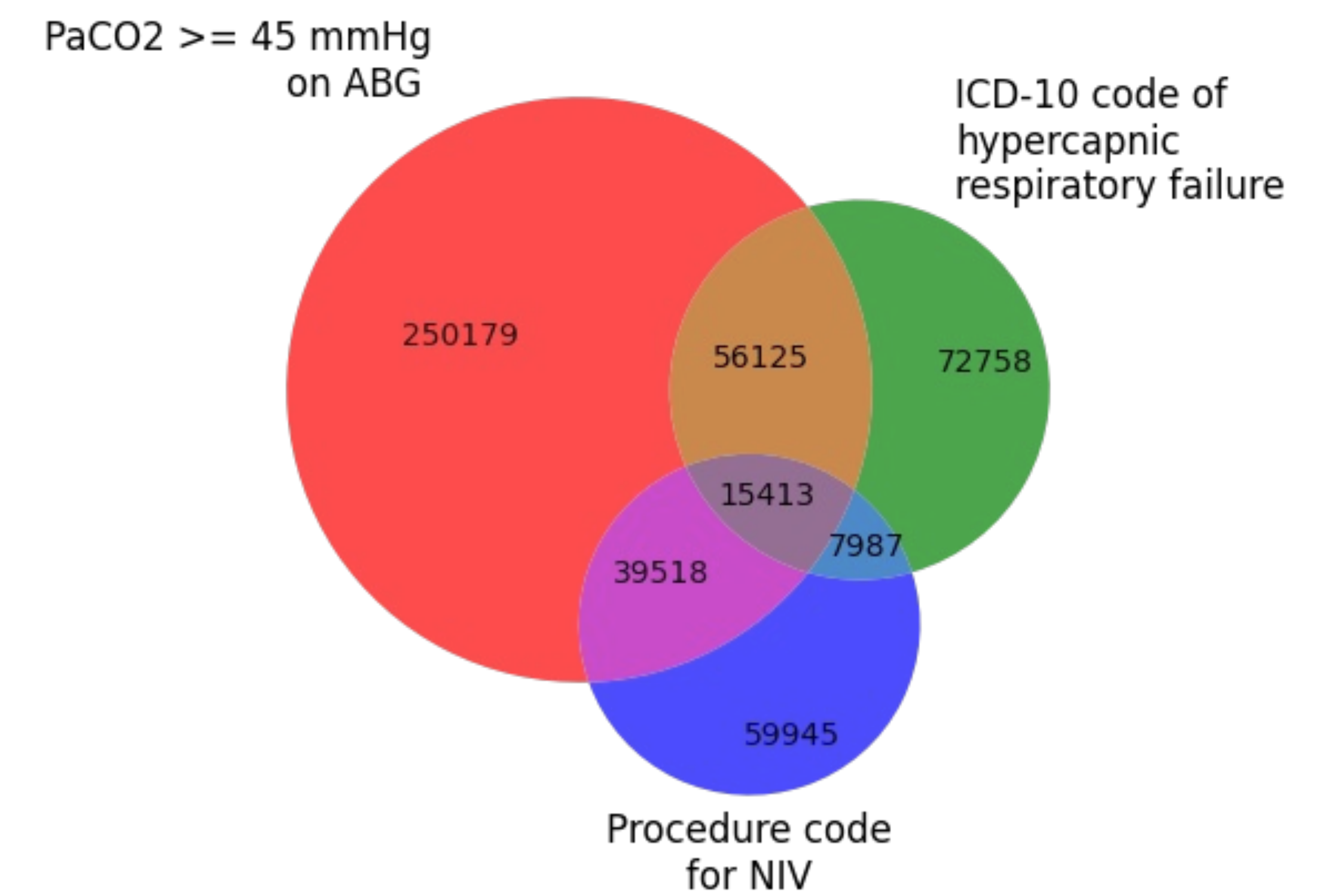PRESENTER:
Brian W Locke, MD

Wayne Richards BS
Jeanette Brown MD PhD
Ram Gouripeddi MBBS MS
Krishna Sundar MD

WHY? The gold-standard test (ABG showing PaCO2 > 45 mmHg) is unreliably obtained.

