Chronic Obstructive Pulmonary Disease SUMMER 2024 Volume 9 Number 1

DIGEST

Modelled small airways lung deposition of two fixed-dose triple therapy combinations assessed with in silico functional respiratory imaging

Respiratory Research 2023 Sep 23; 24(1):226. doi: 10.1186/s12931-023-02534-y

Small airways disease plays a key role in the pathogenesis of chronic obstructive pulmonary disease (COPD) and is a major cause of obstruction; therefore, it is a critical pharmacotherapy target. This study evaluated lung deposition of two inhaled corticosteroid (ICS)/long-acting β2-agonist/long-acting muscarinic antagonist single-inhaler triple therapies using in silico functional respiratory imaging (FRI). Deposition was assessed using real-world inhalation profiles simulating everyday use where optimal inhalation may be compromised.

Methods: Three-dimensional airway models were produced from 20 patients with moderate-to-very severe COPD. Total, central, and regional small airways deposition as a percentage of delivered dose of budesonide/glycopyrronium/formoterol fumarate dihydrate (BGF) 160/7.2/5 µg per actuation and fluticasone furoate/umeclidinium/vilanterol (FF/UM/VI) 100/62.5/25 µg were evaluated using in silico FRI based on in vitro aerodynamic particle size distributions of each device. Simulations were performed using multiple inhalation profiles of varying durations and flow rates representing patterns suited for a pressurized metered-dose inhaler or dry-powder inhaler (four for BGF, two for FF/UM/VI, with one common profile). For the common profile, deposition for BGF versus FF/UM/VI was compared post-hoc using paired t-tests.

Results: Across inhalation profiles, mean total lung deposition was consistently higher with BGF (47.0-54.1%) versus FF/UM/VI (20.8-22.7%) and for each treatment component, with greater deposition for BGF also seen in the central large airways. Mean regional small airways deposition was also greater across inhalation profiles with BGF (16.9-23.6%) versus FF/UM/VI (6.8-8.7%) and for each treatment component. For the common profile, total, central, and regional small airways deposition were significantly greater for BGF versus FF/UM/VI (nominal $p<0.001$), overall

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and for treatment components; notably, regional small airways deposition of the ICS components was approximately five-fold greater with budesonide versus fluticasone furoate (16.1% vs. 3.3%).

Conclusions: BGF was associated with greater total, central, and small airways deposition for all components versus FF/UM/VI. Importantly, using an identical inhalation profile, there was an approximately five-fold difference in small airways deposition for the ICS components, with only a small percentage of the ICS from FF/UM/VI reaching the small airways. Further research is needed to understand if the enhanced delivery of BGF translates to clinical benefits.

Sources: *Omar Usmani, Grace Li, Jan De Backer, Hosein Sadafi, Libo Wu, Jonathan Marshall*

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DIALOGUE

The majority of pharmacotherapy treatments used in COPD require the use of inhaled delivery systems such as metered dose inhalers (MDIs) and dry powdered inhalers (DPIs). Although delivery systems have come a long way since first invented, there exist many challenges with using these devices. These include the well documented issues of patient compliance, errors in technique during the administration, and the patient's own disease severity, all of which may impact drug delivery to the lungs and ultimately the efficacy of the medication.

In this simulated study (no actual patients participated) by Usmani and colleagues, they examine if different single inhaler triple therapies (SITT) differ with regard to their drug deposition in the lungs. Using specific imaging and varying inhalational profiles (simulated patient effort) across a range of COPD severity, they demonstrated there was better lung drug deposition of budesonide-formoterol-glycopyrronium (BFG) MDI vs. fluticasone-vilanterol-umeclidium DPI. Interestingly, for BFG, different inhalation profiles did not significantly affect drug deposition suggesting that delivery may not be impacted by patient related factors such as inhalational technique/effort.

Although differences were seen between the two different SITT therapies, the authors themselves recognize that this is not a real-world study, did not involve patients, and therefore there are many limitations in the clinical interpretation. One must remember that both SITT treatments have demonstrated similar clinical outcomes in separate large randomized controlled trials in similar populations. Importantly, this study does highlight that respiratory device technologies are advancing, resulting in improved drug delivery that is more efficient, safer, and easier to use for patients living with respiratory diseases. This is progress indeed! **MB**

DIGEST

Quantifying COPD as a risk factor for cardiac disease in a primary prevention cohort

European Respiratory Journal 2023 Aug 31; 62(2):2202364. doi: 10.1183/13993003.02364-2022. Print 2023 Aug.

