

RESPONSIVENESS IN EPILEPSY SCALE—REVISED (RES-II)**SUMMARY****BASELINE:**
BEFORE THE FIRST SEIZURE

Explain to the patient they may receive some dollar bills which should be returned after testing.

→Perform RES-II, ITEMS 1-10 and the MOTOR EXAM.

Done at interictal baseline, at least 6 hours after the most recent seizure (or longest available seizure-free interval).

Done only once per patient.

SEIZURE TESTING: (Ictal and Post-ictal)
IMMEDIATELY AFTER EACH SEIZURE ONSET

→Perform MEMORY 1A (Ictal).

→Perform RES ITEMS 1-10 repeatedly (RES-II, ITEM 11 once if indicated) until total score for a complete cycle is within 2 points of baseline.

→Perform MEMORY 1B (Post-ictal) followed by the MOTOR EXAM.

Done for each seizure.

INTERICTAL MEMORY:
6 HOURS OR MORE AFTER EACH SEIZURE TESTED

→Perform MEMORY 2A and MEMORY 2B.

Done at least 6 hours after recovery from the most recent seizure (or longest available seizure-free interval).

Use the same time delay between Memory 2A and 2B as was used for Memory 1A and 1B.

Done after each seizure tested.

When?

BEFORE THE FIRST SEIZURE. As soon as possible after the patient is recruited, but at least 6 hours after any previous seizure. This should usually be done at the beginning of your shift, if you are the first person to sit with that patient. Only needs to be done once.

**What?****Baseline Testing**

- Responsiveness Testing (Items 1 --> 10)
- Motor Testing (Items M1 --> M4)

IMMEDIATELY AFTER SEIZURE ONSET, start here:



Memory 1A (ictal)



Items 1-10
(plus Item 11
if indicated)



Memory 1B (post-ictal)



Motor Testing

When seizure is clinically over and patient returns to baseline performance on entire testing series (within 2 points), move on to memory testing.



INTERICTAL MEMORY: 6 HOURS OR MORE AFTER EACH SEIZURE TESTED.

(At least 6 hours after most recent seizure)
The delay between 2A and 2B should be the same as that between 1A and 1B, by reviewing the video. During this delay, ask patient to name months forward/backward and talk with them, such that they lose short-term focus on the memory task.



Memory 2A



Memory 2B

RES-II

NOTE: **SCORING for all RES-II items is done based on video/EEG review, NOT during the testing.**

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→Perform RES-II, ITEMS 1-10 and the MOTOR EXAM.

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Done only once per patient.

SEIZURE TESTING: (Ictal and Post-ictal) **IMMEDIATELY AFTER EACH SEIZURE ONSET**

→Perform MEMORY 1A (Ictal).

→Perform RES-II, ITEMS 1-10 repeatedly (RES-II, ITEM 11 once if indicated) until total score for a complete cycle is within 2 points of baseline.

→Perform MEMORY 1B (Post-ictal) followed by the MOTOR EXAM.

Done for each seizure.

MEMORY 1A (Ictal)

Immediately at onset of seizure, ask the patient to remember the exact time, hour and minute “--:--” (e.g. 1:52 or 9:34) by saying to patient:

1A. “Remember the time. It is --:--. Say --:--.”

If at full hour (e.g. 2:00) say the time minus one minute (e.g. say “1:59” instead of “2”)

Response:	Score
Repeats exact time correctly	4
Says partly correct time	3
Other vocalization	2
Orients towards examiner	1
No response	0

RES ITEMS 1-11

Perform RES-II, ITEMS 1-10 (and RES-II, ITEM 11 once if indicated) continuously throughout the ictal and postictal periods until the seizure is clinically and electrically over and until the patient succeeds in completing RES-II, ITEMS 1-10 with same score as interictal testing (within 2 points on TOTAL score). **RES-II, ITEMS 1-10 should be performed at least two times for any seizure** no matter how brief before moving on to post-ictal memory and motor testing.

Questions/Commands:	Response:	Score:
1. “What’s your name?”	Correct name (first or last)	4
	Other words	3
	Unintelligible vocalization	2
	Orients towards examiner	1
	No response	0
2. “What’s the name of this place?”	Correct name of hospital	4
	Other words	3
	Unintelligible vocalization	2
	Orients towards examiner	1
	No response	0
3. “What do you call this?” (show a pen)	Says “pen”	4
	Says other intelligible word	3
	Unintelligible vocalization	2
	Orients or gestures	1
	No response	0
4. “What do you call this?” (show a watch)	Says “watch” (not clock, time)	4
	Says other intelligible word	3
	Unintelligible vocalization	2
	Orients or gestures	1
	No response	0
5. “Touch your nose” Say command but do not demonstrate	Touches nose	4
	Touches other part of face	3
	Points to other part of body	2
	Orients towards examiner	1
	No response	0
6. “<u>Touch your right ear with two fingers</u>” Say command but do not demonstrate	All 5 elements correct	4
	3-4 elements correct	3
	1-2 elements correct	2
	Orients towards examiner	1
	No response	0

7. "Wave hello"	Waves back	4
Say command <i>and</i> wave to the patient with one hand	Other non-seizure arm response	3
	Vocalizes without waving	2
	Orients towards examiner	1
	No response	0
8. "Take the money"	Reaches and takes money	4
Say command and hold an open \$1 bill 3 ft (1 m) in front of patient	Reaches towards money	3
	Other motor response	2
	Orients towards examiner	1
	No response	0
9. "Take the ball"	Correct both sides	4
Place a tennis ball on <i>dorsal</i> surface of patient's hand and roll across index finger and thumb, without touching undersurface of hand, saying "Take the ball."	Correct one side	3
Test each hand one time.	Ball held but dropped	2
	Orients towards examiner	1
	No response	0

A correct response meets BOTH of the following criteria:

1. The wrist must rotate and the fingers should extend as the ball is moved along the dorsal surface of the hand.
2. The ball is held without dropping it.