WHAT HAS BEEN DONE?
- Prevalence ~= PE (150 per 100k/y)
- Readmission ≥ CHF (23%, 30d)
- Mortality ~= Cancer (~40% 1yr)
.
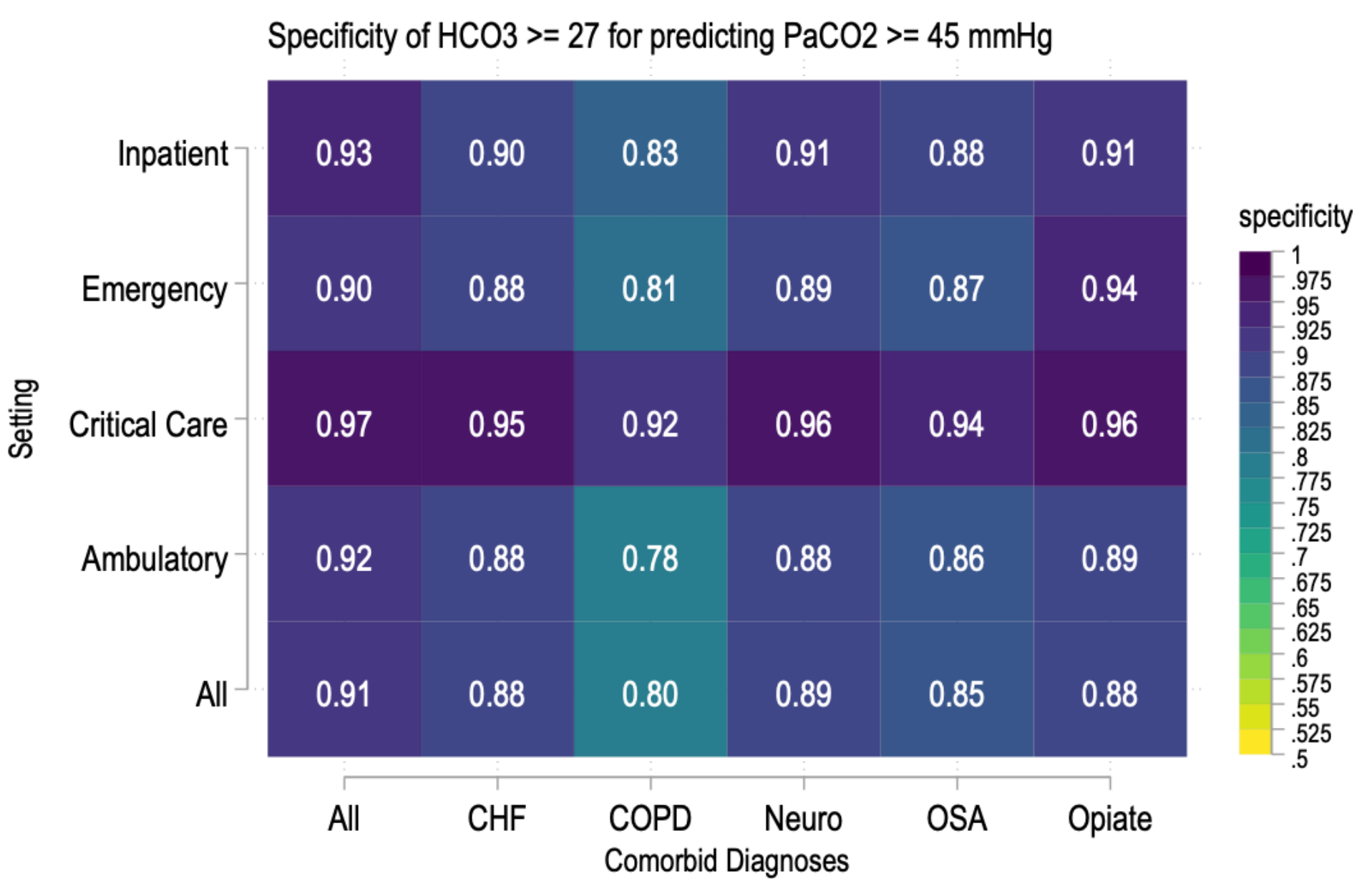