

Guillain-Barré Five Times More Likely in Unvaccinated, COVID-19-Positive Patients Than COVID-Vaccinated Patients

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Abstract: COVID-19-vaccinated patients have lower rates of GBS than unvaccinated patients.

Guillain-Barré Syndrome (GBS) is a rare autoimmune disorder in which a person's nerves are damaged, causing muscle weakness and sometimes paralysis. Patients can sometimes develop GBS after having a recent respiratory illness or digestive tract infection, and in rare cases, after receiving certain vaccines.¹ Some evidence suggests that patients might have an increased risk of GBS after having COVID-19 or, very rarely, after receiving a COVID-19 vaccine.^{2,3}

We investigated whether patients who have received a COVID-19 vaccine or who have had a COVID-19 infection have developed GBS at a higher rate compared to baseline rates in the general population. Our analysis shows that unvaccinated patients with a COVID-19 infection are nearly five times more likely to develop GBS than COVID-vaccinated patients, with a rate of 28 per million for COVID-vaccinated patients, and 130 per million for unvaccinated, COVID-positive patients.

Rates of Guillain-Barré Syndrome Among COVID-19-Vaccinated Patients, COVID-19-Positive Patients, and Control Groups

COVID-Vaccinated Patients



Control Cohort (patients with at least one office visit encounter)



COVID-19-Positive Patients



"Rates of Guillain-Barré Syndrome Among COVID-19 Vaccinated, COVID-19-Positive, and Control Groups," 2021. Epic Health Research Network (EHRN.org)

Figure 1. Patients who aren't vaccinated and are COVID-19-positive have a higher rate of GBS compared to patients who do get the COVID-19 vaccine.

These data come from Cosmos, a HIPAA-defined Limited Data Set of more than 126 million patients from 156 Epic organizations including 889 hospitals and 19,420 clinics, serving patients in all 50 states. This study was completed by two teams, each composed of a clinician and research scientists who worked independently. The two teams came to similar conclusions.

References

1. Mayo Clinic. [Guillain-Barre syndrome](#).
2. Caress, J.B., Casotoro, R.J., Simmons, Z., Scelsa, S.N., Lewis, R.A., Ahlawat, A., and Nrayanaswami, P. (2020). [COVID-19-associated Guillain-Barre syndrome: The early pandemic experience](#). Muscle Nerve, 62(4), 485-491.
3. U.S. Food & Drug. [Coronavirus \(COVID-19\) Update: July 13, 2021](#).

Data Definitions

Term	Definition
COVID-19 Vaccination	Documentation of a COVID-19 vaccination on or after December 11, 2020.
COVID-19 Patient	Patients with a problem list, encounter diagnosis, or final billing diagnosis mapped to ICD-10-CM code U07.1 or SNOMED-CT 840539006, or a positive SARS-CoV-2 PCR lab result.
COVID-19 Vaccination Cohort	This cohort includes patients aged 0-99 who received a COVID-19 Vaccination. The cohort inclusion date is the date of their earliest COVID-19 vaccination. Any patients who are also COVID-19 Patients, have documentation of an excluding condition, or have documentation of Guillain-Barré prior to the inclusion date are removed from the cohort.
COVID-19 Cohort	This cohort includes COVID-19 Patients aged 0-99. The cohort inclusion date is the date of their earliest positive COVID-19 lab result or diagnosis. Any patients who have received a COVID-19 Vaccination, have documentation of an excluding condition, or have documentation of Guillain-Barré prior to the inclusion date are removed from the cohort.
Control Cohort	This cohort includes patients aged 0-99 with at least one office visit encounter from January 1, 2019, to June 30, 2019. The cohort inclusion date is the earliest office visit for the patient during those dates. Any patients who have documentation of an excluding condition or have documentation of Guillain-Barré prior to the inclusion date are removed from the cohort.
Recent Excluding Diagnoses	A problem list, encounter diagnosis, or final billing diagnosis for Influenza (ICD-10-CM code of J09, J10, or J11), Campylobacter (ICD-10-CM code of A04.5), Cytomegalovirus (ICD-10-CM code of B25.9), or Epstein-Barr (ICD-10-CM code of B27.00 or B27.90) attributed between 180 days prior to the cohort inclusion event and 180 days after that event. Such a finding excludes a patient from our analysis.
Recent Excluding Encounter	An encounter of type "Surgery" between 180 days prior to the cohort inclusion event and 180 days after that event. Such a finding excludes a patient from our analysis.
Chronic Excluding Diagnoses	A problem list, encounter diagnosis, or final billing diagnosis for HIV (ICD-10-CM code B20, B97.35, or O98.7% or SNOMED-CT code 62479008, 86406008, 165816005, or 420721002), Cancer (ICD-10-CM code C% or SNOMED-CT code 363346000, excluding diagnoses with ICD-10-CM D% codes or with a name containing "H/O," "history of,"

