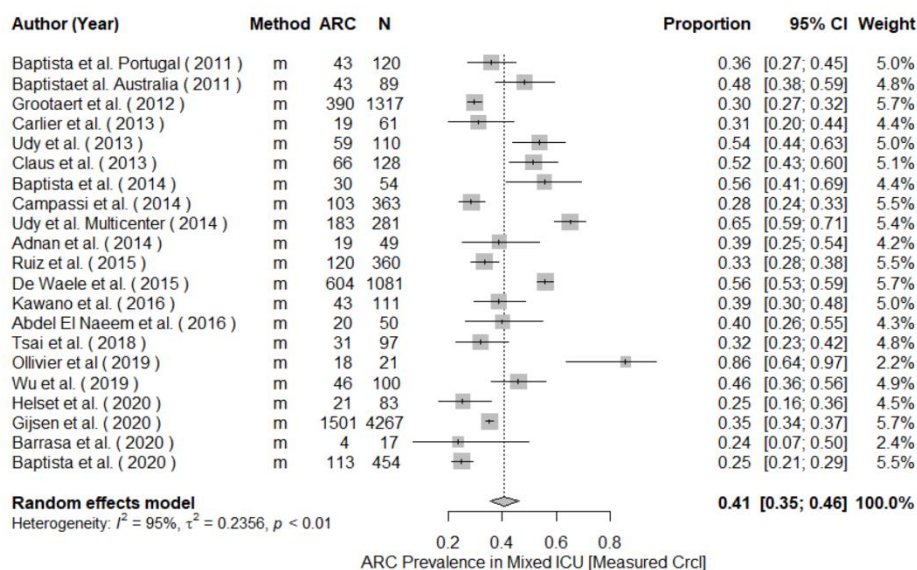


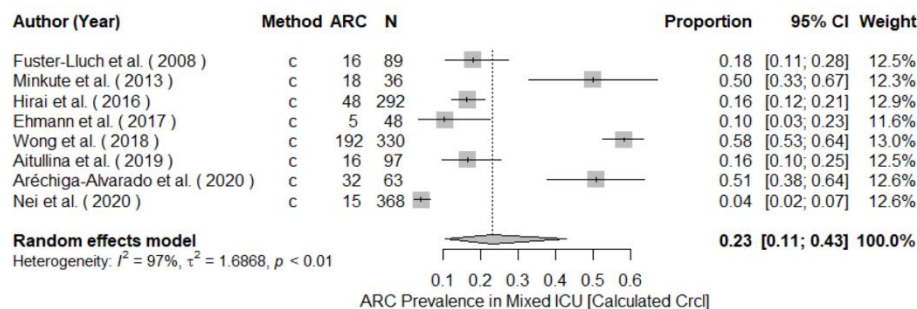
# Supplementary Materials: Prevalence and Risk Factors of Augmented Renal Clearance: A Systematic Review and Meta-Analysis

Fatma Hefny, Anna Stuart, Janice Y. Kung and Sherif Hanafy Mahmoud

A

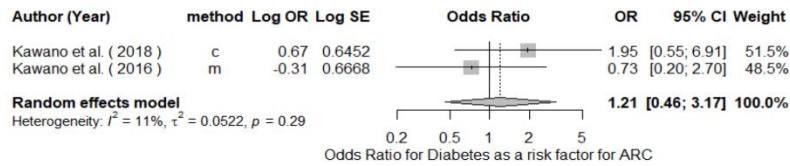


B

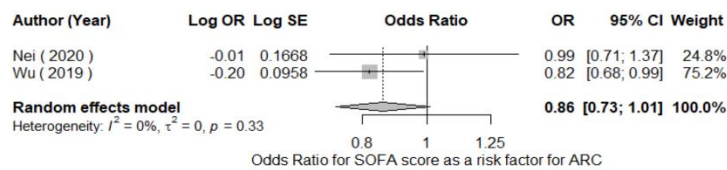


**Figure S1.** Forest plot of the prevalence of ARC in mixed intensive care unit (ICU) population. **A**, studies reported measured creatinine clearance (m); **B**, studies reported calculated creatinine clearance (c).

