Association between diabetes and adverse surgery outcome among lumbar patients

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Association between Diabetes/HbA1c and Surgical Outcomes

- More than 20% of patients undergoing spinal surgery have diabetes.
- Diabetes is found to be associated with poor postoperative outcomes:
  - Infection
  - Perioperative complications
  - Longer length of stay (LOS)
  - 30-day readmission
- HbA1c test is a common blood test used to diagnose diabetes and to monitor the condition of diabetes. Higher preoperative HbA1c found among patients who had surgical site infection.

Reference:
O'Sullivan et al., 2006; Browne, et al., 2007; Lamloum et al., 2009; Pull ter Gunne and Cohen, 2009; Golinvaux, et al., 2014; Guzman et al. 2014; Hikata et al., 2014; Yong et al., 2018. Ali et al., 2018

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However……

- Not all Americans know they have diabetes.
- The association between HbA1c and postoperative surgical outcomes is still unclear among patients with spine surgery.

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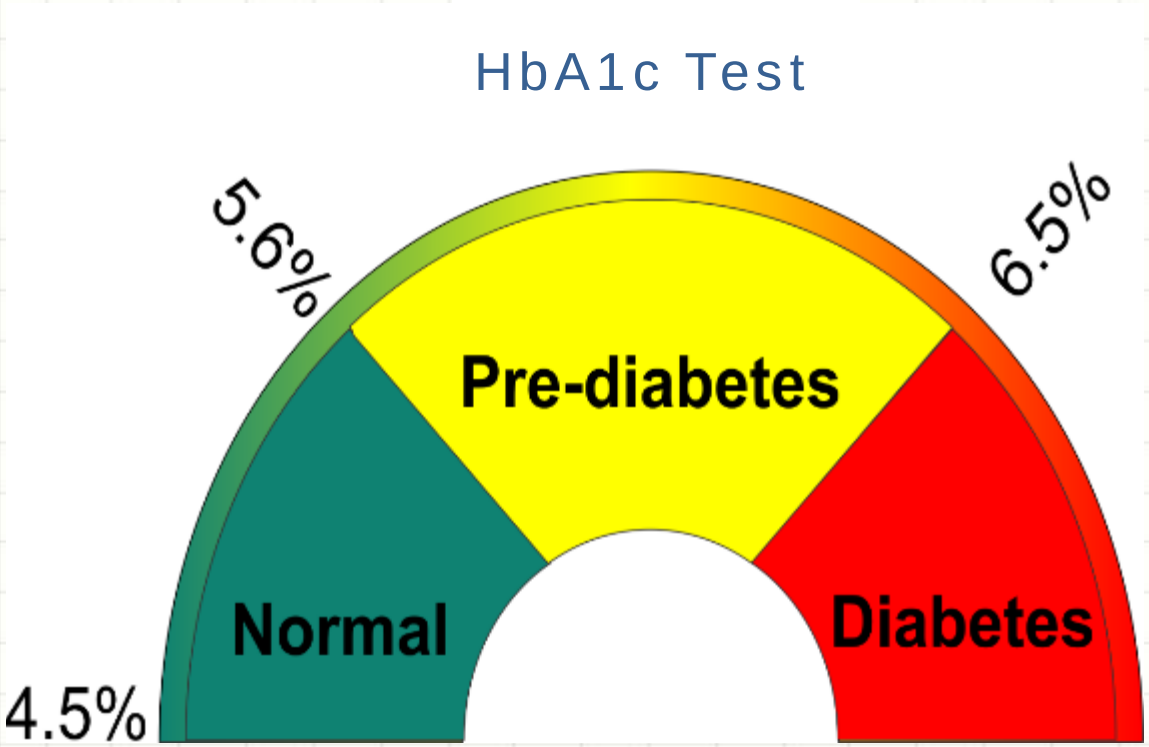
Diagnosis of Diabetes

One third of diabetes in the US is undiagnosed



Reference:
Cowie CC, Rust KF, Byrd-Holt DD, et al. Prevalence of diabetes and high risk for diabetes using A1C criteria in the U.S. population in 1988–2006. Diabetes Care 2010;33:562–568

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Recommendation of the threshold for HbA1c

- Han and Kang reported that a preoperative HbA1c level greater than 8% was an independent risk factor for wound complications in patients with diabetes undergoing total knee arthroplasty (Han & Kang, 2013).
- The increase in HbA1c is associated with the increased risk of complications and surgical infection. An HbA1c level of 8% could serve as a threshold for a markedly increased risk of infection among patients who underwent primary shoulder arthroplasty (Cancienne et al., 2018).
- Ali et al. proposed that patients with known diabetes and HbA1c > 8% should undergo specialty consultation with an endocrinologist prior to spinal surgery following by ERAS protocol (Ali et al., 2018).

