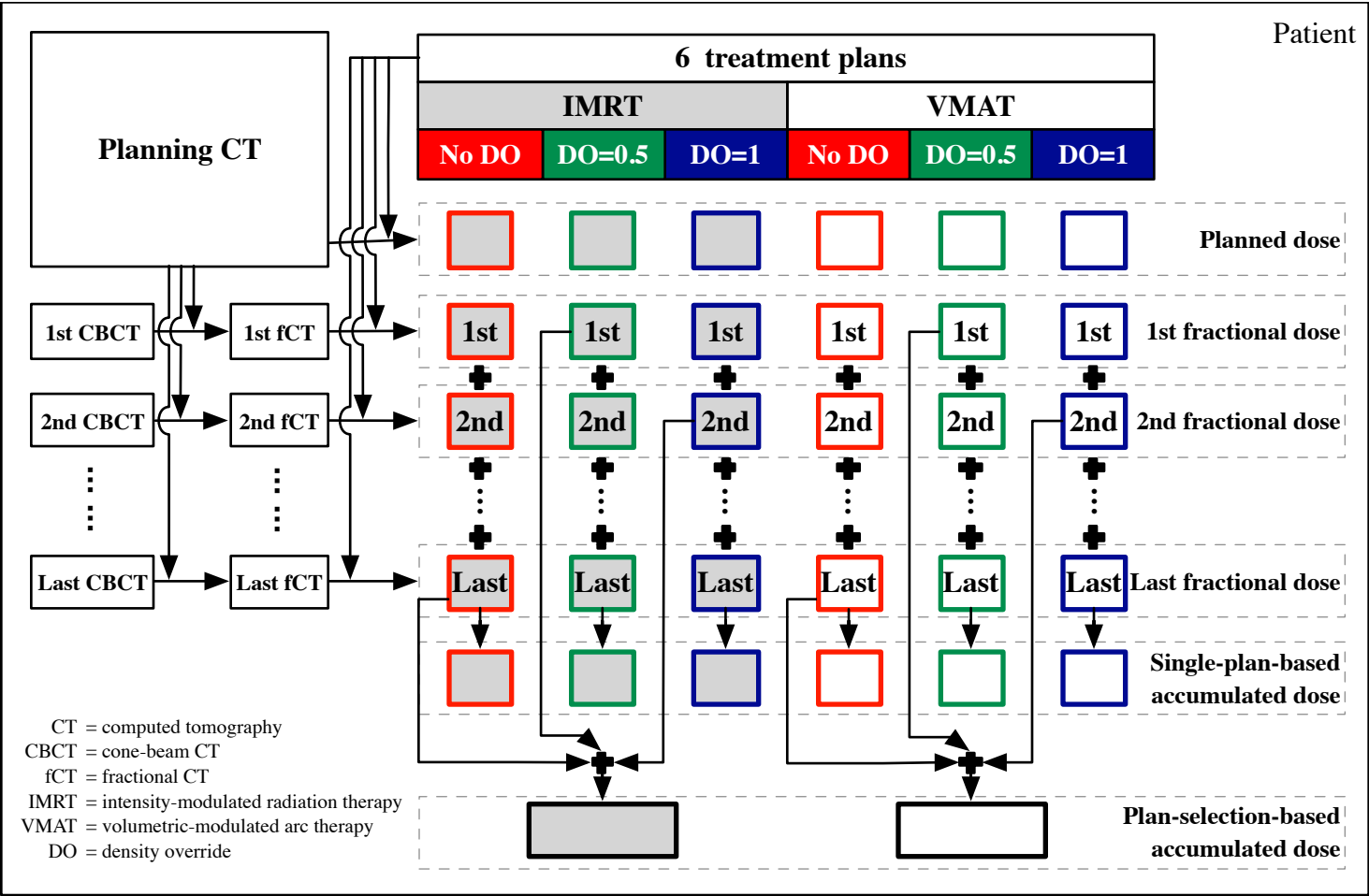


Density override in treatment planning to mitigate the dosimetric effect induced by gastrointestinal gas in esophageal cancer radiation therapy

