Concussion Burden and Comparative Surveillance in Nassau County, New York State (2018–2024)

Executive Summary

Head injury is considered a public health concern because of the potential long-term health consequences (Maas et al., 2022). Concussion, a mild traumatic brain injury (mTBI), is important to understand as it is seen in all ages and often goes underreported when sports-related (Bretzin et al., 2022). This report analyzes Statewide Planning and Research Cooperative System (SPARCS) hospital visit data from 2018–2024 (ICD-10-CM code S06.0) and relates the local epidemiological findings to New York State and national surveillance trends. The findings indicate discernible alignments and a few contrasts between local SPARCS hospital data and broader statewide or national surveillance statistics. Local and broad data comparisons reveal key shifts in hospital visits and coding details in traumatic brain injury. Since the broader surveillance systems do not routinely isolate concussion sub-types from general TBI totals, comparing local concussion data directly to national TBI statistics creates apparent discrepancies—such as much lower local geriatric "concussion" rates compared to high national geriatric "TBI" rates.

Introduction & Methodology

A concussion is an intracranial injury characterized by a transient alteration or loss of consciousness following a closed-head impact, causing functional disruption of neuronal activity without structural damage visible on standard neuroimaging (Centers for Disease Control and Prevention, 2025; McCrory et al., 2017).

Data Extraction & Case Definitions

Local surveillance employed the New York State SPARCS Database, aggregating Emergency Department (ED) visits, ambulatory care encounters, and inpatient hospitalizations across Nassau County ZIP code areas from 2018 through 2024. Acute initial encounters (principal diagnosis) were isolated using specific ICD-10-CM diagnostic codes:

S06.0X0A: Concussion without loss of consciousness, initial encounter.

S06.0X1A: Concussion with loss of consciousness of 30 minutes or less, initial encounter.

S06.0X9A: Concussion with loss of consciousness of unspecified duration, initial encounter.

Analysis of the SPARCS dataset identified 9,718 acute initial concussion encounters in Nassau County between 2018 and 2024, demonstrating distinct care-seeking patterns across clinical settings. Emergency Department (ED) visits dominated healthcare utilization, accounting for 80.74% (n = 7,846) of all recorded cases (see Table 1), mirroring CDC national benchmarks in which over 80% of medically evaluated mTBIs are managed in acute outpatient ED settings (National Center for Injury Prevention and Control, 2015). Across all settings, concussions presenting without loss of consciousness (S06.0X0A) constituted the majority of cases at 63.49% (n = 6,170) (see Table 1), reflecting broader clinical literature that mild brain injuries predominantly manifest through functional neurocognitive symptoms rather than overt loss of consciousness (Centers for Disease Control and Prevention, 2025; Daugherty et al., 2023; McCrory et al., 2017). However, clinical presentation shifted markedly among the 888 patients requiring inpatient admission: nearly two-thirds of admitted individuals presented with documented altered consciousness, including 21.96% (n = 195) with confirmed loss of consciousness of 30 minutes or less (S06.0X1A) and 42.79% (n = 380) with unspecified duration (S06.0X9A) (see Table 1). This sharp increase in loss of consciousness among inpatient

discharges highlights how diagnostic severity and acute neurological disruption serve as primary drivers for hospital admission over outpatient discharge.

Table 1

Table of Claims by Concussion (2018-2024)				
Claims	**Concussion**			
	Loss of consciousness <=30 min	**Loss of consciousness unspecified**	**No loss of consciousness**	**Total**
Emergency Room Visit	633	1982	5231	**7846**
	8.07%	25.26%	66.67%	
Inpatient Discharge	195	380	313	**888**
	21.96%	42.79%	35.25%	
Outpatient Service Visit	65	293	626	984
	6.61%	29.78%	63.62%	
Total	893	2655	**6170**	9718

Nassau County Epidemiological Findings (2022–2024) Three-Year Average

Spatial and Geographic Distribution

Age-adjusted concussion hospital visit rates vary widely across Nassau County. All rates were age-adjusted per 10,000 residents using 3-year averages (2022–2024) to standardize comparisons across communities. Figure 1 shows concussion rates by location in Nassau County.

