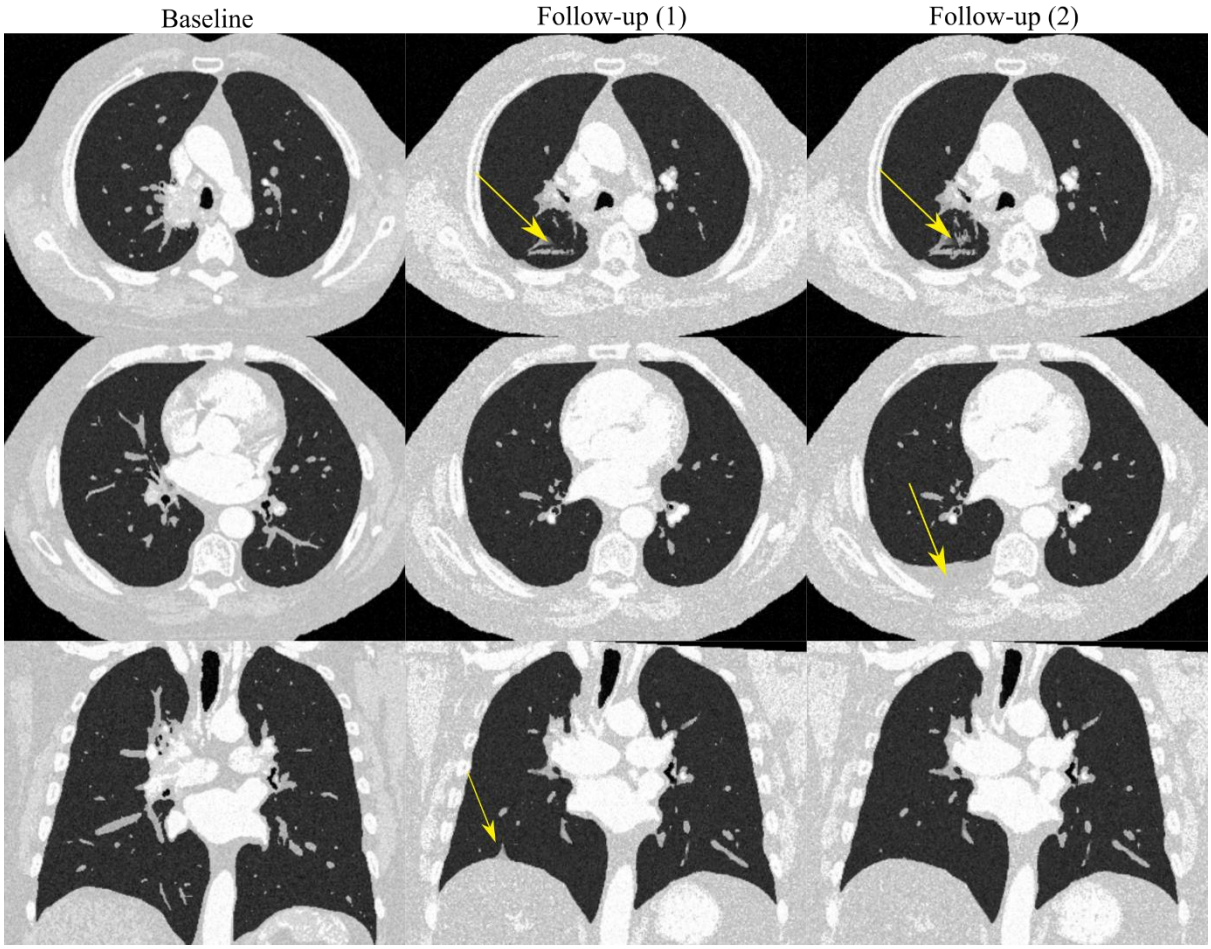
This dataset consists of two virtual phantom datasets, that represent radiation-induced lung damage (RILD) after curative RT.

The two datasets contain the same baseline CT scan, and two different images for possible follow-up. These differ in the volume of parenchymal damage, and presence/absence of pleural effusion and diaphragmatic tenting (see Figure below).



