

No Significant Change in Inflammatory Markers Associated with GLP-1 Medications

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Key Findings:

- Patients prescribed semaglutide or liraglutide showed no significant change in their inflammatory marker levels compared to those not prescribed a GLP-1 medication.

Inflammation is a common response to infection, injury, or chronic conditions such as diabetes and autoimmune diseases. It can be quantified by testing a patient's C-reactive protein (CRP) or erythrocyte sedimentation rate (ESR) levels.¹ Some research suggests that GLP-1 medications may lead to reduced inflammation,² while other research suggests that weight loss alone may reduce inflammation.³

We studied 2,983 patients prescribed semaglutide or liraglutide and matched them with 2,983 patients without a GLP-1 medication based on age, diabetes diagnosis, the year of their initial lab, the time between initial and follow-up lab readings, their percentage change in their BMI over the study period, and their Social Vulnerability Index score. Patients were required to have at least two CRP or ESR levels at least 30 days apart to be included.

While follow-up CRP levels decreased for all groups except non-diabetics prescribed liraglutide, none of those changes were significant, as seen in Figure 1.

Initial and Follow-up CRP Levels by Treatment

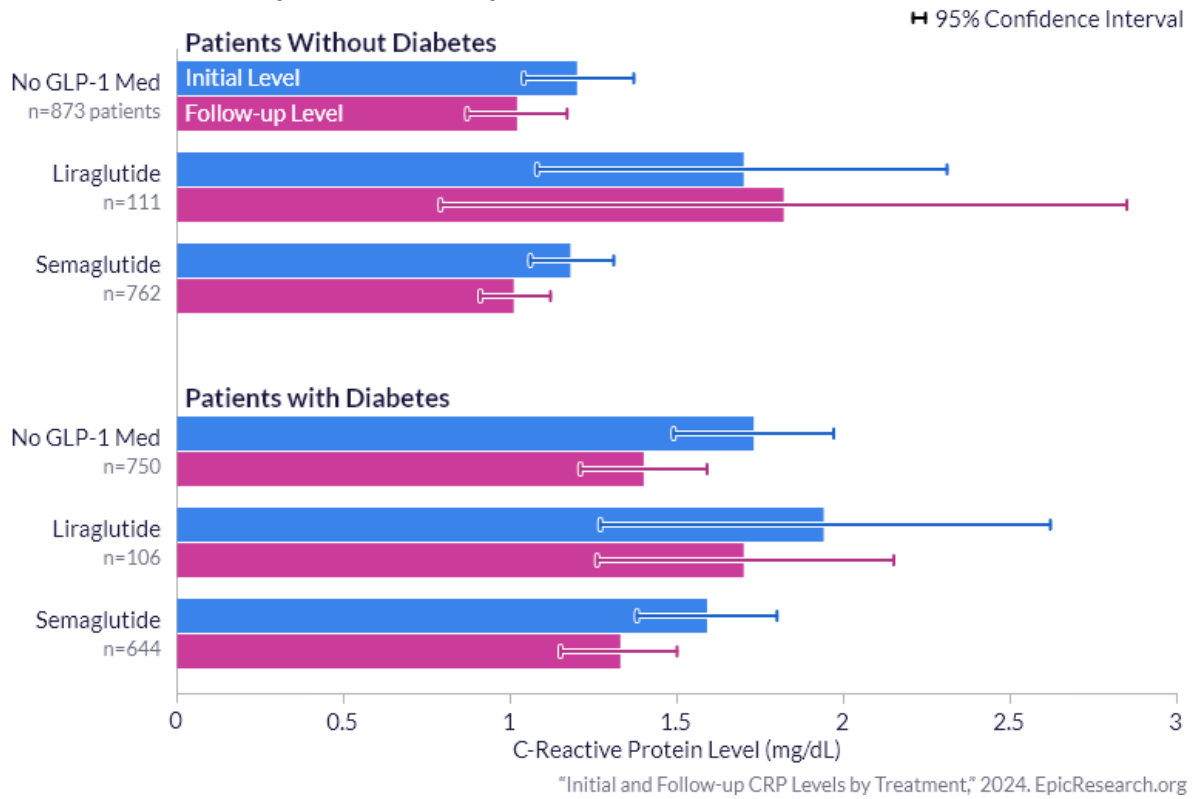


Figure 1. The change in average CRP levels among patients with and without diabetes by treatment.

