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# Clinical trial success influenced by biomarker- and receptor-targeted therapies in NSCLC

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Over the past decade, a great clinical focus has been directed at developing new and innovative therapies for advanced non-small cell lung cancer (NSCLC). An analysis of clinical trials evaluating these therapies demonstrates that the cumulative success rate for new agents for advanced NSCLC is lower than the industry-estimated rate. However, biomarker- and receptor-targeted therapies were found to substantially increase clinical trial success.

The analysis was designed to evaluate the risk of clinical trial failure in advanced (stage IIIb-IV) NSCLC drug development over the past 14 years. The success rate was defined as the likelihood that a new drug would pass all phases of clinical trial testing and be approved. Success rates were compared with rates estimated by the biopharmaceutical industry as well as rates determined by risk analysis research in other disease indications.

The success rate for NSCLC drug development was 11%, which is lower than the industry estimate of 16.5%. However, success rates were higher for certain drug indications; the cumulative success rate was 62% for biomarker targeted therapy, which was nearly six times higher than the rate for trials without a biomarker targeted indication (11%). The analysis also showed that success rates became worse with each new phase of testing, which indicates that earlier phase trials may provide little help in ensuring the success of later phase trials.

"The findings suggest that some treatment modalities and drug design strategies may help to decrease drug-development risk and promote the development of innovative drugs to treat advanced NSCLC," says lead author Jayson Parker, PhD, MBA, of the Department of Biology, University of Toronto at Mississauga, Toronto, Ontario, Canada. A report on the findings of the analysis is published in the February issue of the International Association for the Study of Lung Cancer's journal, the *Journal of Thoracic Oncology* (JTO).

The cumulative success rates for small-molecule and biologic drugs for advanced NSCLC were lower than industry aggregate rates; the rate for small-molecule drugs was 17% (compared with the industry aggregate of 32%) and the rate for biologic drugs was 10% (compared with 13%). When the impact of the mechanism of action was analyzed, the cumulative success rate was 31% for receptor targeted therapies, such as bevacizumab, crizotinib, erlotinib, and gefitinib, which was nearly threefold better than nontargeted therapies (11%). The rate was lowest (6%) for immunotherapy.

"Our analysis suggests that biomarker targeted treatment indications and compounds that have a receptor targeted mechanism of action offer the best chance of clinical success in this indication and should be the focus of future clinical trial development," says first author Adam Falconi, BSc, Pharm, of the Department of Pharmacy, Leslie Dan Faculty of Pharmacy, University of Toronto, Toronto, Canada. Clinical trials involving the use of biomarkers and receptor targeted therapies should be a priority for patients with advanced NSCLC who wish to enroll in a clinical trial.

The third coauthor of the study, Gilberto Lopes, MD, of Johns Hopkins University School of Medicine, Baltimore, Maryland, and HCor Onco Cancer Center for Hospital do Coração, Brazil, is an IASLC member on the Career Development Committee.