

*20 Years of  
Leading Emergency  
Medicine Research*

March  
2018

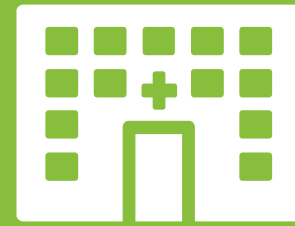
# Looking behind the Emergency Department doors

**EMeRG**

Emergency Medicine  
Research Group



UNIVERSITY OF  
**ALBERTA**



*EMeRG was founded in 1997 at the University of Alberta*



# EMeRG

Emergency Medicine Research Group

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*In celebration of the 20<sup>th</sup> anniversary of EMeRG, we have compiled this report to demonstrate the profound impact our research program has had on ED care.*



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*“For the past 20 years, the Emergency Medicine Research Group (EMeRG) has been conducting applied research that has helped healthcare professionals manage patients within the communities that they serve.”*

*-Bill Sevcik,  
Chair, Department of Emergency Medicine,  
University of Alberta*

# Message from EMeRG Director

*The emergency department (ED) is a hectic and seemingly chaotic place. As the hub for acute care delivery, this setting provides care to all who enter through the ED doors, no matter what health concern brought them there.*



**Brian H. Rowe, MD, MSc, CCFP(EM), FCCP, FCAHS**

Director, Emergency Medicine Research Group, University of Alberta

Scientific Director, Institute of Circulatory and Respiratory Health, Canadian Institutes of Health Research

Scientific Director, Emergency Strategic Clinical Network, Alberta Health Services

Tier I Canada Research Chair in Evidence-based Emergency Medicine

Professor, Department of Emergency Medicine, University of Alberta

When we look closely, many things that happen behind the ED doors are informed by research as well as patients and partners. These factors influence which care providers patients see, which tests, treatments and procedures are completed and the processes that connect patients back to their community care providers. For the last 20 years, EMeRG has studied these aspects of ED care and worked to find solutions to the everyday challenges of providing high-quality and timely ED care.

*Based out of the University of Alberta (UofA) and University of Alberta Hospital, EMeRG conducts applied health research that sets the foundation for patient care in the ED. Since our inception in 1997, ED visits at our own site have increased from approximately 62,000 to 120,000 in 2017.*

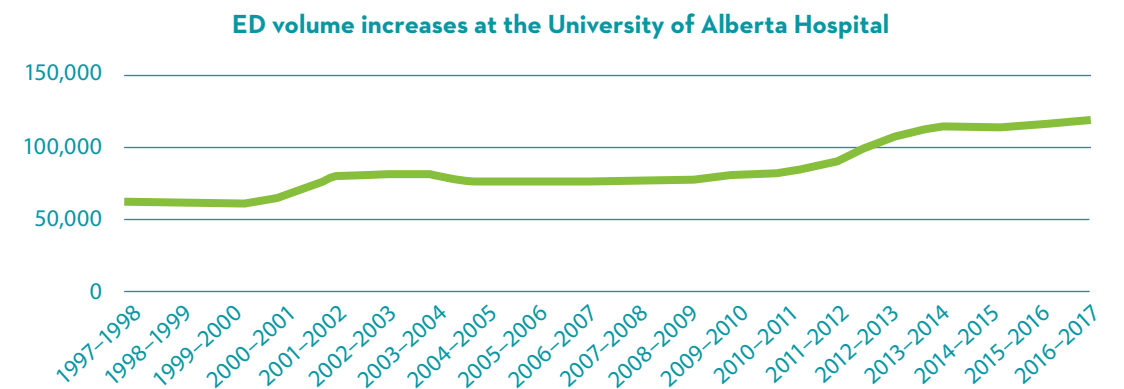
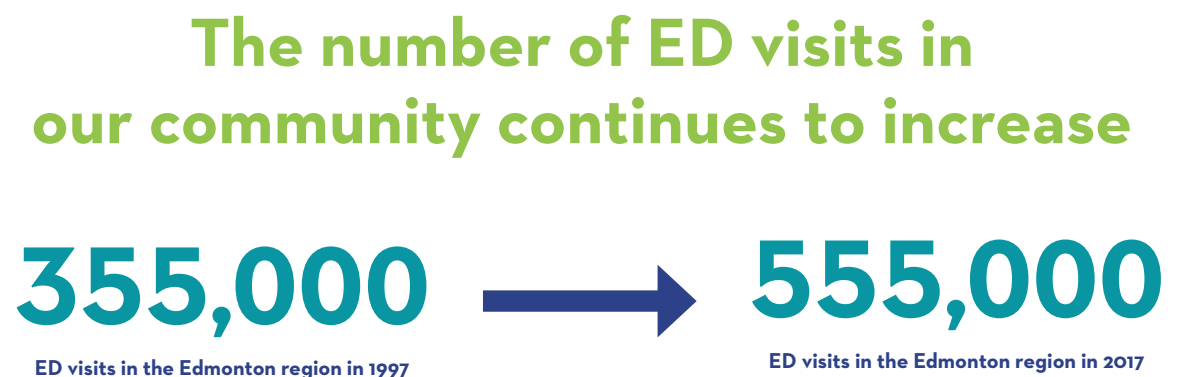
Across EDs in the Edmonton region, annual visits increased by approximately 200,000. Similar increases can be observed all across Alberta. These increases reaffirm the important role EDs play in community health and the importance of finding new ways of providing the best care possible in the ED while helping prevent the relapses that require people to return.

