



Article

Return to driving after a diagnosis of epilepsy: A prospective registry study

Xu, Ying, Hackett, Maree, Glozier, Nick, Nikpour, Armin, Somerville, Ernest, Bleasel, Andrew, Ireland, Carol and Anderson, Craig S.

Available at <https://clock.uclan.ac.uk/21405/>

Xu, Ying, Hackett, Maree orcid iconORCID: 0000-0003-1211-9087, Glozier, Nick, Nikpour, Armin, Somerville, Ernest, Bleasel, Andrew, Ireland, Carol and Anderson, Craig S. (2018) Return to driving after a diagnosis of epilepsy: A prospective registry study. Epilepsia, 59 (3). pp. 661-667. ISSN 0013-9580

It is advisable to refer to the publisher's version if you intend to cite from the work.
<http://dx.doi.org/10.1111/epi.14001>

For more information about UCLan's research in this area go to <http://www.uclan.ac.uk/researchgroups/> and search for <name of research Group>.

For information about Research generally at UCLan please go to <http://www.uclan.ac.uk/research/>

All outputs in CLoK are protected by Intellectual Property Rights law, including Copyright law. Copyright, IPR and Moral Rights for the works on this site are retained by the individual authors and/or other copyright owners. Terms and conditions for use of this material are defined in the [policies](#) page.

Supplementary Appendix

This appendix has been provided by the authors to give readers additional information about their work.

Supplement to: Xu Y, Hackett M, Glozier N, et al. Return to driving after a diagnosis of epilepsy: a prospective registry study.

Table e-1 Participant characteristics and by follow-up status at 12 months after a diagnosis of epilepsy

| Variable (at baseline unless specified) | Participants who drove at baseline (n = 181) | Follow-up status at 12 months | | P value |
|--|--|------------------------------------|-------------------|---------|
| | | Driving status available (n = 152) | Excluded (n = 29) | |
| <i>Demographic and socioeconomic factors</i> | | | | |
| Age, years | 42 (28,56) | 42 (28,56) | 43(30,56),2 | 0.55 |
| Male | 96 (53) | 81 (53) | 15 (52) | 0.88 |
| Married/partnered ^a | 106/176 (60) | 88/147 (60) | 18/29 (62) | 0.82 |
| Post-secondary education | 98/180 (54) | 79 (52) | 19/28 (68) | 0.12 |
| Risk drinking level (≥ 5 for men, ≥ 4 for women on WHO-AUDIT) | 55 (30) | 47 (31) | 8 (28) | 0.72 |
| Family function (APGAR), n | 15 (13,15),178 | 15(13,15),150 | 15(14,15),2 | 0.48 |
| Full/part time occupation before diagnosis | 136/171 (80) | 119/143 (83) | 17/28 (61) | 0.01 |
| Full/part time student | 33/177 (19) | 28/150 (19) | 5/27 (19) | 0.99 |
| Annual household income \geq Aust\$100,400 | 82/169 (49) | 71/143 (50) | 11/26 (42) | 0.49 |
| Encountered economic hardship ^b | 55/180 (31) | 45/152 (30) | 10/28 (36) | 0.52 |
| Private health insurance | 111 (61) | 96 (63) | 15 (52) | 0.25 |
| Own accommodation with/without mortgage | 95/179 (53) | 80/151 (53) | 15/28 (54) | 0.95 |
| ≥ 2 preschool or school aged children in the household | 32/165 (19) | 27/137 (20) | 5/28 (18) | 0.82 |
| Drive for work/education | 97 (54) | 88 (58) | 9 (31) | 0.01 |
| Drive frequency (≥ 3 or 4 days per week) | 138/178 (78) | 118/150 (79) | 20/28 (71) | 0.40 |
| Other licensed driver in household | 122/142 (86) | 122/142 (86) | - | - |
| <i>Clinical factors</i> | | | | |
| No comorbidity ^c | 124/180 (69) | 105 (69) | 19/28 (68) | 0.90 |
| Anxiety or depression (≥ 8 on HADS anxiety/depression subscale) | 60/175 (34) | 45/147 (31) | 15/28 (54) | 0.02 |
| Psychosocial disability (WHO-DAS), n | 14(13,18),178 | 14(13,17),150 | 16(13,23),2 | 0.17 |
| <i>Epilepsy-related characteristics</i> | | | | |
| Symptomatic ^d | 68 (38) | 55 (36) | 13 (45) | 0.38 |
| Seizure frequency more than several times per year | 51/157 (32) | 45/134 (34) | 6/23 (26) | 0.48 |
| No seizure occurrence in the preceding 8 months ^e | 104/152 (68) | 104 (68) | 0/0 | - |
| <2 AEDs ^e | 133/152 (88) | 133 (88) | 0/0 | - |

| Variable (at baseline unless specified) | Participants who drove at baseline (n = 181) | Follow-up status at 12 months | | P value |
|---|--|---------------------------------------|----------------------|---------|
| | | Driving status available (n = 152) | Excluded (n = 29) | |
| No family history of epilepsy | 138/166 (83) | 115/139 (83) | 23/27 (85) | 0.76 |
| Stigma ^f | 42/179 (23) | 37 (24) | 5/27 (19) | 0.51 |

Data are number (percentage) or median (interquartile range).

