

---

## BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.  
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME: Carnahan, Ryan M.

eRA COMMONS USER NAME (credential, e.g., agency login): RCARNAHAN

POSITION TITLE: Associate Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

| INSTITUTION AND LOCATION          | DEGREE<br><i>(if applicable)</i> | Completion<br>Date<br>MM/YY | FIELD OF STUDY     |
|-----------------------------------|----------------------------------|-----------------------------|--------------------|
| University of Iowa, Iowa City, IA | Pharm.D.                         | 2001                        | Pharmacy           |
| University of Iowa, Iowa City, IA | M.S.                             | 2004                        | Epidemiology       |
| University of Iowa, Iowa City, IA | Fellowship                       | 2001-2004                   | Psychopharmacology |

### Positions and Honors

#### Positions and Employment

2001-2004 Fellow in Clinical Psychopharmacology, University of Iowa College of Pharmacy  
2004-2008 Assistant Professor, University of Oklahoma College of Pharmacy  
2004-2008 Pharmacy Consultant, OU-IMPACT, assertive community treatment team  
OU-Tulsa College of Medicine, Department of Psychiatry  
2006-2008 Director of PACT Research, OU-Tulsa College of Medicine, Department of Psychiatry  
2008-2013 Assistant Professor (Clinical)  
University of Iowa College of Public Health, Department of Epidemiology  
2008-present Associate Director, University of Iowa Health Effectiveness Research Center  
2008-2012 Assistant Director and Educational Consortium Representative  
University of Iowa Older Adult Center for Education and Research on Therapeutics  
2013-2014 Associate Professor (Clinical)  
University of Iowa College of Public Health, Department of Epidemiology  
2014-current Associate Professor  
University of Iowa College of Public Health, Department of Epidemiology  
2016-2018 Co-Director of Education and Outreach  
University of Iowa Center on Aging  
2017-current Director of Graduate Studies  
University of Iowa College of Public Health, Department of Epidemiology  
2018-2019 Co-Director  
The University of Iowa Aging Mind and Brain Initiative

#### Other Professional Activities

1998-1999 Member of the Iowa Pharmacy Association House of Delegates  
1998-2000 Co-Chairperson of the Operation Immunization Committee, Academy of Students of Pharmacy  
1999 Member, Iowa Pharmacy Association Professional Affairs Policy Committee  
1999 Member, Academy of Students of Pharmacy—American Pharmaceutical Association National House of Delegates  
1999-2000 Internship with Pharmacy Care Associates/Omni Care, long-term care pharmacy  
1999-2004 Member, Iowa Pharmacy Association Political Action Network  
2004 Board Certification in Psychiatric Pharmacy from the Board of Pharmaceutical Specialties  
2005-2006 University of Oklahoma Health Sciences Center Faculty Leadership Fellow  
2006-2014 Member, the College of Psychiatric and Neurologic Pharmacists Research Committee  
2008-2012 Member, Veterans Affairs VISN 23 Mental Health Pharmacoepidemiology Consulting Board  
2009-2011 Member, CHAIN Editorial Board, CERTs national education website

2010-2012 Vice Chair, the College of Psychiatric and Neurologic Pharmacists Research Committee  
 2010-2014 Member, Protocol Core, FDA Mini-Sentinel surveillance program  
 2010-2014 Co-Director, Iowa Geriatric Education Center  
 2011 Expert Panel Member, Treatment of Neuropsychiatric Symptoms in Dementia, University of Michigan Program for Positive Aging  
 2012-2013 Ad Hoc Member, NIA-S review panel  
 2012-2014 Chair, the College of Psychiatric and Neurologic Pharmacists Research Committee  
 2014 Committee Member, National Quality Forum, Prioritizing Measure Gaps Project, Alzheimer's Disease and Related Dementias  
 2014-2015 Co-Lead, the College of Psychiatric and Neurologic Pharmacists Research Community  
 2014-present Leadership Team Member, Iowa Geriatric Education Center  
 2014-present Co-Lead, Applied Surveillance Core, FDA Sentinel System

### **Awards and Honors**

1999 Inducted into Rho Chi—Delta Chapter, National Pharmacy Honor Society  
 2001 Department of Psychiatry Award for excellence in psychiatric pharmacy practice and research  
 2001 Bristol Meyers Squibb Patient Care Award, University of Iowa  
 2002 American College of Clinical Pharmacists Wyeth Psychopharmacology Research Fellowship  
 2003-2005 NIH Clinical Researcher Loan Repayment Program award  
 2004 Inducted into the Delta Omega—Alpha Phi Chapter, Honorary Society in Public Health  
 2007 The College of Psychiatric and Neurologic Pharmacists New Investigator Award  
 2008 University of Iowa College of Public Health/College of Medicine New Investigator Award  
 2013 Edna Stilwell Writing Award, Slack Incorporated, Publisher of the Journal of Gerontological Nursing  
 2019 Faculty Teaching Award, The University of Iowa College of Public Health