Our group has contributed to finding best care practices by: leading condition-specific research, developing practice guidelines, investigating system-related challenges and exploring ED care experiences. Our work often includes designing and testing solutions to system and condition-specific challenges, and disseminating new strategies locally, provincially, nationally and internationally.

In celebration of the 20<sup>th</sup> anniversary of EMeRG, we have compiled this report to highlight the profound impact our program of research has had on the way emergency care is delivered in Alberta and elsewhere. In these pages you will be introduced to the expertise of our team, learn about EMeRG's milestones, and read about our vision for the coming years. We hope to highlight the vital role of research behind the ED doors and its impact on the health of Canadians.

Sincerely,

**Brian H. Rowe**





# Message from the Department of Emergency Medicine

*It has been said that “emergency medical care is the only medical care resource that offers both immediacy of care and universality of service.” After almost 20 years of practice, I have come to believe this to be true.*



**Bill Sevcik, BEd, MD, FRCPC**

*Chair, Department of Emergency Medicine, University of Alberta*

*Associate Professor, Departments of Emergency Medicine and Pediatrics, University of Alberta*

*Site Chief, University of Alberta Hospital Emergency Department*

Our EDs function as a safety net for our healthcare system and for our social services. Emergency Medicine interacts with all medical specialties and provides care to all those in need, regardless of ethnicity, culture, first language or socioeconomic status. This speaks to the universality of our service mandate. Those of us who choose to work within an ED know that we are the front door for the sickest and most injured patients. Importance of the immediacy of our care has been identified and proven by research, performed within the ED setting, for time sensitive treatments of emergencies like acute coronary syndromes, strokes, shock states and trauma.

As a bedside clinician, I have seen firsthand how evidence-based improvements in emergency care have lowered the immediate morbidity and mortality in patient populations as well as positively affected long-term outcomes in others. As an administrator and academic, I have come to see how research in Emergency Medicine plays a critical role in conserving precious resources and helping to improve the overall delivery of healthcare.

***For the past 20 years, EMeRG has been conducting applied research that has helped healthcare professionals manage patients within the communities that they serve. They have set the standard by which other Emergency Medicine research groups should aspire.***

The EMeRG mission is to “continue to contribute to high-quality, relevant and impactful Emergency Medicine research that improves the health and wellness of patients presenting to the ED.” I am honoured to have been involved with this team and all of its tremendous accomplishments to date. I look forward to the next 20 years of outstanding scholarship and discoveries.

Sincerely,

**Bill Sevcik**

# Message from Alberta Health Services

*On behalf of the Alberta Health Services (AHS) Emergency Strategic Clinical Network (ESCN), we would like to extend our congratulations on the many accomplishments of EMeRG.*



*Photo of B. Holroyd courtesy of AHS.*

**Brian R. Holroyd, MD, MBA, FACEP, FRCPC**

*Senior Medical Director, Emergency Strategic Clinical Network, Alberta Health Services*

*Professor, Department of Emergency Medicine, University of Alberta*

**Scott Fielding, RN, MBA**

*Senior Provincial Director, Emergency Strategic Clinical Network, Alberta Health Services*

With Dr. Brian Rowe as EMeRG Director, the exceptional EMeRG staff have been successful in developing a world class Emergency Medicine research program. EMeRG has successfully undertaken a spectrum of research activities, ranging from systematic reviews to clinical trials and health services research related to clinical care in the ED and ED operations.

***A common theme in all of the research endeavours of the EMeRG is the high degree of relevance to the delivery of clinical care in the ED, and the resultant improvement in care to our ED patients.***

The quality and productivity of the EMeRG program has gained international recognition with many plenary research presentations at national and international forums, a multitude of manuscripts published in high-impact journals, as well as significant success in gaining peer-review grant funding. The EMeRG program has also had very significant success and a positive impact on trainees through its support of many graduate students and an extremely popular and successful summer studentship program. The EMeRG has developed many local and national collaborations, building upon and leveraging its success. Robust knowledge translation activities are a core part of EMeRG; facilitating uptake of research findings and leveraging them to benefit our patients.

The mandate of the AHS ESCN is “to find new and innovative ways of delivering care to provide better quality, better outcomes, and better value for every Albertan.” The collaborations between the EMeRG and the ESCN have contributed significantly to the ESCN meeting this goal. On behalf of the ESCN, we would like to express our appreciation for the opportunity to collaborate with the EMeRG and wish your research program continued success in the future. We look forward to our ongoing collaborations.