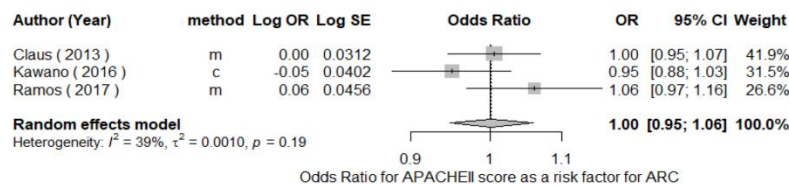
A



B



C



**Figure S2.** Forest plot of risk factors of augmented renal clearance. **A**, diabetes; **B**, Sequential Organ Failure Assessment (SOFA) score; **C**, Acute Physiology and Chronic Health Evaluation (APACHE II).

## Prevalence and Risk Factors of Augmented Renal Clearance: A Systematic Review and Meta-analysis

**Table S1.** Full search strategy.

Database	Search Strategy
MEDLINE	1. augmented renal clearance.mp. 2. augmented kidney clearance.mp.
Ovid	3. ((increas* or enhanc* or high*) adj3 (kidney or renal) adj1 (function or clearance)).mp.
MEDLINE(R)	4. ((increas* or high*) adj3 (creatinine clearance or drug clearance or med* clearance)).mp.
ALL 1946 to October 26, 2020	5. (ultrafiltrat* adj3 (kidney or renal)).mp. 6. glomerular hyperfiltration.mp. 7. 3 or 4 or 5 or 6 8. exp *Intensive Care Units/ 9. (ICU or intensive care or critical care or critical* ill* or acute care).ti,ab,kf. 10. exp *Critical Care/

- 
11. (sepsis or septic shock or trauma or brain injur\* or brain bleed\* or cerebral bleed\* or intracerebral or intracranial or stroke\* or infection\* or meningitis or subarachnoid or h#emorrhag\*).ti,ab,kf.
  12. 8 or 9 or 10 or 11
  13. 7 and 12
  14. 1 or 2 or 13
  15. animal/
  16. human/
  17. 15 not (15 and 16)
  18. (veterinary or rabbit or rabbits or animal or animals or mouse or mice or rodent or rodents or rat or rats or hamster\* or pig or pigs or porcine or horse\* or equine or cow or cows or bovine or goat or goats or sheep or ovine or canine or dog or dogs or feline or cat or cats or zebrafish).ti.
  19. 17 or 18 [animal studies]
  20. 14 not 19
  21. limit 20 to comment
  22. limit 20 to editorial
  23. 21 or 22
  24. 20 not 23
- 

- |                    |  |
|--------------------|--|
| <b>Embase</b>      | 1. augmented renal clearance.mp.   |
|                    | 2. augmented kidney clearance.mp.  |
| <b>Ovid Embase</b> | 3. ((increas* or enhanc* or high*) adj3 (kidney or renal) adj1 (function or clearance)).mp.  |
| 1974 to 2020       |  |
| October 26         | 4. ((increas* or high*) adj3 (creatinine clearance or drug clearance or med* clearance)).mp.   |
|                    | 5. (ultrafiltrat* adj3 (kidney or renal)).mp.  |
|                    | 6. glomerular hyperfiltration.mp.  |
|                    | 7. 3 or 4 or 5 or 6  |
|                    | 8. exp *intensive care unit/   |
|                    | 9. (ICU or intensive care or critical care or critical* ill* or acute care).ti,ab,kw.  |
|                    | 10. exp *intensive care/   |
|                    | 11. (sepsis or septic shock or trauma or brain injur* or brain bleed* or cerebral bleed* or intracerebral or intracranial or stroke* or infection* or meningitis or subarachnoid or h#emorrhag*).ti,ab,kw. |
|                    | 12. 8 or 9 or 10 or 11   |
|                    | 13. 7 and 12   |
|                    | 14. 1 or 2 or 13   |
|                    | 15. animal/  |
|                    | 16. human/   |
|                    | 17. 15 not (15 and 16)   |
|                    | 18. (veterinary or rabbit or rabbits or animal or animals or mouse or mice or rodent or rodents or rat or rats or hamster* or pig or pigs or porcine or horse* or equine or cow or cows or                 |
-

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bovine or goat or goats or sheep or ovine or canine or dog or dogs or feline or cat or cats or zebrafish).ti.

