

Erie County Mental Health Treatment Gaps and Barriers Analysis [2023]

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Gaps and Barriers Analysis Overview

The Gaps and Barriers Analysis for Treatment Services in Erie County compares the provision of treatment services within each ZIP code area to selected risk indicators. Gaps are identified where there is a mismatch between the treatment services and risk level (e.g., no/low treatment provision & high risk). First, the distribution of treatment services was evaluated by compiling information about NYS Office of Mental Health (OMH) licensed, funded, or certified programs treatment programs and their locations through the OMH website. Next, these data were tallied by ZIP code for each program type. These analyses do not reflect the availability of telehealth and remote service delivery which may impact accessibility to some services and have been especially relevant for the system of care throughout the COVID-19 pandemic.

Maps were developed from these data to evaluate the spatial distribution of programs in Erie County and then to examine existing gaps in service provision against the areas of highest risk. The maps of treatment programs are broken down into five categories that correspond to none, one, a few (2 or 3), some (4 or 5) and many (more than 5). The gaps and barriers analysis for treatment programs compares the highest level of aggregated risk for ZIP codes in Erie County with the number of treatment programs. Risk indicator measures were selected using a World Health Organization (WHO) framework for mental health risk (WHO, 2012). These were summed and re-quartiled for the aggregated risk measure; locations with the highest level of risk are those with aggregated measures falling in the fourth quartiles of either ZIP codes in Erie County Excluding City of Buffalo or ZIP codes in the City of Buffalo Only. A detailed description of the methodology can be found in the technical documentation that is Appendix to this document.

Accessibility was measured using definitions instituted by the U.S. Department of Agriculture Economic Research Service through research on food access to define food deserts. These definitions are well suited for use in this analysis to describe deficits in access to important physical resources, in this case, treatment service locations. In urban areas, accessibility is defined as being within 1 mile; and in rural areas, within 10 miles. These maps showing ZIP codes of highest risk were derived by creating straight line distance buffers around the geocoded locations of NYS Office of Mental Health (OMH) treatment program locations for both Erie County excluding Buffalo and the City of Buffalo only. These locations included programs from neighboring counties if they were within 10 miles of the Erie County border. Additionally, a series of comparison maps are included to identify changes in accessibility since the last version of this analytical report in 2017.

Types of Mental Health Treatment Programs

- **Emergency Services** – Provides rapid psychiatric and/or medical stabilization. These services ensure the safety of persons who present a risk to themselves or others. The program types range from crisis counseling and residential services to comprehensive psychiatric emergency programs, better known as CPEP. Home-based crisis intervention services for children are designed to provide crisis services to families when a child is imminent risk for psychiatric hospitalization.

- **Inpatient Services** – Provides stabilization and intensive treatment and rehabilitation with 24-hour care in a controlled environment. They are the programs of choice only when the required services and supports cannot be delivered in community settings.
- **Outpatient Services** – Provides treatment and rehabilitation in settings such as clinics, partial hospital programs, day treatment, Assertive Community Treatment (ACT), and Personalized Recovery-Oriented Services (PROS).
- **Support Services** – Based in the community and help adults diagnosed with serious mental illnesses to live as independently as possible and help children with serious emotional challenges to remain with their families. These services include family support case management and vocational, self-help, and other support services. While the array of services varies between adults and children, the goal is to support successful and full community living.