Sincerely,

**Brian R. Holroyd  
Scott Fielding**

# Overview of EMeRG



## Mission

EMeRG promotes evidence-based medicine by bridging the gap between research and clinical practice. Through partnerships and community involvement, we build an environment rich with opportunities to teach, learn and contribute to the ongoing development of research in our field. Through engaged scholarship and practice, we are committed to treating and preventing illness and injury, and to encouraging best practices in acute clinical care and health promotion.

## Vision

EMeRG strives to be a world leader in creating new knowledge for evidence-based practice in Emergency Medicine. Through primary and secondary research, publications and teaching activities, we promote the development of clinical support systems (such as clinical practice guidelines and informatics) to advance the field of Emergency Medicine.



## Core Values:

**Excellence**   **Engagement**   **Diversity**   **Scholarship**

# Our History

*Before 1997 there was limited research presence in the Division of Emergency Medicine at the UofA; just two successful, but fledgling, Emergency Medicine training programs and a number of emergency physicians providing clinical care across the Edmonton region.*



**Michael J. Bullard, MD, CCFP(EM), FACEP**

*Member, Emergency Strategic Clinical Network, Alberta Health Services*

*Professor, Department of Emergency Medicine, University of Alberta*

*Informatics Lead, Department of Emergency Medicine, University of Alberta*

In 1997 Dr. Brian Rowe was recruited to lead the creation of a research program and, along with myself, provide academic support to our then Chair Dr. Holroyd. Brian provided unflinching support, mentoring, editing and encouragement as we formulated grant proposals and research projects.

As Brian settled in at the UofA through several successful grant applications, he began to establish the EMeRG team. Over the years, Brian and the EMeRG staff collaborated on two key informatics initiatives: the electronic application of the Canadian Triage and Acuity Scale (CTAS) called eTRIAGE and the development of electronic clinical practice guidelines (eCPG). These electronic tools support clinicians in appropriately triaging patients in the ED and providing evidence-informed care. Several studies demonstrated the value of electronic clinical decision support and led to the continuing evolution of the CTAS nationally and internationally as well as other informatics tools designed and tested by the EMeRG team.

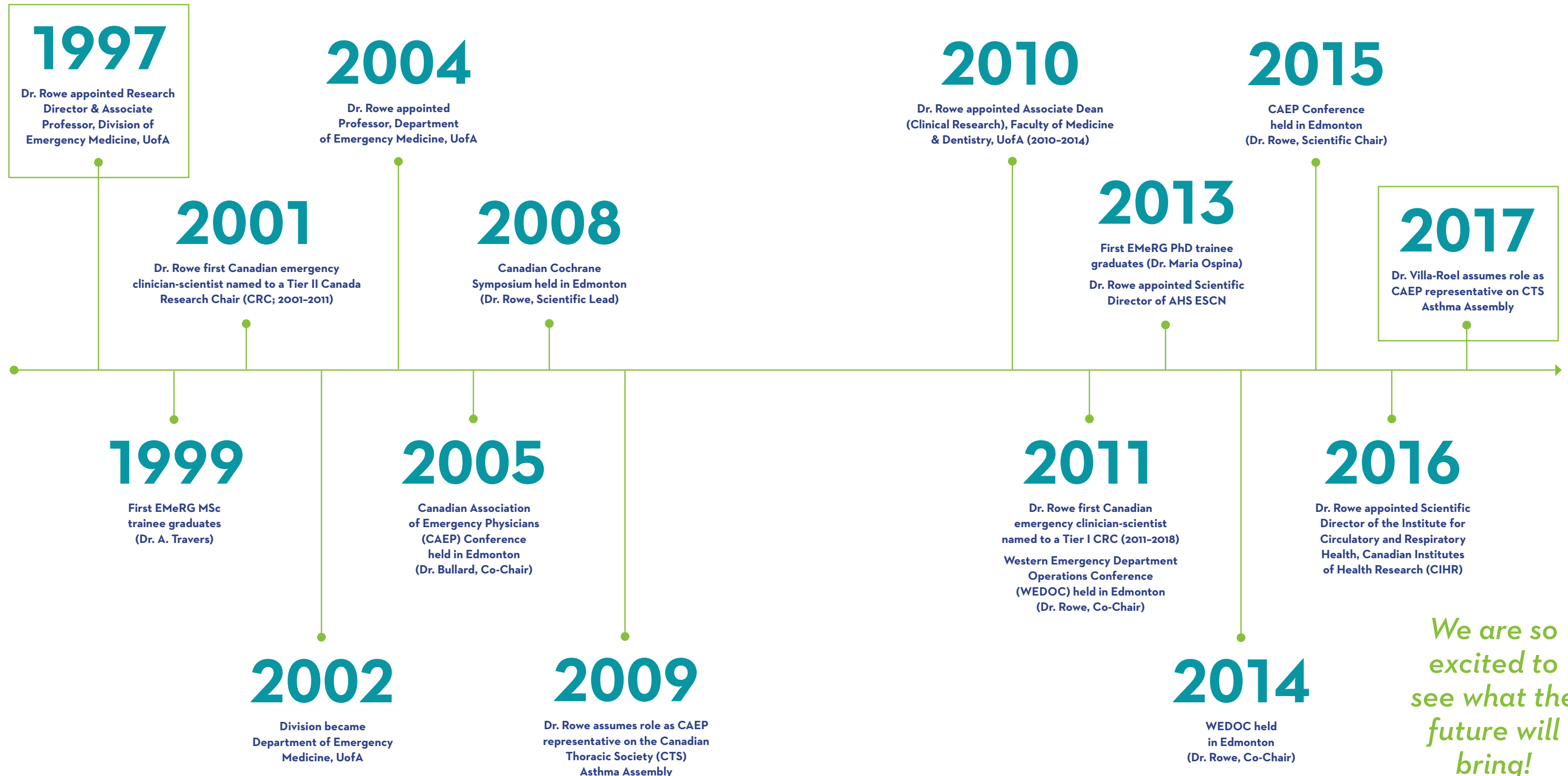
The reach of Brian's team has extended far beyond provincial borders. From 1989–1998, I collaborated with colleagues in Taiwan helping them establish their Emergency Medicine specialty and Brian mentored them in their research activities. Additional international partnerships have continued to develop EMeRG's work and has placed the UofA's Department of Emergency Medicine at the centre of many important discoveries in Emergency Medicine.

