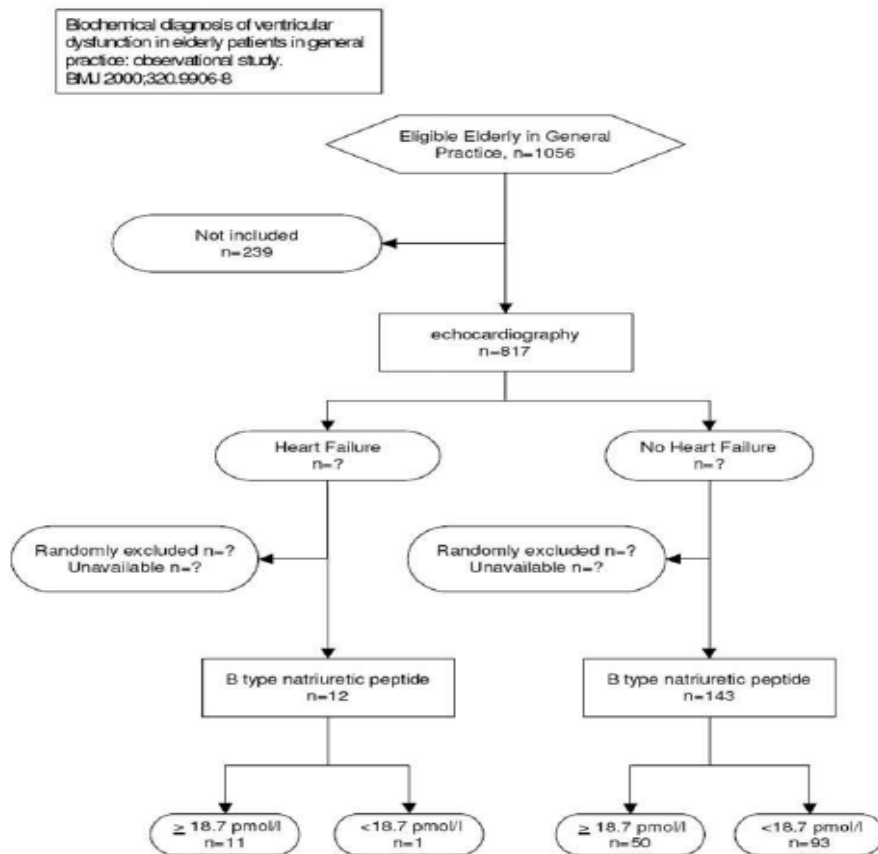


For example, for a review of an objective index test it may be appropriate to omit the signalling question relating to blinding of the test interpreter to results of the reference standard.

QUADAS-2: 第3段階

Phase 3: Flow Diagram (一次研究のフロー図)

Figure 2: Flowchart based on diagnostic cohort study of BNP for diagnosing heart failure



A hand drawn diagram is sufficient as this step does not need to be reported as part of the QUADAS-2 assessment.

QUADAS-2: 第4段階 (1/4)

Phase 4: Judgments on bias and applicability

(バイアスと適用可能性の評価)

QUADAS-2 is structured so that 4 key domains are each rated in terms of the risk of bias and the concern regarding applicability to the research question (as defined above). Each key domain has a set of signalling questions to help reach the judgments regarding bias and applicability.

バイアスのリスク、ならびに研究疑問への適用可能性の観点から、4つの各主要領域を評価する

DOMAIN 1: PATIENT SELECTION

A. Risk of Bias

❖ Was a consecutive or random sample of patients enrolled?	Yes/No/Unclear
❖ Was a case-control design avoided?	Yes/No/Unclear
❖ Did the study avoid inappropriate exclusions?	Yes/No/Unclear
Could the selection of patients have introduced bias?	RISK: LOW/HIGH/UNCLEAR

B. Concerns regarding applicability

Describe included patients (prior testing, presentation, intended use of index test and setting):

Is there concern that the included patients do not match the review question?	CONCERN: LOW/HIGH/UNCLEAR
--	----------------------------------

QUADAS-2: 第4段階 (2/4)

DOMAIN 2: INDEX TEST(S)	
If more than one index test was used, please complete for each test.	
A. Risk of Bias	
Describe the index test and how it was conducted and interpreted:	
❖ Were the index test results interpreted without knowledge of the results of the reference standard?	Yes/No/Unclear
❖ If a threshold was used, was it pre-specified?	Yes/No/Unclear
Could the conduct or interpretation of the index test have introduced bias?	RISK: LOW/HIGH/UNCLEAR
B. Concerns regarding applicability	
Is there concern that the index test, its conduct, or interpretation differ from the review question?	CONCERN: LOW/HIGH/UNCLEAR