Gaps and Barriers Analysis Results

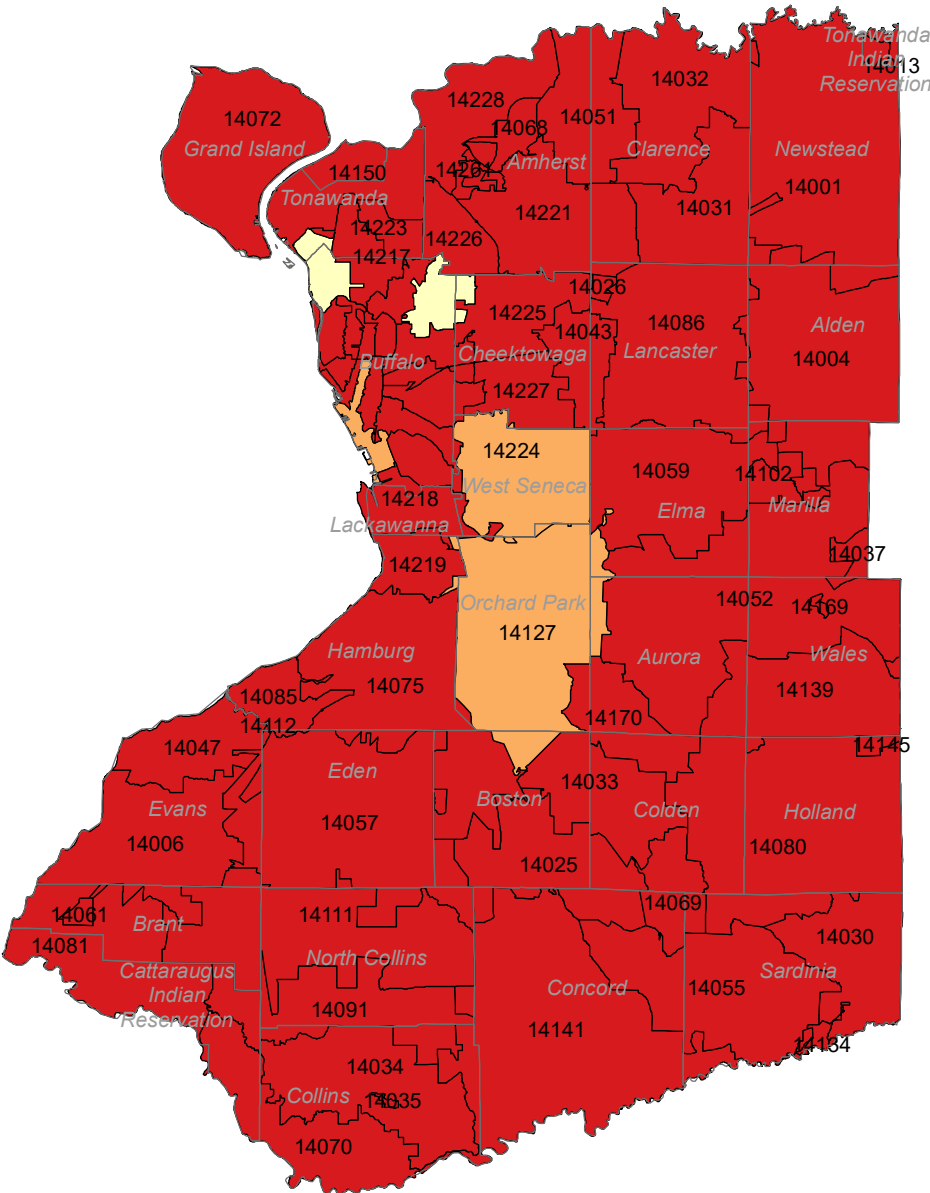
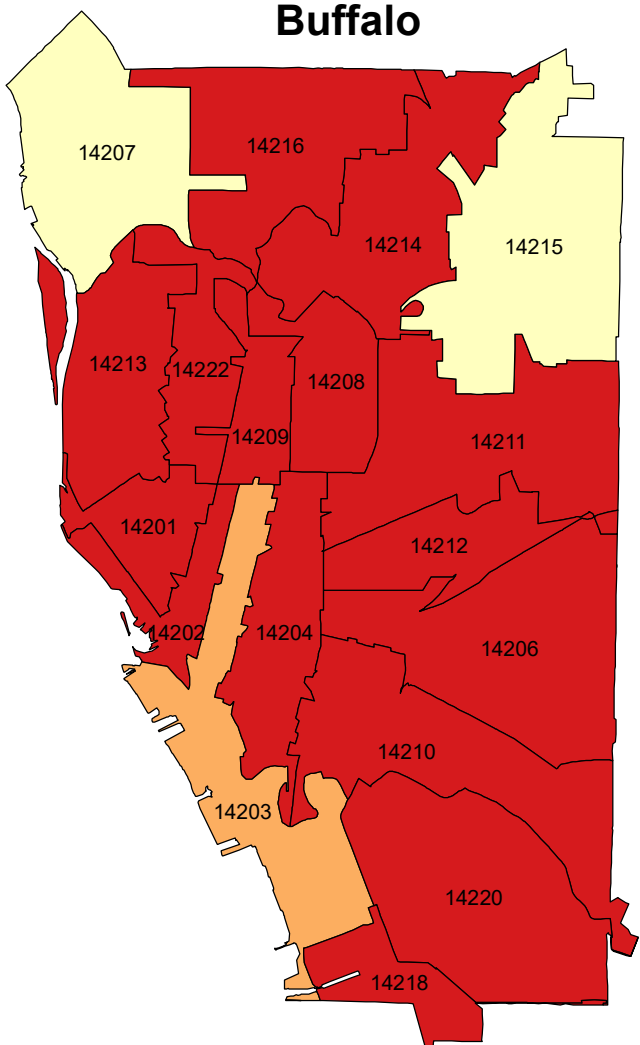
- Descriptive Maps of Treatment Program Locations
 - Treatment programs continue to be concentrated in the more urbanized northwestern portion of Erie County, with many ZIP codes in the rural eastern and southern portions of the county having few or no programs.
 - Many of the ZIP codes in the City of Buffalo contain 5 or more treatment programs.
 - Emergency programs are concentrated in the City of Buffalo, in ZIP Codes 14203, 14207, and 14215.
 - Inpatient programs primarily provide alignment within the City of Buffalo, City of Lackawanna, and West Seneca.
 - Given their number, the distribution of Outpatient programs is similar to the distribution for all programs.
 - Support programs are concentrated in the City of Buffalo with a few exceptions in more eastern suburban areas and Orchard Park.
- Maps of Highest Risk Locations with Treatment Programs
 - Erie County Excluding City of Buffalo
 - Overall, there is fair alignment of programs in the ZIP Codes with highest risk. There are no programs in 14219 and 14025. The remaining areas of highest risk have more substantial levels of services available with 2 or more programs in most areas and 1 program in 14001 and 14004.
 - Emergency, inpatient, and support programs are heavily concentrated in the City of Buffalo. Emergency programs outside the city are limited to Depew and Orchard Park. There are no highest risk zip codes with emergency programs, and only 1 inpatient program in those ZIPs outside the city of Buffalo.
 - Support program alignment to higher risk ZIPs is lacking outside of the suburbs around the city of Buffalo.
 - There is relatively good alignment of outpatient programs in many areas of the County, however northern Hamburg (14219) and 142015 presently lacks any outpatient program alignment.

- City of Buffalo Only
 - Overall, there is good alignment for mental health programs with all of the highest risk ZIP Codes in the city having more than five programs.
 - The alignment of emergency and inpatient programs within the city to areas of highest risk is generally poor. ZIP 14211 lacks any programs in borders while the others have only a few.
 - Overall alignment of outpatient and support programs is very good within the city, with all highest risk locations having at least one program, but often having four or more.

- Accessibility Maps
 - Erie County Excluding City of Buffalo
 - Overall access to mental health programs, as well as outpatient programs is excellent with total alignment for all locations aligned within a 10-mile radius. All highest risk ZIP Codes have access to programs within ten miles, including access to programs outside of Erie County.
 - Inpatient and support programs are clustered around the city and its suburbs. A few of the higher risk ZIPs are lacking coverage as they get farther from Buffalo
 - City of Buffalo Only
 - Overall alignment in the city is good.
 - Access to emergency and inpatient programs are concentrated around portions of northeast and central parts of the city. Portions of ZIP Codes 14215 and 14211 have access to these programs. The remainder of these areas are without access within one mile.
 - Access to outpatient and support programs is well aligned to most of the highest risk areas. The exceptions being the southern part of 14203 lacking either program and the eastern part of 14215 is lacking access to support programs.