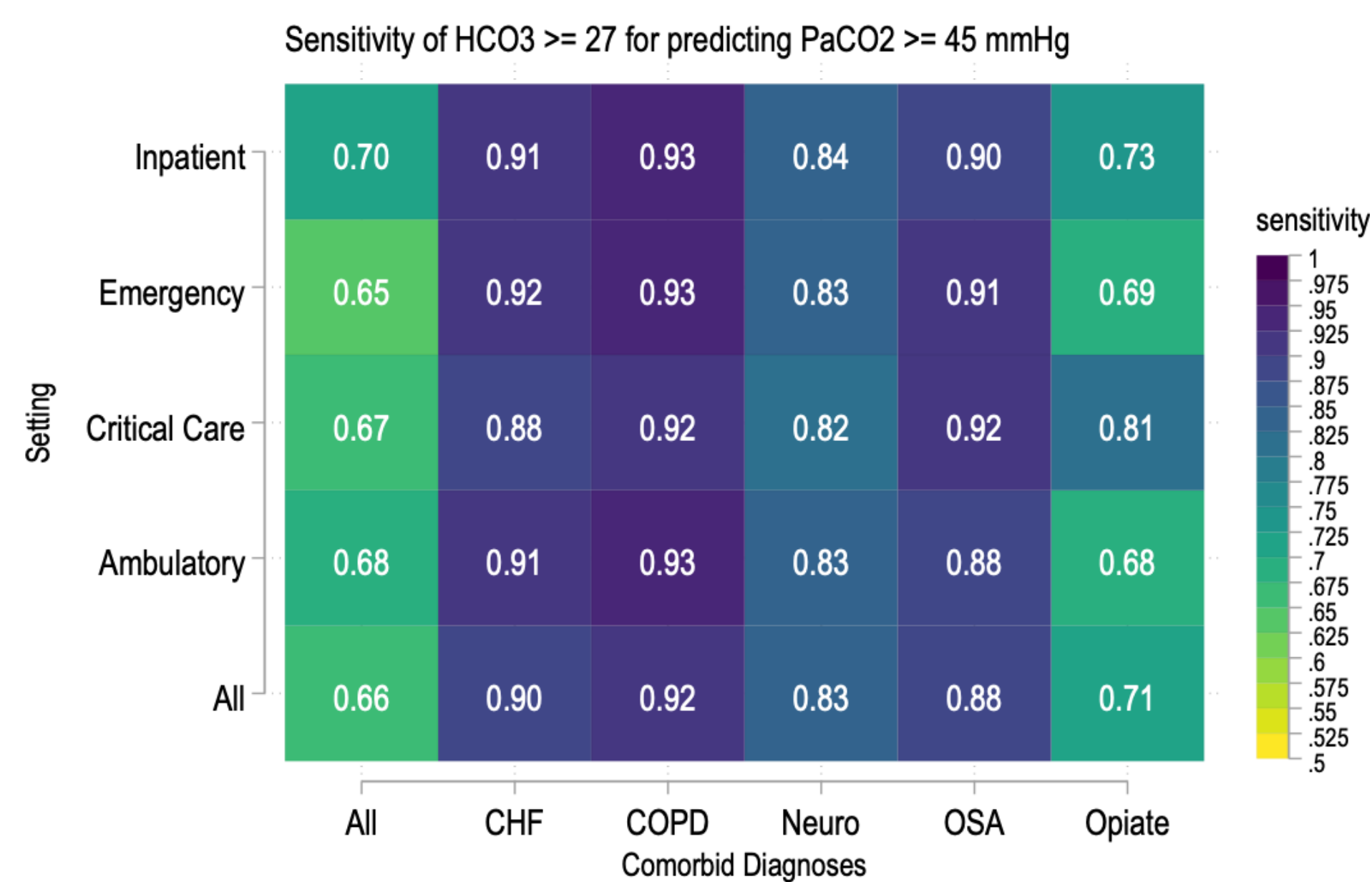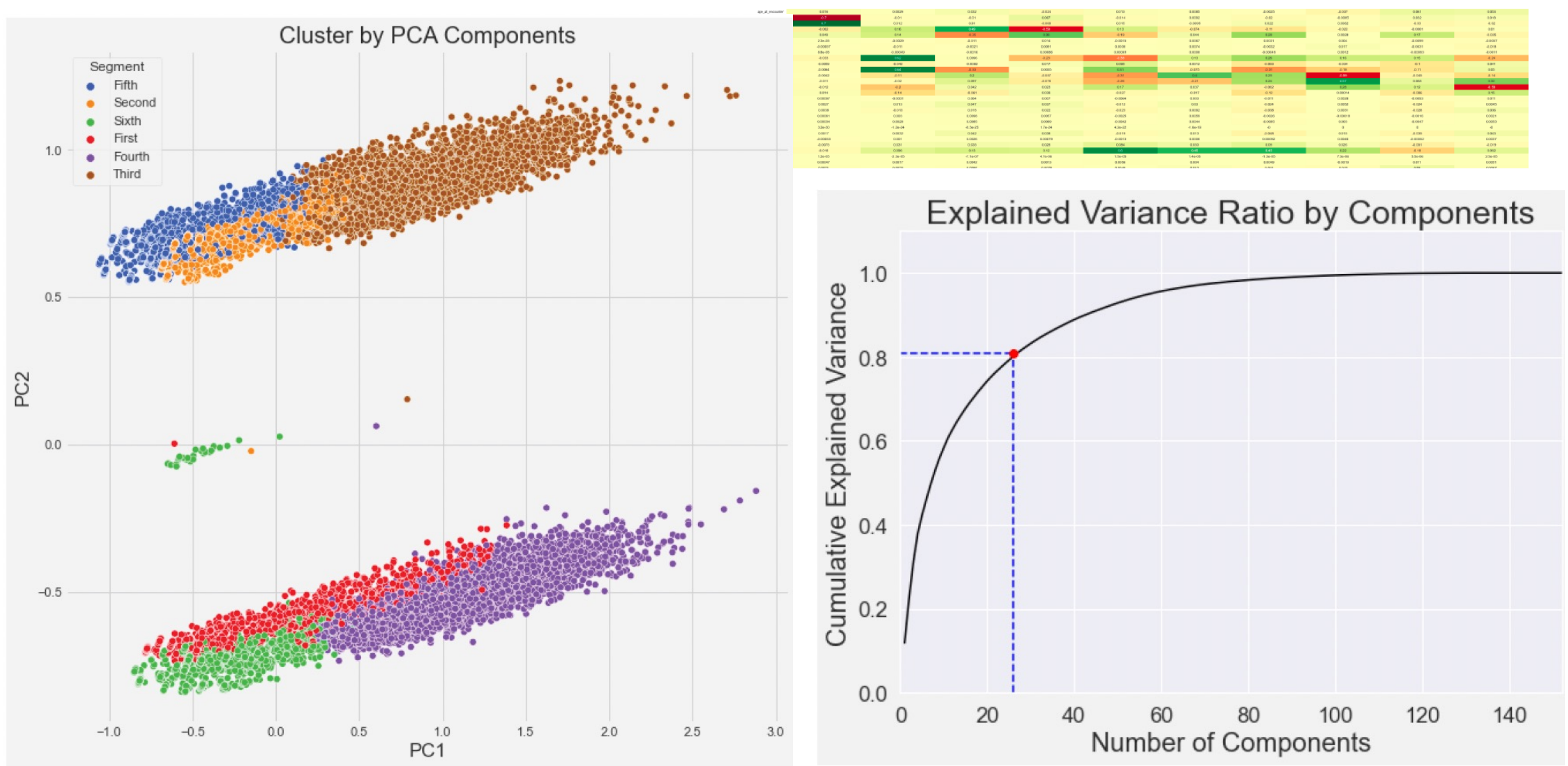Yet, methods of identification select **very different** patients.