The lessons learned in the development of these key informatics initiatives have culminated in the formation of the Clinical Knowledge and Content Management team which is guiding the content for Alberta's provincial clinical information system initiative. This information system will place much of the evidence generated by EMeRG throughout its existence at the point of care as clinicians make management decisions. I look forward to continued collaborations with the EMeRG team as we work together to improve patient care and experiences in the ED.

Sincerely,

**Michael J. Bullard**

# EMeRG Milestones



*We are so excited to see what the future will bring!*

# Students + Trainees

Training the next generation of clinicians and researchers



## Jesse Hill, MD, PGY1 (EM)

University of Alberta, Edmonton, AB, Canada

Early in my academic career I discovered my passion for research. I believe it is important and exciting to contribute to academic discourse, whether that contribution is through the discovery of something new, reframing existing knowledge for new applications, or participating in the peer review process. Throughout my undergraduate and medical training, I conducted research in a variety of fields, but I credit the EMeRG team (especially Drs. Rowe and Villa-Roel) with helping me focus my passion on Emergency Medicine. Working with this research group was tremendously enjoyable and instrumental in my development as a researcher; especially the seminar series on critical appraisal of publications, which was eye-opening for me. I wouldn't be in the position I am today without the support and development afforded to me by the EMeRG team!

## Jamie Bawden, MD, CCFP (EM)

Staff Emergency Physician, Edmonton, AB, Canada

Being a part of the EMeRG group as a student researcher was an immense honour. All of the research projects that Dr. Rowe and the EMeRG group have worked on have significantly impacted the field of Emergency Medicine. Their commitment and passion certainly influenced my decision to choose Emergency Medicine as a career.



## Ian Colman, PhD

CRC in Mental Health Epidemiology  
Associate Professor, School of Epidemiology and Public Health  
University of Ottawa, Ottawa, ON, Canada

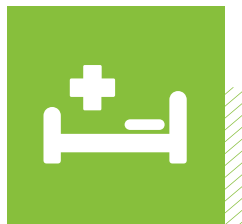
Working with the EMeRG group was the best classroom for learning how to do research that makes a difference. Brian Rowe taught me how to identify meaningful research questions, how to answer those questions effectively, and how to translate research results so that they would influence clinical practice. He also taught me how to do all this with a sense of humour! The experience inspired me to pursue an academic career. I've never forgotten the lessons I learned with EMeRG about doing meaningful research and creating a culture of teamwork throughout the research process.

My only regret from those years with EMeRG was not teaching Dr. Rowe how to type with more than two fingers. Imagine how much more productive he could have been!

## Laura Rodriguez, MD, PhD

Professor, Department of Public Health  
Universidad Industrial de Santander  
Bucaramanga, Sder, Colombia

I am proud of having been part of the EMeRG during my PhD training. The four years I spent in Edmonton as a PhD student under Dr. Rowe's supervision were unforgettable, not only for the wisdom and support that he gave me during easy and hard times, but for the warm welcome and friendship that my family and I found in the EMeRG team. My professional activities back in Colombia, both as a researcher and a professor, will always be influenced by this positive experience.



## Barry Diner, MD, MSc

Staff Emergency Physician, Houston, TX, USA

Doing a Masters degree in Clinical Epidemiology with Brian Rowe as my mentor and the support of EMeRG was the single most important and fulfilling experience of my medical career. I can honestly say this has shaped me into the physician I am today. In medical school you learn to be a doctor and in residency you are taught how to be a doctor but, it was not until I took part in the academic research side of medicine that I became a physician. Being a consumer of the literature and taking part in research has been the most important part of my medical career.



# 20 Years of Leading Emergency Medicine Research

452

Manuscripts published

33

Book chapters

577

Abstracts published

1

Book

*Evidence-Based Emergency Medicine*. Editors: Rowe BH, Lang E, Brown M, Houry D, Newman D, Wyer P. Wiley-Blackwell-BMJ Books, London, UK (2009; ISBN: 9781405161435).