Supplementary figures and table

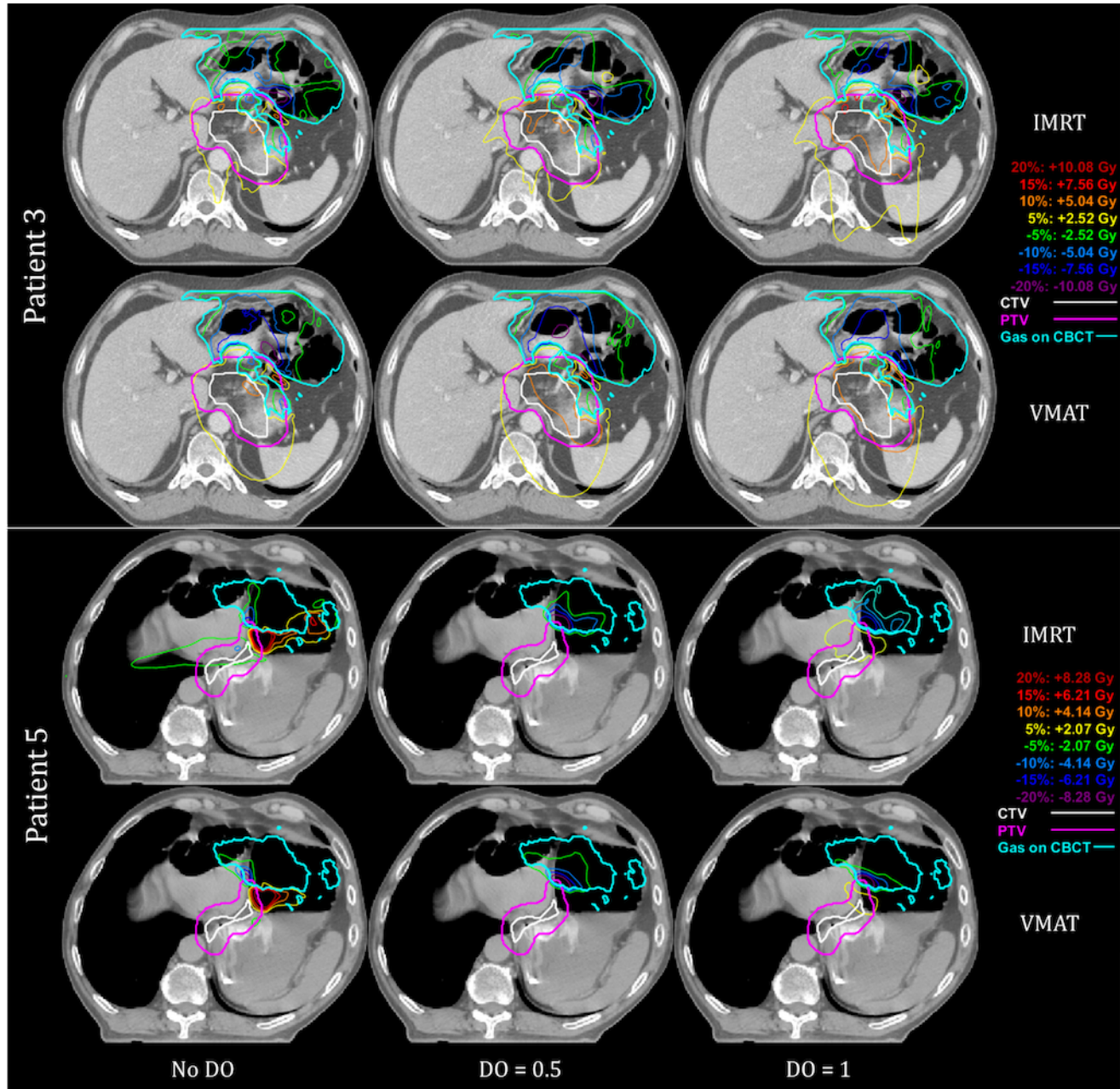


Supplementary Fig. A1. Schematic illustration of the study workflow.

