

## CURRICULUM VITAE

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### Education

- PhD in Biostatistics from the Department of Epidemiology and Biostatistics at the University of Western Ontario, London ON, 1979.
- MSc in Statistics from Queen's University, Kingston ON, 1976.
- BEd in Mathematics and Physical Education from Queen's University, Kingston ON, 1972.
- BA in Economics and Mathematics from York University, Toronto ON, 1970.

### Current Positions

- Clinical Epidemiologist / Biostatistician, Ontario Child Health Support Unit, SickKids Research Institute, Toronto ON
- Professor of Biostatistics, Dalla Lana School of Public Health, University of Toronto, Toronto ON
- Senior Scientist Emeritus, Child Health Evaluative Sciences, SickKids Research Institute, Toronto ON
- Professor Emeritus, Clinic Epidemiology and Biostatistics, McMaster University, Hamilton ON

### Awards

- Co-author on a paper receiving the International Society for Pharmaco-economics and Outcomes Research Award for Methodology Excellence, awarded May 2002.
- First author on a paper receiving the International Society for Pharmaco-economics and Outcomes Research Award for Methodology Excellence, awarded May 2000.
- Co-author on a paper receiving the Best Paper Award from the Society for Medical Decision Making, 1995.
- NHRDP Graduate Fellowship, 1977-1980.

### Prior Positions

- July 2002 to October 2014 - Senior Scientist Emeritus, Child Health Evaluative Sciences, SickKids Research Institute, Toronto ON
- September 1993 to June 2002 - Professor, Department of Clinical Epidemiology and Biostatistics, McMaster University, Hamilton ON
- September 1990 to June 1993 - Associate Professor, Department of Clinical Epidemiology and Biostatistics, McMaster University, Hamilton ON
- January 1989 to May 1990 - Head, Division of Clinical Trials and Epidemiology, Sunnybrook Health Science Centre, Toronto ON
- March 1989 to October 1991 - Associate Professor, Department of Preventive Medicine and Biostatistics, University of Toronto, Toronto ON
- September 1987 to February 1989 - Associate Professor, Department of Population Medicine, University of Guelph, Guelph ON

- April 1985 to August 1987 - Head of Biometry with the Clinical Trials Group, National Cancer Institute of Canada, Queen's University, Kingston ON.
- September 1981 to August 1987 - Assistant Professor, Department of Community Health and Epidemiology, Queen's University, Kingston ON.
- October 1980 to March 1985 - Biostatistician with the Clinical Trials Group, National Cancer Institute of Canada, Queen's University, Kingston ON
- December 1979 to September 1980 - Biostatistician with the Division of Epidemiology at the Cancer Control Agency of British Columbia, Vancouver BC
- January 1980 to September 1980 - Assistant Professor, Department of Mathematics, University of British Columbia, Vancouver BC

### **Research Funding, 2013-2018, inclusive**

- Canadian Institutes of Health Research, The Twin Birth Study. Barrett J (Principal Investigator), Hannah M, **Willan A**, Ross S, Hutton E, et al., \$8,608,045, 2003-2014.
- National Science and Engineering Council, Expected Value of Information and Optimal Trial Design. **Willan AR** (Principal Investigator) \$70,000, 2008-2013.
- Canadian Institutes of Health Research, The Bedside Paediatric Early Warning System: a cluster randomized trial of mortality and processes of care. Parshuram C (Principal Investigator), **Willan AR**, and 13 others. \$3,959,716, 2010-2014.
- Canadian Institutes of Health Research, Sustainability of a multidimensional knowledge translation intervention to improve paediatric pain practices and outcomes. Bonnie Stevens (Principal Investigator), **Willan AR**, and 20 others. \$998,061, 2011-2014.
- Bill and Belinda Gates Foundation, Parathyroid-vitamin D axis dysregulation in early-onset infant stunting in resource-poor settings. Dan Roth (Principal Investigator), **Willan AR**, and 5 others. \$1,999,993, 2012-2016.
- Canadian Institutes of Health Research, Impact of Emergency Department Probiotic Treatment of Pediatric Gastroenteritis: Randomized Controlled Trial. Stephen Freedman (Principal Investigator), **Willan AR**, and 9 others. \$2,231,300, 2013-2018.
- Canadian Institutes of Health Research, Sucrose Practices for Pain in Neonates (SPiN); A Program of Research. Bonnie Stevens (Principal Investigator), **Willan AR**, and 12 others. \$1,246,500, 2013-2018.
- IMPACT. Comparing the complex care for kids Ontario (CCKO) province-wide integrated care intervention for children with medical complexity (CMC) to waitlist controls using a patient-engaged evaluation framework and mixed method design. Nora Fayed (Principal Investigator), **Willan AR**, and 16 others. \$300,000, 2016-2018.
- IMPACT. Addressing obesity in toddlers at risk: a pragmatic randomized controlled trial comparing usual care to group-based parenting and home visits in primary care. Catherine Birken (Principal Investigator), **Willan AR**, and 11 others. \$299,723, 2016-2018.
- Canadian Institutes of Health Research - Foundation Scheme – 2nd Live Pilot. Effective Knowledge Translation Strategies for Enhancing Impact and Improving Outcomes in Infant Pain. Bonnie Stevens (Principal Investigator), **Willan AR**, and 13 others. \$3,823,346. 2016-2023.
- Canadian Institutes of Health Research - Project Scheme – 1st Live Pilot. Evaluating the effectiveness of an online knowledge translation intervention for minimizing procedural pain in hospitalized infants. Bonnie Stevens (Principal Investigator), **Willan AR**, and 13 others. (\$1,116,171). Declined. 2016-2021.
- Canadian Institutes of Health Research - Project Scheme. Intermittent vs. Continuous Oxygen Saturation Monitoring in Infants Hospitalized for Bronchiolitis: A Randomized Controlled Trial. Sanjay Mahant (Principal Investigator), **Willan AR**, and 9 others. (\$1,823,340). 2016-2020.

