QUANTITATIVE IMAGING WORKSHOP XVII:

Leveraging CT to Accelerate Detection of Lung Cancer, COPD and Cardiovascular Disease

October 28-30, 2020 | Virtual

For the past 17 years, the Prevent Cancer Foundation® has hosted an annual Quantitative Imaging Workshop, a high-impact, multi-disciplinary forum for the advancement of quantitative low dose computerized tomography (LDCT) imaging biomarkers for detection and management of early thoracic disease. These include COPD, cardiovascular disease, and lung cancer, three of the top four leading causes of death in the U.S.

Now in the midst of the COVID-19 pandemic, we approached this year's Workshop on October 28-30 with a sense of urgency. In light of current travel restrictions, we revised the meeting format and moved to a ZOOM-based virtual meeting.

Thought leaders from across the spectrum of disciplines involved in the global implementation of thoracic CT screening came together to explore how we can work together to advance the benefit of thoracic CT imaging of individuals who have a history of extended cigarette consumption.

Session 1: Computational analysis of high-quality thoracic CT images enables us to explore how to more accurately detect and characterize the clinical aggressiveness of early thoracic disease. In these efforts, we collaborated with the American Cancer Society National Lung Cancer Roundtable and the Quantitative Imaging Biomarker Alliance of the Radiological Society of North America to explore how to optimize the precision of image quantitation applied as a clinical tool to measure change in small suspected lung nodules in high-risk populations. Discussions focused on the potential benefit of rigorously applied quantitative imaging techniques in managing early lung cancer. In addition, experts in regulatory science reviewed next steps in objectively validating the accuracy and reliability of this powerful new imaging tool as it is applied for early lung cancer management.

An important new focus in the Workshop was to address health care disparities in regard to developing screening approaches that are appropriately tailored to all potential screening communities. Such engagement involves both ensuring access to screening services but also engaging diverse communities in development of the computational and imaging tools to ensure robust performance of screening tools across all types of screening subjects.

Recent reports from around the world confirm that ever smokers undergoing lung cancer screening will regularly have CT findings consistent with COPD in the absence of clinical symptoms. However, no systematic approach has been defined to categorize the extent of such injury by screening CT. Further, there is no existing guidance as to what preventive measures or other interventions should be recommended for observed level of pulmonary injury observed on thoracic screening CTs. In partnership with the American Lung Association, a session involving leading

thoracic imaging experts explored developing consensus on what are the critical diagnostic features for detection of COPD and related diseases on a low dose CT scan acquired for lung cancer screening.

Further discussion focused on the clinical practice recommendations that may be made for the extent of COPD changes found with CT screening. For example, what information about the degree of lung parenchymal injury from a screening CT scan would be useful to share with a screening subject that justifies enhanced measures for tobacco cessation beyond standard approaches. A follow-on session involving leading imaging experts to address the technical considerations as to how to best ensure CT screening scans are acquired in an optimal fashion that ensures productive quantitative analyses for both lung cancer and also features of COPD. Topics that were discussed included the potential benefits of developing a standardized way to report pulmonary findings routinely found on thoracic CT screening, and standardizing recommendations for relevant general preventive options appropriate to potential findings of lung injury detected on their screening CT image - such as by recommending increasing physical activity.

Another important topic discussed in this Workshop was the potential for therapeutic interventions such as adjuvant therapy to extend curative options beyond thoracic surgery for aggressive, early screen-detected lung cancer. The Initiative for Early Lung Cancer Research on Treatment (IELCART) has already accrued over 1000 participants and this may be a favorable resource for launching a major new umbrella trial with molecularly targeted therapy.

The final session focused on the evolution of population health and its relevance to the implementation of lung cancer screening. Two opportunities emerged including aligning reimbursement incentives with full implementation of lung cancer screening in eligible individuals. In addition, the use of thoracic CT characterizes tobacco-related injury to the lung relative to COPD as well as coronary artery disease risk related to coronary calcification. With the emergence of population health-based reimbursement, such enhanced chronic disease information may lead to much more efficient health management approaches that may allow for better disease preemption and cost mitigation.

In conclusion, the 2020 Workshop highlighted the need for broad, closely-communicating multi-disciplinary teams, including oncologists, surgeons, pulmonologists, radiologists, cardiologists, primary care clinicians and imaging scientists, along with representatives of federal agencies, the pharmaceutical and imaging industries and patient advocates to realize the full potential of precise quantitative imaging of the thorax in tobacco-exposed individuals. The workshop also highlighted compelling strategies for applying high quality CT imaging for lung cancer and other tobacco-induced diseases to prevent death and debility from chronic tobacco exposure.