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Diabetes has been shown to be associated with postoperative adverse outcomes. However, the association between HbA1c and postoperative outcomes is unclear among patients with spine surgery.

This study aims to investigate the association between HbA1c and surgical outcomes among lumbar patients includes:

- **SSI**
- **SSH**
- **Readmission within 30 days**
- **Readmission within 90 days**
- **Return to OR**
- **Any complication**
- **Length of stay**
- **Urinary Retention**

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Statistical Methods

- **Logistic regression models were used in the analysis**
- **All multivariate models were adjusted for:**

  Age, Gender, BMI, Race, Education, Depression, Smoking status, Fusion, and Surgical levels.

- **Analyses are also ran on two cohorts separately:**

  All patients & Diabetic patients

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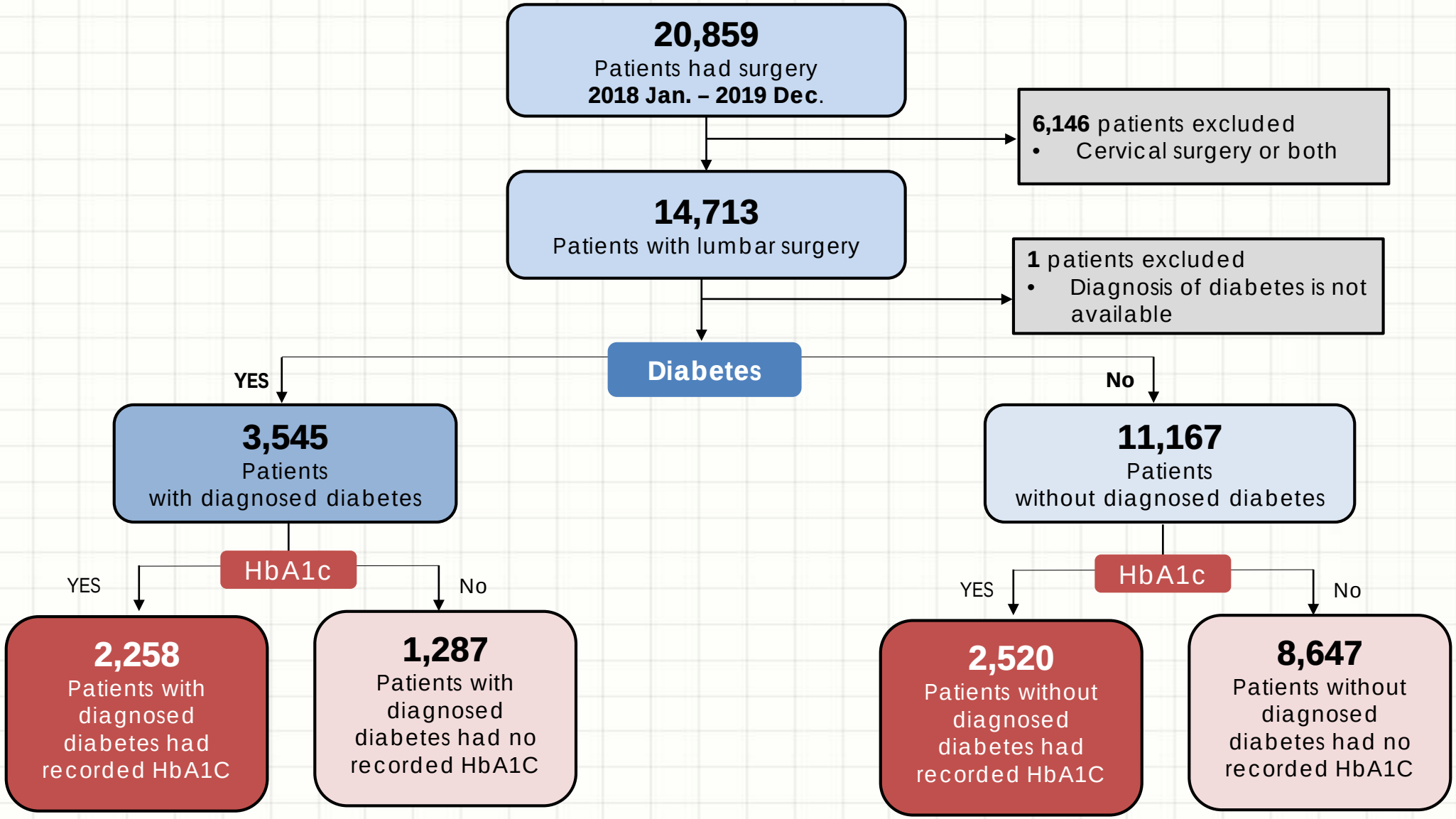
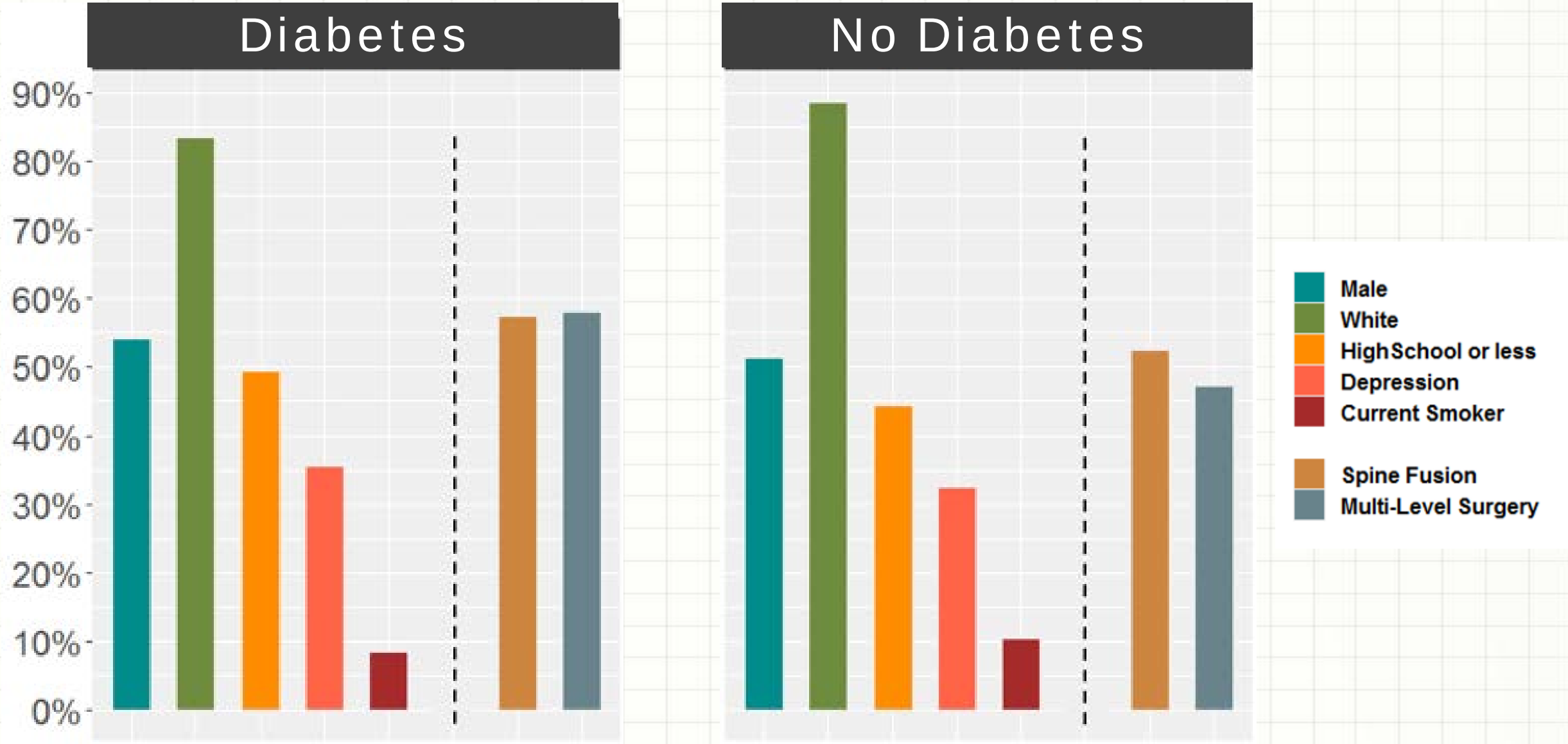
Flow Chart of Study Sample