WHO-AUDIT denotes World Health Organization Alcohol Use Disorders Identification Test alcohol consumption part, Family APGAR Family Adaptation, Partnership, Growth, Affection and Resolve questionnaire, HADS Hospital Anxiety and Depression Scale.

P values are for the comparisons of the study group with those excluded. Kruskal-Wallis and Chi squared tests used for continuous and categorical variables, respectively. If there were missing values, the actual denominators were presented.

^aVersus no current partner (i.e. never married, widowed, divorced or separated)

^bEither an instance of a household's inability to make a necessary household payment (i.e. gas, electricity or telephone bills, heat or cool home, mortgage or rent payments, etc.) or the demonstration of dissaving behavior (i.e. borrowing or use of savings, sell assets, borrow money, etc.)

^cIncludes self-reported cardiovascular, respiratory, ophthalmology, otorhinolaryngology, gastrointestinal, hepatic, renal, genito-urinary, musculoskeletal and endocrine-metabolic diseases, but not including neurological (e.g. epilepsy) and psychiatric/behavioral conditions

^dSymptomatic epilepsy due to encephalitis or meningitis, head injury, stroke or brain operation, versus idiopathic epilepsy

^eVariables collected at 12 months, reflecting the situation in the preceding 8 months

^fAs a result of epilepsy, the participants think that other people are uncomfortable, treat them differently, or prefer to avoid them

Table e-2 Participant characteristics and by if the baseline interview was conducted within 28 days after a diagnosis of epilepsy

| Variable (at baseline unless specified) | Baseline interview | | P value |
|---|--------------------|--------------------|---------|
| | ≤ 28 days (n = 53) | > 28 days (n = 99) | |
| <i>Demographic and socioeconomic factors</i> | | | |
| Age, years | 42 (31, 58) | 40 (28, 56) | 0.40 |
| Male | 26 (49) | 55 (56) | 0.44 |
| Married/partnered ^a | 31 (58) | 57/94 (61) | 0.80 |
| Post-secondary education | 29 (55) | 50 (51) | 0.62 |
| Risk drinking level (≥ 5 for men, ≥ 4 for women on WHO-AUDIT) | 18 (34) | 29 (29) | 0.55 |
| Family function (APGAR), n | 15 (14, 15), 53 | 15 (13, 15), 97 | 0.44 |
| Full/part time occupation before diagnosis | 40/49 (82) | 79/94 (84) | 0.71 |
| Full/part time student | 9 (17) | 19/97 (20) | 0.70 |
| Annual household income ≥ Aust\$100,400 | 27/50 (54) | 44/93 (47) | 0.45 |
| Encountered economic hardship ^b | 12 (23) | 33 (33) | 0.17 |
| Private health insurance | 34 (64) | 62 (63) | 0.85 |
| Own accommodation with/without mortgage | 28 (53) | 52/98 (53) | 0.98 |
| ≥ 2 preschool or school aged children in the household | 12/46 (26) | 15/91 (16) | 0.18 |
| Drive for work/education | 28 (53) | 60 (61) | 0.35 |
| Drive frequency (≥ 3 or 4 days per week) | 42 (79) | 76/97 (78) | 0.90 |
| Other licensed driver in household ^e | 39/49 (80) | 83/93 (89) | 0.12 |
| <i>Clinical factors</i> | | | |
| No comorbidity ^c | 40 (75) | 65 (66) | 0.21 |
| Anxiety or depression (≥ 8 on HADS anxiety/depression subscale) | 14 (26) | 31/94 (33) | 0.41 |
| Psychosocial disability (WHO-DAS), n | 14 (13, 16), 53 | 14 (13, 18), 97 | 0.54 |
| <i>Epilepsy-related characteristics</i> | | | |
| Symptomatic ^d | 15 (28) | 40 (40) | 0.14 |
| Seizure frequency more than several times per year | 10/45 (22) | 35/89 (39) | 0.05 |
| No seizure occurrence in the preceding 8 months ^e | 33 (62) | 71 (72) | 0.23 |
| <2 AEDs ^e | 46 (87) | 87 (88) | 0.85 |
| No family history of epilepsy | 40/47 (85) | 75/92 (82) | 0.60 |

| Variable (at baseline unless specified) | Baseline interview | | P value |
|---|--------------------|--------------------|---------|
| | ≤ 28 days (n = 53) | > 28 days (n = 99) | |
| Stigma ^f | 8 (15) | 29 (29) | 0.052 |

Data are number (percentage) or median (interquartile range).

