# Abstract for the Annual Lung Cancer SPORE Workshop 2024 June 12-13, 2024, New Haven, CT

# Title: Significance of image acquisition parameters for Sybil’s ability to predict future lung cancer risk on low-dose chest computed tomography

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**Conflicts of interest:**

Regina Barzilay has Consulting or advisory roles at Dewpoint Therapeutics, J&J, Amgen, Outcomes4Me, Immunai, and Firmenich. Lecia Sequist has consulting or advisory roles with AstraZeneca, Janssen, Takeda and research funding from Novartis, AstraZeneca, and Delfi. She is leading a clinical demonstration project funded by Grail and Point32 Health. Florian Fintelmann reports research support from Pfizer and serving as a consultant and speaker for Boston Scientific. The other authors declare no relevant conflicts of interest.

# ABSTRACT

**Purpose**

Sybil is a validated open access deep learning-based algorithm that can accurately predict long-term lung cancer risk from a single low-dose chest computed tomography (LDCT). We aimed to study the effect of reconstruction filter and reconstruction thickness on Sybil’s performance.

**Methods and Materials**

We used LDCTs of the National Lung Screening Trial participants who were included in the test set for the development of Sybil (**Figure 1**). Series from the same LDCT examination were paired by matching kilovoltage peak, milliampere-seconds, and either reconstruction filter or reconstruction thickness, interval, and diameter. We considered any LDCT positive for future lung cancer if cancer was subsequently confirmed by needle biopsy or surgical resection. We compared the area under the curve (AUC) for each series pair using DeLong’s test.

**Results**

We were unable to detect a significant difference in Sybil’s performance between the 1,049 pairs of bone vs standard reconstruction filter (AUC at 1 year 0.73 [95%CI: 0.66-0.80] vs 0.72 [95%CI: 0.65-0.79]; p=0.87) and the 1,961 pairs of lung vs standard reconstruction filter (AUC at 1 year 0.80 [95%CI: 0.75-0.85] vs 0.81 [95%CI: 0.76-0.85]; p=0.77). Similarly, we were unable to detect a significant difference between the 1,288 pairs of 2 mm vs 5 mm reconstruction thickness (AUC at 1 year 0.72 [95%CI: 0.65-0.79] vs 0.70 [95%CI: 0.62-0.78]; p=0.75) and the 158 pairs of 1.25 mm vs 2.5 mm reconstruction thickness (AUC at 1 year 0.75 [95%CI: 0.58-0.93] vs 0.73 [95%CI: 0.52-0.94]; p=0.86).

**Conclusion**

We did not detect a difference in Sybil’s performance across different reconstruction filters and thicknesses, emphasizing the robustness of this tool for early lung cancer prediction across diverse clinical scenarios.

## Figure 1.

Study flowchart. NLST = National Lung Screening Trial.

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