- Change in Accessibility Maps (2021 to 2023)
 - Erie County Excluding City of Buffalo
 - Overall access to all mental health programs as well as outpatient programs is almost fully aligned throughout the county since 2021. There is a small area in the southeast corner that lacks alignment.
 - Accessibility to emergency programs has decreased across the time period and is lacking coverage in the rural areas in the northeast and southwest.
 - Accessibility to inpatient programs has stayed the same during this time, once again leading to rural areas not having coverage.
 - Support programs have increased in county-level alignment since 2021 notably covering the higher risk ZIP of 14006.
 - City of Buffalo Only
 - Overall program alignment in the city has improved since 2021. Notably programs alignment has improved in 14211 and 14203. There was a slight shift of alignment in 14220 as well with some areas. This pattern also persists for Outpatient programs.
 - Access to emergency programs and inpatient programs has not changed. There is roughly 50% alignment to highest risk areas.
 - Support programs have seen an expansion in availability since 2021, primarily in 14216 North Buffalo

Erie County Mental Health Treatment Programs: Emergency Programs

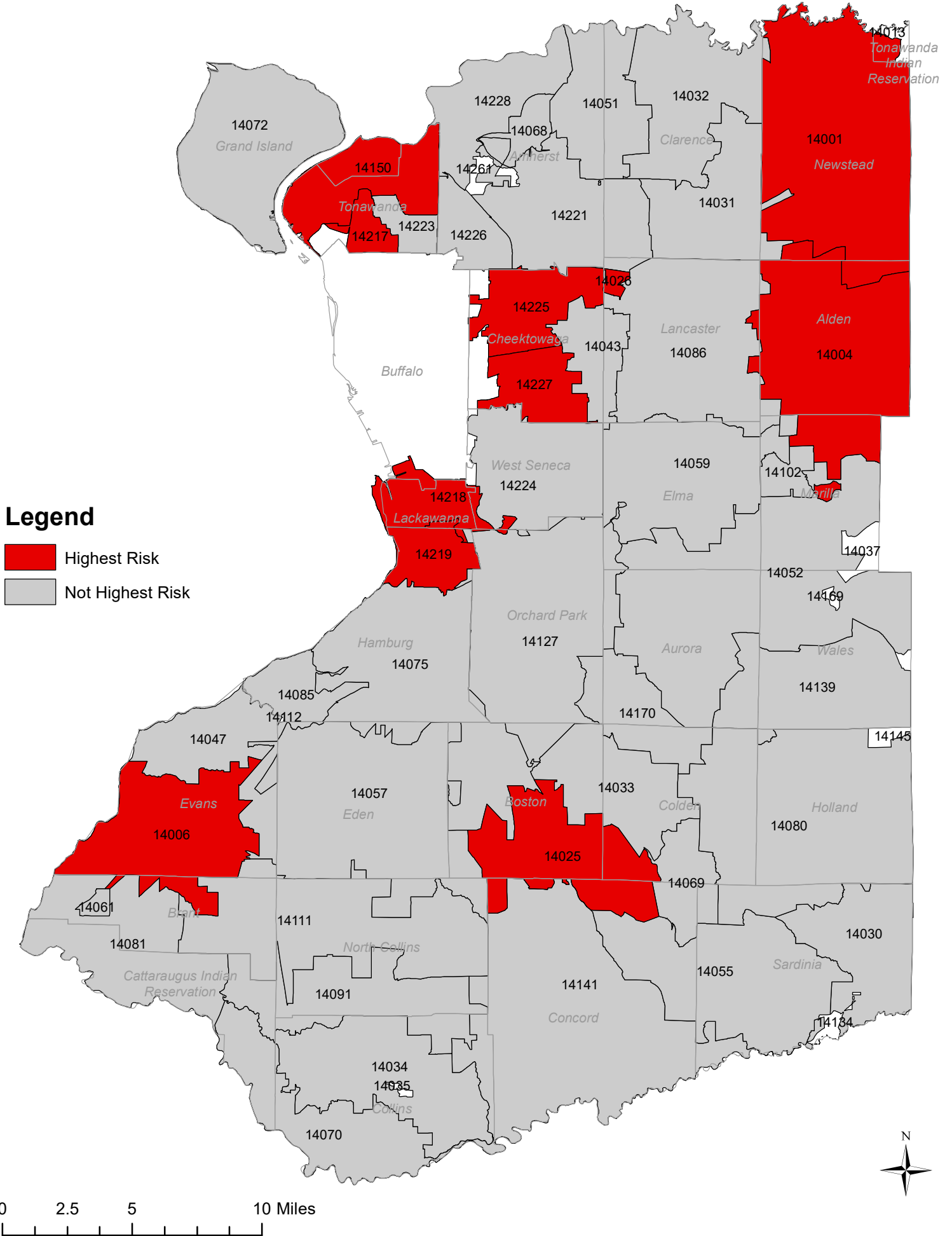


- Legend**
- No Treatment Programs
 - One Treatment Program
 - A Few Treatment Programs (2 or 3)
 - Some Treatment Programs (4 or 5)
 - Many Treatment Programs (more than 5)