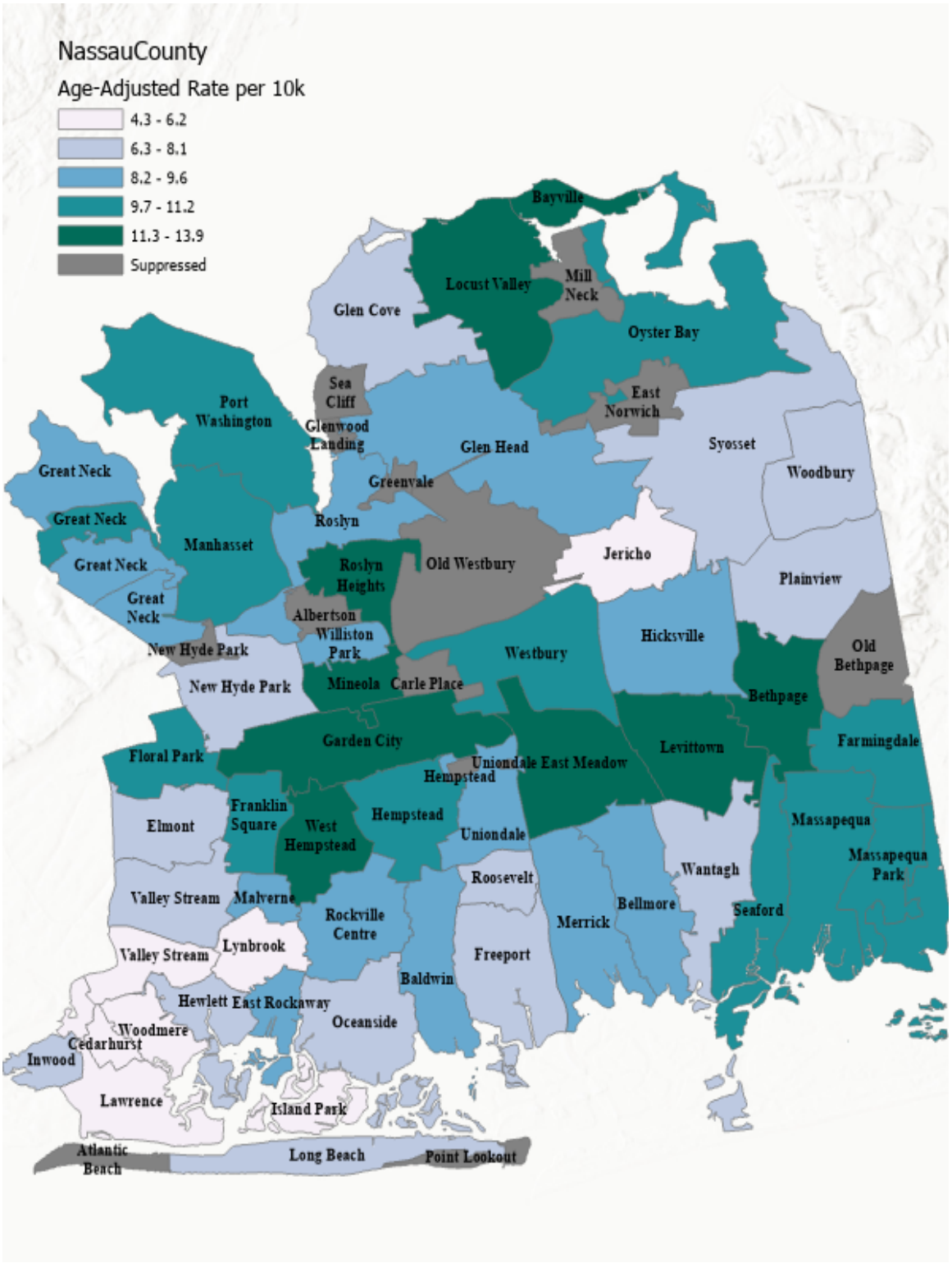
High-Incidence Areas (11.3–13.9 per 10,000 / 113–139 per 100k): Concentrated in central suburban corridors, including Garden City, Hempstead, West Hempstead, East Meadow, Levittown, Bethpage, and Locust Valley.

Moderate-Incidence Areas (8.2–11.2 per 10,000 / 82–112 per 100k): Located in communities such as Port Washington, Manhasset, Oyster Bay, Hicksville, Westbury, Massapequa, Glen Head, Great Neck, and Hempstead.

Low-Incidence Areas (4.3–6.2 per 10,000 / 43–62 per 100k): Primarily along the south/southwestern shoreline communities, including Inwood, Lawrence, Island Park, Cedarhurst, Woodmere, Valley Stream, and Lynbrook, alongside Jericho in the north-central area. Incidence rates in northern communities such as Old Bethpage, Old Westbury, Carle Place, and Mill Neck were suppressed in ZIP codes with fewer than 11 cases.

