

# Conformal Prediction and Monte Carlo Inference for Addressing Uncertainty in Cervical Cancer Screening Supplementary Material

Christopher Clark<sup>1</sup>, Scott Kinder<sup>1</sup>, Didem Egemen<sup>2</sup>, Brian Befano<sup>3</sup>, Kanan Desai<sup>2</sup>, Syed Rakin Ahmed<sup>4</sup>, Praveer Singh<sup>1</sup>, Ana Cecilia Rodriguez<sup>2</sup>, Jose Jeronimo<sup>2</sup>, Silvia De Sanjose<sup>5</sup>, Nicolas Wentzensen<sup>2</sup>, Mark Schiffman<sup>2</sup>, and Jayashree Kalpathy-Cramer<sup>1</sup>

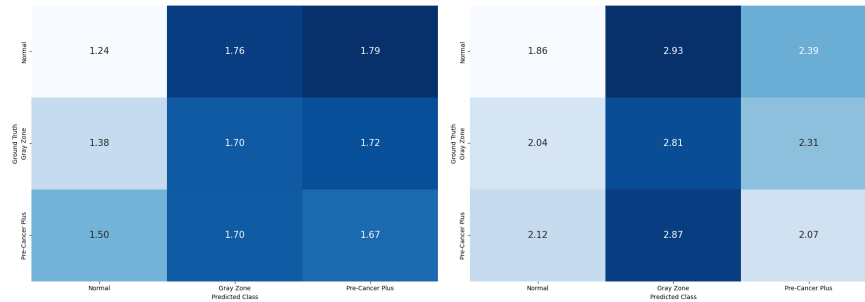
<sup>1</sup> University of Colorado School of Medicine, USA  
{christopher.w.clark, scott.kinder, praveer.singh,  
jayashree.kalpathy-cramer}@cuanschutz.edu

<sup>2</sup> National Cancer Institute, USA  
{didem.egemen, kanan.desai, rodriguezac2, jose.jeronimo, wentzenn,  
schiffmm}@nih.gov

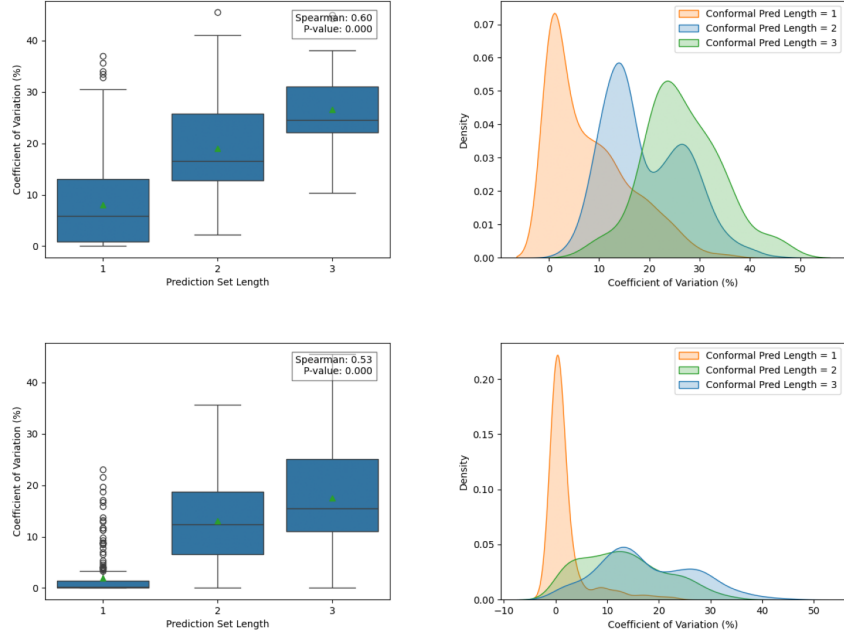
<sup>3</sup> Information Management Services, USA  
befanob@imsweb.com

<sup>4</sup> Harvard University, USA  
syedrakin\_ahmed@fas.harvard.edu

<sup>5</sup> Cancer Epidemiology Research Programme, Spain  
s.sanjose@iconcologia.net



**Fig. 1.** Confusion Matrix of Average Conformal Prediction Length for LAC with  $\alpha = 0.2$  (Left) and  $\alpha = 0.05$  (Right)



**Fig. 2.** Box-and-Whisker Plot of Conformal Prediction Length vs Coefficient of Variation and Distribution of Coefficient of Variation Color-Coded by Conformal Prediction Set Length for LAC  $\alpha = 0.2$  (Top) and  $\alpha = 0.05$  (Bottom)

**Table 1.** T-Test for Average Conformal Prediction Lengths  $\mu_{PL}$  by APS with  $\alpha = 0.1$  in the Two-Class Model (95% Confidence). \* indicates  $p < 0.05$ .

| $\mu_{PL,1}$ vs $\mu_{PL,2}$ | APS                                | $p$  |
|------------------------------|------------------------------------|------|
| GZ vs Overall Inc GZ         | $1.98 \pm 0.02$ vs $1.95 \pm 0.01$ | *    |
| GZ vs Overall Exc GZ         | $1.98 \pm 0.02$ vs $1.94 \pm 0.02$ | *    |
| GZ vs Normal                 | $1.98 \pm 0.02$ vs $1.94 \pm 0.02$ | *    |
| GZ vs PC+                    | $1.98 \pm 0.02$ vs $1.96 \pm 0.03$ | 0.33 |