WHO-AUDIT denotes World Health Organization Alcohol Use Disorders Identification Test alcohol consumption part, Family APGAR Family Adaptation, Partnership, Growth, Affection and Resolve questionnaire, HADS Hospital Anxiety and Depression Scale.

P values are for the comparisons of the study group with those excluded. Kruskal-Wallis and Chi squared tests used for continuous and categorical variables, respectively. If there were missing values, the actual denominators were presented.

^aVersus no current partner (i.e. never married, widowed, divorced or separated)

^bEither an instance of a household's inability to make a necessary household payment (i.e. gas, electricity or telephone bills, heat or cool home, mortgage or rent payments, etc.) or the demonstration of dissaving behavior (i.e. borrowing or use of savings, sell assets, borrow money, etc.)

^cIncludes self-reported cardiovascular, respiratory, ophthalmology, otorhinolaryngology, gastrointestinal, hepatic, renal, genito-urinary, musculoskeletal and endocrine-metabolic diseases, but not including neurological (e.g. epilepsy) and psychiatric/behavioral conditions

^dSymptomatic epilepsy due to encephalitis or meningitis, head injury, stroke or brain operation, versus idiopathic epilepsy

^eVariables collected at 12 months, reflecting the situation in the preceding 8 months

^fAs a result of epilepsy, the participants think that other people are uncomfortable, treat them differently, or prefer to avoid them

Table e-3 Association of participant baseline characteristics and driving status in the month before a diagnosis of epilepsy

| Variable | Driving status | | P value | AOR (95%CI) |
|---|----------------------|-------------------------|---------|----------------------|
| | Driving (n = 181) | Not driving (n = 56) | | |
| <i>Demographic and socioeconomic factors</i> | | | | |
| Age, years | 42 (28, 56) | 30 (22, 64) | 0.03 | |
| Male | 96 (53) | 26 (46) | 0.39 | |
| Married/partnered ^a | 106/176 (60) | 17/55 (31) | <0.001 | 2.32 (1.00 to 5.41) |
| Post-secondary education | 98/180 (54) | 18 (32) | 0.004 | |
| Risk drinking level (≥ 5 for men, ≥ 4 for women on WHO-AUDIT) | 55 (30) | 16/55 (29) | 0.85 | |
| Family function (APGAR), n | 15 (13, 15), 178 | 14 (11, 15), 50 | 0.03 | 1.22 (1.02 to 1.46) |
| Full/part time occupation before diagnosis | 136/171 (80) | 17/43 (40) | <0.001 | 8.22 (3.40 to 19.88) |
| Full/part time student | 33/177 (19) | 15/51 (29) | 0.10 | |
| Annual household income ≥ Aust\$100,400 | 82/169 (49) | 11/51 (22) | <0.001 | |
| Encountered economic hardship ^b | 55/180 (31) | 21/52 (40) | 0.18 | |
| Private health insurance | 111 (61) | 22 (39) | 0.004 | |
| Own accommodation with/without mortgage | 95/179 (53) | 17 (30) | 0.003 | 2.90 (1.19 to 7.04) |
| ≥ 2 preschool or school aged children in the household | 32/165 (19) | 3/48 (6) | 0.03 | |
| Drive for work/education | 97 (54) | N/A | - | |
| Drive frequency (≥ 3 or 4 days per week) | 138/178 (78) | N/A | - | |
| <i>Clinical factors</i> | | | | |
| No comorbidity ^c | 124/180 (69) | 29/55 (53) | 0.03 | |
| Anxiety or depression (≥ 8 on HADS anxiety/depression subscale) | 60/175 (34) | 18/52 (35) | 0.97 | |
| Psychosocial disability (WHO-DAS), n | 14 (13, 18), 178 | 15 (13, 27), 55 | 0.42 | |
| <i>Epilepsy-related characteristics</i> | | | | |
| Symptomatic ^d | 68 (38) | 21 (38) | 0.99 | |
| Seizure frequency more than several times per year | 51/157 (32) | 18/50 (36) | 0.65 | |
| No family history of epilepsy | 138/166 (83) | 37/54 (69) | 0.02 | 2.89 (1.06 to 7.89) |
| Stigma ^e | 42/179 (23) | 13/52 (25) | 0.82 | |
| | | | | C statistic 0.81 |

Data are number (percentage) or median (interquartile range).