### **C. Publications (2016-present, in chronological order)**

1. Urick BY, Kaskie BP, Carnahan RM (2016). Improving antipsychotic prescribing practices in nursing facilities: the role of surveyor methods and surveying agencies in upholding the Nursing Home Reform Act. *Res Soc Adm Pharm*, 12(1):91-103.
2. Ammann EM, Jones MP, Link BK, Carnahan RM, Winiecki SK, Torner JC, McDowell BD, Fireman BH, Chrischilles EA (2016). Intravenous immune globulin and thromboembolic adverse events in patients with hematologic malignancy. *Blood*, 127(2):200-7. PMC: PMC4713161, PMID: 26443622
3. Chatterjee S, Carnahan RM, Chen H, Holmes HM, Johnson ML, Aparasu RR (2016). Anticholinergic medication use and risk of pneumonia in elderly adults: a nested case-control study. *Journal of the American Geriatrics Society*, 64(2):394-400. PMID: 26889844
4. Marcum ZA, Wirtz HS, Pettinger M, LaCroix AZ, Carnahan R, Cauley JA, Bea JW, Gray SL (2016). Anticholinergic medication use and falls in postmenopausal women: findings from the women's health initiative cohort study. *BMC Geriatrics*, 16(1):76. PMC: PMC4818856, PMID: 27038789
5. Chatterjee S, Bali V, Carnahan RM, Johnson ML, Chen H, Aparasu RR (2016). Anticholinergic Medication Use and Risk of Dementia Among Elderly Nursing Home Residents with Depression. *The American journal of geriatric psychiatry : official journal of the American Association for Geriatric Psychiatry*, 24(6):485-95. PMID: 26976294
6. Ammann EM, Haskins CB, Fillman KM, Ritter RL, Gu X, Winiecki SK, Carnahan RM, Torner JC, Fireman BH, Jones MP, Chrischilles EA (2016). Intravenous immune globulin and thromboembolic adverse events: A systematic review and meta-analysis of RCTs. *American Journal of Hematology*, 91(6):594-605. PMID: 26973084

7. Chatterjee S, Bali V, Carnahan RM, Chen H, Johnson ML, Aparasu RR (2016). Anticholinergic Medication Use and Risk of Fracture in Elderly Adults with Depression. *Journal of the American Geriatrics Society*, 64(7):1492-7. PMID: 27294403
8. Gavinski K, Carnahan R, Weckmann M (2016). Validation of the delirium observation screening scale in a hospitalized older population. *Journal of hospital medicine*, 11(7):494-7. PMC: PMC4931982, PMID: 26970312
9. Bali V, Chatterjee S, Johnson ML, Chen H, Carnahan RM, Aparasu RR (2016). Comparative risk of hip fractures in elderly nursing home patients with depression using paroxetine and other selective serotonin reuptake inhibitors. *Journal of comparative effectiveness research*, 5(5):461-73. PMID: 27426927
10. Gagne JJ, Han X, Hennessy S, Leonard CE, Chrischilles EA, Carnahan RM, Wang SV, Fuller C, Iyer A, Katcoff H, Woodworth TS, Archdeacon P, Meyer TE, Schneeweiss S, Toh S (2016). Successful Comparison of US Food and Drug Administration Sentinel Analysis Tools to Traditional Approaches in Quantifying a Known Drug-Adverse Event Association. *Clinical pharmacology and therapeutics*, 100(5):558-564. PMID: 27416001
11. Bali V, Chatterjee S, Johnson ML, Chen H, Carnahan RM, Aparasu RR (2016). Risk of cognitive decline associated with paroxetine use in elderly nursing home patients with depression. *American Journal of Alzheimer's Disease and Other Dementias*, 31(8):678-86. PMID: 27765867
12. Bali V, Chatterjee S, Carnahan R, Chen H, Johnson M, Aparasu RR (2017). Risk of mortality in elderly nursing home patients with depression using paroxetine. *Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy*, 37(3):287-296. PMID: 28079266
13. Carnahan RM, Brown GD, Letuchy EM, Rubenstein LM, Gryzlak BM, Smith M, Reist JC, Kelly MW, Schultz SK, Weckmann MT, Chrischilles EA (2017). Impact of programs to reduce antipsychotic and anticholinergic use in nursing homes. *Alzheimer's & Dementia: Clinical and Translational Sciences*, 3(4):553-561. PMC: PMC5671632, PMID: 29124114
14. Al-Jumaili AA, Al-Rekabi MD, Alsawad OS, Allela OQB, Carnahan R, Saaed H, Naqishbandi A, Kadhim DJ, Sorofman B (2017). Exploring Electronic Communication Modes Between Iraqi Faculty and Students of Pharmacy Schools Using the Technology Acceptance Model. *American Journal of Pharmaceutical Education*, 81(5):89. PMC: PMC5508088, PMID: 28720917
15. Jorgensen SM, Carnahan RM, Weckmann MT (2017). Validity of the Delirium Observation Screening Scale in Identifying Delirium in Home Hospice Patients. *The American journal of hospice & palliative care*, 34(8):744-747. PMC: PMC5236003, PMID: 27413013
16. Zhou M, Wang SV, Leonard CE, Gagne JJ, Fuller C, Hampp C, Archdeacon P, Toh S, Iyer A, Woodworth TS, Cavagnaro E, Panozzo CA, Axtman S, Carnahan RM, Chrischilles EA, Hennessy S (2017). Sentinel Modular Program for Propensity Score-Matched Cohort Analyses: Application to Glyburide, Glipizide, and Serious Hypoglycemia. *Epidemiology (Cambridge, Mass.)*, 28(6):838-846. PMC: PMC6554646, PMID: 28682851
17. Ammann EM, Leira EC, Winiecki SK, Nagaraja N, Dandapat S, Carnahan RM, Schweizer ML, Torner JC, Fuller CC, Leonard CE, Garcia C, Pimentel M, Chrischilles EA (2017). Chart validation of inpatient ICD-9-CM administrative diagnosis codes for ischemic stroke among IGIV users in the Sentinel Distributed Database. *Medicine*, 96(52):e9440. PMID: 29384925