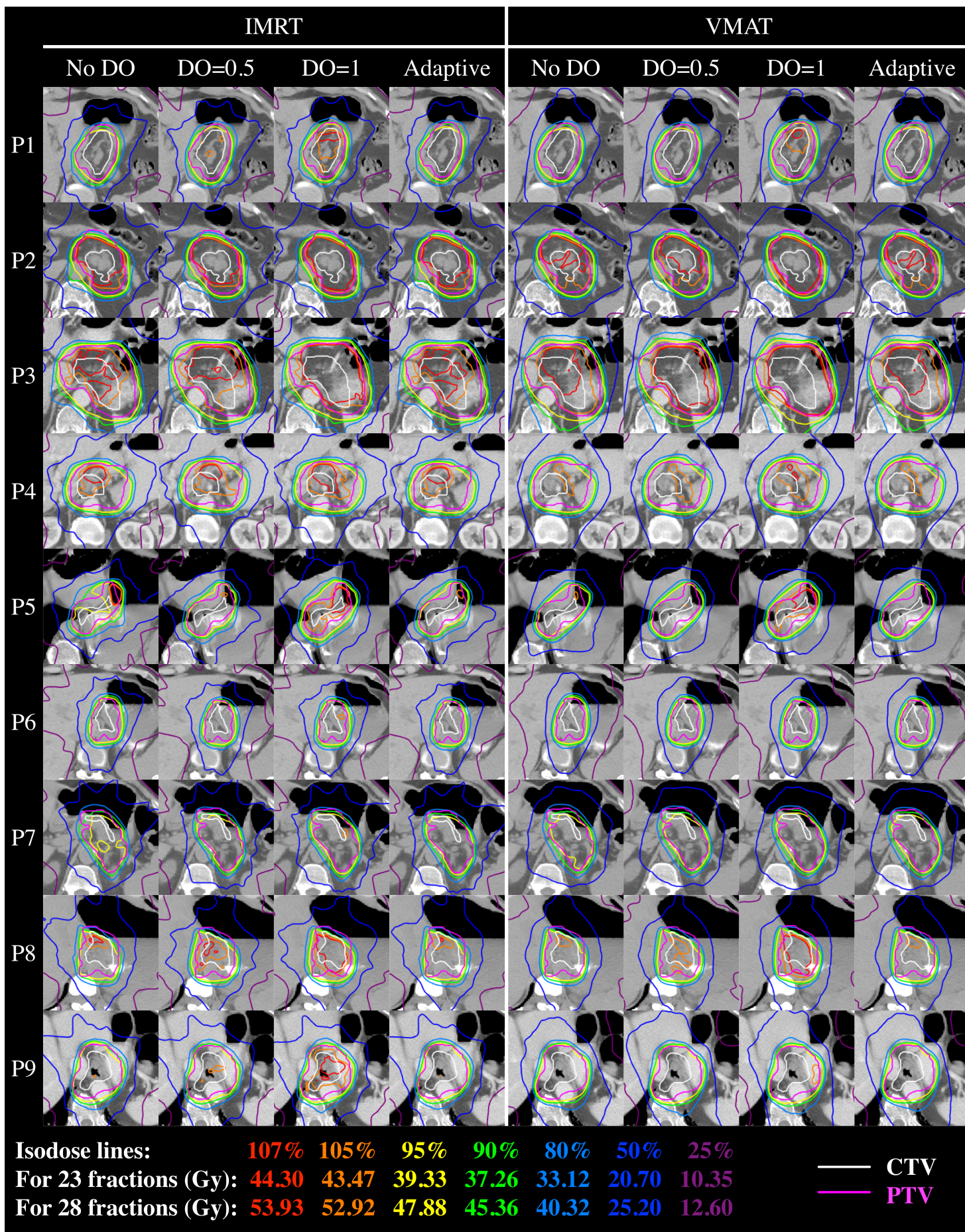
Supplementary Table A1. Planning objectives and evaluation constraints.

Region of interest	Dose-volume histogram parameter		Constraints
CTV/PTV	V _{95%}	Volume [% of the total volume] receiving $\geq 95\%$ of the prescribed dose	$\geq 98\%$
	D _{2%}	Near-maximum absorbed dose [Gy]	$< 107\%$
Lungs	V _{10Gy}	Volume [% of the total volume] receiving ≥ 10 Gy	$< 50\%$
	V _{20Gy}	Volume [% of the total volume] receiving ≥ 20 Gy	$< 30\%$
	D _{mean}	Mean dose [Gy]	< 16 Gy
Left/right kidney	V _{18Gy}	Volume [% of the total volume] receiving ≥ 18 Gy	$< 33\%$
Spinal cord	D _{2cm³}	Minimum dose [Gy] to the most irradiated 2 cm ³ volume	< 50 Gy
Heart	V _{30Gy}	Volume [% of the total volume] receiving ≥ 30 Gy	$< 30\%$ (neoadjuvant treatment) $< 40\%$ (definitive treatment)
Liver	D _{mean}	Mean dose [Gy]	< 26 Gy

Abbreviation: CTV = clinical target volume, PTV = planning target volume.



Supplementary Fig. A2. Two examples (patient 3 at fraction 28 and patient 5 at fraction 5) of the isodose lines of the dose difference distribution between the fractional dose and planned dose depicted on the planning CT for intensity-modulated radiotherapy (IMRT) and volumetric-modulated arc therapy (VMAT) plans associated with the three density override (DO) settings. *Note: The high dose difference region of 10-20% in patient 5 does not mean there was an overdose of 10-20% because the planned dose was low in the gas pocket in the planning CT. It was only an overdose of 5-10% when we looked at the absolute fractional dose.*



Supplementary Fig. A3. Accumulated dose distribution for intensity-modulated radiation therapy (IMRT) and volumetric-modulated arc therapy (VMAT) using the single-plan strategy with no density override (DO), DO=0.5, and DO=1, and the plan-selection strategy (adaptive) for all nine patients (P1 - P9). Abbreviations: CTV = clinical target volume; PTV = planning target volume.