Figure 1

Age-Adjusted Concussion Rates by Nassau County Places (3-Year Average) 2022–202



Demographic Characteristics and Trends

Figure 2

Trends in Age-Adjusted Concussion Rates Across All Hospital Visit Types, 2018–2024

Between 2018 and 2024, hospital discharge rates for concussions across Nassau County followed a downward trajectory, with the rate falling from 14.5 to 7.9 per 10,000 population, as shown in Figure 2, aligning with CDC national survey data showing a drop in youth sports concussions from 15% in 2019 to 12% in 2021 (USAFacts, 2023). Broader Traumatic Brain Injury (TBI) metrics—which encompass concussions as a mild subtype—followed the same pattern. NYS SPARCS data: age-adjusted TBI hospitalizations in Nassau County decreased from 9.6 to 7.7 per 10,000, gradually converging with the statewide average (7.6 to 7.5 per 10,000) and NYS excluding NYC (7.7 to 7.2 per 10,000) (New York State Department of Health, 2026).

SPARCS Data Trends in Nassau County

A synthesis of Nassau County's SPARCS findings on the 2022-2024 three-year average age-adjusted concussion incidence rate—8.89 cases per 10,000 population (89 per 100,000)—in comparison with New York State TBI totals and national figures reveals several underlying patterns:

Local Geriatric and National Metrics

In 2024, adults aged 65 years and older experienced a fall-related traumatic brain injury emergency department visit rate of 1,010.2 per 100,000 ED visits, highlighting the substantial burden of fall-related TBI among older adults in the United States (Kan et al., 2025). However, Nassau County SPARCS data showed geriatric hospital visit rates for concussion ranging from 4.2 to 5.8 per 10,000 (42.0 to 58.0 per 100,000) across groups aged 65 to 85+ (see Figure 3). These lower numbers do not indicate fewer falls among Nassau County's older adults. Instead, broader national datasets classify severe structural injuries—such as subdural or subarachnoid hemorrhages—under general TBI totals. Nassau's SPARCS analysis isolated only concussions (S06.0 code only). Severe falls in older adults frequently involve acute intracranial bleeding, routing patients into structural TBI codes rather than pure concussion codes.

Figure 3

Adolescent Hospital Visits

Nationally, adolescents had the highest incidence of diagnosed concussion, with approximately 1,270 cases per 100,000 insured individuals in 2023, according to a national health insurance claims analysis (Lickfeld et al., 2026). SPARCS data supports this trend, showing that the 15–24 age bracket represents Nassau County's largest hospital visit volume, peaking at 18.9 per 10,000 (189.0 per 100k) for females and 16.8 per 10,000 (168.0 per 100k) for males (see Figures 3 and 4). High-density suburban sports corridors (Garden City, Levittown, Bethpage) drive these local peaks (see Figure 1).

Figure 4

Figure 4 visualizes SPARCS data and shows a gender crossover between childhood and young adulthood. In the 00–14 age group, males exhibit higher visit rates (13.4 per 10,000) than females (8.2 per 10,000). In the 15–24 age group, females surpass males (18.9 vs. 16.8 per 10,000). This aligns with sports science literature showing females have higher concussion risk in comparable sports due to neck musculature and reporting behaviors (Shaffer et al., 2025).

Across New York State, non-hospital sports medicine networks, urgent care centers, primary care practices, and private concussion clinics manage a substantial proportion of adolescent concussions without hospital admission or emergency department utilization. Consequently, Nassau County's hospital-based concussion rate of approximately 168 to 189 per 100,000 population likely reflects only a fraction of the true community burden. This interpretation is consistent with national insurance claims data showing an estimated concussion

incidence of 370 per 100,000 population annually across healthcare settings, suggesting that hospital-based surveillance substantially underestimates total concussion occurrence (Lickfeld et al., 2026).

Socioeconomic and Spatial Disparities

Shoreline ZIP codes like Inwood and Lawrence, as shown in Figure 2, record hospital visit rates as low as 4.3 per 10,000 (43 per 100k). Rather than indicating safer environments, lower ED visit rates in socioeconomically disadvantaged areas often reflect barriers to hospital care, underinsurance, or reduced parental time off to seek non-emergency evaluation (Kerr et al., 2022).