Despite COPD being a risk factor for cardiovascular disease (CVD) and knowing that risk stratification for CVD primary prevention is important, little is known about the real-world risk of CVD among people with COPD with no history of CVD. This knowledge would inform CVD management for people with COPD. The current study aimed to examine the risk of major adverse cardiovascular events (MACE) (including acute myocardial infarction, stroke, or cardiovascular death) in a large, complete real-world population with COPD without previous CVD.

Methods: We conducted a retrospective population cohort study using health administrative, medication, laboratory, electronic medical record and other data from Ontario, Canada. People without a history of CVD with and without physician-diagnosed COPD were followed between 2008 and 2016, and cardiac risk factors and comorbidities compared. Sequential cause-specific hazard models adjusting for these factors determined the risk of MACE in people with COPD.

Results: Among ~5.8 million individuals in Ontario aged ≥40 years without CVD, 152,125 had COPD. After adjustment for cardiovascular risk factors, comorbidities and other variables, the rate of MACE was 25% higher in persons with COPD compared with those without COPD (hazard ratio 1.25, 95% CI 1.23-1.27).

Conclusion: In a large real-world population without CVD, people with physician-diagnosed COPD

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were 25% more likely to have a major CVD event, after adjustment for CVD risk and other factors. This rate is comparable to the rate in people with diabetes and calls for more aggressive CVD primary prevention in the COPD population.

Source: *Laura C Maclagan, Ruth Croxford, Anna Chu, Don D Sin, Jacob A Udell, Douglas S Lee, Peter C Austin, Andrea S Gershon*

PMID: 37385658 DOI: 10.1183/13993003.02364-2022

DIALOGUE

There is a clear association between COPD and cardiovascular disease with approximately 40% of hospitalizations for ischemic heart disease attributable to COPD. Additionally, cardiovascular events are common among patients admitted to hospital for acute exacerbation of COPD (AECOPD), with the highest risk in the first week after AECOPD, and remain elevated up to one year after admission to hospital. In this Canadian study of people without a history of cardiovascular disease, COPD was associated with a higher occurrence of risk factors for CVD and was independently associated with rates of CVD events comparable to rates seen in people with diabetes and chronic kidney disease (populations known to be higher risk for CVD). Unlike COPD, these populations are identified in clinical guidelines as high risk with recommendations targeted towards interventions that aim to prevent future CVD events. This study is the largest study to date that has assessed the rates of CVD events in a COPD population without any history of CVD and provides evidence to support a need for more aggressive primary prevention efforts by clinicians. Although the current Canadian COPD pharmacotherapy guidelines do not address prevention of cardiovascular disease, they do highlight the importance of single inhaler triple therapy (SITT) for patients with COPD and a history of severe or frequent AECOPD because of the improvement in mortality associated with SITT in this high-risk population. With growing evidence on how best to prevent and manage these conditions together, it is anticipated that future clinical practice guidance documents will address these important co-morbid conditions. **EP**

DIGEST

QRISK3 underestimates the risk of cardiovascular events in patients with COPD

Thorax 2023 Nov 27:thorax-2023-220615.doi: 10.1136/thorax-2023-220615. Online ahead of print.

Patients with chronic obstructive pulmonary disease (COPD) are at increased risk of cardiovascular disease (CVD). The extent to which the excess CVD risk is captured by risk factors in QRISK, a widely used CVD risk scoring tool, is not well studied.

Methods: We created an incidence cohort of diagnosed COPD patients from the United Kingdom (UK) Clinical Practice Research Datalink GOLD database (Jan. 1998 to July 2018). The outcome was a composite of fatal or non-fatal CVD events. Sex-specific age-standardised incidence ratios (SIR) were compared with values for the UK primary-care population. The observed 10-year CVD risk was derived using the Kaplan-Meier estimator and was compared with predicted 10-year risk from the QRISK3 tool.

Results: 13,208 patients (mean age 64.9 years, 45% women) were included. CVD incidence was 3.53 events per 100 person-years. The SIR of CVD was 1.71 (95% CI 1.61 to 1.75) in women and 1.62 (95%CI 1.54-1.64) in men. SIR was particularly high among patients younger than 65 years (women=2.13 (95% CI 1.94 to 2.19); men=1.86 (95% CI 1.74 to 1.90)). On average, the observed 10-year risk was 52% higher than QRISK predicted score (33.5% vs 22.1%). The difference was higher in patients younger than 65 years (observed risk 82% higher than predicted).

