Purpose: Nausea and vomiting have been known to occur in patients undergoing external beam radiation treatments for head&neck cancers. We sought to determine the feasibility of limiting the dose delivered to the nausea center, area postrema (AP) and dorsal vagal complex (DVC), for these patients without compromising target coverage and critical organ doses.

Methods: In a retrospective study 23 oropharyngeal cancer patients were identified as being treated with definitive or adjuvant radiotherapy at Memorial Sloan Kettering Cancer Center. Patients were treated solely with external beam radiation using intensity modulated radiation therapy (IMRT). The nausea center was carefully contoured in the treatment CT with the assistance of a board certified neuroradiologist. The doses delivered to the nausea center were calculated for each plan delivered. Cases were replanned offline to determine the lowest achievable nausea center dose that does not compromise the overall PTV coverage or critical structures doses, these being brainstem, spinal cord, cochleas, and temporal lobes.

Results: Patients reporting higher nausea grade had median AP and DVC doses of 38.7Gy and 40.4Gy, respectively. Patients reporting higher vomiting grade had median AP and DVC doses of 39.5Gy and 44.7Gy, respectively. Replanning resulted in reduced dose to AP by an average of 18% and to the DVC by an average of 16% while maintaining adequate target coverage and doses to the critical organs the same or decreased by 1-4%. We aim to achieve a max dose of 36Gy to AP and 38Gy to DVC for these cases.

Conclusions: It is feasible to limit the doses to the nausea center without compromising target coverage or critical organ limits for oropharyngeal cancer patients undergoing IMRT treatment. Clinical results indicating an association between radiation dose to the nausea center and development of nausea and/or vomiting can potentially be addressed by implementing this technique.