10. "Look at the mirror"	Correct both sides	4
Hold a hand mirror 4-6 inches in front of patient's face and say "Look at the mirror" while rotating the mirror <i>slowly</i> 45 degrees to the right and left of the midline.	Correct one side	3
	Equivocal response	2
	Orients towards examiner	1
	No response	0

Describe patient response out loud during testing e.g. "Looked left, looked right" or "Looked left, did not look right" (Note that eyes often cannot be seen on camera)

A correct response is when eyes follow the mirror for 45 degrees in one direction *without loss of fixation*.

NOTE: ITEM 11 is only done if patient scores 0 on ALL items above, and is only done ONCE AT MOST per seizure

Test item:	Response:	Score:
11. Apply pressure to nailbed (press handle of reflex hammer on cuticle for 2 seconds). One trial for each hand.	Localizes	4
	Withdraws	3
	Postures	2
	Winces or vocalizes	1
	No response	0

Describe patient response out loud during testing e.g. “Moved left, moved right” or “Moved left, did not move right” (Note that hands might not be seen on camera)

Localizes = a non-stimulated limb must locate and make contact with point of stimulus

Withdraws = isolated non-stereotyped flexion withdrawal of limb away from stimulus

Postures = stereotyped flexion or extension posturing

Best of above responses to *EITHER* hand is used for score.

REPEAT RES LEVEL 1-10 TESTS WITHOUT INTERRUPTION until seizure is over.
Then continue to repeat tests in postictal period until all responses have returned to baseline (within 2 points of TOTAL interictal score on RES ITEMS 1-10).

MEMORY 1B (Post-ictal)

Immediately after return to baseline (within 2 points of interictal score on a complete cycle of items 1-10) say to patient:

1B. “What time did I ask you to remember before?”	Repeats exact time correctly	4
	Says partly correct time	3
	Other vocalization	2
	Orients towards examiner	1
	No response	0

MOTOR EXAM (Post-ictal)

Test items:	Response:	Score:
M.1 Hold patient’s R arm 18 inches off bed, release it and say “ Hold up your arm while I count to 3: 1..2..3 ”	Holds up >3s	2
	Holds up <3s	1
	Drops immediately	0
M.2 Hold patient’s L arm 18 inches off bed, release it and say “ Hold up your arm while I count to 3: 1..2..3 ”	Holds up >3s	2
	Holds up <3s	1
	Drops immediately	0
M.3 Hold patient’s R leg 18 inches off bed, release it and say “ Hold up your leg while I count to 3: 1..2..3 ”	Holds up >3s	2
	Holds up <3s	1
	Drops immediately	0
M.4 Hold patient’s L leg 18 inches off bed, release it and say “ Hold up your leg while I count to 3: 1..2..3 ”	Holds up >3s	2
	Holds up <3s	1
	Drops immediately	0

Describe motor responses aloud while performing testing of each limb (in case off camera)

INTERICTAL MEMORY:
6 HOURS OR MORE AFTER EACH SEIZURE TESTED

→ Perform MEMORY 2A and MEMORY 2B.

Done at least 6 hours after recovery from the most recent seizure (or longest available seizure-free interval).

Use the same time delay between Memory 2A and 2B as was used for Memory 1A and 1B.

Done after each seizure tested.

MEMORY 2A and 2B (Inter-ictal)

Do only in patients after ictal memory testing, at least 6 hours after the most recent seizure (or longest available seizure-free interval). Measure time between items 1.A and 1.B above by video review. Use the same time delay here between items 2.A. and 2.B. Again, ask the patient to remember the exact time, hour and minute “--:--” (e.g. 1:52 or 9:34) by saying to patient:

2A. “Remember the time. It is --:--. Say --:--.”	Response:	Score
If at full hour (e.g. 2:00) say the time minus one minute (e.g. say “1:59” instead of “2”)	Repeats exact time correctly	4
	Says partly correct time	3
	Other vocalization	2
	Orients towards examiner	1
	No response	0

During delay, ask pt to name months forwards/backwards once, then talk with them. Then say:

2B. “What time did I ask you to remember before?”	Repeats exact time correctly	4
	Says partly correct time	3
	Other vocalization	2
	Orients towards examiner	1
	No response	0

REMINDER:

SCORING for all RES-II items is done based on subsequent video/EEG review within 24 hours of testing, NOT during the testing.

REFERENCES

The RES-II has been modified from earlier scales based on the following sources:

Giacino JT, Kalmar K, Whyte J. 2004. The JFK Coma Recovery Scale–Revised: Measurement Characteristics and Diagnostic Utility. *Arch Phys Med Rehabil.* 85: 2020-2029.

Yang L, Shklyar I, Lee HW, Ezeani C, Anaya J, Balakirsky S, Han X, Enamandram S, Men C, Cheng JY, Nunn A, Mayer T, Francois C, Albrecht M, Hutchison AL, Yap E-L, Ing K, Didebulidze G, Xiao B, Hamid H, Farooque P, Detyniecki K, Giacino JT, Blumenfeld H. (2012). Impaired consciousness in epilepsy investigated by a prospective responsiveness in epilepsy scale (RES). *Epilepsia*, 53(3):437–447 .