Conclusion: People living with COPD are at a significantly heightened risk of CVD over and beyond their predicted risk. This is particularly the case for younger people whose 10-year CVD risk can be >80% higher than predicted. Risk scoring tools must be validated and revised to provide accurate CVD predictions in patients with COPD.

Source: *Joseph Emil Amegadzie, Zhiwei Gao, Jennifer K Quint, Richard Russell, John R Hurst, Tae Yoon Lee, Don D Sin, Wenjia Chen, Mona Bafadhel, Mohsen Sadatsafavi*

50168 DOI: 10.1136/thorax-2023-220615 Free article

DIALOGUE

This retrospective cohort study of 29.605 patients (between ages 40 to 84 years) with COPD from the UK Clinical Practice Research Datalink between 1998 and 2018 found that the incidence of cardiovascular disease (CVD) defined as fatal or non-fatal coronary heart disease, ischemic stroke, or TIA, was 3.53 events per 100 person-years. The incidence rates of CVD in patients living with COPD were higher than in the general population across all sex and age groups. However, this was more than three-fold higher in COPD patients <=65 years, versus less than 1.5 fold higher in those over 65.

QRISK3 is a validated, widely used cardiovascular disease risk scoring tool incorporating not only the traditional risk factors but also certain diseases that are associated with CV disease such as diabetes, CKD, rheumatoid arthritis, SLE, and obesity. Standardized incidence ratios (SIR) across age and sex using the development sample, also showed a significant difference in CVD incidence between COPD and the general population, again higher in younger patients less than 65 years old.

The average predicted 10-year CVD risk based on QRISK3 in patients with COPD was 22.1%, and the observed incidence in this cohort was 33.5%, 1.52 times higher than the predicted risk, even a higher discrepancy is seen in younger patients less than 65 (1.82 times)

This study confirms that the incidence of CVD in patients with COPD is significantly higher than the general population particularly in younger patients. Importantly, it nicely demonstrates that the risk of CVD is underestimated by traditional CVD risk scores that have been well validated, such as QRISK3. Not only is CVD risk assessment often forgotten in COPD patients, when risk is assessed, frequently used CV risk scores underestimate CV risk which leads to significant underdiagnosis of CVD in COPD patients. COPD should be added as a risk enhancer in cardiac risk assessment, like other diseases such as CKD, diabetes, obesity, and certain rheumatological disorders. Even if not formally incorporated, clinicians should strongly take COPD into consideration when assessing CV risk **GC**

DIGEST

2023 Canadian Thoracic Society Guideline on Pharmacotherapy in Patients With Stable COPD

Chest 2023 Nov; 164(5):1159-1183. doi: 10.1016/j.chest.2023.08.014. Epub 2023 Sep 9.

Chronic obstructive pulmonary disease patient care must include confirming a diagnosis with postbronchodilator spirometry. Because of the clinical heterogeneity and the reality that airflow obstruction assessed by spirometry only partially reflects disease severity, a thorough clinical evaluation of the patient should include assessment of symptom burden and risk of exacerbations that permits the implementation of evidence-informed pharmacologic and nonpharmacologic interventions. This guideline provides recommendations from a comprehensive systematic review with a meta-analysis and expert-informed clinical remarks to optimize maintenance pharmacologic therapy for individuals with stable COPD, and a revised and practical treatment pathway based on new evidence since the 2019 update of the Canadian Thoracic Society (CTS) Guideline. The key clinical questions were developed using the Patients/Population (P), Intervention(s) (I), Comparison/Comparator (C), and Outcome (O) model for three questions that focus on the outcomes of symptoms (dyspnea)/health status, acute exacerbations, and mortality. The evidence from this systematic review and meta-analysis leads to the recommendation that all symptomatic patients with spirometry-confirmed COPD should receive long-acting bronchodilator maintenance therapy. Those with moderate to severe dyspnea (modified Medical Research Council ≥2) and/or impaired health status (COPD Assessment Test ≥10) and a low risk of exacerbations should receive combination therapy with a long-acting muscarinic antagonist/long-acting ß2-agonist (LAMA/LABA). For those with a moderate/severe dyspnea and/or impaired health status and a high risk of exacerbations should be prescribed triple combination therapy (LAMA/LABA/inhaled corticosteroids) azithromycin, roflumilast, or N-acetylcysteine is recommended for specific populations; a recommendation against the use of theophylline, maintenance systemic oral corticosteroids such as prednisone and inhaled corticosteroid monotherapy is made for all COPD patients.