18. Eum S, Hill SK, Rubin LH, Carnahan RM, Reilly JL, Ivleva EI, Keedy SK, Tamminga CA, Pearlson GD, Clementz BA, Gershon ES, Keshavan MS, Keefe RSE, Sweeney JA, Bishop JR (2017). Cognitive burden of anticholinergic medications in psychotic disorders. *Schizophrenia research*, 190:129-135. PMC: PMC5628100, PMID: 28390849
19. Carnahan RM, Letuchy EM (2018). Bipolar Disorder in Nursing Homes: Impact on Antipsychotic Use, Diagnosis Patterns, and New Diagnoses in People with Dementia. *The American Journal of Geriatric Psychiatry*, 26(1):2-10. PMID: 29031571
20. Ammann EM, Cuker A, Carnahan RM, Perepu US, Winiacki SK, Schweizer ML, Leonard CE, Fuller CC, Garcia C, Haskins C, Chrischilles EA (2018). Chart validation of inpatient International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) administrative diagnosis codes for venous thromboembolism (VTE) among intravenous immune globulin (IGIV) users in the Sentinel Distributed Database. *Medicine*, 97(8):e9960. PMC: PMC5841980, PMID: 29465588
21. Chrischilles EA, Gagne JJ, Fireman B, Nelson J, Toh S, Shoaibi A, Reichman ME, Wang S, Nguyen M, Zhang R, Izem R, Goulding MR, Southworth MR, Graham DJ, Fuller C, Katcoff H, Woodworth T, Rogers C, Saliga R, Lin ND, McMahaill-Walraven CN, Nair VP, Haynes K, Carnahan RM (2018). Prospective surveillance pilot of rivaroxaban safety within the US Food and Drug Administration Sentinel System. *Pharmacoepidemiology and drug safety*, 27(3):263-271. PMID: 29318683
22. Ammann EM, Schweizer ML, Robinson JG, Eschol JO, Kafa R, Girotra S, Winiacki SK, Fuller CC, Carnahan RM, Leonard CE, Haskins C, Garcia C, Chrischilles EA (2018). Chart validation of inpatient ICD-9-CM administrative diagnosis codes for acute myocardial infarction (AMI) among intravenous immune globulin (IGIV) users in the Sentinel Distributed Database. *Pharmacoepidemiology and Drug Safety*, 27(4):398-404. PMID: 29446185
23. Carnahan RM, Kuntz JL, Wang SV, Fuller C, Gagne JJ, Leonard CE, Hennessy S, Meyer T, Archdeacon P, Chen CY, Panozzo CA, Toh S, Katcoff H, Woodworth T, Iyer A, Axtman S, Chrischilles EA (2018). Evaluation of the US Food and Drug Administration sentinel analysis tools in confirming previously observed drug-outcome associations: The case of clindamycin and Clostridium difficile infection. *Pharmacoepidemiology and Drug Safety*, 27(7):731-739. PMID: 29532543
24. Zhang Y, Letuchy EM, Carnahan RM (2018). Where Are Antipsychotics Prescribed in Nursing Homes Initiated? *Journal of the American Geriatrics Society*, 66(6):1082-1088. PMID: 29355891
25. Mendy A, Forno E, Niyonsenga T, Carnahan R, Gasana J (2018). Prevalence and features of asthma-COPD overlap in the United States 2007-2012. *The Clinical Respiratory Journal*, 12(8):2369-2377. PMC: PMC6287748, PMID: 29873189
26. Carnahan RM, Gagne JJ, Hampp C, Leonard CE, Toh S, Fuller C, Hennessy S, Hou L, Cocoros NM, Panucci G, Woodworth T, Cosgrove A, Iyer A, Chrischilles EA (2019). Evaluation of the US Food and Drug Administration Sentinel Analysis Tools Using a Comparator with a Different Indication: Comparing the Rates of Gastrointestinal Bleeding in Warfarin and Statin Users. *Pharmaceutical Medicine*, 33(1):29-43.
27. Carnahan RM, Daly JM, Minion S, Gryzlak B, Weckmann MT, Levy BT, Bay CP (2019). A Needs Assessment of Family Physicians to Inform Development of Educational Resources on Antipsychotic Use in Dementia. *Journal of primary care & community health*, 10:2150132719840113. PMC: PMC6477762, PMID: 31006318
28. Ranapurwala SI, Carnahan RM, Brown G, Hinman J, Casteel C (2019). Impact of Iowa's Prescription Monitoring Program on Opioid Pain Reliever Prescribing Patterns: An Interrupted Time Series Study 2003-2014. *Pain medicine (Malden, Mass.)*, 20(2):290-300. PMID: 29509935