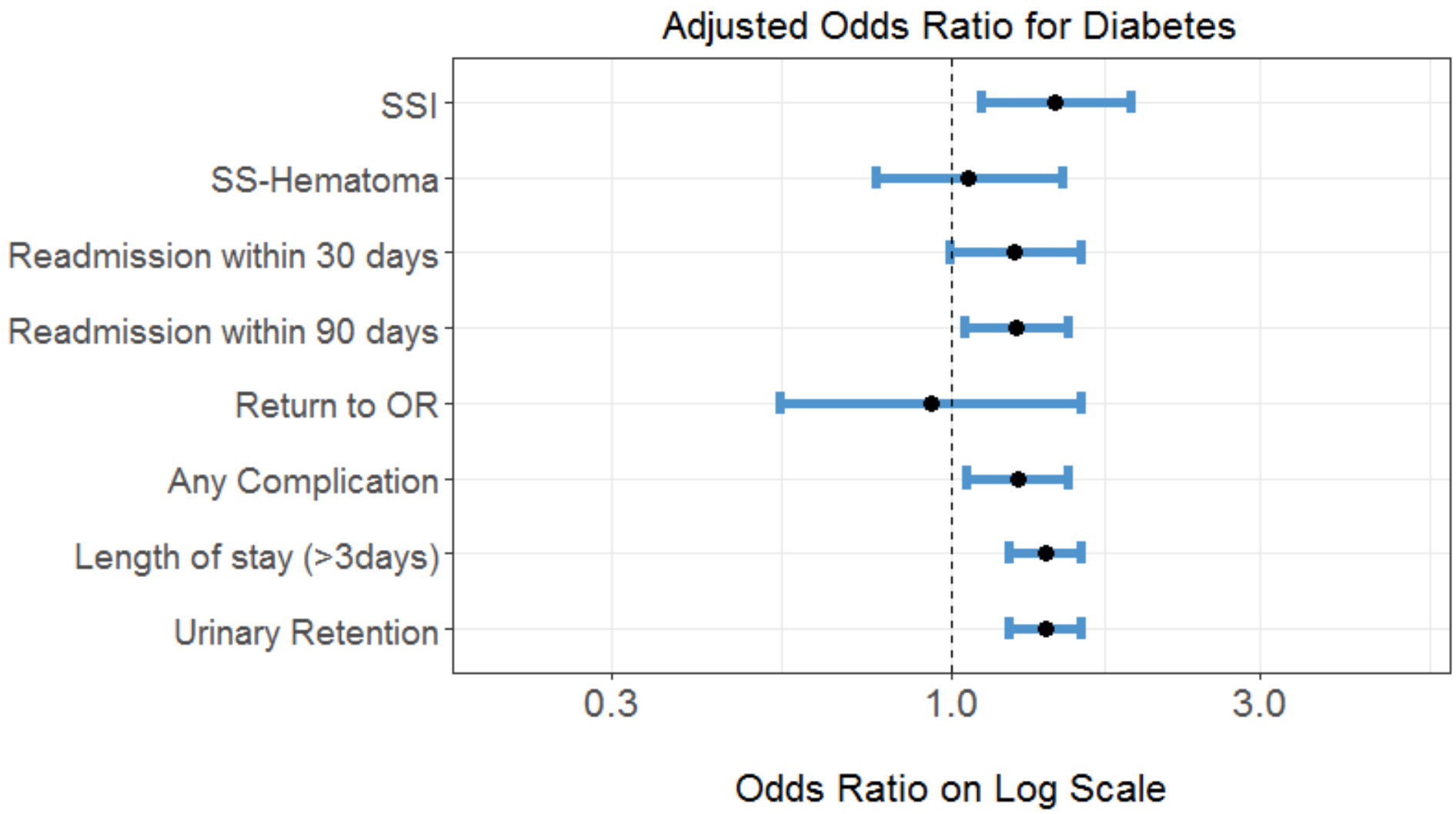
Inclusion and Exclusion criteria



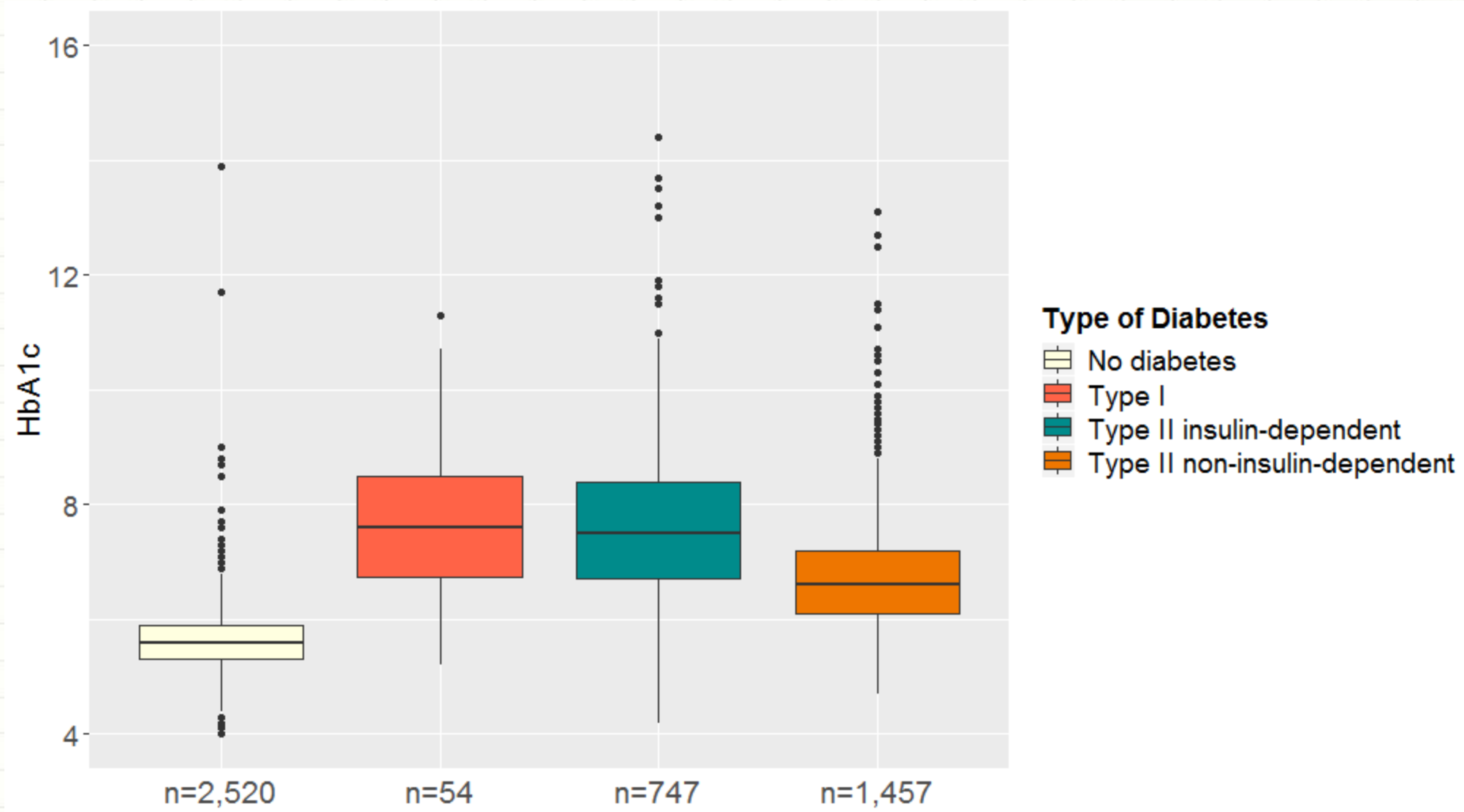
Comorbidity and Surgery Type among Lumbar Patients after Jan. 2018 (n=14,713)



Patients had lumbar surgery since 2018 (n=14,713)