Nationally, American Indian/Alaska Native (AI/AN) individuals face the highest TBI burden, with past-year high school sports concussion rates reaching up to 40% and a national TBI death rate of 29.0 per 100,000 (Doan et al., 2026), aligning with Nassau County, where AI/AN residents experience an age-adjusted hospital visit rate of 15.2 per 10,000—higher than any other racial group except Native Hawaiian/Pacific Islanders. Conversely, Asian populations consistently demonstrate the lowest rates in both datasets, recording a national TBI mortality rate of 7.7 per 100,000 (Doan et al., 2026) and the lowest local Nassau County hospital visit rate at 5.4 per 10,000 (see Figure 5). Nassau's Hispanic/Latino residents show a lower hospital visit rate (6.4 per 10,000) than Non-Hispanic/Latino residents (8.0 per 10,000) (see Figure 6), illustrating how healthcare access barriers can drive acute care underreporting despite high injury prevalence. SPARCS data indicate elevated rates for Native Hawaiian / Pacific Islander (54.2 per 10,000) and American Indian / Alaska Native populations (15.2 per 10,000). While small local census denominators can inflate age-adjusted rates for smaller demographic groups, these

findings align with national surveillance showing systemic disparities in injury severity and delayed access to care (CDC WISQARS, 2026).

Figure 5

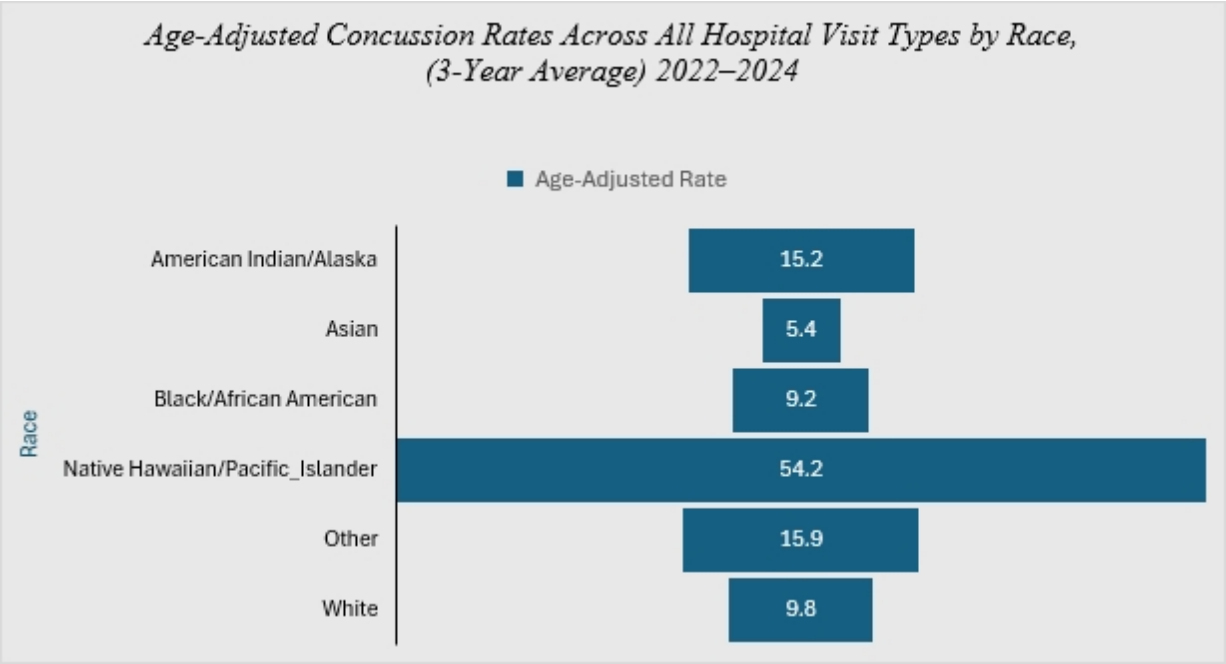


Figure 6

Three Priority Areas

Integrating SPARCS local data with New York State injury frameworks highlights three priority actions for local health authorities:

1. Expand Community-Based Geriatric Screening: Because hospital SPARCS data undercounts mild falls in older adults, local health networks should expand fall-prevention screenings (*A Matter of Balance*) directly in senior centers and primary care clinics across Nassau County.
2. Standardize School and Outpatient Protocols: Athletic corridors in central Nassau require expanded access to certified athletic trainers and standardized Return-to-Play/Return-to-Learn protocols to catch concussions that do not present to emergency rooms.
3. Address Healthcare Access Gaps**:** Public health outreach must address underreporting in lower-rate ZIP codes by increasing health literacy and establishing affordable outpatient concussion care pathways.