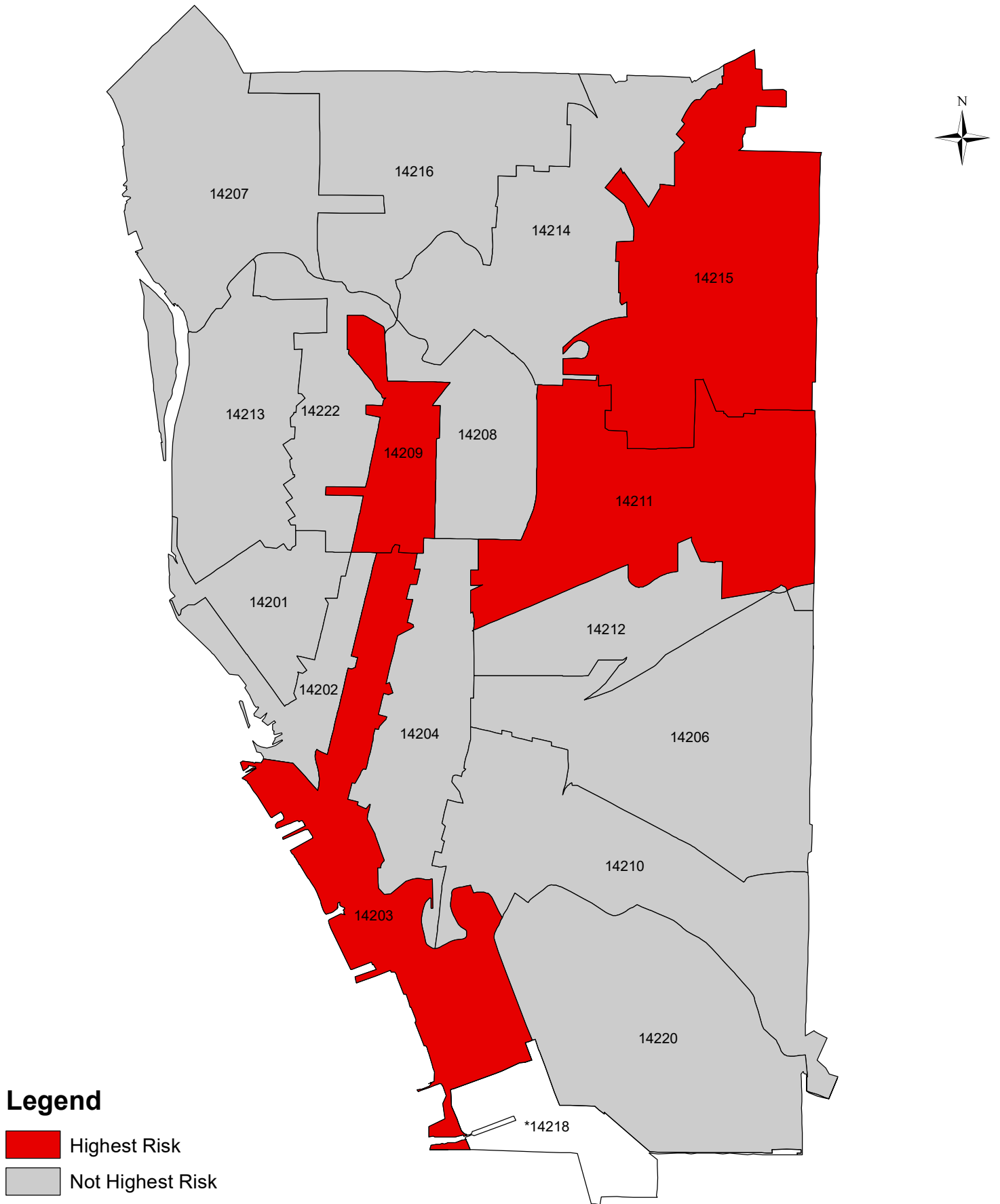


ZIP Codes with Highest Level of Aggregated Risk

[Erie County Excluding City of Buffalo, with Municipal Boundaries]

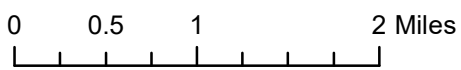


ZIP Codes with Highest Level of Aggregated Risk [City of Buffalo Only]



Legend

- Highest Risk
- Not Highest Risk



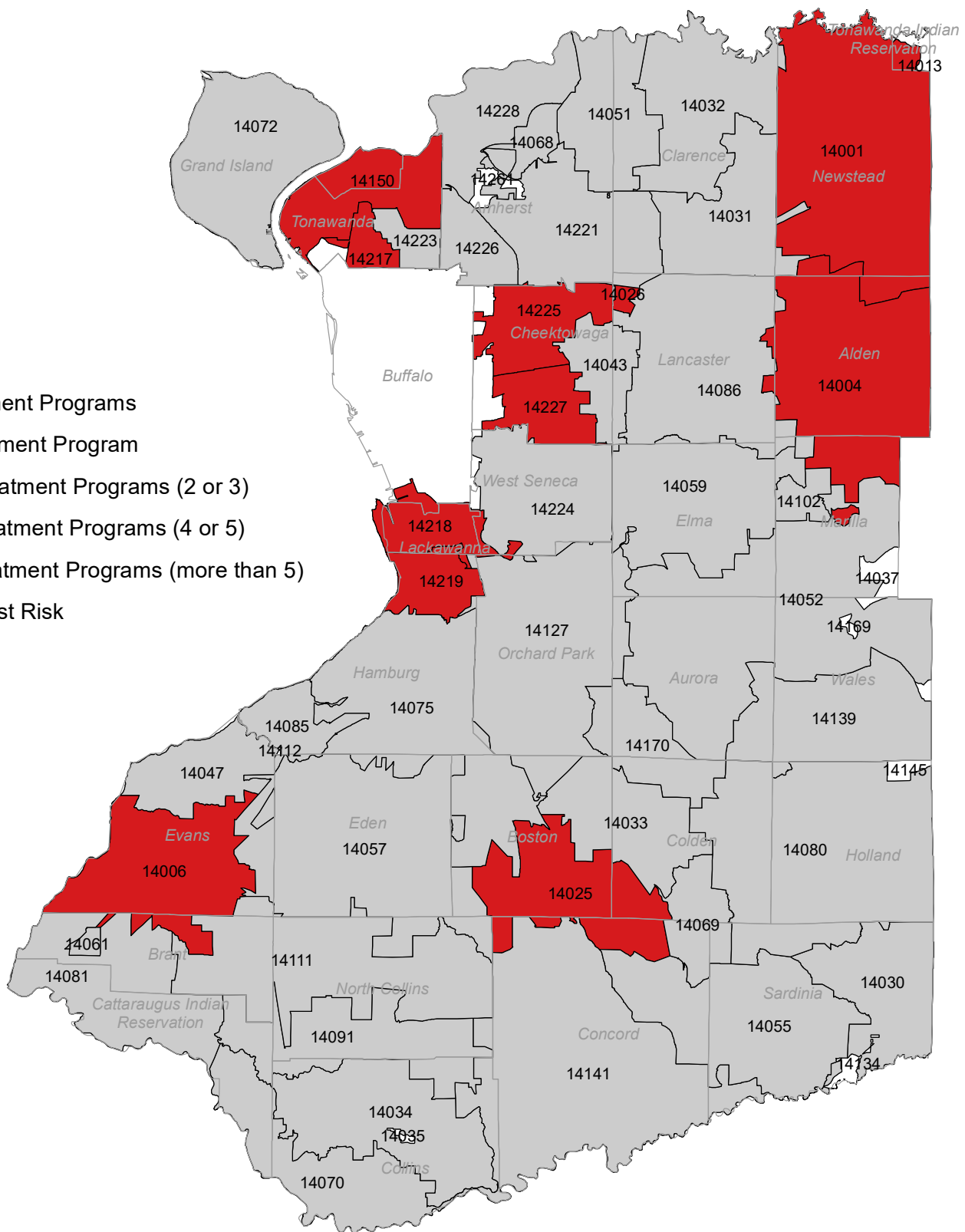
*The majority of Zip Code 14218 is outside the City of Buffalo

ZIP Codes with Highest Level of Aggregated Risk by Number of Emergency Programs

[Erie County Excluding City of Buffalo, with Municipal Boundaries]