Difference in HbA1c Among Patients With and Without Diagnosed Diabetes



HbA1c in Diabetic Patients

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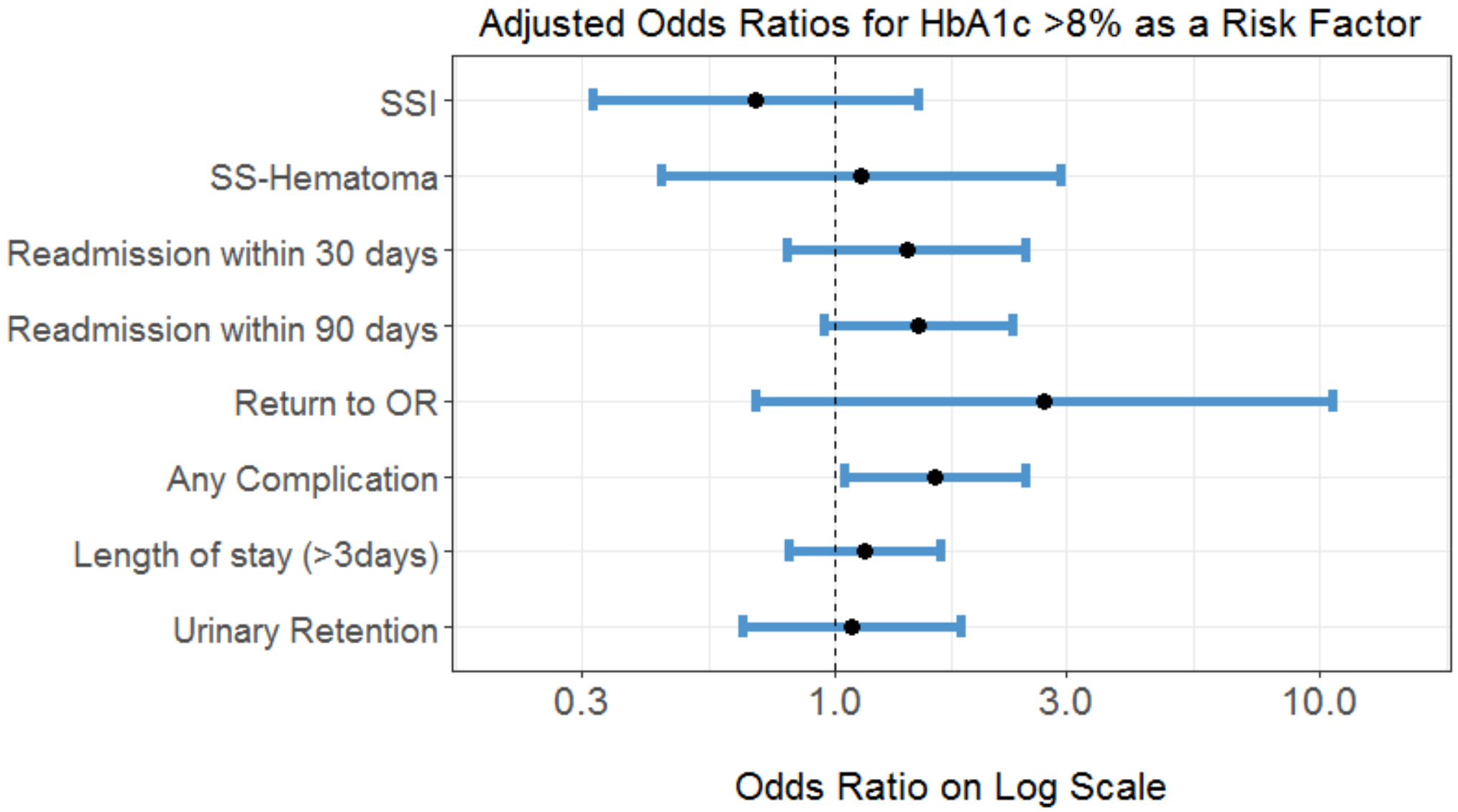
Diabetic patients with HbA1c available (n= 2,258)

