

# COVID-19 No Worse for Triggering Type 1 Diabetes than Influenza

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*Abstract: Type 1 diabetes diagnosed following COVID-19 infection at similar rates to influenza.*

Type 1 diabetes is an autoimmune disease that can be triggered by viral infections.<sup>1</sup> Recent studies have hypothesized that the COVID-19 pandemic might cause a global surge in diabetes diagnoses beyond what we typically see for patients with respiratory infections.<sup>2</sup>

Our data, however, showed similar rates of new type 1 diabetes diagnoses in COVID-19 admitted patients compared to admitted patients with an influenza diagnosis. As a baseline, we also examined rates of new diabetes diagnoses in patients admitted for trauma, which were slightly lower than rates in patients with COVID-19 or influenza diagnoses. Our results suggest that COVID-19 shares a similar risk profile for a new diagnosis of type 1 diabetes as other viral infections.

## Type 1 Diabetes Diagnoses After COVID-19, Influenza, and Trauma

	Total Patients with Condition	Post-Admit Type 1 Diabetes Diagnoses (95% confidence interval)
COVID-19	46,109	64 <b>0.14%</b> (0.10—0.17%)
Influenza	6,577	8 <b>0.12%</b> (0.04—0.21%)
Trauma	47,644	26 <b>0.05%</b> (0.03—0.08%)

“Type 1 Diabetes Dx After COVID-19, Influenza, and Trauma, 2021. Epic Health Research Network (EHRN.org)

Figure 1. The percentage of patients with a new type 1 diabetes diagnosis within 90 days of admission, by admission diagnosis.

*These data come from Cosmos, a HIPAA Limited Data Set of more than 111 million patients from Epic customers. This study was completed by two teams, each comprised of a clinician and two research scientists, who worked independently. The two teams came to similar conclusions. Data for this study are pooled from 58 healthcare organizations representing 257 hospitals in 40 states and cover 2.9 million patients.*

## References

- 1) Ruiz PLD, Tapia G, Bakken IJ, et al. Pandemic influenza and subsequent risk of type 1 diabetes: a nationwide cohort study. *Diabetologia*. 2018;61(9):1996-2004. doi:10.1007/s00125-018-4662-7
- 2) Caruso P, Longo M, Esposito K, Maiorino MI. Type 1 diabetes triggered by covid-19 pandemic: A potential outbreak?. *Diabetes Res Clin Pract*. 2020;164:108219. doi:10.1016/j.diabres.2020.108219

## Data Definitions

Term	Definition
<b>Active Patient</b>	<p>A patient who had an encounter of one of the following types within the timeframe specified:</p> <p>Allied Health, Ancillary Procedure, Anticoagulation Visit, Appointment, Audiology, Case Management, Clinical Support, Confidential, Consult, Diagnostic Services, Education, Emergency, Evaluation, Fetal Care Consult, Fetal Procedure, Follow-up, Genetics, Home Care Visit, Hospice F2F Visit, Hospital, Hospital Encounter, Immunization, Induction, Infusion, Initial Prenatal, Injection, Lactation Consult, Lactation Encounter, Multidisciplinary Visit, NST, Nurse Only, Nursing Home, Nutrition, Office Visit, Oncology Survivorship, Ophth Exam, OT/PT, Postpartum Visit, Procedural Consult, Procedure Visit, Radiology Appointment, REI, Research Encounter, Routine Prenatal, Sleep Study, Social Work, Speech Therapy, Surgery, Surgical Consult, Telemedicine, Transplant Evaluation, Transplant Follow Up, Treatment, Urgent Care, Walk-in, Well Child</p> <p>Timeframe for cohorts: in the two years prior to the cohort admission Timeframe for overall statistics: between 2016-11-25 and 2021-05-23</p>
<b>COVID-19 Diagnosis</b>	<p>One of the following codes in one of the listed diagnosis settings.</p> <p>Diagnosis Code: U07.1 (ICD-10-CM), 840539006 (SNOMED-CT) Diagnosis Setting: Encounter Diagnosis, Billing Diagnosis, Problem List Start Date: Diagnosis noted date</p>
<b>COVID-19 Positive Patient</b>	<p>Patient with a positive SARS-CoV-2 lab result or a COVID-19 diagnosis.</p> <p>Start Date: The earlier of the earliest positive SARS-CoV-2 lab result collection date or earliest diagnosis noted date.</p>
<b>COVID-19-Related Admission</b>	<p>A hospital admission during which the patient had a positive SARS-CoV-2 lab test or COVID-19 diagnosis.</p>
<b>Diabetes, General Diagnosis</b>	<p>A diagnosis with diagnosis codes matching the following conditions: Inclusion</p>