19. 17 or 18 [animal studies]

20. 14 not 19

21. limit 20 to editorial

22. 20 not 21

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## CINAHL

S1 augmented renal clearance

S2 augmented kidney clearance

S3 (increas\* or enhanc\* or high\*) N2 ("kidney function" or "kidney clearance" or "renal function" or "renal clearance")

S4 (increas\* or high\*) N2 ("creatinine clearance" or "drug clearance" or "med\* clearance")

S5 (ultrafiltrat\* N3 (kidney or renal))

S6 "glomerular hyperfiltration"

S7 S3 OR S4 OR S5 OR S6

S8 (MM "Intensive Care Units+")

S9 TI ( ICU or "intensive care" or "critical care" or "critical\* ill\*" or "acute care" ) OR AB ( ICU or "intensive care" or "critical care" or "critical\* ill\*" or "acute care" )

S10 (MM "Critical Care+")

S11 TI ( sepsis or "septic shock" or trauma or "brain injur\*" or "brain bleed\*" or "cerebral bleed\*" or intracerebral or intracranial or stroke\* or infection\* or meningitis or subarachnoid or h#emorrhag\* ) OR AB ( sepsis or "septic shock" or trauma or "brain injur\*" or "brain bleed\*" or "cerebral bleed\*" or intracerebral or intracranial or stroke\* or infection\* or meningitis or subarachnoid or h#emorrhag\* )

S12 S8 OR S9 OR S10 OR S11

S13 S7 AND S12

S14 S1 OR S2 OR S13

S15 (MH "Animals+")

S16 (MH "Human")

S17 S15 NOT (S15 AND S16)

S18 TI veterinary or rabbit or rabbits or animal or animals or mouse or mice or rodent or rodents or rat or rats or hamster\* or pig or pigs or porcine or horse\* or equine or cow or cows or bovine or goat or goats or sheep or ovine or canine or dog or dogs or feline or cat or cats or zebrafish

S19 S17 OR S18

S20 S14 NOT S19

S21 S14 NOT S19 [Limit to Commentary]

S22 S14 NOT S19 [Limit to Editorial]

S23 S21 OR S22

S24 S20 NOT S23

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## Scopus

( TITLE-ABS-KEY ( "augmented renal clearance" OR "augmented kidney clearance" ) OR TITLE-ABS-KEY ( ( ( ( increas\* OR enhanc\* OR high\* ) W/2 ( "kidney

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function" OR "kidney clearance" OR "renal function" OR "renal clearance")) OR ((  
 increas\* OR high\* ) W/2 ( "creatinine clearance" OR "drug clearance" OR "med\*  
 clearance" ) ) OR ( ultrafiltrat\* W/3 ( kidney OR renal ) ) OR "glomerular  
 hyperfiltration" ) AND ( icu OR "intensive care" OR "critical care" OR "critical\*  
 ill\*" OR "acute care" OR sepsis OR "septic shock" OR trauma OR "brain  
 injur\*" OR "brain bleed\*" OR "cerebral  
 bleed\*" OR intracerebral OR intracranial OR stroke\* OR infection\* OR meningiti  
 s OR subarachnoid OR hemorrhag\* OR haemorrhag\* ) ) ) AND NOT TITLE (   
 veterinary OR rabbit OR rabbits OR animal OR animals OR mouse OR mice  
 OR rodent OR rodents OR rat OR rats OR hamster\* OR pig OR pigs OR po  
 rcine OR horse\* OR equine OR cow OR cows OR bovine OR goat OR goats  
 OR sheep OR ovine OR canine OR dog OR dogs OR feline OR cat OR cats  
 OR zebrafish ) AND ( EXCLUDE ( DOCTYPE , "ed" ) )