## Top 5 areas of impact

### 1. Asthma and Chronic Obstructive Pulmonary Disease (COPD)

Our strong program of research investigating care for exacerbations of asthma and COPD has played a key role in setting evidence-based management standards for these chronic conditions in the ED. Our research contributed to identifying:



Effective ED interventions



Risk factors for admission and relapse



Medications for reducing relapse risk



Patient expectations and experiences

"Dr. Rowe's team at the UofA have authored systematic reviews which have been published on the Cochrane Library by Cochrane Airways. These have contributed to international guidelines, which influence care in the UK, Australia and many different countries beyond Canadian borders."

**Christopher Cates, MD, BM BCh, FRCGP**

Joint Co-ordinating Editor, Cochrane Airways  
St. George's University of London, London, UK  
Cochrane Collaboration

### 2. ED Crowding

ED crowding is a complex and common problem. Our research has consistently identified that patients pursue a variety of care options prior to presenting to the ED. Not only have we contributed to studying the drivers and impacts of crowding, we have also tested possible solutions. Our research identified that introducing a triage liaison physician could improve ED flow.



Triage Liaison Physician

led to



Reducing patient length of stay



Reducing the number of patients that leave without completing treatment

"ED overcrowding ("access block" in some countries) remains a major public health issue in Canada and internationally. Under the leadership of Dr. Brian Rowe, research on overcrowding from the UofA has contributed to our understanding of the causes and solutions for overcrowding and helped shape the CAEP ED Overcrowding position statement."

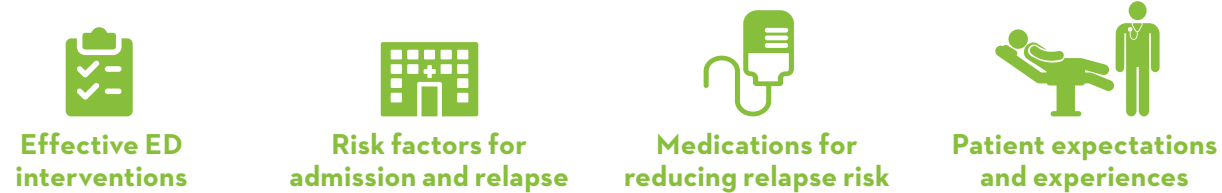
**Howard Ovens, MD**

Sinai Health System Toronto  
CAEP Public Affairs Committee  
Professor, Department of Family and Community Medicine  
University of Toronto, Toronto, ON, Canada



### 3. Neurosciences

Our research with patients visiting the ED because of recurrent headaches highlighted that these patients often need to return to the ED for additional pain management within a few days. Through a series of studies our research identified a more effective discharge medication to prevent patients from needing to return. Our research changed management for these patients throughout the world by identifying:



"Neurological conditions like benign headache and concussion frequently present to EDs in North America. Under the leadership of Dr. Rowe, the highly productive UofA team has conducted collaborative, relevant, high-quality research that has changed management of these conditions."

**Benjamin W. Friedman, MD, MS**  
 Professor, Department of Emergency Medicine  
 Albert Einstein College of Medicine, New York, NY, USA

### 4. Injury

Studying injury and injury prevention, particularly for recreational injuries, has been a key focus of EMeRG research. In order to support local decision-makers build healthy public policy, our research investigated the effectiveness of helmet legislation and demonstrated that local helmet legislation:



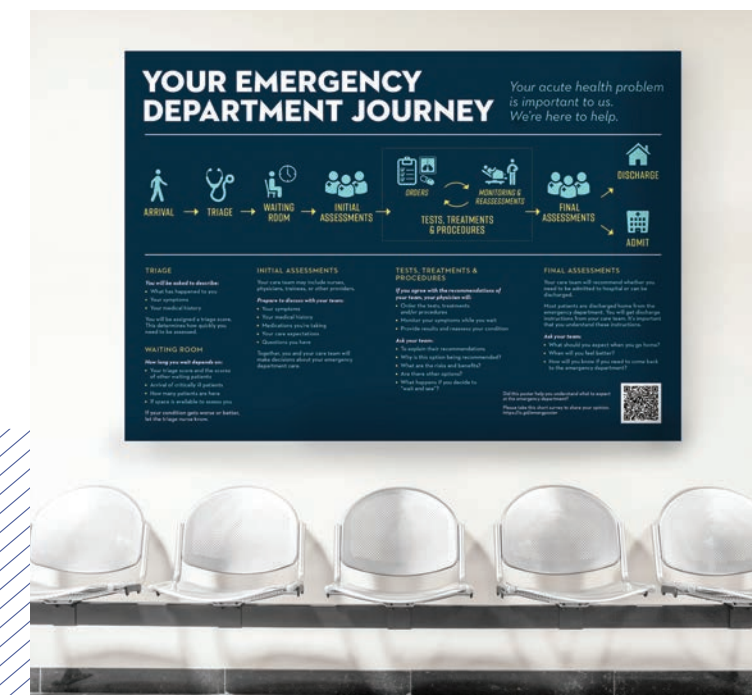
EMeRG continues to be committed to supporting decision-makers invest in the health of the public through applied research.

