The total 4413 HbA1c data points were pulled on patient level (results from Jan1 2019 to Jun 1 2020). We pulled out the HbA1C data which was the closet to the positive diagnosis of covid-19 on patient level. All HbA1c data that were older than 2019 Dec 31 was ruled out as invalid.

Of 3846 patients with COVID-19 and T2DM, 2291 (59.6%) were men, with a median age of 67 years old. Overall, 953 patients (24.8%) died during hospitalization after median 10-day length of stay, among them, 612 (64.2%) stayed on ventilation machine. (Table1)

Compared with survivors, more non-survivors were found among older people (median age 72.0 years vs 65.0 years, p < 0.0001), male (66.5% vs 57.2%, p <0.0001). (Table1)

Patients with a preexisting medical history were also examined to detect the differences on mortality. Non survivors tend to have more preexisting medical conditions in CAD (32.7%-24.6%), CKD (20.1%-13.1%, p <0.0001), COPD (13.4% - 8%, p<0.0001) and CHF (18.2%-13.1%, p <0.001), HTN(87%-82%, p = 0.002)than survivors. (Table1)

We stratified patients into two groups based on the hemoglobin a1c, at their first admission date after they got confirmed of COVID-19: patients with HbA1c >= 9% (n = 1029, 26.8%) and patients with HbA1C less than 9% (n = 2817, 73.2 %). *Log rank test suggested within hospitalization, there is significant difference in people with higher 9% a1c level may survive than the ones are not. – It may due to disproportional of two groups in the beginning. (Figure 2)*

**Factors associated with in-hospital mortality**

The multivariable Cox regression analysis further suggested that age (HR 1.9 [95% CI 1.76, 2.3]), male sex (HR 1.19 [95% CI 1.04,1.4]), COPD (HR 1.01 1.00-1.4), were independent predictors for mortality.(Figure 3) The stratified a1c group was not significantly different in predicting mortality when put it into modelling.

A screenshot of a cell phone

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Figure 3

(Original hypothesis: We propose that having poorly controlled diabetes as represented by a Hemoglobin A1C (HbA1c) greater than 9% (75 mmol/mol) is associated with poorer health outcomes when compared to those with a HbA1c less than 9% (75 mmol/mol), including primary outcomes: mortality and ventilation use, as well as secondary outcomes of stroke, pulmonary embolus and myocardial infarction.)

A screenshot of a map

Description automatically generatedFigure 1 Kaplan-Meier plots stratified by Age group (Time in days)

A close up of a map

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Figure 2 Kaplan-Meier plots stratified by HbA1c group (Time in days)

--- Kaplan-Meier plots stratified by comorbidity

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| **Contingency Tables** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **status** | | | |  | |
| **VTE\_(including\_PE)\_Dx\_On\_Discharge** | | **Alive** | | **Expired** | | **Total** | |
| N |  | 2706 |  | 907 |  | 3613 |  |
| Y |  | 187 |  | 46 |  | 233 |  |
| Total |  | 2893 |  | 953 |  | 3846 |  |
|  | | | | | | | |

| **Contingency Tables** | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **status** | | | | |  | |
| **PE\_Dx\_On\_Discharge** | | **Alive** | | **Expired** | | | **Total** | |
| N |  | 2881 |  | 952 | |  | 3833 |  |
| Y |  | 12 |  | 1 | |  | 13 |  |
| Total |  | 2893 |  | 953 | |  | 3846 |  |
|  | | | | | | | | |
| Contingency Tables | | | | | | | | |
|  | | | | | | | **status** | | | |  | |
| **IschemicYStroke\_Dx\_On\_Discharge** | | | | | | | **Alive** | | **Expired** | | **Total** | |
| N | | | | |  | | 2812 |  | 922 |  | 3734 |  |
| Y | | | | |  | | 81 |  | 31 |  | 112 |  |
| Total | | | | |  | | 2893 |  | 953 |  | 3846 |  |
|  | | | | | | | | | | | | |