Sources: *Jean Bourbeau, Mohit Bhutani, Paul Hernandez, Shawn D Aaron, Marie-France Beauchesne, Sophie B Kermelly, Anthony D'Urzo, Avtar Lal, François Maltais, Jeffrey D Marciniuk, Sunita Mulpuru, Erika Penz, Don D Sin, Anne Van Dam, Joshua Wald, Brandie L Walker, Darcy D Marciniuk*

PMID: 37690008 DOI: 10.1016/j.chest.2023.08.014

DIALOGUE

In 2023, the Canadian Thoracic Society (CTS) Guideline on Pharmacotherapy in Patients with Stable COPD was published. This guideline was developed using state of the art methods for guideline production.

The authors continue to advocate for proper patient assessment. They recommend for clinicians to use a breathlessness scale (mMRC) and/or a scale to measure quality of life called the COPD Assessment Test (CAT). Lung function assessed by spirometry can also be used. These assessments along with a patients risk of future exacerbations (flare ups requiring antibiotics, prednisone either as an inpatient or outpatient) will be used to determine the best pharmacotherapy for a patient.

Patients with the highest risk of mortality: mMRC of ≥2 and/or CAT score of ≥10 AND who have had ≥2 outpatient or one hospitalization/ED visit for a flare-up in the last 12 months, should use Single Inhaler Triple Therapy (SITT), containing two long acting bronchodilators (LAMA and LABA) and an inhaled corticosteroid (ICS). This high-risk group when treated with SITT experience a reduction in flare-ups and an improvement in survival when compared to ICS/LABA or LAMA/LABA combinations.

The medicines in SITT can be delivered using multiple inhalers (Multi-Inhaler Triple Therapy (MITT)), however, studies have shown that SITT, when compared to MITT, improves compliance and outcomes. If patients are currently on MITT, the decision to change to SITT is something that should be discussed with their physician to see if this is appropriate.

The 2023 CTS COPD guidelines is a proactive document that has simplified the pharmacotherapy approach for both clinicians and patients. Using this guidance will give COPD patients the best chance to reduce flare-ups and improve survival. **MB**

DIGEST

Association of COPD exacerbations and acute cardiovascular events: a systematic review and meta-analysis

Therapeutic Advances in Respiratory Disease 2022 Jan-Dec; 16:17534666221113647. doi: 10.1177/17534666221113647

The majority of patients with chronic obstructive pulmonary disease (COPD) suffer from comorbid cardiovascular (CV) disease. Accumulating evidence suggests a temporal association between COPD exacerbations and acute CV events, possibly due to lung hyperinflation, increased hypoxemia, and systemic inflammation. The aims of the study were to estimate the risk of (1) acute CV events [acute myocardial infarction (AMI), CV-related death] or stroke in the months following a COPD exacerbation and (2) COPD exacerbation in the months following an acute CV event.

Methods: A systematic literature review of observational studies published since 2000 was conducted by searching literature databases (Medline and Embase). Studies were eligible if conducted in adults with COPD, exposed to either COPD exacerbation or acute CV events, with outcomes of acute CV events or COPD exacerbation reported. Studies were appraised for relevance, bias, and quality. Meta-analyses, using random-effect models, were performed for each outcome of interest, thus providing a pooled relative risk (RR) and its 95% confidence interval.

Results: Eight studies were identified, of which seven were used for the meta-analyses examining the risk of CV events 1-3 months after an exacerbation compared with none. For stroke (six studies), RR was 1.68 (95% CI=1.19-2.38). For AMI (six studies), RR was 2.43 (95% CI=1.40-4.20). No studies exploring risk of exacerbation following an acute CV event were identified.

Conclusions: This meta-analysis identified a markedly increased risk of stroke or AMI within a relatively short period of time following a COPD exacerbation. Although the underlying mechanisms are not fully elucidated, patients with COPD should be monitored for risk of CV outcomes after exacerbations. In addition, preventing exacerbations may decrease the risk of subsequent acute CV events.

Source: *Hana Müllerová, Jonathan Marshall, Enrico de Nigris, Precil Varghese, Nick Pooley, Nina Embleton, Clementine Nordon, Zoe Marjenberg*

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Registration: The study protocol was published via PROSPERO: International Prospective Register of Systematic Reviews (#CRD42020211055).