Next, we evaluated the change in ESR levels. Patients with and without diabetes did not have a significant change in their ESR levels between their initial and follow-up readings, as seen in Figure 2.

Initial and Follow-up ESR Levels by Treatment

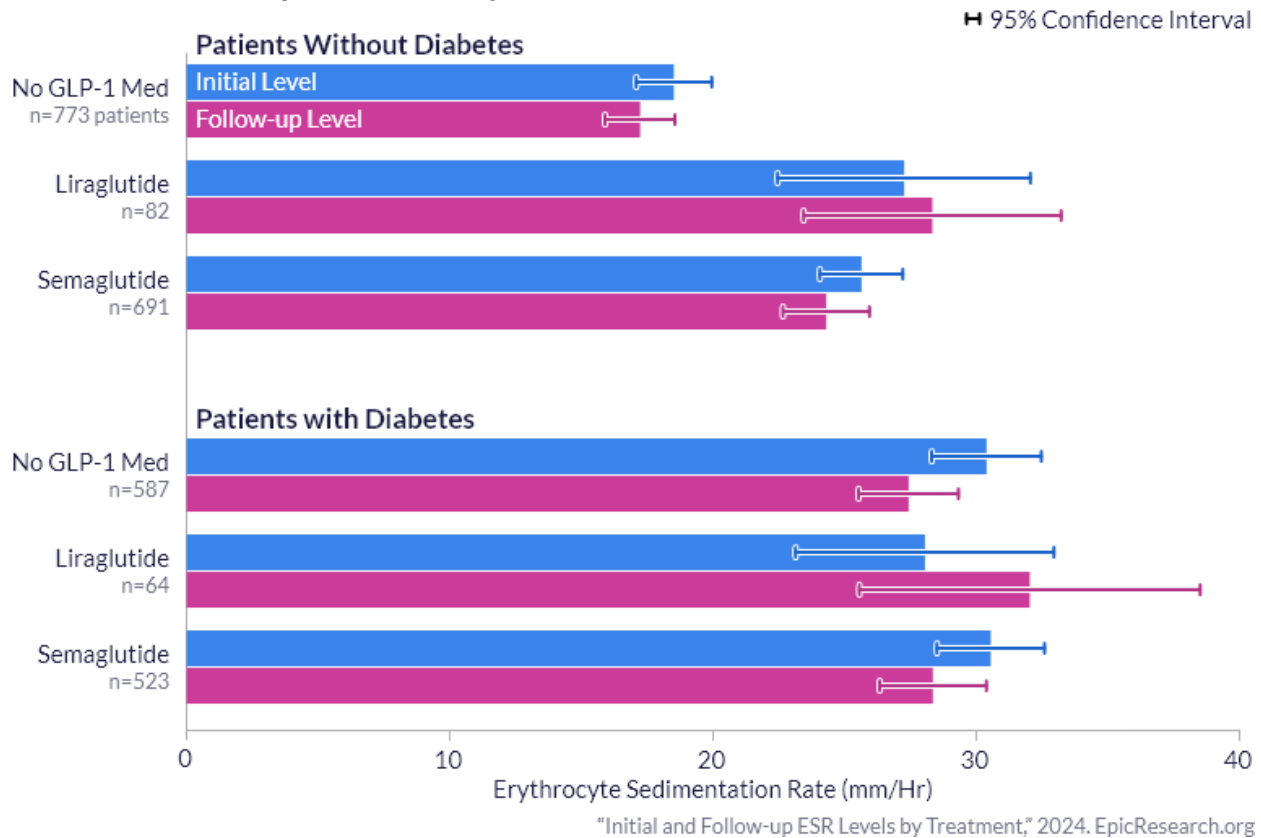


Figure 2. The change in average ESR levels among patients with and without diabetes by therapy.

