

# Bleeding Rates and Risk Factors among Cancer and Non-Cancer Patients: A Comparison of Several Anticoagulants

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I have no relevant disclosures



# Background

- Bleeding complications are common in cancer patients
- Treatment with anticoagulation exacerbates bleeding risk in cancer patients
- LMWH has been the standard treatment for cancer-associated VTE, however the use of DOACs is increasing with more available data
- Hokusai and Select-D pilot trial compared DOACs with LMWH and reported treatment with DOACs led to fewer VTE recurrence rates with a cost of more bleeding complications
- Further data is needed to define specific risk factors for bleeding in this new era

# Study Aims

- Evaluate the rate of bleeding with commonly used anticoagulants in patients with cancer compared to those without cancer
- Identify risk factors for bleeding events in our study population

# Methods

- Data were obtained from Explorys (IBM Watson, Inc.), a validated dataset pooled from multiple United States health systems

- The data

- Data system

The screenshot displays the 'Power Search' interface. At the top, there is a section for 'Explore:' with a dropdown menu set to 'Universe' and a 'Power Search Name:' field containing 'My power search'. Below this is a 'Power Search Definition' tab. The main area is titled 'Cohort Definition' and is divided into two columns. The left column is 'Initial Patient Population Attributes' and contains an 'Add a group' link. The right column is 'Pre-existing Condition Exclusion Attributes' and contains an 'Add pre-existing condition exclusion group' link, 'Temporal Attributes', and another 'Add a group' link. At the bottom of the 'Cohort Definition' section are three buttons: 'Save Definition', 'Save and Execute', and 'Clear'. A small blue icon is visible in the bottom right corner of the 'Cohort Definition' area.

# Methods

- Risk factors analyzed for increased bleeding rates included:
  - Cancer type
  - Metastatic disease
  - Obesity (BMI  $\geq 40$ )
  - Chronic kidney disease stage III or higher
  - Thrombocytopenia



# Methods

- Cancer was defined as “malignant neoplastic disease”
  - Excluded squamous cell and basal cell carcinoma of the skin
- Included patients  $\geq 18$  years old

Risk Category	Cancer Type
Very high risk	Stomach Pancreas
High risk	Lung Lymphoma GYN Genitourinary (excluding prostate)
Low risk	Breast Colorectal Head and neck

# Methods

- Bleeding Definition:
  - Gastrointestinal ulcer with hemorrhage +/- perforation
  - Gastrointestinal hemorrhage/bleeding/hematemesis
  - Non traumatic hemoperitoneum/hemopericardium
  - Subarachnoid hemorrhage/intracranial hemorrhage
  - Bleeding of unknown origin
  - Hemarthrosis
  - Frank hematuria
  - Acute post hemorrhagic anemia
  - Hemoptysis