<b>Cochrane Library</b> via Wiley	#1	augmented renal clearance
	#2	augmented kidney clearance
	#3	(increas* or enhanc* or high*) NEAR/2 ("kidney function" or "kidney clearance" or "renal function" or "renal clearance")
	#4	(increas* or high*) NEAR/2 ("creatinine clearance" or "drug clearance" or "med* clearance")
	#5	(ultrafiltrat* NEAR/3 (kidney or renal))
	#6	"glomerular hyperfiltration"
	#7	{OR #3-#6}
	#8	[mh "intensive care units"[mj]]
	#9	ICU or "intensive care" or "critical care" or "critical* ill*" or "acute care"
	#10	[mh "critical care"[mj]]
	#11	sepsis or "septic shock" or trauma or "brain injur*" or "brain bleed*" or "cerebral bleed*" or intracerebral or intracranial or stroke* or infection* or meningitis or subarachnoid or hemorrhag* or haemorrhag*
	#12	{OR #8-#11}
	#13	#7 AND #12
	#14	#1 OR #2 OR #13

<b>ProQuest Dissertations and Theses Global</b>	noft("augmented renal clearance" OR "augmented kidney clearance") OR noft(((increas* NEAR/2 ("kidney function" OR "kidney clearance" OR "renal function" OR "renal clearance")) OR (enhanc* NEAR/2 ("kidney function" OR "kidney clearance" OR "renal function" OR "renal clearance")) OR (high* NEAR/2 ("kidney function" OR "kidney clearance" OR "renal function" OR "renal clearance")) OR (increas* NEAR/2 ("creatinine clearance" OR "drug clearance" OR "med* clearance")) OR (high* NEAR/2 ("creatinine clearance" OR "drug clearance" OR "med* clearance")) OR (ultrafiltrat* NEAR/3 (kidney OR renal)) OR "glomerular hyperfiltration") AND (icu OR "intensive care" OR "critical care" OR "critical* ill*" OR "acute care" OR sepsis OR "septic shock" OR trauma OR ("brain injured" OR "brain injuries" OR "brain injury") OR "brain bleed*" OR "cerebral bleed*" OR intracerebral OR intracranial OR stroke* OR infection*
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OR meningitis OR subarachnoid OR hemorrhag\* OR haemorrhag\*)) NOT  
ti(veterinary OR rabbit OR rabbits OR animal OR animals OR mouse OR mice  
OR rodent OR rodents OR rat OR rats OR hamster\* OR pig OR pigs OR porc  
ine OR horse\* OR equine OR cow OR cows OR bovine OR goat OR goats OR  
sheep OR ovine OR canine OR dog OR dogs OR feline OR cat OR cats OR  
zebrafish)

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**Google  
Scholar**

augmented renal clearance OR enhanced renal function OR enhanced renal clearance OR  
increased kidney function OR increased kidney clearance

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## Prevalence and Risk Factors of Augmented Renal Clearance: A Systematic Review and Meta-analysis