DATA DESCRIPTION

Total of two virtual patients provided: phantom001, phantom002

For each one, the following folder structure follows:

- Baseline_data: contains all information of pre-RT scan
    - segmentations:
        - Major Airways (at least up to 4th generation): airways.nii
        - Bone anatomy (to define patient specific coordinate system): bones_for_PCA.nii
        - Chest wall surface (for both ipsi and contralateral lungs): chestwalll_ipsi.nii/ chestwall_contra.nii
        - Lungs (semi-automated segmentation of left and right lung, and ipsilateral thoracic cage): lungs.nii
        - Diaphragm surface (for both ipsi and contralateral lungs): diaphragm_ipsi.nii/ chest_contra.nii
        - Normal lung volume (NV, for both ipsi and contralateral lungs): nvolume_ipsi.nii/ nvolume_contra.nii
        - Spinal canal: scanal.nii
    - transformations:
        - Affine transformation from raw to PSC coordinate system: psc_baseline.txt
    - Raw CT image: CT_baseline.nii
    - PS transformed CT image: psc_CT_baseline.nii
- Follow_up_data: contains all information of pos-RT scan
    - Raw segmentations:
        - Major Airways (at least up to 4th generation): airways.nii
        - Chest wall surface (for both ipsi and contralateral lungs): chestwall_ipsi.nii/ chestwall_contra.nii
        - Lungs (semi-automated segmentation of left and right lung, and ipsilateral thoracic cage): lungs.nii
        - Chest wall surface (for both ipsi and contralateral lungs): chestwalll_ipsi.nii/ chestwall_contra.nii
        - Normal lung volume (NV, for both ipsi and contralateral lungs): nvolume_ipsi.nii/ nvolume_contra.nii
        - High-intensity lung volume (NV, for both ipsi and contralateral lungs): hivolume_ipsi.nii/ hivolume_contra.nii
        - Spinal canal: scanal.nii
        - Diaphragm surface (for both ipsi and contralateral lungs, defined for CT image resampled in baseline space): psc_diaphragm_ipsi_resampled.nii/ psc_contra_ipsi_resampled.nii
    - Transformations:
        - Affine transformation from raw to PSC coordinate system: psc_follow_up.txt
        - Affine transformation to baseline scan: followup2baseline.txt
    - Raw CT image: CT_followup.nii
    - PSC transformed CT image: psc_CT_followup.nii
    - CT image resampled to baseline space: psc_CT_followup_resampled.nii

BIOMARKER CALCULATION

Details of how the features are used to calculate the biomarkers can be found in the spreadsheet here.

Using the segmentation data provided with the dataset, the values of the biomarkers calculated are:

phantom001:

				FEATURES MEASURED				
				Baseline		Follow-up		BIOMARKER
Feature	units	Biomarker	units	IL	CL	IL	CL	
NV	cm^3	ΔNV	%	3169	2757	2453	2368	11
RV	1	RV	1	N/A	N/A	0.027	0.026	1.0
X	mm	ΔX	%	164	156	158	160	6
Z	mm	ΔY	%	211	226	184	196	-1
h	mm	Δh	mm	11	N/A	8	N/A	-3
C	N/A	ΔC	%	0.011	0.011	0.011	0.011	5
S	mm^2	ΔS	mm^2	0	N/A	118	N/A	118
α	deg	Δα	%	127	125	125	124	0
M	mm	ΔM	%	118	128	113	125	2
β	deg	Δβ	deg	1	N/A	3	N/A	2
t	mm	Δt	1	5	N/A	8	N/A	1.6
P	%	ΔP	%	3	N/A	10	N/A	7

phantom002:

				FEATURES MEASURED				
				Baseline		Follow-up		BIOMARKER
Feature	units	Biomarker	units	IL	CL	IL	CL	
NV	cm^3	ΔNV	%	3169	2757	2401	2367.96	14
RV	1	RV	1	N/A	N/A	0.028	0.026	1.1
X	mm	ΔX	%	164	156	158	160	6
Z	mm	ΔY	%	211	226	184	197	0
h	mm	Δh	mm	11	N/A	6	N/A	-5
C	N/A	ΔC	%	0.011	0.011	0.011	0.011	7
S	mm^2	ΔS	mm^2	0	N/A	46	N/A	46
α	deg	Δα	%	127	125	125	124	0
M	mm	ΔM	%	118	128	113	125	2
β	deg	Δβ	deg	1	N/A	3	N/A	2
t	mm	Δt	1	5	N/A	8	N/A	1.6
P	%	ΔP	%	3	N/A	14	N/A	11