# Results

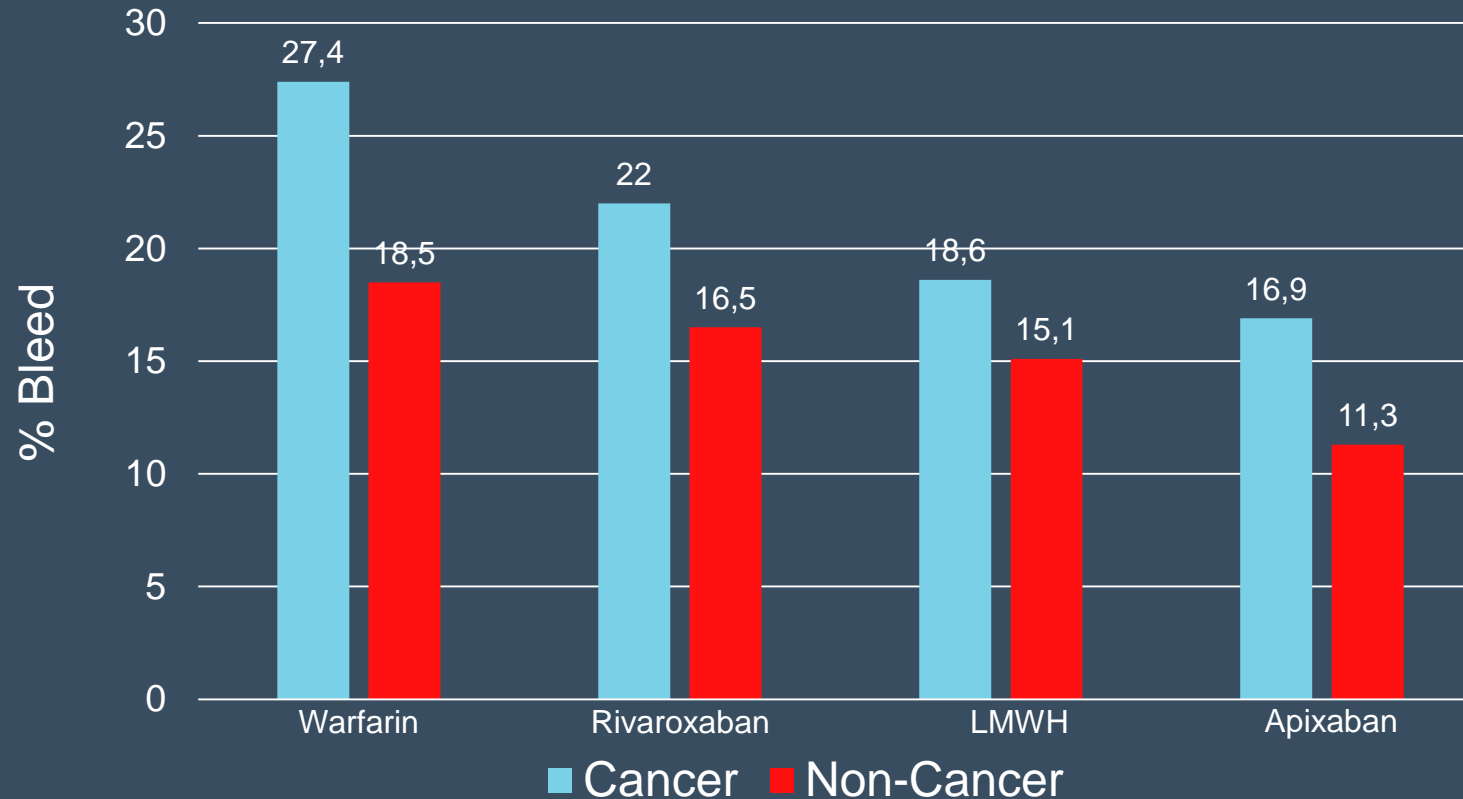
- Rolling database of >3 million adult cancer patients

Demographic	Study Population
Age >65	58%
Age 18-65	40%
Caucasian	79%
African American	8%
Asian	2%
Female	54%
Metastatic Disease	12%

Type of Cancer	Study Population
Genitourinary (includes prostate)	21.3%
Breast	14.0%
Gastrointestinal	10.9%
Lymphoid/Hematopoietic	10.8%
Respiratory Tract	8.2%
Head and Neck	4.3%
Melanoma	4.3%
Pancreas	1.5%
Primary Brain	1.2%