**Table S2.** Appraisal of individual studies included in this review.

<b>Prevalence/Incidence Studies</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>Total</b>
Adnan (2014) [1]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	<b>8/9</b>
Abdel el Naeem (2017) [2]	Yes	Unclear	No	Yes	Yes	Yes	Yes	Yes	Yes	<b>7/9</b>
Aréchiga-Alvarado et al. [3]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	<b>9/9</b>
Aitullina (2019) [4]	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	<b>7/9</b>
Baptista (2011) [5]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	<b>8/9</b>
Baptista (2012) [6]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	<b>8/9</b>
Baptista (2014) [7]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	<b>9/9</b>
Baptista et al.(2014) [8]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	<b>9/9</b>
Baptista (2020) [9]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	<b>9/9</b>
Barletta (2016) [10]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	<b>8/9</b>
Barletta (2017) [11]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	<b>8/9</b>
Barrasa (2020) [12]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	<b>8/9</b>
Bricheux (2019) [13]	Unclear	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	<b>7/9</b>
Brown (2020) [14]	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	<b>7/9</b>
Burnham (2017) [15]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	<b>8/9</b>
Campassi (2014) [16]	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	<b>7/9</b>
Carlier (2013) [17]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	<b>8/9</b>
Carrie (2018a) [18]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	<b>8/9</b>
Carrie (2018b) [19]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	<b>8/9</b>
Carrie (2019a) [20]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	<b>8/9</b>
Carrie (2019b) [21]	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	<b>6/9</b>
Carrie (2020) [22]	Unclear	Yes	No	Yes	Yes	No	Yes	Yes	Yes	<b>6/9</b>
Chen (2020) [23]	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	<b>7/9</b>
Chu (2016) [24]	Yes	Unclear	No	Yes	Yes	No	Yes	Yes	Yes	<b>6/9</b>
Chu (2019) [25]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	<b>8/9</b>
Claus (2013) [26]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	<b>8/9</b>
Cojutti (2020) [27]	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes	<b>6/9</b>

Dhaese et al. (2018) [28]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	9/9
Declercq (2016) [29]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	9/9
DeWaele (2015) [30]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	9/9
Dias (2015) [31]	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	7/9
Ehmann (2017) [32]	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes	6/9
Eidelson et al.[33]	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	7/9
Fuster-Lluch (2008) [34]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	9/9
Gijzen (2020) [35]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	9/9
Grootaert (2012) [36]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	9/9
Helset (2020) [37]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	8/9
Hirai (2016) [38]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	8/9
Huttner (2015) [39]	Yes	Unclear	No	Yes	Yes	No	Yes	Yes	Yes	6/9
Ishii (2018) [40]	Yes	Yes	No	Yes	No	No	Yes	No	Yes	5/9
Izumisawa (2019) [41]	Unclear	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	7/9
Joynt (2001) [42]	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	7/9
Kawano et al.(2016) [43]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	9/9
Kawano (2018) [44]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	9/9
Lannou (2020) [45]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	8/9
Lannou editorial letter (2020) [46]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	8/9
Lautrette (2012) [47]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	8/9
May (2015) [48]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	8/9
Minkute (2013) [49]	Unclear	Yes	No	Yes	Yes	No	Yes	Yes	Yes	6/9
Minville (2011) [50]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	8/9
Morbitzer (2019) [51]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	9/9
Mulder (2019) [52]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	8/9
Nei (2020) [53]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	8/9
Ollivier (2019) [54]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	8/9
Ramos (2017)[55]	Yes	Yes	No	No	Unclear	Yes	Yes	Yes	Yes	6/9
Ruiz (2015) [56]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	9/9
Saito (2020) [57]	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	7/9
Saour (2016) [58]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	8/9
Steinke (2015) [59]	Yes	Yes	No	Yes	Unclear	Yes	No	Yes	Yes	6/9



Tamatsukuri (2018) [60]	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	7/9
Tsai (2018) [61]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	8/9
Udy (2013) [62]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	8/9
Udy (2013b) [63]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	8/9
Udy (2014) [64]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	9/9
Udy (2017) [65]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	8/9
Udy (2018) [66]	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	8/9
Villaneuva (2019) [67]	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	7/9
Weber (2019) [68]	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	6/9
Wong (2018) [69]	Unclear	Yes	Yes	Yes	No	No	Yes	Yes	Yes	6/9
Wu (2019) [70]	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	8/9

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**A:** Was the sample frame appropriate to address the target population? **B:** Were study participants sampled in an appropriate way? **C:** Was the sample size adequate? **D:** Were the study subjects and the setting described in detail? **E:** Was the data analysis conducted with sufficient coverage of the identified sample? **F:** Were valid methods used for the identification of the condition? **G:** Was the condition measured in a standard, reliable way for all participants? **H:** Was there appropriate statistical analysis? **I:** Was the response rate adequate, and if not, was the low response rate managed appropriately?

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