The causes, prevalence, and consequences of <u>hypercapnic respiratory failure</u> are not well described. EHR data could help.

METHODS:

TriNetX

- 925,512 patients
- 70 Healthcare organizations since 2017.
- 20 gigabytes of data (billions of data points)

PaCO2 >= 45 mmHg on ABG

	ABG Group	ICD Group	NIV Group
Age	62±18	**65±16**	62±17
% Female	46%	**51%**	42%
% white	66%	**71%**	65%
% Black	18%	19%	17%
BMI	30.4±8.3	**33.1±10.3**	29.1±8.2
% with CHF	37%	30%	**19%**
% with COPD	31%	30%	**14%**
% Opiate UD	**6%**	3%	3%
% Sleep Apnea	23%	24%	**10%**

HOW CAN WE BETTER IDENTIFY PATIENTS WITH HYPERCAPNIA?

1. Validate Traditional Data-Points

Sensitivity of HCO3 >= 27 for predicting PaCO2 >= 45 mmHg

Specificity of HCO3 >= 27 for predicting PaCO2 >= 45 mmHg
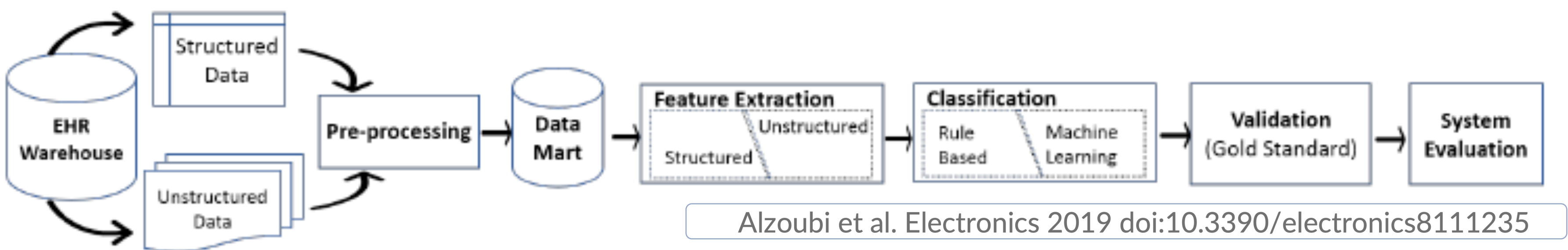

2. Principal Component Analysis

3. Propose and Evaluate Computable Phenotype(s)
Disorganized processes of care

Alzoubi et al. Electronics 2019 doi:10.3390/electronics8111235

COMPUTABLE PHENOTYPE:
(operational case definition)
- Efficacy trial: homogeneity, severity important
- Epi; QI: sensitivity, representativeness

WHY IS THIS WORTH DOING?
- Obesity, Opiates, Multimorbidity ↑
- Common component causes? Unknown
- Evidence: RCTs only of select subsets
- Post-acute management?
- Disorganized processes of care

Evidence needed to improve