These findings suggest that these GLP-1 medications do not meaningfully influence inflammation as measured by inflammatory markers after adjusting for weight loss.

These data come from Cosmos, a dataset created in collaboration with a community of Epic health systems representing more than 274 million patient records from 1,500 hospitals and more than 36,000 clinics from all 50 states, Lebanon, and Saudi Arabia. This study was completed by two teams that worked independently, each composed of a clinician and research scientists. The two teams came to similar conclusions. Graphics by Brian Olson.

References

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Data Definitions

Term	Definition
Study period	1/1/2018 to 6/1/2024

Study population	<p>Patients with two outpatient labs for CRP or ESR</p> <p>Labs must be 30 days to two years apart, have a numeric value populated, and have units of:</p> <ul style="list-style-type: none"> • CRP: mg/dL or mg/L • ESR: mm/Hr or mm/H <p>We used the patient's first lab of each type as their initial lab and the first subsequent qualifying lab as the follow-up lab.</p> <p>Control patients were not prescribed a GLP-1 medication</p>
Exposures	An active order for a GLP-1 medication between their two CRP or ESR tests, lasting at least through the second test
CRP	A lab result with LOINC code 11039-5, 14634-0, 16503-5, 1988-5, 30522-7, 35648-5, 45062-7, 48421-2, 59182-6, 71426-1, 76485-2, 76486-0, or 98987-1
ESR	A lab result with LOINC code 18184-2, 30341-2, 43402-7, 4537-7, 4538-5, 4539-3, or 82477-1
GLP-1 medication	<p>Semaglutide: 7 mg, 14 mg (Oral) or 1 mg, 2 mg, 1.7 mg, 2.4 mg (SubQ)</p> <p>Dulaglutide: 1.5 mg, 0.75 mg, 3 mg, 4.5 mg (SubQ)</p> <p>Exenatide: 2 mg, 0.01 mg, 0.005 mg (SubQ)</p> <p>Liraglutide: 0.6 mg, 3 mg (SubQ)</p> <p>Tirzepatide: 5 mg, 10 mg, 15 mg (SubQ)</p>
Diabetes	A diagnosis with ICD-10-CM code E11*

Table 1: Inflammatory Marker Levels by GLP-1 Use

Lab Type	Diabetes	Count	Start				End			
			Med	Mean Start	Low CI	Upper CI	Med	Mean End	Low CI	Upper CI
CRP	No	873	No GLP-1 Med	1.20	0.17	0.17	No GLP-1 Med	1.02	0.15	0.15
CRP	No	111	Liraglutide	1.70	0.62	0.62	Liraglutide	1.82	1.03	1.03
CRP	No	762	Semaglutide	1.18	0.13	0.13	Semaglutide	1.01	0.10	0.10
CRP	Yes	750	No GLP-1 Med	1.73	0.24	0.24	No GLP-1 Med	1.40	0.19	0.19
CRP	Yes	106	Liraglutide	1.94	0.67	0.67	Liraglutide	1.70	0.45	0.45
CRP	Yes	644	Semaglutide	1.59	0.21	0.21	Semaglutide	1.33	0.17	0.17
ESR	No	773	No GLP-1 Med	18.51	1.44	1.44	No GLP-1 Med	17.23	1.32	1.32
ESR	No	82	Liraglutide	27.26	4.80	4.80	Liraglutide	28.33	4.89	4.89
ESR	No	691	Semaglutide	25.64	1.57	1.57	Semaglutide	24.30	1.64	1.64
ESR	Yes	587	No GLP-1 Med	30.39	2.08	2.08	No GLP-1 Med	27.43	1.89	1.89
ESR	Yes	64	Liraglutide	28.05	4.90	4.90	Liraglutide	32.03	6.47	6.47
ESR	Yes	523	Semaglutide	30.55	2.04	2.04	Semaglutide	28.35	2.03	2.03