QUADAS-2: 第4段階 (3/4)

DOMAIN 3: REFERENCE STANDARD	
A. Risk of Bias	
Describe the reference standard and how it was conducted and interpreted:	
❖ Is the reference standard likely to correctly classify the target	Yes/No/Unclear
❖ Were the reference standard results interpreted without knowledge of the results of the index test?	Yes/No/Unclear
Could the reference standard, its conduct, or its interpretation have introduced bias?	CONCERN: LOW/HIGH/UNCLEAR
B. Concerns regarding applicability	
Is there concern that the target condition as defined by the reference standard does not match the review question?	CONCERN: LOW/HIGH/UNCLEAR

QUADAS-2: 第4段階 (4/4)

DOMAIN 4: FLOW AND TIMING

A. Risk of Bias

Describe any patients who did not receive the index test(s) and/or reference standard or who were excluded from the 2x2 table (refer to flow diagram):

Describe the time interval and any interventions between index test(s) and reference standard:

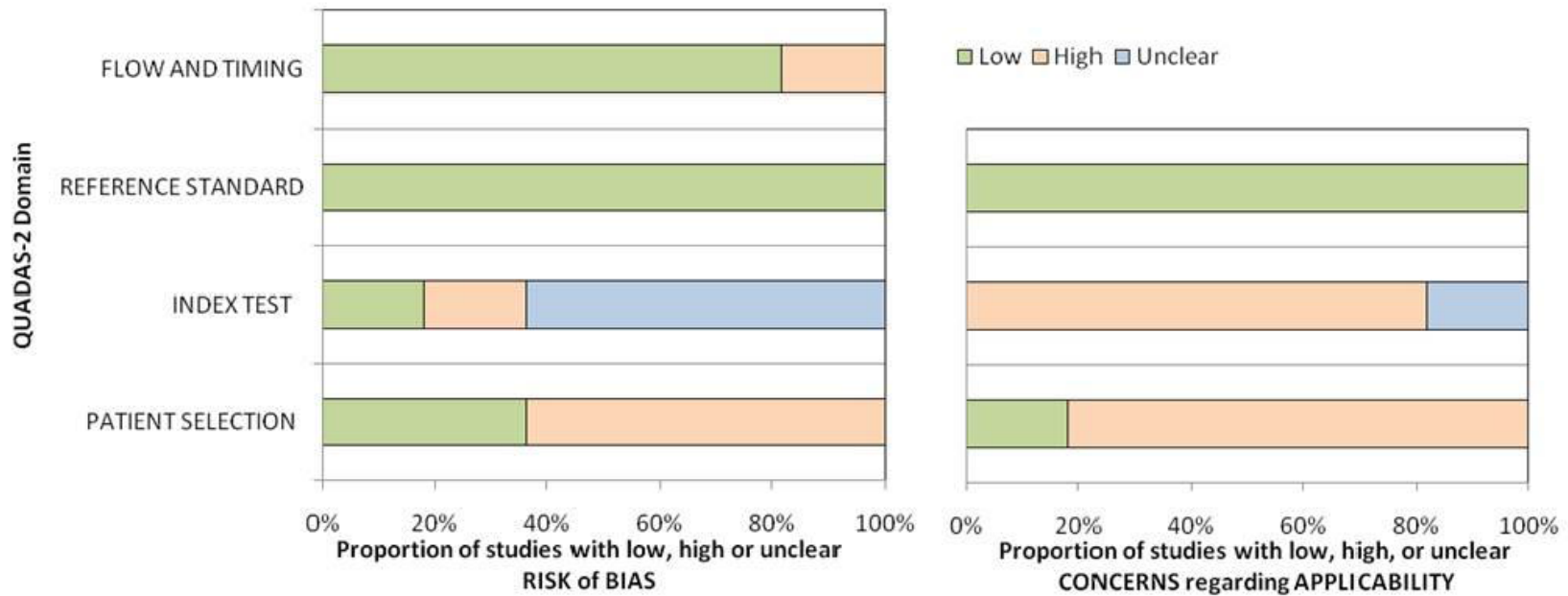
❖ Was there an appropriate interval between index test(s) and reference standard?	Yes/No/Unclear
❖ Did all patients receive a reference standard?	Yes/No/Unclear
❖ Did patients receive the same reference standard?	Yes/No/Unclear
❖ Were all patients included in the analysis?	Yes/No/Unclear
Could the patient flow have introduced bias?	RISK: LOW /HIGH/UNCLEAR