	<p>E08*, E09*, E13* (ICD-10-CM)  73211009, 74627003 (SNOMED-CT)  Exclusion  E10*, E11*, O24.4* (ICD-10-CM)  11687002, 44054006, 46635009, 420868002, 422014003 (SNOMED-CT)  Diagnosis Setting: Encounter Diagnosis, Billing Diagnosis, Problem List</p>
<b>Diabetes, New Diagnosis</b>	A diagnosis of diabetes within 90 days of admission.
<b>Diabetes, Type 1 Diagnosis</b>	<p>A diagnosis with diagnosis codes matching the following conditions:</p> <ul style="list-style-type: none"> <li>• Inclusion <ul style="list-style-type: none"> <li>○ E10* (ICD-10-CM)</li> <li>○ 46635009, 420868002 (SNOMED-CT)</li> </ul> </li> <li>• Exclusion <ul style="list-style-type: none"> <li>○ O24.4* (ICD-10-CM)</li> <li>○ 11687002 (SNOMED-CT)</li> </ul> </li> </ul> <p>Diagnosis Setting: Encounter Diagnosis, Billing Diagnosis, Problem List</p>
<b>Diabetes, Type 2 Diagnosis</b>	<p>A diagnosis with diagnosis codes matching the following conditions:</p> <p>Inclusion  E11* (ICD-10-CM)  44054006, 422014003 (SNOMED-CT)</p> <p>Exclusion  E10*, O24.4* (ICD-10-CM)  11687002, 46635009, 420868002 (SNOMED-CT)</p> <p>Diagnosis Setting: Encounter Diagnosis, Billing Diagnosis, Problem List</p>
<b>Excluded Patients</b>	<p>Patients were excluded from the data if they met any of the following conditions:</p> <ul style="list-style-type: none"> <li>• Under age 19</li> <li>• No face-to-face visit at the organization within two years prior to admission</li> <li>• A previous diagnosis of either type 1 or type 2 diabetes, Died during admission</li> </ul>
<b>Influenza Diagnosis</b>	<p>A diagnosis with one of the following diagnosis codes:</p> <ul style="list-style-type: none"> <li>• J09*, J10*, J11* (ICD-10-CM)</li> <li>• 6142004 (SNOMED-CT)</li> </ul> <p>Diagnosis Setting: Encounter Diagnosis, Billing Diagnosis</p>
<b>Influenza Lab Result</b>	A lab result for a component with one of the following LOINC codes: 34487-9, 40982-1, 49521-8, 49524-2, 55465-9, 61102-0, 76078-5, 76080-1, 80382-5, 80383-3, 82166-0, 82167-8, 82169-4, 82170-2
<b>SARS-CoV-2 Lab Result</b>	A final result for one of the lab tests for SARS-CoV-2, with a lab value that could be interpreted definitively as Positive or Negative. LOINC codes include:

94306-8, 94307-6, 94308-4, 94309-2, 94310-0, 94311-8, 94312-6, 94313-4, 94314-2, 94315-9, 94316-7, 94500-6, 94502-2, 94509-7, 94510-5, 94511-3, 94531-1, 94532-9, 94533-7, 94534-5, 94558-4, 94559-2, 94565-9, 94639-2, 94640-0, 94641-8, 94642-6, 94643-4, 94644-2, 94645-9, 94646-7, 94647-5, 94660-8, 94745-7, 94746-5, 94756-4, 94757-2, 94758-0, 94759-8, 94760-6, 94763-0, 94764-8, 94765-5, 94766-3, 94767-1, 94819-0, 94822-4, 94845-5, 95209-3, 95406-5, 95409-9, 95424-8, 95425-5, 95521-1, 95522-9, 95608-6, 95609-4, 95823-1, 95824-9, 95826-4, 95970-0, 95971-8, 95972-6, 95973-4, 95974-2, 96091-4, 96094-8, 96119-3, 96120-1, 96121-9, 96122-7, 96123-5, 96448-6

Test Date: Date when the sample was collected or resulted, if the specimen collection date is not available.

**Trauma Diagnosis**

A diagnosis with one of the following diagnosis codes:

- 125605004 (SNOMED-CT)

Diagnosis Setting: Encounter Diagnosis, Billing Diagnosis