AOR denotes adjusted odds ratio, CI confidence interval, WHO-AUDIT World Health Organization Alcohol Use Disorders Identification Test alcohol consumption part, Family APGAR Family Adaptation, Partnership, Growth, Affection and Resolve questionnaire, HADS Hospital Anxiety and Depression Scale.

P values are for the comparisons of drivers with non-drivers. Kruskal-Wallis and Chi squared tests used for continuous and categorical variables, respectively. If there were missing values, the actual denominators were presented.

^aVersus no current partner (i.e. never married, widowed, divorced or separated)

^bEither an instance of a household's inability to make a necessary household payment (i.e. gas, electricity or telephone bills, heat or cool home, mortgage or rent payments, etc.) or the demonstration of dissaving behavior (i.e. borrowing or use of savings, sell assets, borrow money, etc.)

^cIncludes self-reported cardiovascular, respiratory, ophthalmology, otorhinolaryngology, gastrointestinal, hepatic, renal, genito-urinary, musculoskeletal and endocrine-metabolic diseases, but not including neurological (e.g. epilepsy) and psychiatric/behavioral conditions

^dSymptomatic epilepsy due to encephalitis or meningitis, head injury, stroke or brain operation, versus idiopathic epilepsy

^eAs a result of epilepsy, the participants think that other people are uncomfortable, treat them differently, or prefer to avoid them

Appendix e-1 Clinical assessment at 12 months (Part A only)

PART A: CLINICAL COURSE

INTERVIEWER If you are interviewing a parent or other proxy about a participant, then replace “you/your” with the name of the participant.

TO THE PROXY: As the nominated person who can provide details about this person/child/teenager, I would like to ask you some questions that relate to this person’s turns and medical history.

TO THE PARTICIPANT: The questions I am going to ask you are in regard to the turns that you have had that appear related, or maybe due, to seizures or epilepsy.

TO BOTH SOURCES: The information you provide is confidential and will be used only for research.

INTERVIEWER: I’d like to ask you some questions about your / your child’s seizures / turns

1. Have you experienced any seizures/attacks in the last 8 months? Yes No
- 1a. If yes, number of seizures/attacks |_|_|_|_|
- 1b. Date of last seizure |_|_| / |_|_| / |_|_|_|_|
- 1c. Was the seizure(s) the same as your usual seizures? Yes No
- 1c1. If No, please describe how the seizure(s) was different
-
-
- 1d. Was the seizure(s) focal? Yes No Don't know
- 1e. Was the seizure(s) generalised? Yes No Don't know
2. Did you need to visit the emergency department or some other doctor due to a seizure in the last 8 months? Yes No
- 2a. Were you transported by ambulance? Yes No
- 2b. Did the doctor say the seizures were epileptic? Yes No
- 2c. How many hospital readmissions have you had in the last 8 months? |_|_|_|_| (total number)
3. Have you developed any new medical problems in the last 8 months? Yes No (Go to Part B)
- (please specify)
- 3a.
-
-
-

Appendix e-2 Adult psychosocial assessment at baseline (Part F only)

PART F: TRANSPORT

INTERVIEWER: In the month before the diagnosis with epilepsy:

- 1. What form/s of transport did you usually use to get to work/ place of education**
Please tick all that apply
- 01 Public transport (bus, train, ferry etc)
 - 02 Car/truck/motorbike/motor scooter – as driver
 - 03 Car/truck/motorbike/motor scooter – as passenger
 - 04 Bicycle
 - 05 Walked
 - 06 Worked at home
 - 07 Other please specify
 - 08 Did not attend work/education
- 2. What form/s of transport did you usually use to attend your usual domestic/social activities**
(shopping, transporting children to school, sporting activities etc)
Please tick all that apply
- 01 Public transport (bus, train, ferry etc)
 - 02 Car/truck/motorbike/motor scooter – as driver
 - 03 Car/truck/motorbike/motor scooter – as passenger
 - 04 Bicycle
 - 05 Walked
 - 06 Other
- 3. What type of vehicle(s) did you drive?**
Please tick all that apply
- 01 Private use vehicle
 - 02 Public transport vehicle
 - 03 Emergency service vehicle
 - 04 Commercial vehicle
 - 05 Heavy vehicle (truck, semitrailer etc)
 - 06 Farm machinery or vehicle
 - 07 Industrial machinery or vehicle
 - 08 Did not drive question 5. Skip to
 - 09 Other please specify
- 4. How often did you drive, on average a week**
- 01 Every day
 - 02 Five or six days per week
 - 03 Three or four days per week
 - 04 One or two days per week
 - 05 Less than one day per week
- 5. How important is it for you to be able to drive?**
- 01 Very important
 - 02 Fairly important
 - 03 Only slightly important
 - 04 Not at all important