Legend

- No Treatment Programs
- One Treatment Program
- A Few Treatment Programs (2 or 3)
- Some Treatment Programs (4 or 5)
- Many Treatment Programs (more than 5)
- Not Highest Risk

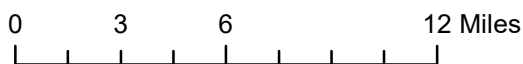
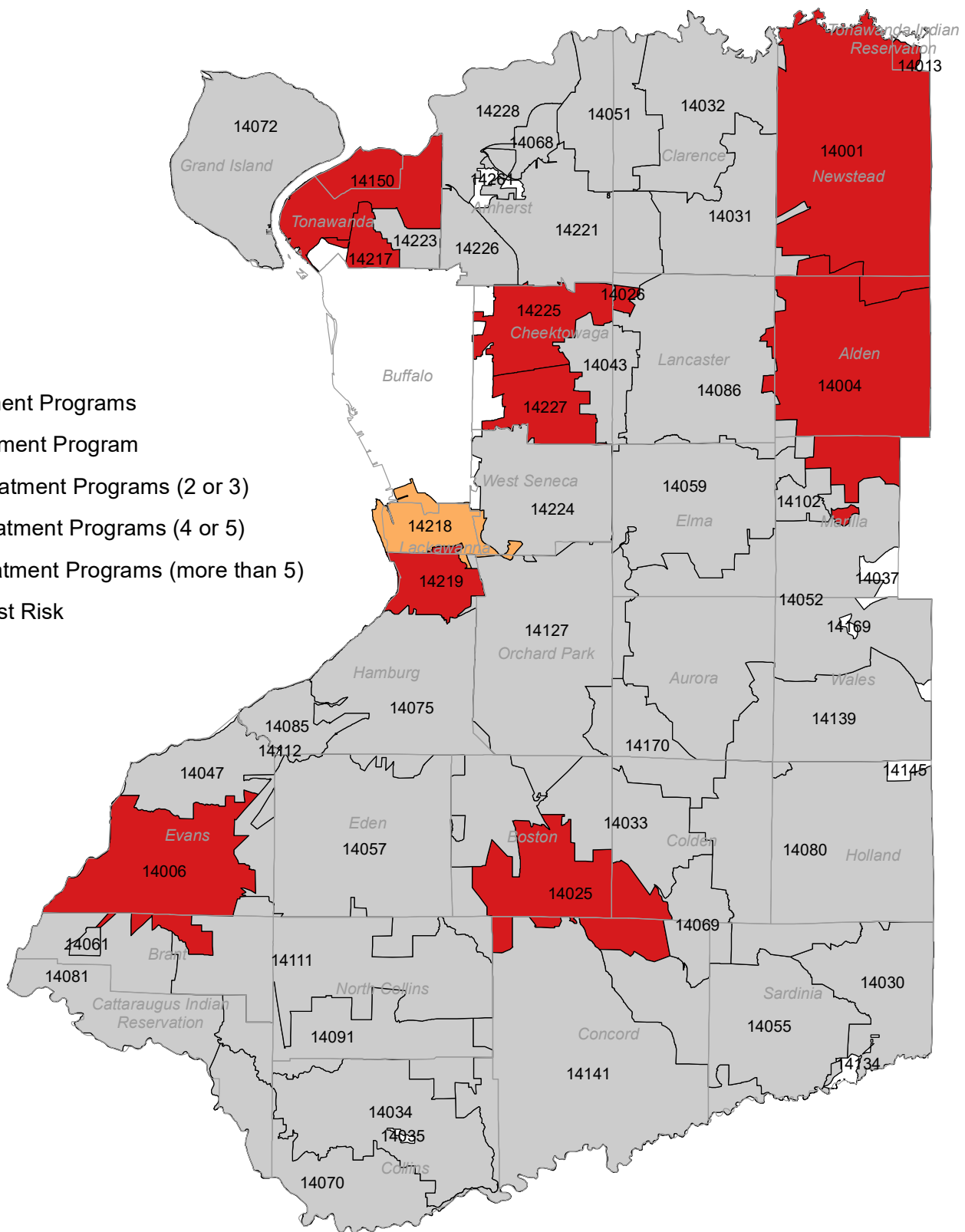


ZIP Codes with Highest Level of Aggregated Risk by Number of Inpatient Programs

[Erie County Excluding City of Buffalo, with Municipal Boundaries]

Legend

- No Treatment Programs
- One Treatment Program
- A Few Treatment Programs (2 or 3)
- Some Treatment Programs (4 or 5)
- Many Treatment Programs (more than 5)
- Not Highest Risk

