



The 48th Annual Scientific Meeting of the Nutrition Society of Australia, 3-6 December 2024

## The influence of fruit and vegetable intake on chronic obstructive pulmonary disease respiratory outcomes and risk: a systematic review and meta-analysis

R.A. Stent<sup>1,2</sup>, L.R.C. Dowling<sup>1,2</sup>, H.A. Scott<sup>1,2</sup> and L.G. Wood<sup>1,2</sup>

<sup>1</sup>School of Biomedical Sciences and Pharmacy, The University of Newcastle, Callaghan, New South Wales, Australia

<sup>2</sup>Immune Health Research Program, Hunter Medical Research Institute, New Lambton Heights, New South Wales, Australia

The role of nutrition in diseases such as diabetes, cancer and cardiovascular disease has been widely explored; however, less is known about the role nutrition plays in the development and progression of chronic obstructive pulmonary disease (COPD). Despite limited research, studies have identified favourable associations between diets high in fruits and vegetables and a reduction in COPD incidence and severity. There are several potential mechanisms through which consuming adequate fruits and vegetables may decrease the risk and severity of COPD<sup>(1)</sup>. These mechanisms include protection of the lungs due to increased consumption of antioxidants and soluble fibre<sup>(1,2)</sup>. The aim of this systematic review was to synthesise evidence on the effects of fruit and vegetable intake on COPD risk. A systematic search was completed across six databases up to July 2023. Studies reporting COPD risk and fruit and vegetable intake in COPD vs non-COPD were assessed for inclusion. 26 studies met our inclusion criteria and, of these, 21 were eligible for meta-analysis. This review found that both fruit and vegetable consumption are linked to a reduced risk of developing COPD. The meta-analysis confirmed that higher intakes of fruit and vegetables were significantly associated with greater reduction in COPD incidence. Specifically, individuals who consumed higher amounts of fruit had a 17% lower risk of COPD compared to those with lower fruit intake (Odds ratio, OR = 0.83; 95% CI: 0.73–0.94, n = 2107, p = 0.004, I<sup>2</sup> = 84%). Over a mean follow-up period of 13.07 years, the protective effect of fruit consumption against COPD appeared to be even more pronounced, with a 25% reduction in risk observed (hazard ratio, HR = 0.75; 95% CI: 0.67–0.84, n = 3770 p = < 0.00001, I<sup>2</sup> = 0%). Vegetable consumption was also associated with a significant reduction in COPD risk, with a 24% lower risk observed in individuals with higher vegetable intake compared to those with lower intake (OR = 0.76; 95% CI: 0.66–0.88, n = 2107, p = 0.0003, I<sup>2</sup> = 97%). Further analysis focusing on fibre content of fruits and vegetables demonstrated that high fruit fibre intake was associated with a 27% reduction in the risk of developing COPD (HR = 0.73; 95% CI: 0.65–0.83, n = 3901, p < 0.00001, I<sup>2</sup> = 0%) and higher vegetable fibre intake was associated with a 12% reduction in COPD risk (HR = 0.88; 95% CI: 0.79–0.99, n = 3901, p = 0.03, I<sup>2</sup> = 62%). The results from this review strongly support the beneficial effects of fruit and vegetable consumption in reducing the risk of COPD. Further work is warranted to understand the mechanisms that lead to these benefits.

### References

1. Keranis E, Makris D, Rodopoulou P *et al.* (2010) *Eur Respir J* **36**(4), 774–780.
2. Vaughan A, Frazer ZA, Hansbro PM, Yang IA (2019) *J Thorac Dis* **11** Suppl 17, S2173–S2180.