"Injuries are the leading cause of death and disability for children, adolescents and young adults. Our research collaborations with Dr. Rowe's team at the UofA have contributed to the prevention of injuries provincially, nationally and internationally."

**Brent Hagel, PhD**  
 Associate Professor, Departments of Pediatrics and Community Health Sciences  
 University of Calgary, Calgary, AB, Canada

### 5. Choosing Wisely

Supporting patients and clinicians in working together to make the right care decisions is a vital aspect of EMeRG research. Over several years of research, patients told us that they need support in understanding how their ED care works. Today, patients at all our intervention site EDs will see this poster, helping them understand their ED journey.



Helping clinicians and patients make the right management decisions together.

"Helping engage clinicians and patients in conversations about unnecessary tests and treatments can improve health care quality and avoid harm. In collaboration with Dr. Rowe and the CAEP Choosing Wisely Committee, a list of 10 unnecessary tests, procedures and treatments has been developed and disseminated. Dr. Rowe was an early champion and continues to be a committed leader in advancing efforts related to research, education and implementation for the campaign and the CAEP list. These efforts have been an important part of reducing harms associated with unnecessary tests and treatments in EDs across Canada."

**Wendy Levinson, MD, OC**  
 Chair, Choosing Wisely Canada  
 Professor of Medicine  
 University of Toronto, Toronto, ON, Canada

# Our Present

2017 was another productive year for EMeRG



We completed six research projects and disseminated the results of many of our studies through 37 conference abstracts. We also obtained funding to lead four new projects. We fostered our collaborations locally, nationally and internationally. Most importantly, we left our comfort zone and explored new methodologies in qualitative research and quality improvement in an effort to strengthen our integrated knowledge translation initiatives. Through these activities, the EMeRG members acquired new skills and advanced professionally; so did I by assisting our director in the coordination of the methods team. I look forward to the opportunities that the next few years will bring us. We will continue working hard to support clinicians and patients in seeing the value of participating in research and fostering an ED culture that recognizes the important role research plays in providing the best care.

Sincerely,

**Cristina Villa-Roel**

## Research Team:



**Brian H. Rowe**

Director  
MD, MSc, CCFP(EM),  
FCCP, FCAHS



**Cristina Villa-Roel**

Research Associate  
MD, PhD

## Methods Team:



**Lindsay Gaudet**

Research Coordinator  
MSc



**Lynette Krebs**

Research Coordinator  
MPP, MSc



**Majid Nabipoor Sanjebad**

Statistician  
PhD



**Maureen Kruhlak**

Research Assistant  
BSc



**Miriam Garrido**

Research Coordinator  
MSc



**Nicole Hill**

Research Assistant  
MA, PhD(c)



**Scott Kirkland**

Research Coordinator  
MSc



**Stephanie Couperthwaite**

Data Management  
Coordinator  
BSc

## Clinical & Administrative Team:



**Justin Lowes**

Research Assistant  
BSc



**Natalie Runham**

Lead Clinical Research  
Coordinator  
BScN, RN, CRE



**Pamela Pang**

Clinical Research Assistant  
BScN, RN



**Sonia La Giorgia**

Research Administrative  
Assistant  
BSc

2017 members not photographed: Diana Keto-Lambert, MLIS and Pamela Chow, BScN, RN



# 2017 by the numbers

5

Grants obtained

34

Manuscripts published

38

Abstracts published

14

Invited presentations

5

Publications in press

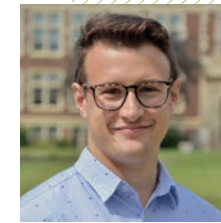
14

Current projects  
(8 EMeRG Led)



8

Students in 2017



**Adrian Battison**

BSc, MD(c)



**Emily Zikalns**

BA(c)



**James Gilbertson**

MD(c)



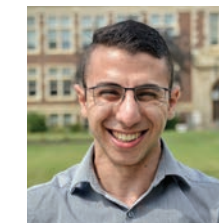
**Nicole Hill**

MA, PhD(c)  
Staff as of September 2017



**Nicole Loewen**

BSc(c)