DIALOGUE

Chronic obstructive pulmonary disease (COPD) and cardiovascular (CV) diseases frequently occur together.[1,2] Studies suggest that people with COPD have a two-fold increase in the odds of having chronic CV disease compared with those without COPD.[3] Unfortunately, people living with both conditions experience worse quality of life, higher risk of hospitalisation, and increased mortality risk. There has been evidence showing that CV events often occur in association with acute exacerbations of COPD (AECOPD) with increased risk of death. This study aimed to systematically review the evidence (using meta-analysis) to determine the risk of acute CV outcomes following a AECOPD and determine if there is a risk of AECOPD following an acute CV event. A total of seven studies were included in this analysis and indeed suggest an increased risk for acute myocardial infarction (heart attack) and stroke following an AECOPD, with the risk being the highest in the first few days after an AECOPD. The authors did not find any evidence that reported on the risk of AECOPD following acute cardiovascular events. The findings of this meta-analysis are not surprising and certainly highlight the importance of prevention of acute exacerbations of COPD. There is strong evidence for self-management education, smoking cessation, exercise and pulmonary rehabilitation, and vaccinations for optimizing care for people with COPD, and these are highlighted in the Canadian COPD guidelines. Importantly, pharmacotherapy including long-acting bronchodilators (with or without inhaled steroids) also have strong evidence for preventing exacerbations among COPD patients. Conversations between patients and their clinicians are crucial and should include discussing what exacerbations are and how to best prevent them. This will not only help improve living with COPD but also hopefully reduce their risk of CV events. The COPD Checklist (www.copdcanada.info/my-copd-checklist) is one resource that patients can access to help them in starting these conversations with their healthcare provider. **EP**

1. Morgan AD, Zakeri R, Quint JK: Defining the relationship between COPD and CVD: what are the implications for clinical practice. Ther Adv Respir Dis 2018; 12: 1753465817750524. [PMC free article] [PubMed] [Google Scholar]

2.Schneider C, Bothner U, Jick SS, et al: Chronic obstructive pulmonary disease and the risk of cardiovascular diseases. Eur J Epidemiol 2010; 25:253–260. [PubMed] [Google Scholar]

3. Chen W, Thomas J, Sadatsafavi M, et al: Risk of cardiovascular comorbidity in patients with chronic obstructive pulmonary disease: a systematic review and meta-analysis. Lancet Respir Med 2015; 3:631–639. [PubMed] [Google Scholar]

DIGEST

Heightened long-term cardiovascular risks after exacerbation of chronic obstructive pulmonary disease

Heart 2024 Jan 5:heartjnl-2023-323487. doi: 10.1136/heartjnl-2023-323487. Online ahead of print.

This study examined the risk of adverse cardiovascular (CV) events following an exacerbation of chronic obstructive pulmonary disease (COPD).

Methods: This retrospective cohort study identified patients with COPD using administrative data from Alberta, Canada from 2014 to 2019. Exposure periods were 12 months following moderate or severe exacerbations; the reference period was time preceding a first exacerbation. The primary outcome was the composite of all-cause death or a first hospitalization for acute coronary syndrome, heart failure (HF), arrhythmia, or cerebral ischemia. Time-dependent Cox regression models estimated covariate-adjusted risks associated with six exposure subperiods following exacerbation.

Results: Among 142,787 patients (mean age 68.1 years and 51.7% men) 61,981 (43.4%) experienced at least one exacerbation and 34,068 (23.9%) died during median follow-up of 64 months. The primary outcome occurred in 43,564 (30.5%) patients with an incidence rate prior to exacerbation of 5.43 (95% CI 5.36 to 5.50) per 100 person-years. This increased to 95.61 per 100 person-years in the one to seven days post exacerbation (adjusted HR 15.86, 95% CI 15.17 to 16.58) and remained increased for up to one year. The risk of both the composite and individual CV events was increased following either a moderate or a severe exacerbation, though greater and more prolonged following severe exacerbation. The highest magnitude of increased risk was observed for HF decompensation (one to seven days, HR 72.34, 95% CI 64.43 to 81.22).

Conclusion: Moderate and severe COPD exacerbations are independent risk factors for adverse CV events, especially HF decompensation. The impact of optimizing COPD management on CV out-

comes should be evaluated.

Source: *ANathaniel M Hawkins, Clementine Nordon, Kirsty Rhodes, Manisha Talukdar, Suzanne McMullen, Paul Ekwaru, Tram Pham, Arsh K Randhawa, Don D Sin*

PPMID: 38182279 DOI: 10.1136/heartjnl-2023-323487 Free article

DIALOGUE

In this Canadian population-based retrospective cohort study of 142,787 patients with C0PD in Alberta, Canada between 2014 to 2019, 43% experienced at least one exacerbation, 24% died with almost one-third of deaths being cardiac-related. Moreover, the risk of all-cause death or severe cardiovascular event (ACS, heart failure decompensation, arrhythmias, or ischemic stroke) went up close to 16-fold in the first seven days after an exacerbation. Increased risk was lower (seven-fold) but still present one year post-exacerbation.

