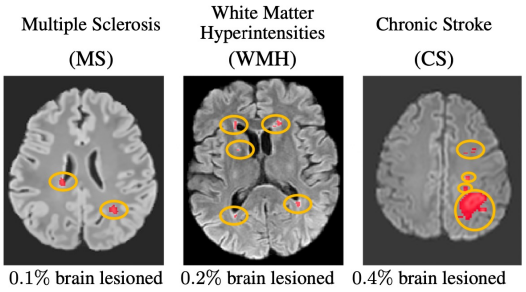
Using off-Target-Disease Data to Improve Target-Disease Lesion Segmentation

Jingpeng Li[1,2], Sheng He[1], Rina Bao[1], Atle Bjørnerud[2], P. Ellen Grant[1], Yangming Ou[1]

[1] Boston Children's Hospital [1] HARVARD MEDICAL SCHOOL [2] Oslo universitetssykehus

ISBI 2025 2025 IEEE International Symposium on Biomedical Imaging April 14-17, 2025 | Houston, TX, USA

Poster No. 1571091971

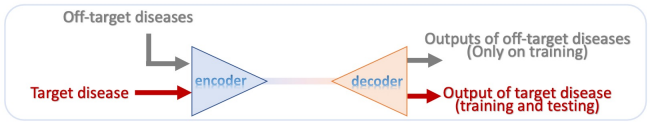


Disease	Dataset	# Samples		Avg.(%)	
		per-Dataset	per-Disease	in Dataset	in Disease
MS	MSSEG [4]	53	124	0.5%	0.6%
	MSLUB [5]	30		1.3%	
	JHU [6]	21		0.4%	
	BCHUNC [7]	20		0.2%	
WMH	NWMH [8]	60	90	1.2%	0.9%
	MRBrainS18 [9]	30		0.5%	
CS	ATLAS [10]	655	905	0.7%	0.7%
	ISLES22 [11]	250		1.0%	

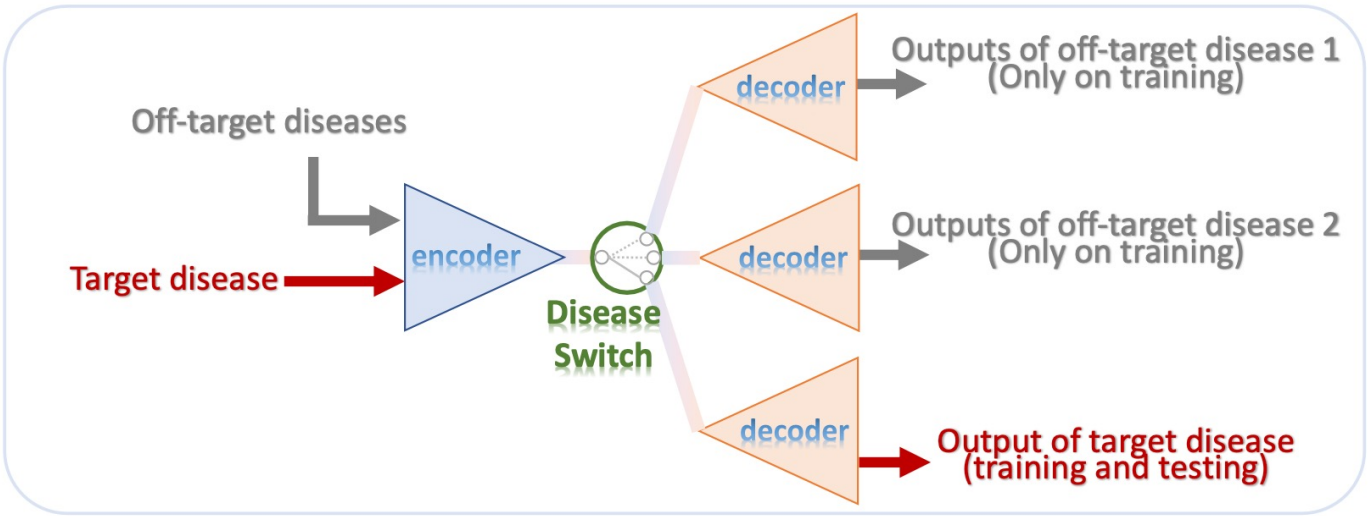
Problem: 1, small-diffuse lesion 2, small sample size

Question: Whether adding more training data from datasets with different diseases (off-target diseases) can help improve the accuracy on the target disease with a small sample size?

Solution: Disease-Switch training strategy



(a) Naïve training strategy



(b) Disease-Switch training strategy

Table 2. Comparison of accuracy (Dice) across different methods for three diseases.

Methods			MS	WHM	CS
Baselines	**Naïve training strategy**	dataset-specific	$0.696_{\pm 0.162}$	$0.714_{\pm 0.121}$	$0.595_{\pm 0.305}$
		within-target-disease	$0.693_{\pm 0.149}$	$0.708_{\pm 0.131}$	$0.575_{\pm 0.314}$
		plus-off-target-disease	$0.652_{\pm 0.186}$	$0.632_{\pm 0.159}$	$0.599_{\pm 0.305}$
The proposed	**Disease-Switch training strategy**		$\mathbf{0.711}_{\pm 0.173}$	$\mathbf{0.722}_{\pm 0.116}$	$\mathbf{0.604}_{\pm 0.300}$