29. Haskins CB, McDowell BD, Carnahan RM, Fiedorowicz JG, Wallace RB, Smith BJ, Chrischilles EA (2019). Impact of preexisting mental illness on breast cancer endocrine therapy adherence. *Breast cancer research and treatment*, 174(1):197-208. PMC: PMC6426454, PMID: 30465157
30. Chatterjee S, Bali V, Carnahan RM, Chen H, Johnson ML, Aparasu RR (2019). Anticholinergic burden and risk of cognitive impairment in elderly nursing home residents with depression. *Research in social & administrative pharmacy:RSAP*. PMID: 31182419
31. Stewart M, Norden AD, Dreyer N, Henk HJ, Abernethy AP, Chrischilles E, Kushi L, Mansfield AS, Khozin S, Sharon E, Arunajadai S, Carnahan R, Christian JB, Miksad RA, Sakoda LC, Torres AZ, Valice E, Allen J (2019). An Exploratory Analysis of Real-World End Points for Assessing Outcomes Among Immunotherapy-Treated Patients With Advanced Non-Small-Cell Lung Cancer. *JCO clinical cancer informatics*, 3:1-15. PMID: 31335166
32. Voruganti DC, Shantha G, Dugyala S, Pothineni NVK, Mallick DC, Deshmukh A, Mohsen A, Colello SS, Saeed M, Latchamsetty R, Jongnarangsin K, Pelosi F, Carnahan RM, Giudici M (2019). Temporal trends and factors associated with increased mortality among atrial fibrillation weekend hospitalizations: an insight from National Inpatient Sample 2005-2014. *BMC research notes*, 12(1):398. PMID: 31300069
33. Lee S, Gottlieb M, Mulhausen P, Wilbur J, Reisinger HS, Han JH, Carnahan R (2019). Recognition, prevention, and treatment of delirium in emergency department: An evidence-based narrative review. *The American journal of emergency medicine*. PMID: 31759779
34. Singh N, Nair R, Goto M, Carvour ML, Carnahan R, Field EH, Lenert P, Vaughan-Sarrazin M, Schweizer ML, Perencevich EN (2019). Risk of Recurrent *Staphylococcus aureus* Prosthetic Joint Infection in Rheumatoid Arthritis Patients-A Nationwide Cohort Study. *Open forum infectious diseases*, 6(11):ofz451. PMC: PMC6847211, PMID: 31737738
35. Lee S, Harland K, Mohr NM, Matthews G, Hess EP, Bellolio MF, Han JH, Weckmann M, Carnahan R (2019). Evaluation of emergency department derived delirium prediction models using a hospital-wide cohort. *Journal of psychosomatic research*, 127:109850. PMID: 31678811
36. Dougherty MC, Woodroffe RW, Wilson S, Gillies GT, Howard, 3rd MA, Carnahan RM (2020). Predictors of Reduced Opioid Use With Spinal Cord Stimulation in Patients With Chronic Opioid Use. *Neuromodulation: journal of the International Neuromodulation Society*, 23(1):126-132. PMID: 31602750
37. Weeks KS, Lynch CF, West M, McDonald M, Carnahan R, Stewart SL, Charlton M (2020). Impact of Rurality on Stage IV Ovarian Cancer at Diagnosis: A Midwest Cancer Registry Cohort Study. *The Journal of rural health:official journal of the American Rural Health Association and the National Rural Health Care Association*. PMID: 32077162