- Canadian Institutes of Health Research - Foundation Scheme – 2nd Live Pilot. Necrotizing Enterocolitis (NEC) Research Program: introducing innovative therapies to halt the disease progression and promote recovery. Agostino Pierro (Principal Investigator), **Willan AR**, and others. \$. 2016-2023.
- CIHR – Innovative Clinical Trials. Four trials with Pediatric Emergency Research Canada. Klassen TP. (Principal Investigator), **Willan AR**, and 26 others. (\$3,000,000). 2017-20.

**Publications, 2013-2018, inclusive** (232 publications prior to 2013)

1. Hossain A, **Willan AR**, Beyene J. An improved method on Wilcoxon rank sum test for gene selection from microarray experiments. *Communications in Statistics* 2013; **42**(7):1563-1577.
2. Eckermann S, **Willan AR**. Optimal global VOI trials: better aligning manufacturer and decision maker interests and enabling feasible risk sharing. *PharmacoEconomics* 2013; **31**(5):393-401.
3. Atenafu EG, Hamid JS, To T, **Willan AR**, Feldman BM and Beyene J. Bias-corrected estimator for intraclass correlation coefficient in the balanced one-way random effects model. *BMC Medical Research Methodology* 2012; **12**:126.
4. Ballantyne M, Stevens B, Guttman A, **Willan AR**, Rosenbaum, P. Maternal and infant predictors of attendance at neonatal follow-up programs. *Child: Care, Health and Development* DOI:10.1111/cch.12015.
5. **Willan AR**. Bayesian methods for the design, analysis and interpretation of clinical studies. In: Berger VW, Zhang X. (Eds.) *Important Considerations for Clinical Trial Methodologies*. Future Medicine London, 2013. (eISBN 978-1-909453-31-9).
6. Hossain A, **Willan AR**, Beyene J. A flexible nonparametric approach to find candidate genes associated to disease in microarray experiments. *Journal of Bioinformatics and Computational Biology* 2013; **11**(2):1250021 (19 pages).
7. Chen MH, **Willan AR**. Determining optimal sample sizes for multistage adaptive randomized clinical trials from an industry perspective using value of information methods. *Clinical Trials* 2013; **10**(1):54–62.
8. Boutis K, Grootendorst P, **Willan A**, Plint AC, Babyn P, Brison RJ, Sayal A, Parker M, Mamen N, Schuh S, Grimshaw J, Johnson D, Narayanan U. Effect of the Low Risk Ankle Rule on the frequency of radiography in children with ankle injuries. *CMAJ* 2013. DOI:10.1503/cmaj.122050 August 12, 2013.
9. Barrett JFR, Hannah ME, Hutton EK, **Willan AR et al**. A randomized trial of planned cesarean or vaginal delivery for twin pregnancy. *NEJM* 2013; **369**(14):1295-1305.
10. Richardson SA, **Willan AR**, Rothman L *et al*. The impact of pedestrian countdown signals on pedestrian-motor vehicle collisions: a reanalysis of data from a quasi-experimental study. *BMJ: Injury Prevention* DOI:10.1136/injuryprev-2012-040717, September 23, 2013.
11. Asztalos EV, Murphy KE, **Willan AR et al**. Multiple courses of antenatal corticosteroids for preterm birth study outcomes in children at 5 years of age (MACS-5). *JAMA Pediatr*. DOI:10.1001/jamapediatrics.2013.2764, October 14, 2013.
12. Chan KKW, **Willan AR**, Gupta M, Pullenayegum E. Underestimation of uncertainties in health utilities derived from mapping algorithms involving health related quality of life measures: Statistical explanations and potential remedies. *Medical Decision Making* 2014; **34**(7):863-872.
13. Chen MH, **Willan AR**. Value of information methods for assessing a new diagnostic test. *Statistics in Medicine* 2014; **33**(11):1801-1815.
14. **Willan AR**. Bayesian decision theory and the design and analysis of randomized clinical trials. In: van Montfort K, Oud J, and Ghidry W. (Eds.) *Developments in Statistical Evaluation of Clinical Trials*. Springer Berlin Heidelberg, 2014. (ISBN 978-3-642-55345-5).
15. Freedman SB, Williamson-Urquhart S, Schuh S, Sherman PM, Farion KJ, Gouin S, **Willan AR**, Goeree R, Johnson D, Black K, Schnadower D, Gorelick MH. Impact of emergency department