The risk of all cause death as well as all the individual components of CV events increased significantly following any severity of COPD exacerbation (moderate or severe) with the greatest risk being in the acute period. In particular, the risk of heart failure decompensation within six months was significantly elevated (72 fold) and remained elevated up to 180 days (2.25 fold). The risk of ACS, arrhythmia, and stroke were comparable and remained elevated in the first year. However, there was a significant difference in the acute period. ACS was increased by 25-fold, arrhythmias 31-fold, and ischemic strokes by16-fold in the first seven days.

There has been a known strong association between COPD and cardiovascular disease. The incredible increase in risk of death and cardiovascular events after a COPD exacerbation regardless of severity, particularly in the acute period shown in this study should usher a wake-up call to all clinicians (cardiologists, respirologists, internists, family physicians) who touch these patients. Particular attention should be made towards diagnosing cardiac disease in COPD patients and recognizing COPD in cardiac patients. Optimizing, and treating CV risk factors with lifestyle and risk reducing therapies, and most importantly, optimizing holistic strategies and therapies to prevent exacerbations should be a priority. Exacerbations not only decrease the patient's lung function and functional status, but is a strong harbinger of cardio-vascular events, hospitalization, and death. With the advent of SITT that can significantly decrease exacerbations and all-cause mortality, clinicians need to consider taking action as quickly as possible to improve the prognosis of their patients. Multi-disciplinary and shared care approaches between cardiology and respirology should be considered in COPD patients as well as cardiac patients who present with dyspnea. **GC**

Dr. Mohit Bhutani is a Professor of Medicine at the University of Alberta. His main clinical interests are in the fields of Asthma and COPD, and his work has led him to be involved in many local, provincial and national initiatives in these areas of specialty. He is currently the clinical director of the Asthma and COPD clinics at the University of Alberta. Provincially, he is the Co-chair of the Alberta Health Services (AHS) COPD Connect Care Pathway development program. From 2014-2020 he was co-chair of the Airways Working Group of the AHS Respiratory Health Strategic Clinical Network. Nationally, he is the past Co-chair of the Canadian Thoracic Society (CTS) COPD Clinical Assembly. He is one of the lead authors of the 2015, 2017, 2019 and 2023 CTS COPD Pharmacotherapy Guidelines. He was elected to the CTS Executive in 2020 , was President of the CTS from April 2023-2024. He was Co-chair of the Royal College of Physicians and Surgeons Adult Respiratory Examination from 2017-2023. He has a number of research interests in both COPD and Asthma and has received research funding from many public and private granting agencies including CIHR and Alberta Innovates.

Dr. Erika Penz is an Associate Professor and Head of the Division of Respirology, Critical Care and Sleep Medicine at the University of Saskatchewan and is the Medical Lead for the Saskatchewan Lung Cancer Screening program. Dr. Penz obtained her MD from McMaster University Medical Centre, Hamilton, in 2004 and completed Internal Medicine and Respirology training at the University of Calgary. She has obtained Master's degrees in health policy and management at the Harvard School of Public Health, Boston, and health economics at the University of York, UK, and completed a Post-doctoral Fellowship in health economics in 2013. She is currently President-Elect of the Canadian Thoracic Society

Dr. Grace Chua is a community cardiologist in Richmond Hill, Ont. She received her medical and cardiology training including a fellowship in Adult Echocardiography and Clinical Epidemiology at the University of Toronto. Clinical research during training led to a publication in The New England Journal of Medicine that has been instrumental in initiating the declaration of conflict of interest in medicine. She was the Chief of the Division of Cardiology at Mackenzie Health from 2003 to 2017 and was the initiating force in developing the hospital's rapid access cardiology clinic and heart function service.

Currently, her interests lie in clinical education and knowledge translation, particularly in the field of heart failure, as well as prevention of cardiometabolic disease. She has been involved in the development and delivery of many educational programs in different formats, both locally and nationally.

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We invite your comments. Please mail comments to: The COPD Digest, c/o COPD Canada, 1460 The Queensway, Suite 212, Toronto, ON M8Z 1S4. Or you can e-mail questions to: *exec.copdcanada@gmail.com*

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