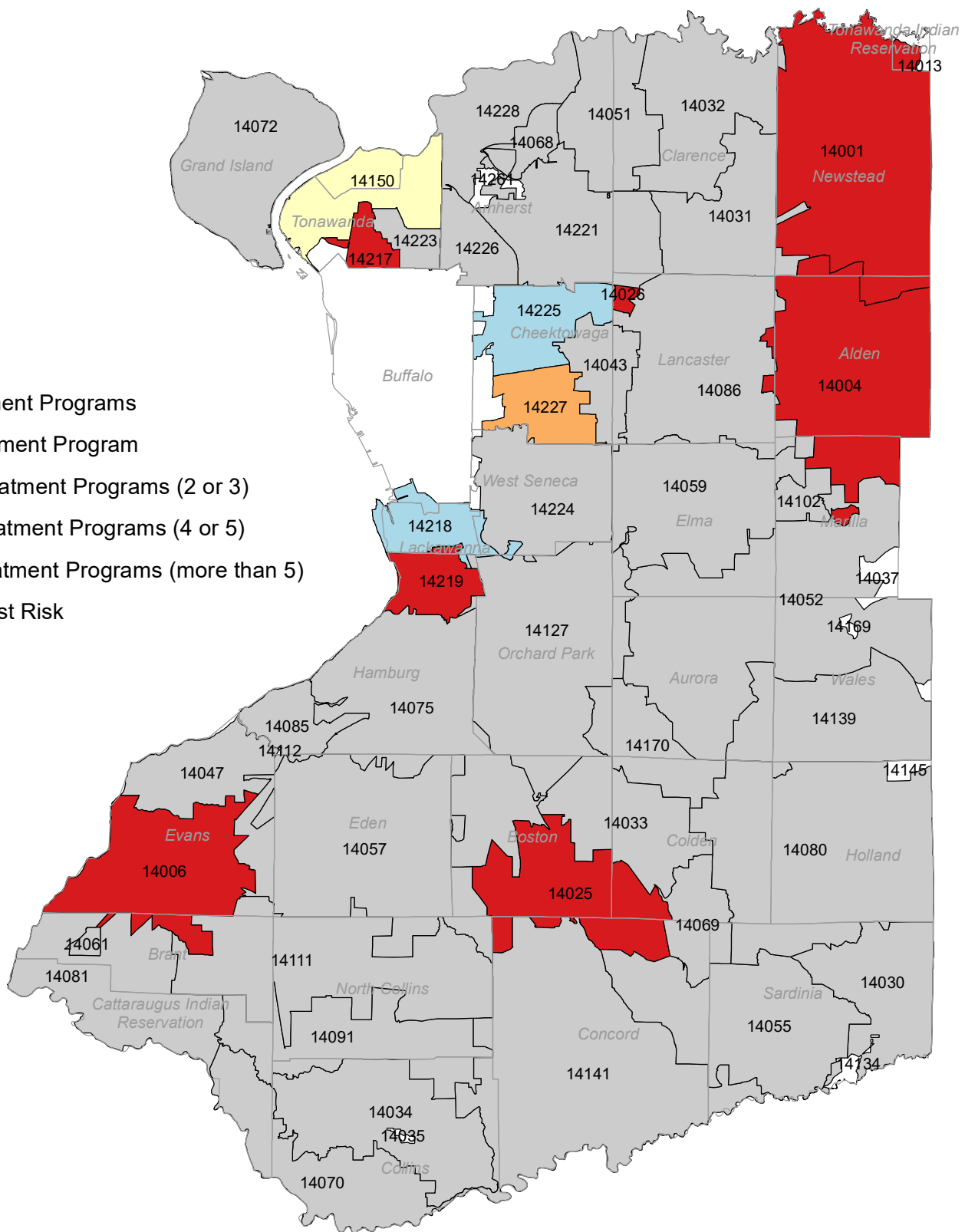


ZIP Codes with Highest Level of Aggregated Risk by Number of Support Programs

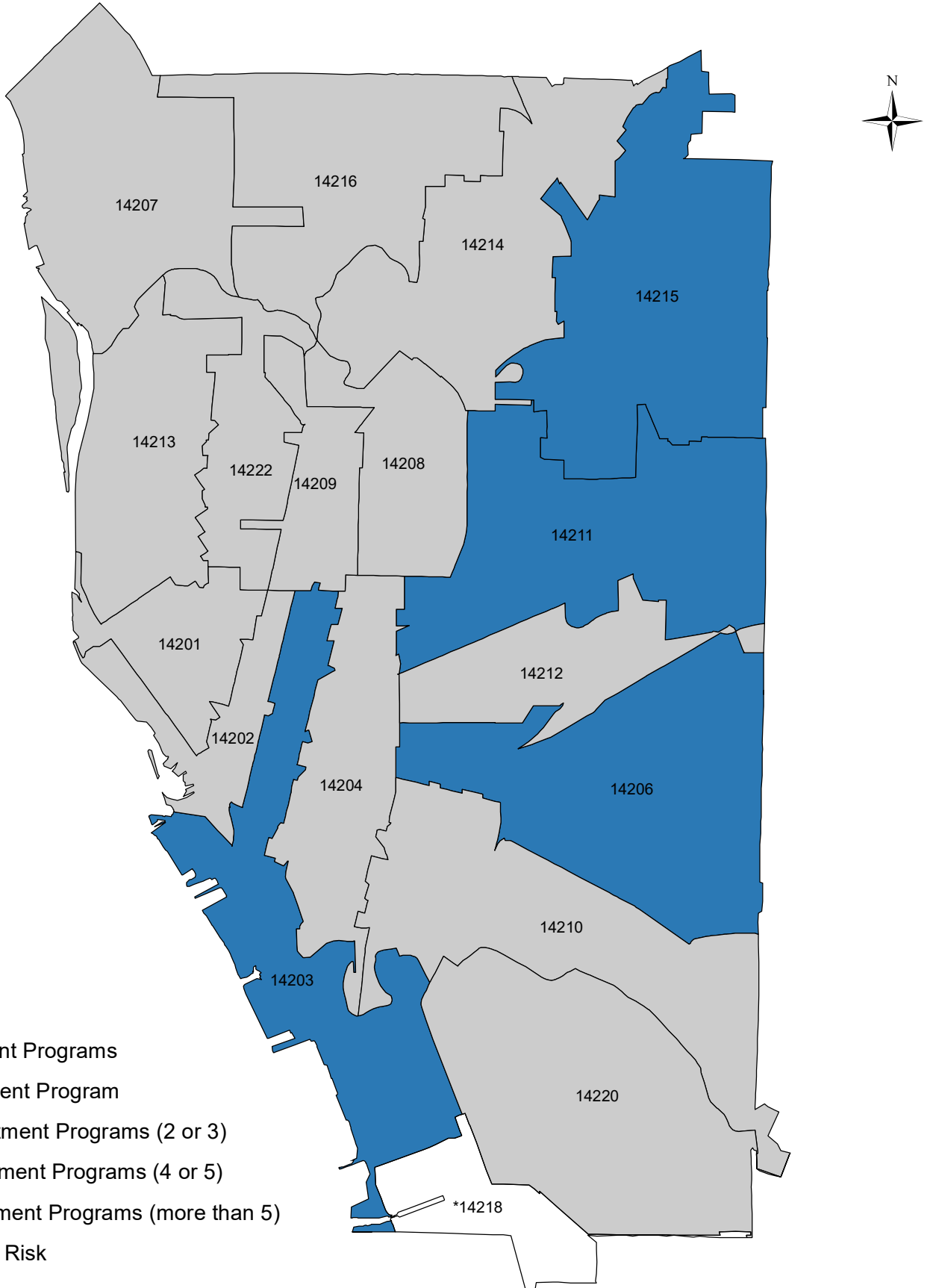
[Erie County Excluding City of Buffalo, with Municipal Boundaries]

Legend

- No Treatment Programs
- One Treatment Program
- A Few Treatment Programs (2 or 3)
- Some Treatment Programs (4 or 5)
- Many Treatment Programs (more than 5)
- Not Highest Risk