- probiotic treatment of pediatric gastroenteritis: randomized controlled trial (PROGUT Trial). *Trials* 2014; **15**:170.
16. Abrahamyan L, **Willan AR**, Beyene J, Mclimont M, Blanchette V, Feldman BM. Using value of information methods when the disease is rare and the treatment is expensive – The example of hemophilia A. *Journal of General Internal Medicine* 2014; **29**(3):767-773.
  17. Schuh S, Freedman S, Coates A, Allen U, Parkin PC, Stephens D, Ungar W, DaSilva Z, **Willan AR**. Effect of oximetry on hospitalization in bronchiolitis: a randomized clinical trial. *JAMA* 2014; **312**(7):712-718.
  18. Parshuram CS, Amaral ACKB, Ferguson ND, Baker GR, Etchells EE, Flintoft V, Granton J, Lingard L, Kirpalani H, Mehta S, Moldofsky H, Scales DC, Stewart TE, **Willan AR**, Friedrich JO. Patient safety, resident well-being and continuity of care with different resident duty schedules in the intensive care unit: a randomized trial. *CMAJ*, published ahead of print February 9, 2015 as doi:10.1503/cmaj.140752.
  19. Freedman SB, Sherman PM, **Willan AR**, Johnson D, Gouin S, Schuh S. Emergency Department Treatment of Children With Diarrhea Who Attend Day Care: A Randomized Multidose Trial of a Lactobacillus helveticus and Lactobacillus rhamnosus Combination Probiotic. *Clinical Pediatrics*, published ahead of print February 10, 2015 as doi:10.1177/0009922815569200.
  20. **Willan AR**. Bayesian decision theory and the design and analysis of randomized clinical trials. In: van Montfort K, Oud J, and Ghidry W. (Eds.) *Developments in Statistical Evaluation of Clinical Trials*. Springer Berlin Heidelberg, 2014. (ISBN 978-3-642-55345-5).
  21. **Willan AR**. Bayesian methods for the design, analysis and interpretation of clinical studies. In: Berger VW, Zhang X. (Eds.) *Important Considerations for Clinical Trial Methodologies*. Future Medicine London, 2013. (eISBN 978-1-909453-31-9).
  22. Parshuram CS, Dryden-Palmer K, Farrell C, Gottesman R, Gray M, Hutchison S, Helfaer M, Hunt E, Joffe A, Lacroix J, Nadkarni V, Parkin P, Wensley David, **Willan AR**, for the Canadian Critical Care Trials Group. Evaluating processes of care and outcomes of children in hospital (EPOCH): study protocol for a randomized controlled trial. *Trials* 2015; **16**:245, DOI: 10.1186/s13063-015-0712-3.
  23. Boutis K, von Keyserlingk C, **Willan AR**, Narayanan UG, Brison R, Grootendorst P, Plint AC, Parker M, Goeree R. Cost consequence analysis of implementing the low risk ankle rule in emergency departments. *Annals of Emergency Medicine* 2015; **66**(5):455-463.
  24. Roth DE, Gernand AD, Morris SK, Pezzack B, Islam MM, Dimitris MC, Shanta SS, Zlotkin SH, **Willan AR**, Ahmed T, Shah PS, Murphy KE, Weksberg R, Choufani S, Shah R, Mahmud AA. Maternal vitamin D supplementation during pregnancy and lactation to promote infant growth in Dhaka, Bangladesh (MDIG trial): study protocol for a randomized controlled trial. *BMC Trials* 2015; **16**(300), DOI 10.1186/s13063-015-0825-8.
  25. Freedman SB, **Willan AR**, Boutis K, Schuh S. Effect of dilute apple juice and preferred fluids vs electrolyte maintenance solution on treatment failure among children with mild gastroenteritis. *JAMA* 2016; **315**(18):1966-1974. doi:10.1001/jama.2016.5352.
  26. **Willan AR**. Accounting for treatment by center interaction in sample size determinations and the use of surrogate outcomes in the pessary for the prevention of preterm birth trial: a simulation study. *BMC Trials* 2016; **17**(1):310. doi: 10.1186/s13063-016-1433-y.
  27. Chan KKW, Xie F, **Willan AR**, Gupta M, Pullenayegum E. Underestimation of variance of predicted health utilities derived from multi-attribute utility instruments the use of multiple imputation as a potential solution. *Medical Decision Making* 2016; Published online before print May 23, 2016, doi: 10.1177/0272989X16650181.
  28. Mei-Dan E, Asztalos EV, **Willan AR**, Barrett JFR. The effect of induction method in twin pregnancies: a secondary analysis for the Twin Birth Study. *BMC Pregnancy and Childbirth*. 2017; **17**(1):9-15.