Multivariate Analysis



HbA1c in All Patients

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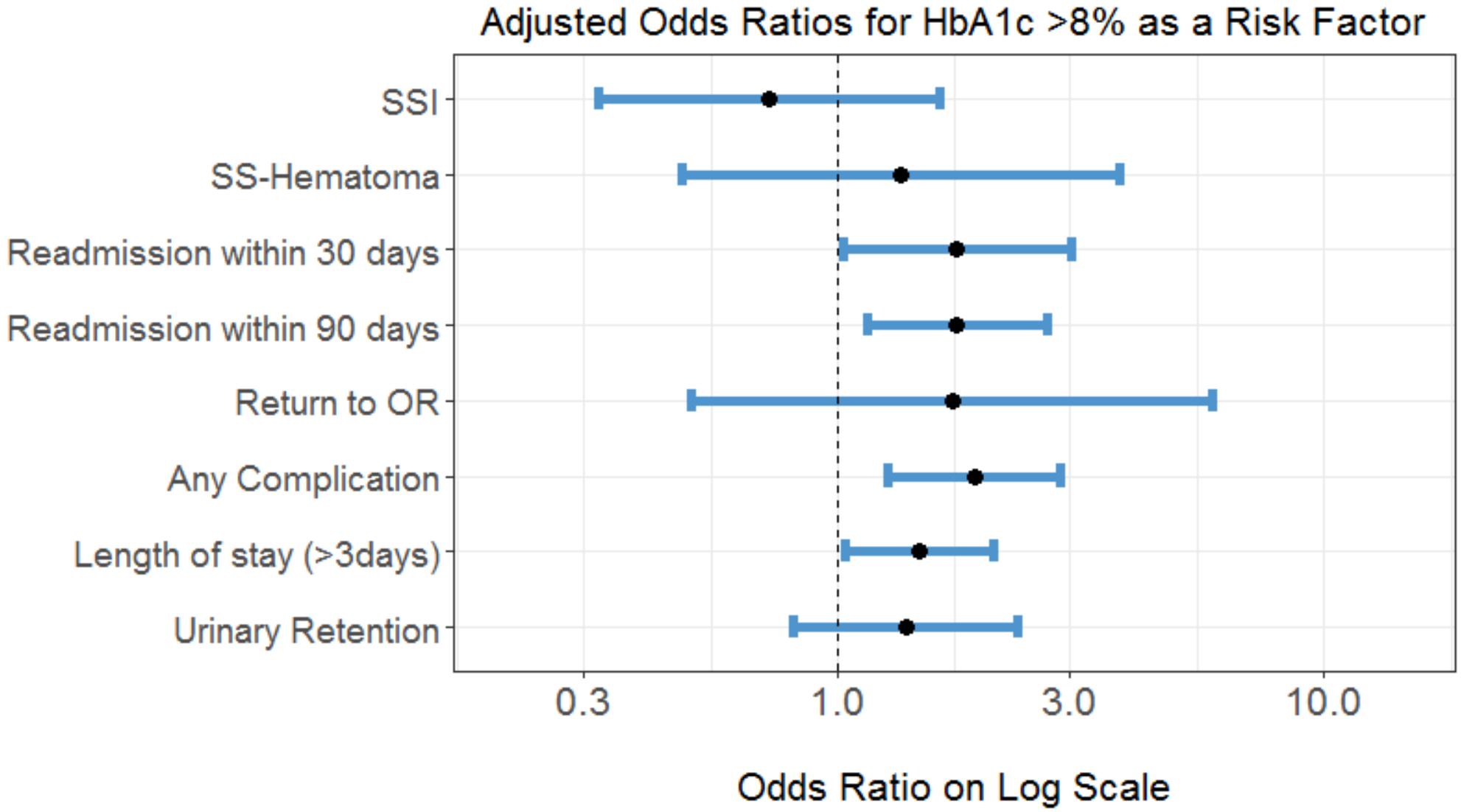
All patients with HbA1c available (n= 4,778)