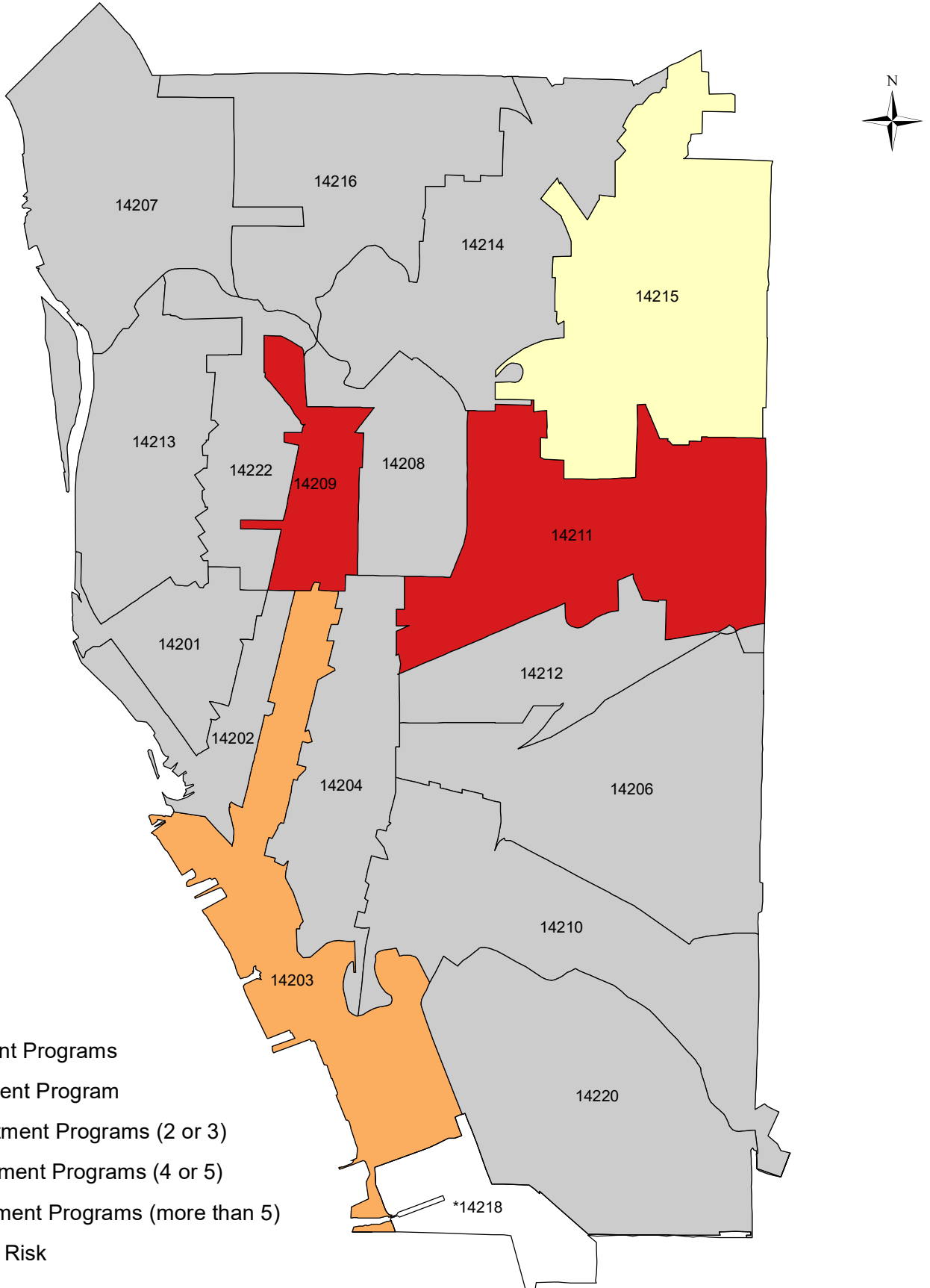
ZIP Codes with Highest Level of Aggregated Risk by Number of Mental Health Treatment Programs [City of Buffalo Only]



0 0.5 1 2 Miles

*The majority of ZIP Code 14218 is outside the City of Buffalo

ZIP Codes with Highest Level of Aggregated Risk by Number of Emergency Programs [City of Buffalo Only]