6. How much do you depend on being able to drive?

- 6a. For getting about socially?**
- 01 Not at all
 - 02 A little
 - 03 To some extent
 - 04 A lot

- 6b. For getting to your place of work?**
- 01 Not at all
 - 02 A little
 - 03 To some extent
 - 04 A lot

- 6c. For carrying out your job?**
- 01 Not at all
 - 02 A little
 - 03 To some extent
 - 04 A lot

- 7. How much would not being able to drive affect your daily life?**
- 01 A lot
 - 02 To some extent
 - 03 Only a little
 - 04 Not at all
 - 05 Not applicable

Appendix e-3 Adult psychosocial assessment at 12 months (Part F only)

PART F: TRANSPORT

INTERVIEWER: In the last 8 months:

1. What form/s of transport did you use to get to work and/or your place of education in the last 8 months

| | | | | | |
|-----|--|--------------------------|-----|--------------------------|----|
| 1a. | Public transport (bus, train, ferry etc) | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 1b. | Car/truck/motorbike/motor scooter – as driver | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 1c. | Car/truck/motorbike/motor scooter – as passenger | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 1d. | Bicycle | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 1e. | Walked | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 1f. | Worked at home | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 1g. | Other please specify: _____ | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 1h. | Did not attend work/education | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |

2. What form/s of transport did you use to attend your usual domestic/social activities (shopping, transporting children to school, sporting activities etc) in the last 8 months

| | | | | | |
|-----|--|--------------------------|-----|--------------------------|----|
| 2a. | Public transport (bus, train, ferry etc) | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 2b. | Car/truck/motorbike/motor scooter – as driver | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 2c. | Car/truck/motorbike/motor scooter – as passenger | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 2d. | Bicycle | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 2e. | Walked | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 2f. | Other please specify: _____ | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |

3. What type of vehicle(s) did you drive in the last 8 months?

| | | | | | |
|-----|--|--------------------------|-----|--------------------------|----|
| 3a. | Private use vehicle | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 3b. | Public transport vehicle | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 3c. | Emergency service vehicle | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 3d. | Commercial vehicle | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 3e. | Heavy vehicle (truck, semitrailer etc) | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 3f. | Farm machinery or vehicle | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 3g. | Industrial machinery or vehicle | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 3h. | Did not drive (Go to question F5) | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| 3i. | Other please specify: _____ | <input type="checkbox"/> | Yes | <input type="checkbox"/> | No |

4. How often did you drive, on average a week

- 01 Every day
- 02 Five or six days per week
- 03 Three or four days per week
- 04 One or two days per week
- 05 Less than one day per week

5. How important is it for you to be able to drive?

- 01 Very important
- 02 Fairly important
- 03 Only slightly important
- 04 Not at all important

6a.

- 01 Not at all

- | | | | |
|------------|---|-----------------------------|----------------|
| | | <input type="checkbox"/> 02 | A little |
| | | <input type="checkbox"/> 03 | To some extent |
| | How much do you depend on being able to drive for getting about socially? | <input type="checkbox"/> 04 | A lot |
| 6b. | How much do you depend on being able to drive for getting to your place of work? | <input type="checkbox"/> 01 | Not at all |
| | | <input type="checkbox"/> 02 | A little |
| | | <input type="checkbox"/> 03 | To some extent |
| | | <input type="checkbox"/> 04 | A lot |
| 6c. | How much do you depend on being able to drive for carrying out your job? | <input type="checkbox"/> 01 | Not at all |
| | | <input type="checkbox"/> 02 | A little |
| | | <input type="checkbox"/> 03 | To some extent |
| | | <input type="checkbox"/> 04 | A lot |
| 7. | How much does not being able to drive affect your daily life? | <input type="checkbox"/> 01 | A lot |
| | | <input type="checkbox"/> 02 | To some extent |
| | | <input type="checkbox"/> 03 | Only a little |
| | | <input type="checkbox"/> 04 | Not at all |
| | | <input type="checkbox"/> 05 | Not applicable |
| 8. | Do you have any other licensed drivers in your household? | <input type="checkbox"/> Y | Yes |
| | | <input type="checkbox"/> N | No |