(including diabetic and non-diabetic patients)

Multivariate Analysis



Availability of HbA1c by Site

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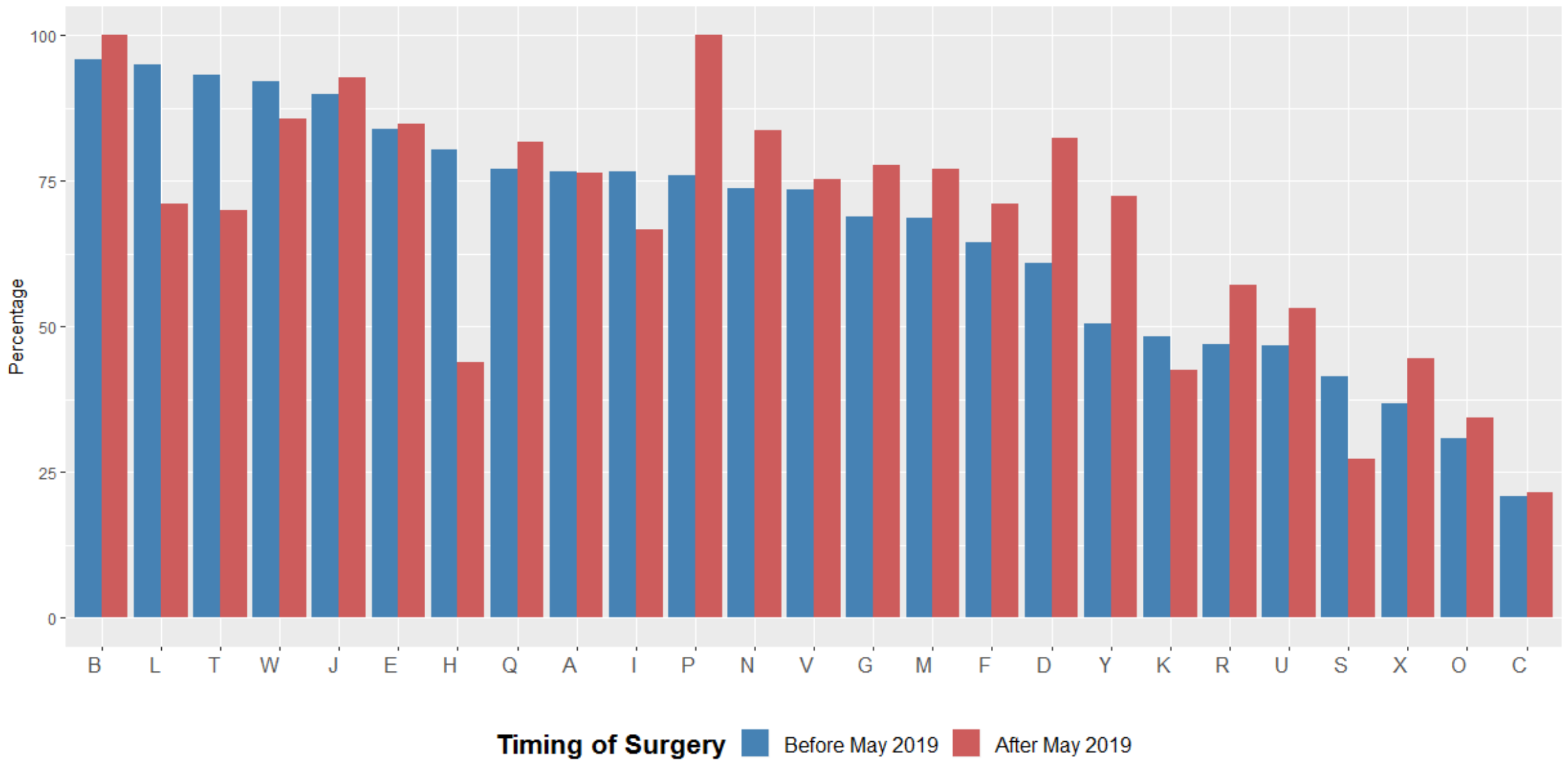
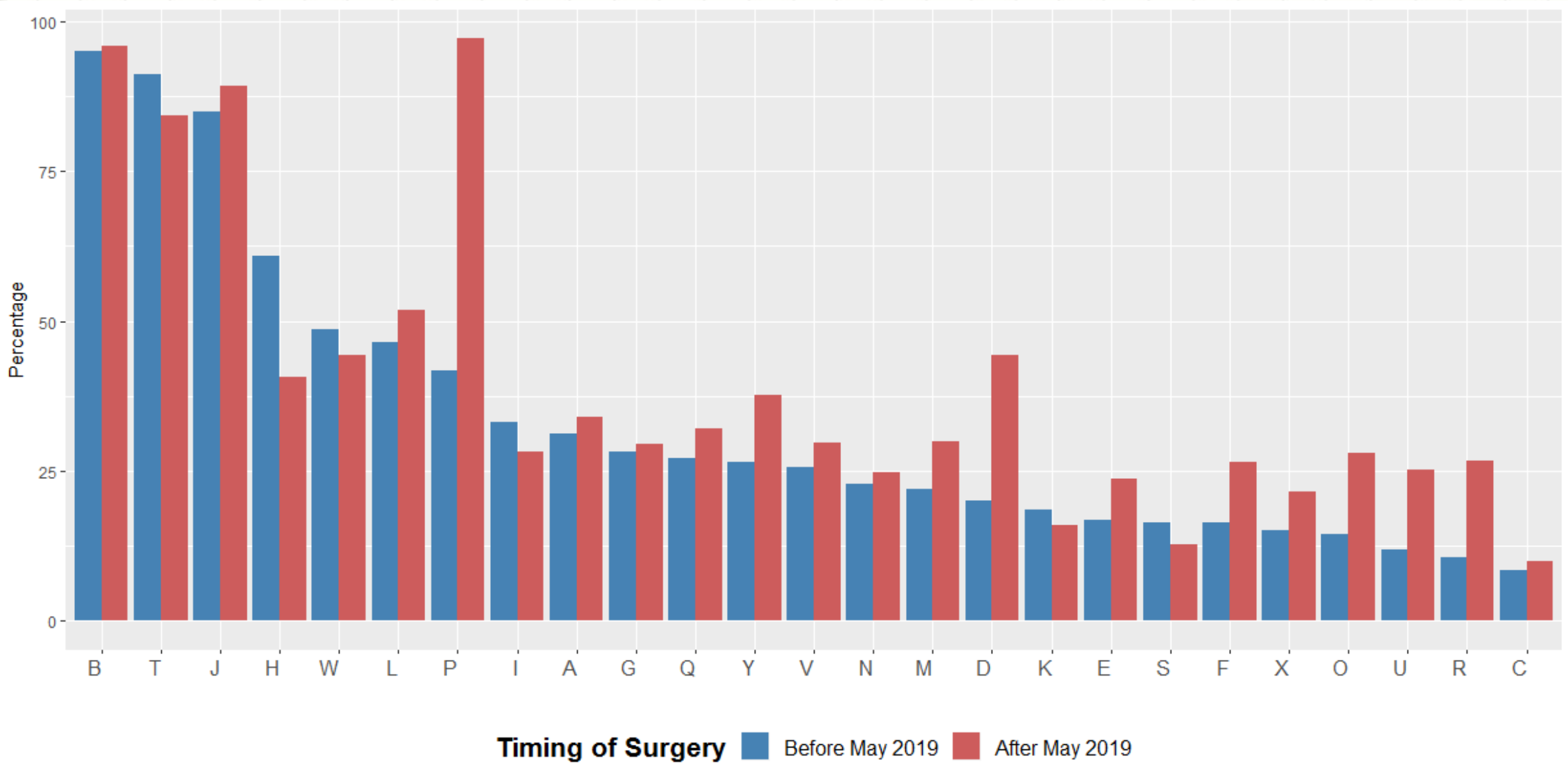
Availability of HbA1c by Site
(Among Diabetic patients after Jan. 2018)



Availability of HbA1c by Site
(Among All patients after Jan. 2018)



Discussions

- Diabetes is a risk for bad outcomes
- HbA1c > 8 is significantly correlated with having any complication, readmission, and increased length of stay
- Proper glycemic control may be an avenue to decrease the risk of adverse outcomes with diabetes

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Questions?

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