	<p>“hx”, or “in remission”), Kidney Transplant (ICD-10-CM code Z94.0 or SNOMED-CT code 70536003), Kidney Transplant Failure (ICD-10-CM code T86.12 or SNOMED-CT code 213150003), or Solid Organ Transplant (ICD-10-CM codes T86.1%, T86.2%, T86.3%, T86.4%, T86.81%, T86.85%, Z48.28%, Z94.0, Z94.1, Z94.2, Z48.21, Z48.214, Z48.22, Z48.23, Z94.3, Z94.4, Z94.82, or Z94.83 or SNOMED code 18027006, 32413006, 61535006, 62438007, 70536003, 88039007, 161665007, 161666008, 161671001, 161672008, 175902000, 313030004, 313039003, 698362007, 698367001, with the SNOMED qualification excluded if the diagnosis name includes the text “pre-heart,” “pre heart,” “pre-kidney,” “pre kidney,” “pre-liver,” “pre liver,” “pre-lung,” “pre lung,” “pre-transplant,” or “pre transplant”) attributed to any time prior to 180 days after the cohort inclusion event. Such a finding excludes a patient from our analysis.</p>
Chronic Excluding Procedures	<p>A completed procedure for Bone Marrow or Stem Cell Transplant (CPT code 38240 or 38241 or ICD-10-PCD code 30230G, 30230G0, 30230G2, 30230G3, 30230G4, 30230U, 30230U2, 30230U3, 30230U4, 30230Y, 30230Y0, 30230Y2, 30230Y3, 30230Y4, 30233G, 30233G0, 30233G2, 30233G3, 30233G4, 30233U, 30233U2, 30233U3, 30233U4, 30233Y, 30233Y0, 30233Y2, 30233Y3, 30233Y4, 30240G, 30240G0, 30240G2, 30240G3, 30240G4, 30240U, 30240U2, 30240U3, 30240U4, 30240Y, 30240Y0, 30240Y2, 30240Y3, 30240Y4, 30243G, 30243G0, 30243G2, 30243G3, 30243G4, 30243U, 30243U2, 30243U3, 30243U4, 30243Y, 30243Y0, 30243Y2, 30243Y3, or 30243Y4) or Solid Organ Transplant (CPT code 32851, 32852, 32853, 32854, 33935, 33945, 44135, 44136, 47135, 47136, 48160, 48552, 48554, 50360, or 50365, HCPCS code S2053, S2054, S2060, S2065, or S2152, ICD-9-CM Volume 3 code 33.5, 33.50, 33.51, 33.52, 37.51, 50.5, 50.51, 50.59, 55.6, 55.61, or 55.69, or ICD-10-PCS code 02Y, 02YA, 02YA0, 02YA0Z, 02YA0Z0, 02YA0Z1, 02YA0Z2, 0BY, 0BYC, 0BYC0, 0BYC0Z, 0BYC0Z0, 0BYC0Z1, 0BYC0Z2, 0BYD, 0BYD0, 0BYD0Z, 0BYD0Z0, 0BYD0Z1, 0BYD0Z2, 0BYF, 0BYF0, 0BYF0Z, 0BYF0Z0, 0BYF0Z1, 0BYF0Z2, 0BYG, 0BYG0, 0BYG0Z, 0BYG0Z0, 0BYG0Z1, 0BYG0Z2, 0BYH, 0BYH0, 0BYH0Z, 0BYH0Z0, 0BYH0Z1, 0BYH0Z2, 0BYJ, 0BYJ0, 0BYJ0Z, 0BYJ0Z0, 0BYJ0Z1, 0BYJ0Z2, 0BYK, 0BYK0, 0BYK0Z, 0BYK0Z0, 0BYK0Z1, 0BYK0Z2, 0BYL, 0BYL0, 0BYL0Z, 0BYL0Z0, 0BYL0Z1, 0BYL0Z2, 0BYM, 0BYM0, 0BYM0Z, 0BYM0Z0, 0BYM0Z1, 0BYM0Z2, 0DY8, 0DY80, 0DY80Z, 0DY80Z0, 0DY80Z1, 0DY80Z2, 0DYE, 0DYE0, 0DYE0Z, 0DYE0Z0, 0DYE0Z1, 0DYE0Z2, 0FY, 0FY0, 0FY00, 0FY00Z, 0FY00Z0, 0FY00Z1, 0FY00Z2, 0FYG, 0FYG0, 0FYG0Z, 0FYG0Z0, 0FYG0Z1, 0FYG0Z2, 0TY0, 0TY00, 0TY00Z, 0TY00Z0, 0TY00Z1, 0TY00Z2, 0TY1, 0TY10, 0TY10Z, 0TY10Z0, 0TY10Z1, or 0TY10Z2) attributed to any time prior to 180 days after the cohort inclusion event. Such a finding excludes a patient from our analysis.</p>
Guillain-Barré Syndrome	<p>A problem list, encounter diagnosis, or final billing diagnosis mapped to ICD-10-CM code G61.0.</p>

Onset of Guillain-Barré Syndrome

Each cohort was evaluated for whether patients received their first documentation of Guillain-Barré Syndrome on their cohort inclusion date or the 180 days that followed.