29. Henderson J, Cheung A, Cleverley K, Chaim G, Moretti M, de Oliveira C, Hawke LD, **Willan AR**, O'Brien D, Heffernan O, Herzog T, Courey L, McDonald H, Grant E, Szatmari P. Integrated collaborative care teams to enhance service delivery to youth with mental health and substance use challenges: protocol for a pragmatic randomised controlled trial. *BMJ Open* 2017;7:e014080.doi:10.1136/bmjopen-2016-014080.
30. Hall NJ, Eaton S, Piero A, **Willan AR**, and 19 others. Appendectomy versus non-operative treatment for acute uncomplicated appendicitis in children: study protocol for a multicentre, open-label, non-inferiority, randomised controlled trial. *BMJ Paediatrics Open* 2017;1:e000028. doi:10.1136/bmjpo-2017-000028.
31. Mahant S, Wahi G, Giglia L, Pound C, Kanani R, Bayliss A, Roy M, Sakran M, Kozlowski N, Breen-Reid K, Lavigne M, Premji L, Moretti ME, **Willan AR**, Schuh S, Parkin PC. Intermittent vs. continuous oxygen saturation monitoring for infants hospitalized with bronchiolitis: study protocol for a pragmatic randomized controlled trial. *BMJ Open* 2018; **8**(4):e022707.
32. Parshuram CS, Dryden-Palmer K, **Willan AR** et al. Effect of a Pediatric Early Warning System on All-Cause Mortality in Hospitalized Pediatric Patients: The EPOCH Randomized Clinical Trial. *JAMA* 2018; **319**(10):1002-1012. doi:10.1001/jama.2018.0948
33. Freedman SB, Williamson-Urquhart S, Farion JK, **Willan AR** et al. Combination probiotic in pediatric gastroenteritis: a multicenter trial. *NEJM* 2018. (accepted for publication)
34. Hutton EK, Hannah ME, **Willan AR**, et al. Urinary stress incontinence and other maternal outcomes two years after Caesarean or vaginal birth for twin pregnancy: a multicentre randomised trial. *British Journal of Obstetrics and Gynaecology*. 2018 July 14. doi: 10.1111/1471-0528.15407.
35. Roth DE, Morris SK, Zlotkin S, **Willan AR**, et al. Vitamin D supplementation in pregnancy and lactation and infant growth. *N Engl J Med* 2018; **379**:535-546. <https://doi.org/10.1056/NEJMoal800927> C
36. Mei-Dan E, Dougan C, Melamed N, Asztalos EV, Aviram A, **Willan AR**, Barrett JFR. Planned cesarean or vaginal delivery for women in spontaneous labor with a twin pregnancy: A secondary analysis of the Twin Birth Study. *Birth* 2018 Aug 2. doi: 10.1111/birt.12387.