Link to the dashboard:
Nassau County All Hospital Visit Age-Adjusted Concussion Rates

https://nassau-county.maps.arcgis.com/apps/dashboards/3e4160360fa84557b92a182ca774ff9a#

References

Centers for Disease Control and Prevention. (2025). *Concussion Basics: HEADS UP*. U.S. Department of Health and Human Services. https://www.cdc.gov/heads-up/about/index.html

Centers for Disease Control and Prevention. (2026). *Web-based Injury Statistics Query and Reporting System (WISQARS)*. U.S. Department of Health and Human Services. https://wisqars.cdc.gov/

Bretzin, A. C., Anderson, M., Bhandari, N., Schmitt, A. J., & Beidler, E. (2022). Concussion nondisclosure in youth sports. *Journal of Athletic Training, 57*(7), 688-695. https://doi.org/10.4085/1062-6050-534-21

Daugherty, J., Sarmiento, S., & Breiding, M. (2023). Comparison of self-reported lifetime concussions and mild traumatic brain injuries among adults. *Brain Injury*, 37(3), 1–8. https://doi.org/10.1080/02699052.2023.2175909

Doan, V. G.-B., Daugherty, J. D., Singichetti, B., Kuku, R., Sarmiento, K., & Naumann, R. B. (2026). Systematic search and review of racial and ethnic differences in traumatic brain injury prevalence and incidence. *Injury Prevention, 32*(2), 184-191. https://doi.org/10.1136/ip-2025-045645

Kan, V., Alcusky, M., Akie, T., Bacelar, V., & Darling, C. (2025). 241 Rising Burden of Fall-Related Traumatic Brain Injury in Older Adults in the United States, 2015 to 2024. *Annals of Emergency Medicine, 86*(3 Suppl. 1), S103. https://www.annemergmed.com/article/S0196-0644(25)00636-5/fulltext

Kerr, Z. Y., Chandran, A., Nedimyer, A. K., Rothschild, A. E., Kay, M. C., Gildner, P., Byrd, K. H., Haarbauer-Krupa, J. K., & Register-Mihalik, J. K. (2022). Use of sport-related

concussion information sources among parents of United States middle school children. *Journal of Sport and Health Science*, 11(6), 716–724. https://doi.org/10.1016/j.jshs.2020.04.008

Lickfeld, A. M., Castro, E. V., Ferreira, A., Edwards, J. M., Patel, A., Leddy, J. J., & Haider, M. N. (2026). Incidences of Concussion in the United States: A Review of Health Insurance Claims. *Brain Sciences*, 16(6), 546. https://doi.org/10.3390/brainsci16060546

Maas, A. I. R., Menon, D. K., Manley, G. T., Abrams, M., Åkerlund, C., Andelic, N., ... & the International Traumatic Brain Injury Research (InTBIR) Collaborators. (2022). Traumatic brain injury: Progress and challenges in prevention, clinical care, and research. *The Lancet Neurology*, *21*(11), 1004-1060. https://doi.org/10.1016/S1474-4422(22)00309-X

McCrory, P., Meeuwisse, W., Dvořák, J., Aubry, M., Bailes, J., Broglio, S., ... & Vos, P. E. (2017). Consensus statement on concussion in sport—the 5th international conference on concussion in sport held in Berlin, October 2016. *British Journal of Sports Medicine*, 51(11), 838–847. https://doi.org/10.1136/bjsports-2017-097699

National Center for Injury Prevention and Control. (2015). *Report to Congress on Traumatic Brain Injury in the United States: Epidemiology and Rehabilitation*. Centers for Disease Control and Prevention. https://stacks.cdc.gov/view/cdc/29215

New York State Department of Health. (2026). *County/region trends* [Data dashboard]. New York State Community Health Indicator Reports (CHIRS). https://apps.health.ny.gov/public/tabvis/PHIG_Public/chirs/reports/#state

New York State Department of Health. (2024). *Statewide Planning and Research Cooperative System (SPARCS)*. NYS DOH. https://www.health.ny.gov/statistics/sparcs/

Shaffer, A., Kemprecos, H. J., Woolridge, M. G., Soulakis, N. D., & Arnold, P. M. (2025). Sport-Related Concussions in High School Athletes: A Comprehensive Update. *Current Neurology and Neuroscience Reports*, 25(1), 32. https://doi.org/10.1007/s11910-025-01419-5

USAFacts. (2023, December 1). *How common are traumatic brain injuries in the US?* https://usafacts.org/articles/how-common-are-traumatic-brain-injuries-in-the-us/

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