Table: Suggested tabular presentation for QUADAS-2 results

Study	RISK OF BIAS				APPLICABILITY CONCERNS		
	PATIENT SELECTION	INDEX TEST	REFERENCE STANDARD	FLOW AND TIMING	PATIENT SELECTION	INDEX TEST	REFERENCE STANDARD
Study 1	😊	😊	😊	😊	😞	😊	😊
Study 2	😊	😊	😊	😊	😞	😊	😊
Study 3	😞	😞	😊	😊	😞	😊	😊
Study 4	😞	😞	😊	😊	😞	😊	😊
Study 5	😞	?	😊	😊	😞	😊	😊
Study 6	😞	?	😊	😊	😞	?	😊
Study 7	😞	?	😊	😊	😞	😊	😊
Study 8	😞	?	😊	😊	😞	?	😊
Study 9	😞	?	😊	😊	😞	😊	😊
Study 10	😞	?	😊	😞	😞	😊	😊
Study 11	😊	?	😊	😞	😊	😊	😊

😊 Low Risk 😞 High Risk ? Unclear Risk

Figure 3: Suggested Graphical Display for QUADAS-2 results



Review authors may choose to restrict the primary analysis so that only studies at low risk of bias and/or low concern regarding applicability for all or specified domains are included. It may be appropriate to restrict inclusion to the review based on similar criteria, but it is often preferable to review all relevant evidence and then investigate possible reasons for heterogeneity.(13;18) Subgroup and or sensitivity analysis can be conducted by investigating how estimates of accuracy of the index test vary between studies rated as high, low, or unclear on all or selected domains. Domains or signalling questions can be included as items in meta-regression analyses, to investigate their association with estimated accuracy.

RevMan 5.2 QUADAS-2

Risk of bias and applicability concerns summary

Figure 3

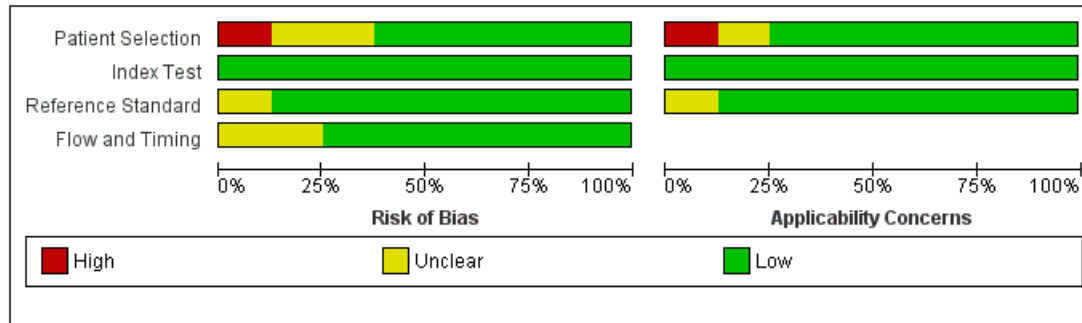
	<u>Risk of Bias</u>				<u>Applicability Concerns</u>		
	Patient Selection	Index Test	Reference Standard	Flow and Timing	Patient Selection	Index Test	Reference Standard
study 1	+	+	+	?	+	+	+
study 2	+	+	+	+	+	+	+
study 3	?	+	+	+	+	+	+
study 4	?	+	+	+	?	+	+
study 5	+	+	+	+	+	+	+
study 6	+	+	+	+	+	+	+
study 7	+	+	+	+	+	+	+
study 8	-	+	?	?	-	+	?

Legend: - High ? Unclear + Low

RevMan 5.2 QUADAS-2

Risk of bias and applicability concerns graph

Figure 2



Caption

Risk of bias and applicability concerns graph: review authors' judgements about each domain presented as percentages across included studies

さて、
診断精度研究に関する論文の質を評価し、統合したならば、その次は？



統合エビデンスの質を
評価する

GRADE

High	⊕⊕⊕⊕
Moderate	⊕⊕⊕○
Low	⊕⊕○○
Very low	⊕○○○

http://www.grade-jpn.com/applying_grade_to_diagnosticTest.ppt

GRADE

診断検査にGRADEを適用する

Applying GRADE to diagnostic tests

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2012/10/23

http://www.grade-jpn.com/how_to_use_grade_aihara_20120426.ppt

GRADE

GRADE システムの使い方

エビデンスから推奨へ

How to use GRADE system

Going from evidence to recommendations

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April 26, 2012