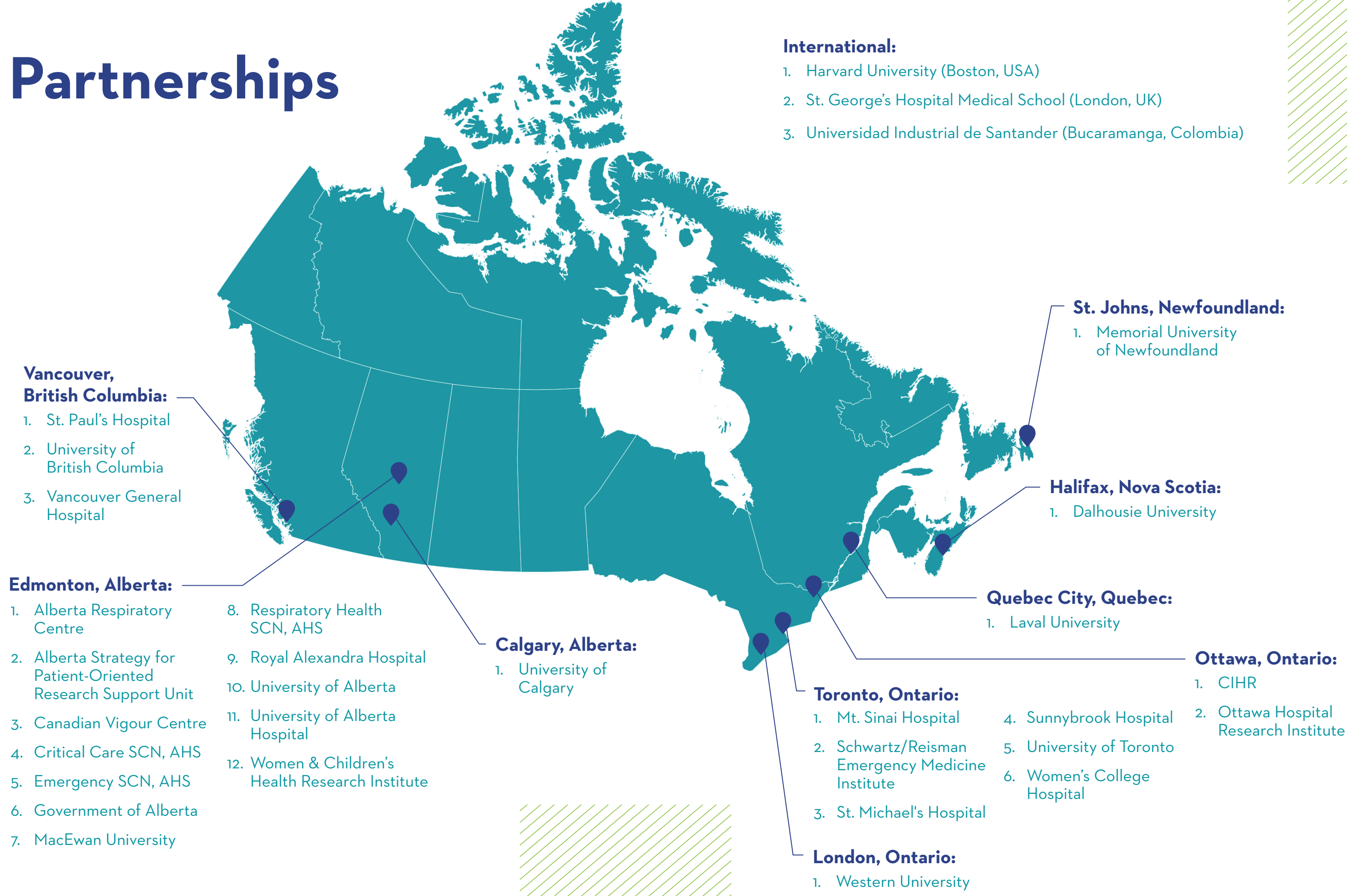


**Retha Moghrabi**

BSc, MD(c)

2017 students not photographed: Caitlin Tarun, BSc and Megan Carr, BSc(c)

# Partnerships





# Our Future

Our 20<sup>th</sup> anniversary has not only been a time to reflect on our achievements and milestones, but also a time to think about our future. Over the next years, we plan to continue conducting high-quality, relevant and impactful Emergency Medicine research by focusing on four strategic priorities.

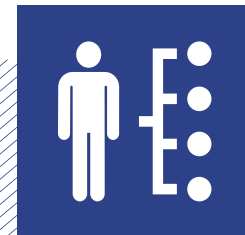


## 1. Excellence

- » Maintaining the highest standards in all aspects of research including: design, ethics, conduct and reporting.
- » Enhancing strategies for knowledge translation and dissemination in order to share evidence-based recommendations with the public and health professionals.

## 2. Capacity Building

- » Building knowledge and skills within the EMeRG team.
- » Bringing diverse skill sets to the team in the form of new members, including individuals with experience in administrative data and qualitative methods.



## 3. Collaboration

- » Establishing and maintaining relationships with clinicians, patients and administrators to ensure our research addresses relevant issues.
- » Fostering connections with researchers in Alberta and beyond.

## 4. Innovation

- » Advancing the field of Emergency Medicine research by identifying and implementing new research methods.
- » Embracing patient-oriented research by bringing patients into all stages of the research process.
- » Being on the frontier of studying the ever-increasing role of the ED as a safety net within the health system and beyond.