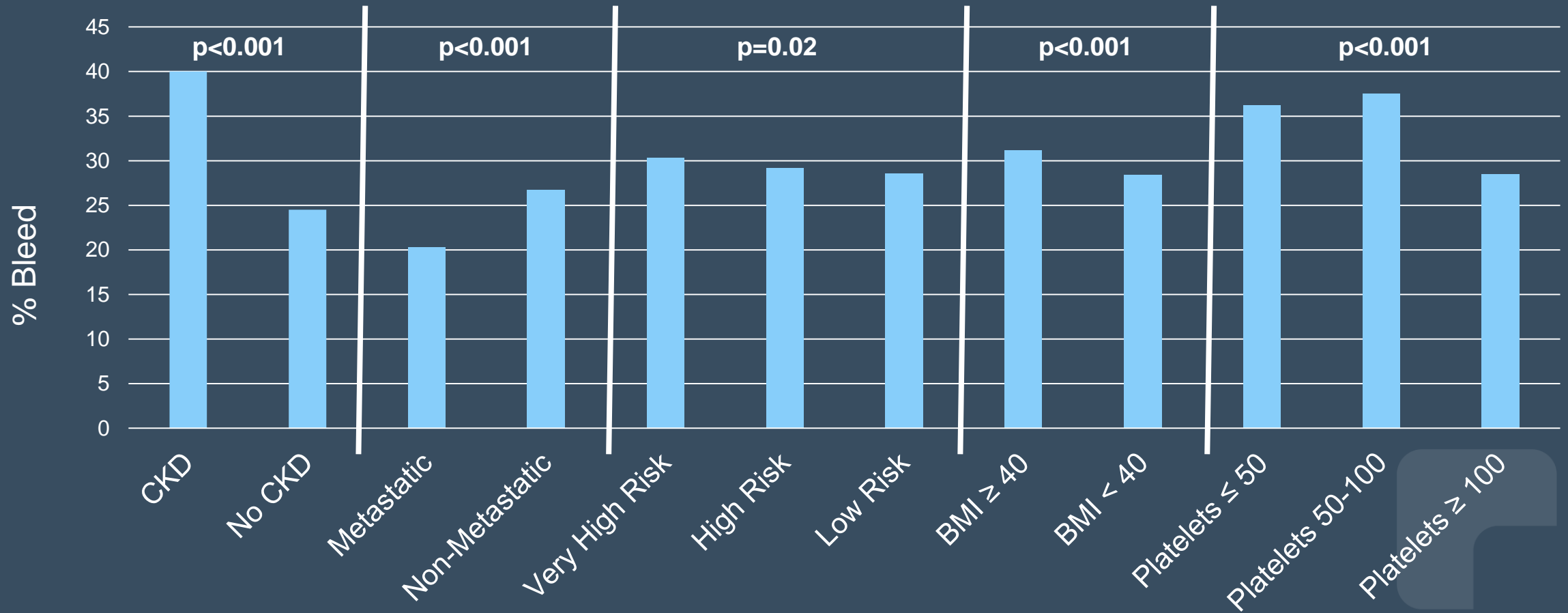
# Results

Bleeding rate was higher in cancer patients vs. non-cancer patients

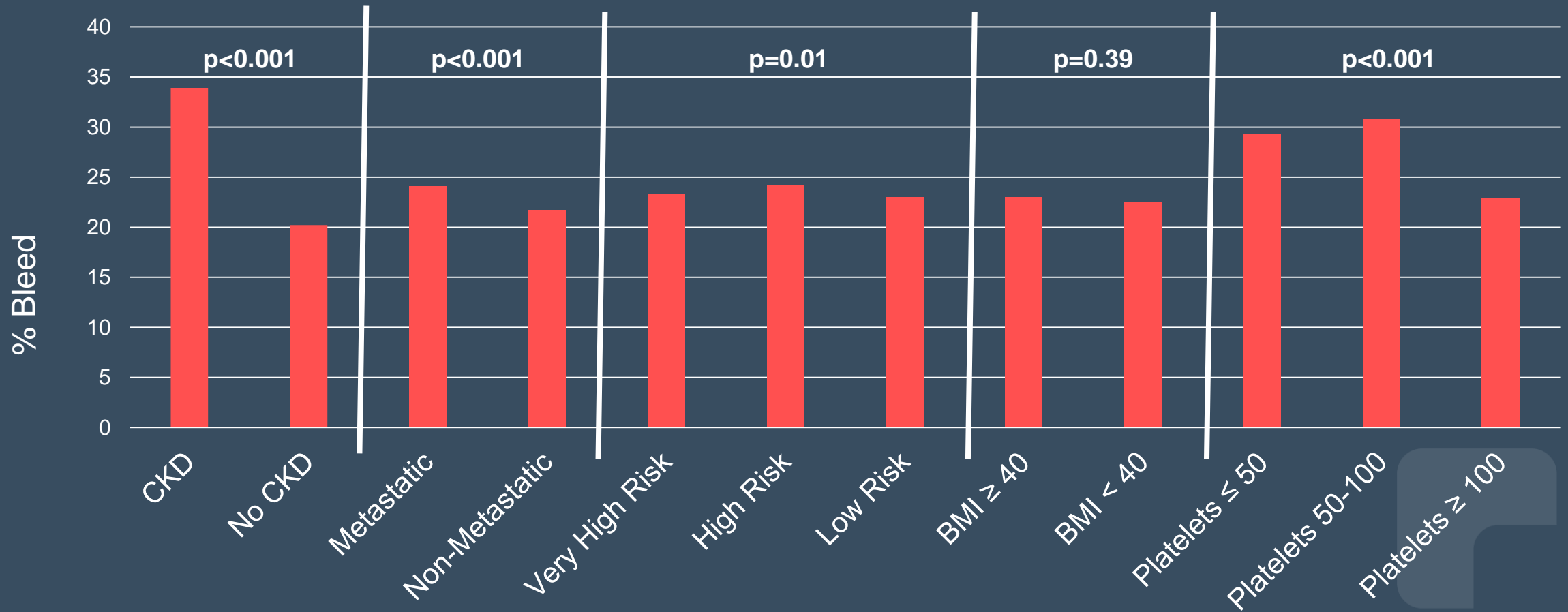


$p < 0.001$  for all comparisons

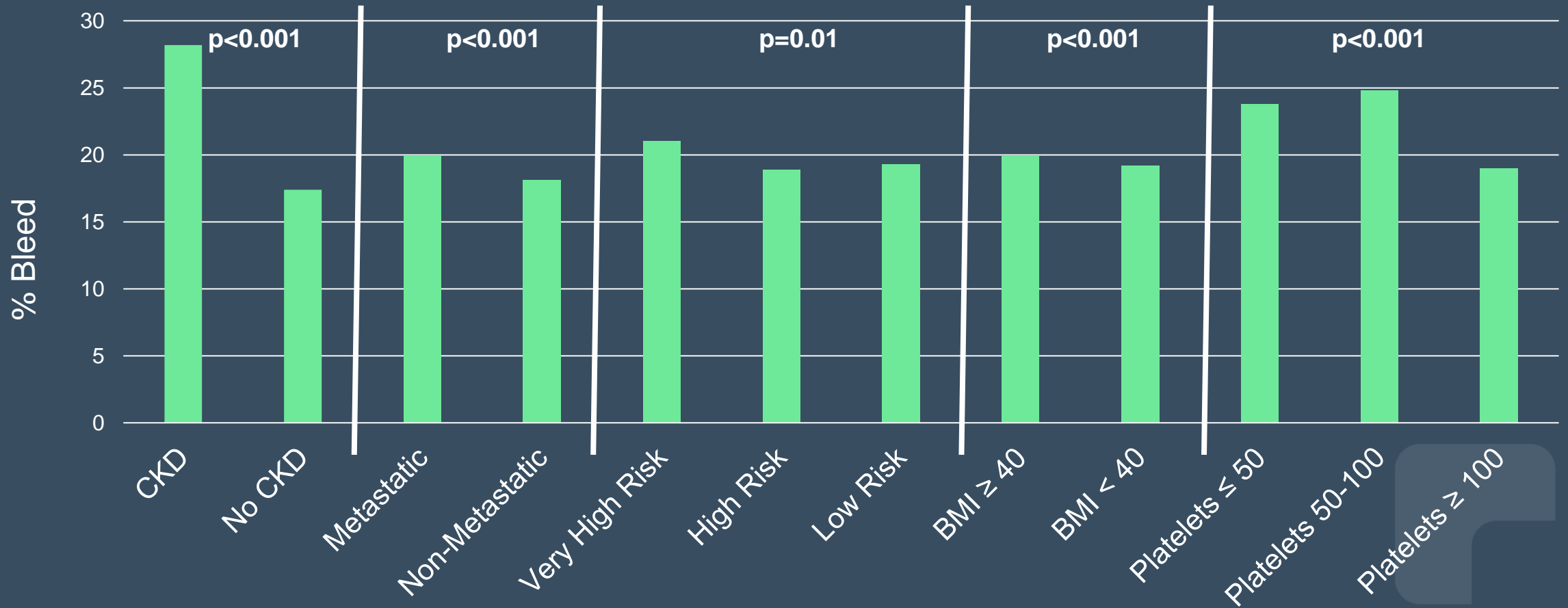
# Risk Factors for Bleeding: Warfarin



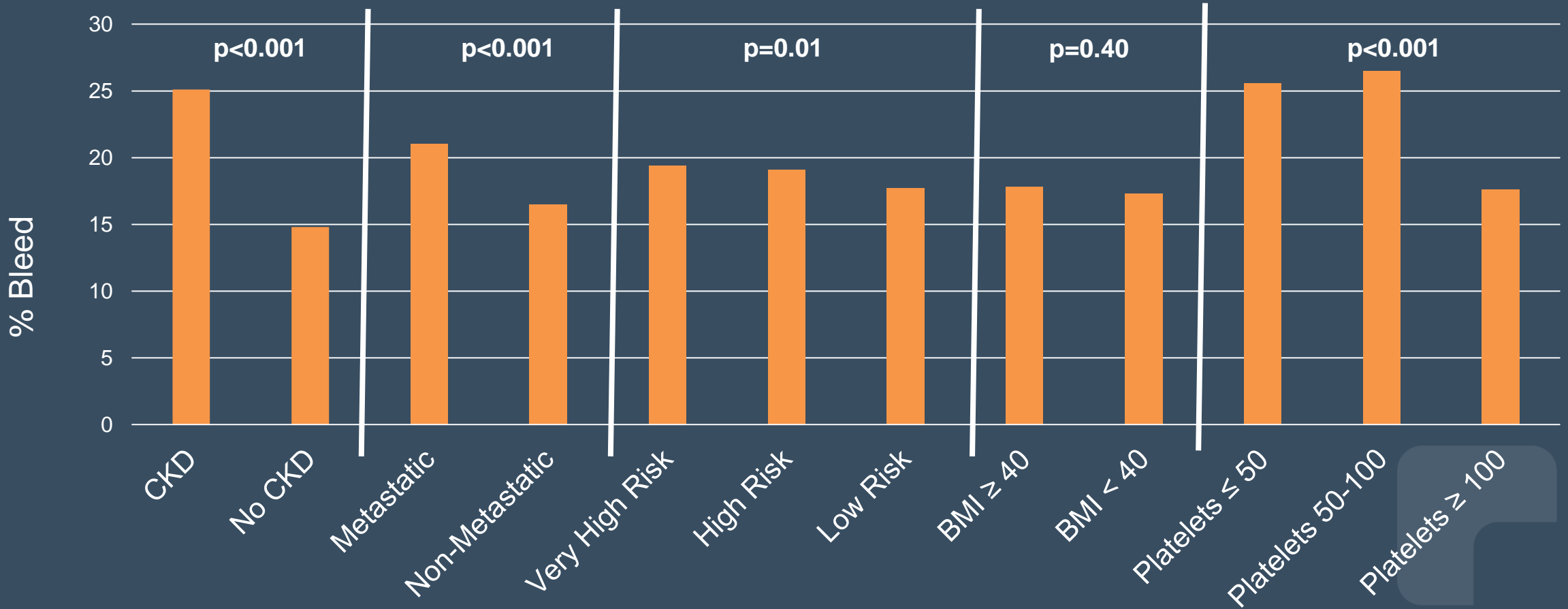
# Risk Factors for Bleeding: Rivaroxaban



# Risk Factors for Bleeding: LMWH



# Risk Factors for Bleeding: Apixaban



# Strengths/Limitations

- Strengths:
  - Explorys (IBM, Watson) provides a very large database with granular detail
  - Able to design specific patient cohorts to compare to one another
- Limitations
  - Given the de-identified nature of the database, we are unable to verify individual patient data
  - Limited to searchable terms of the database
  - Did not separate out different doses of anticoagulation
  - Uses for anticoagulation other than VTE were captured in this analysis
  - Unable to perform multivariate analysis of bleeding risk factors
  - Possible selection bias

# Summary

- Among the cancer patient cohort, we found CKD III or higher was associated with an increased risk of bleeding regardless of anticoagulant used
- Apart from warfarin, the presence of metastatic disease associated with increased bleeding risk
- Tumor type did not correlate with risk of bleeding
- Thrombocytopenia also correlated with risk of bleeding



# Conclusions

- Cancer patients bled more than non-cancer patients when treated with anticoagulants
- In cancer patients, risk factors for bleeding included platelet count  $<100K$ , CKD III or higher, and metastatic disease (except on warfarin)
- These data help close the knowledge gap of bleeding events in cancer patients and also highlight the need for antithrombotic strategies that do not increase bleeding potential

# Thank You