## A Memorial Tribute

### Deborah ("Debbie") Ann Folk



Debbie was one of EMeRG's first research nurses. A devoted wife, mother, nurse and friend to many, she was diagnosed with a malignant brain tumour in 2003. Despite aggressive therapy and great courage, she died on January 11, 2004 at the age of 49. In her honour, the University of Alberta lowered the Canadian flag in front of the University Hospital to half-mast for 2 days, a plaque was placed in the Hospital's *Century of Caring Memorial Garden*, and a fund was established in Debbie's name in the Faculty of Nursing by her close colleagues and family. The DEBORAH A. FOLK NURSING EXCELLENCE AWARD was established in 2003 and has raised over \$35,000 to help support RNs returning to obtain further training. The first annual Folk Award recipient was Laura Bennett in 2009. Debbie always challenged us to do more for our patients and her contributions to EMeRG were critical to our early success. Her legacy lives on through her children (Braden and Lindsey) and the scholarship award.



# Appendix

## Number of articles printed in 2017 that were e-published in 2016: 3

1. Ospina MB, Mrklas K, Deuchar L, Rowe BH, Leigh R, Bhutani M, Stickland MK. A systematic review of the effectiveness of discharge care bundles for patients with chronic obstructive pulmonary disease. *Thorax*. 2017; 72:31–39. (with Editorial: Man WD-C, Barker R, Maddocks M, et al. *Thorax*. 2017; 72:8-9).
2. Pollack M, Sinha IP, Hartling L, Rowe BH, Schreiber A, Fernandez RM. Inhaled short-acting bronchodilators for the emergency department management of asthma and wheeze exacerbations in children: an overview of reviews. *Allergy*. 2017; 72(2):183-200.
3. Wozniak LA, Johnson JA, McAlister FA, Beaupre LA, Bellerose D, Rowe BH, Majumdar SR. Understanding fragility fracture patients' decision-making process regarding bisphosphonate treatment. *Osteoporos Int*. 2017; 28: 219-229.

## Number of articles published in 2017: 31

1. Kirkland SW, Vandenbergh C, Voaklander B, Nikel T, Campbell S, Rowe BH. Combined inhaled beta-agonist and anticholinergic agents for emergency management in adults with asthma. *Cochrane Database of Systematic Reviews* 2017, Issue 1, Art. No.: CD001284.
2. Kawano T, Scheuermeyer FX, Stenstrom R, Rowe BH, Grafstein E, Grunau B. Epinephrine use in older patients with anaphylaxis: Clinical outcomes and cardiovascular complications. *Resuscitation*. 2017; 112:53–58.
3. Rowe BH, Kirkland SW, Vandermeer B, Campbell S, Newton A, Ducharme FM, Villa-Roel C. Prioritizing systemic corticosteroid treatments to mitigate relapse in adults with acute asthma. A systematic review and network meta-analysis. *Acad Emerg Med*. 2017; 24(3):371-381.
4. Moe J, Kirkland SW, Rowe E, Ospina M, Vandermeer B, Campbell S, Rowe BH. Effectiveness of interventions to decrease emergency department visits by adult frequent users: A systematic review. *Acad Emerg Med*. 2017; 24:40–52.
5. Rosychuk RJ, Graham MM, Holroyd BR, Rowe BH. Emergency department presentations for atrial fibrillation and flutter in Alberta: A large population-based study. *BMC Emerg Med*. 2017; 17(1):2.
6. Krebs LD, Kirkland SW, Villa-Roel C, Davidson A, Voaklander B, Nikel T, Chetram R, Couperthwaite S, Cummings G, Rowe BH. Emergency Department Use: Influence of connection to a family physician on ED use and attempts to avoid presentation. *Health Care Q*. 2017; 19(4):47-54.
7. Basu R, Hazra S, Paul M, Yogasundaram H, Poglitsch M, Thomas J, Rowe BH, Oudit GY. Dynamic network of plasma and myocardial angiotensin peptides in heart failure: Role of angiotensin 1-7 and recombinant human ACE2. *J Am Coll Cardiol*. 2017; 69(7):805-819.
8. Cheng AHY, Campbell S, Goddard T, Magee K, McEwan J, Chartier L, Kumar AK, Holroyd BR, Upadhye S, Couperthwaite S, Rowe BH. Choosing Wisely Canada®: Five tests, procedures and treatments to question in Emergency Medicine. *CJEM*. 2017; S9-S17.
9. Stiell IG, Perry JJ, Clement CM, Brison RJ, Rowe BH, Aaron SD, McRae AD, Borgundvaag B, Calder LA, Forster AJ, Wells GA. Prospective and explicit clinical validation of the Ottawa Heart Failure Risk Scale, with and without use of quantitative NT-proBNP. *Acad Emerg Med*. 2017; 24(3):316–327.

10. Hill J, Arrotta N, Villa-Roel C, Dennett L, Rowe BH. Factors associated with relapse in adult patients discharged from the emergency department following acute asthma: a systematic review. *BMJ Open Respir Res* 2017; 4(1):e000169.
11. Stiell IG, Clement CM, Rowe BH, Brison RJ, Wyse DG, Birnie D, Dorian P, Lang E, Perry JJ, Borgundvaag B, Eagles D, Redfearn D, Brinkhurst J, Wells GA. Outcomes for ED patients with recent-onset atrial fibrillation and flutter (RAFF) treated in Canadian hospitals. *Ann Emerg Med*. 2017; 69(5):562-571.
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