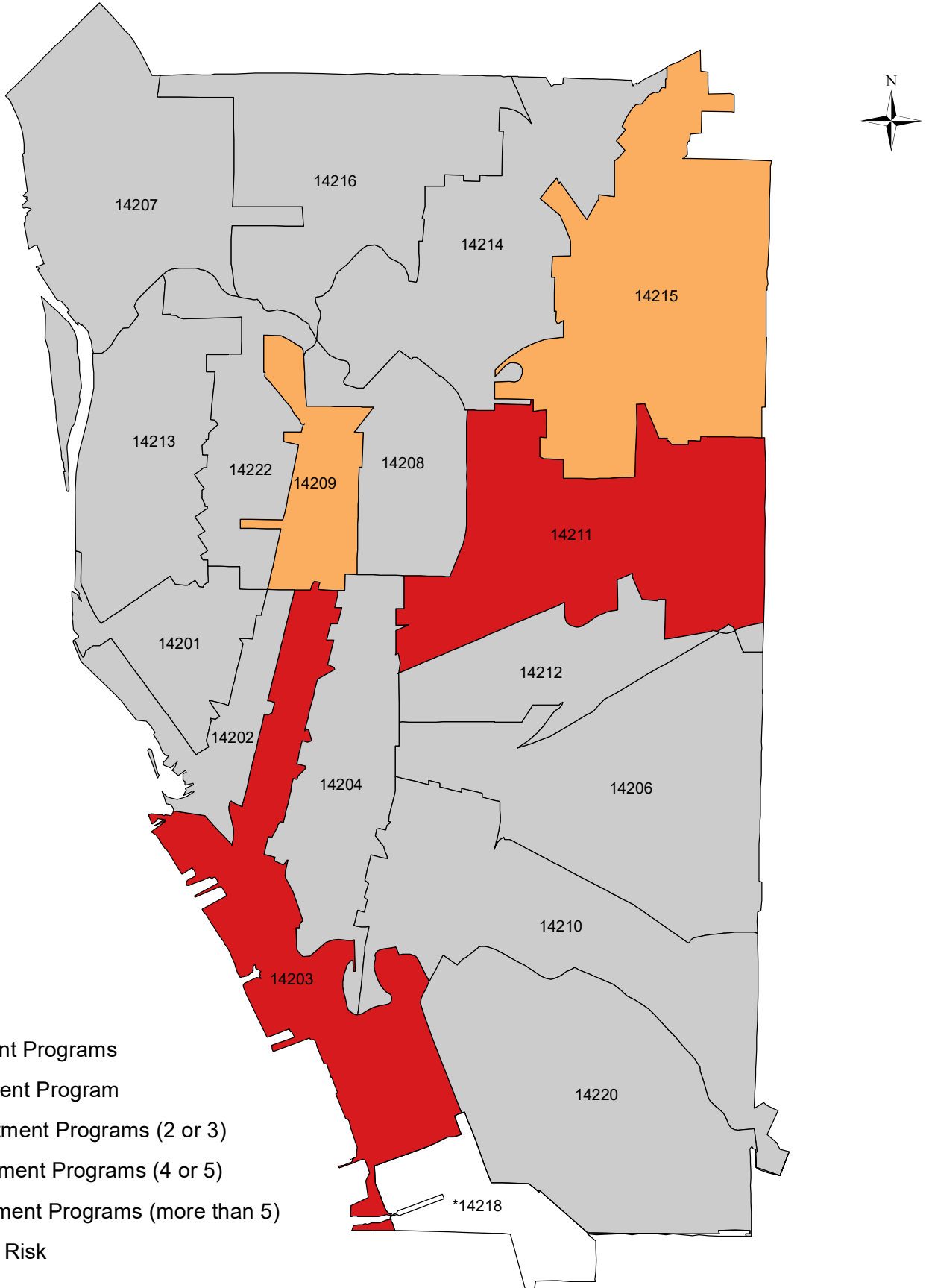
Legend

- No Treatment Programs
- One Treatment Program
- A Few Treatment Programs (2 or 3)
- Some Treatment Programs (4 or 5)
- Many Treatment Programs (more than 5)
- Not Highest Risk

0 0.5 1 2 Miles

*The majority of ZIP Code 14218 is outside the City of Buffalo

ZIP Codes with Highest Level of Aggregated Risk by Number of Inpatient Programs [City of Buffalo Only]



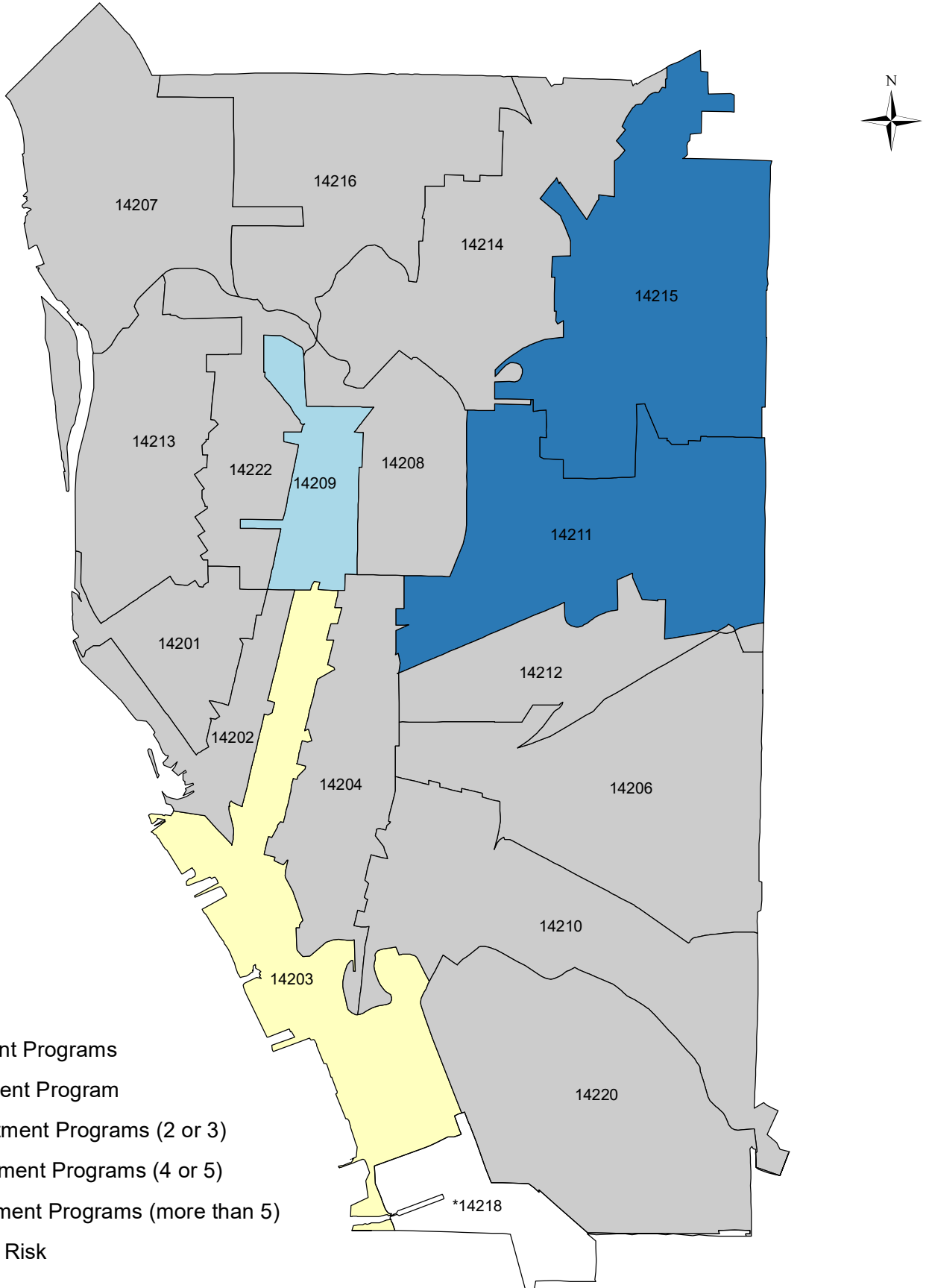
Legend

- No Treatment Programs
- One Treatment Program
- A Few Treatment Programs (2 or 3)
- Some Treatment Programs (4 or 5)
- Many Treatment Programs (more than 5)
- Not Highest Risk

0 0.5 1 2 Miles

*The majority of ZIP Code 14218 is outside the City of Buffalo

ZIP Codes with Highest Level of Aggregated Risk by Number of Outpatient Programs [City of Buffalo Only]



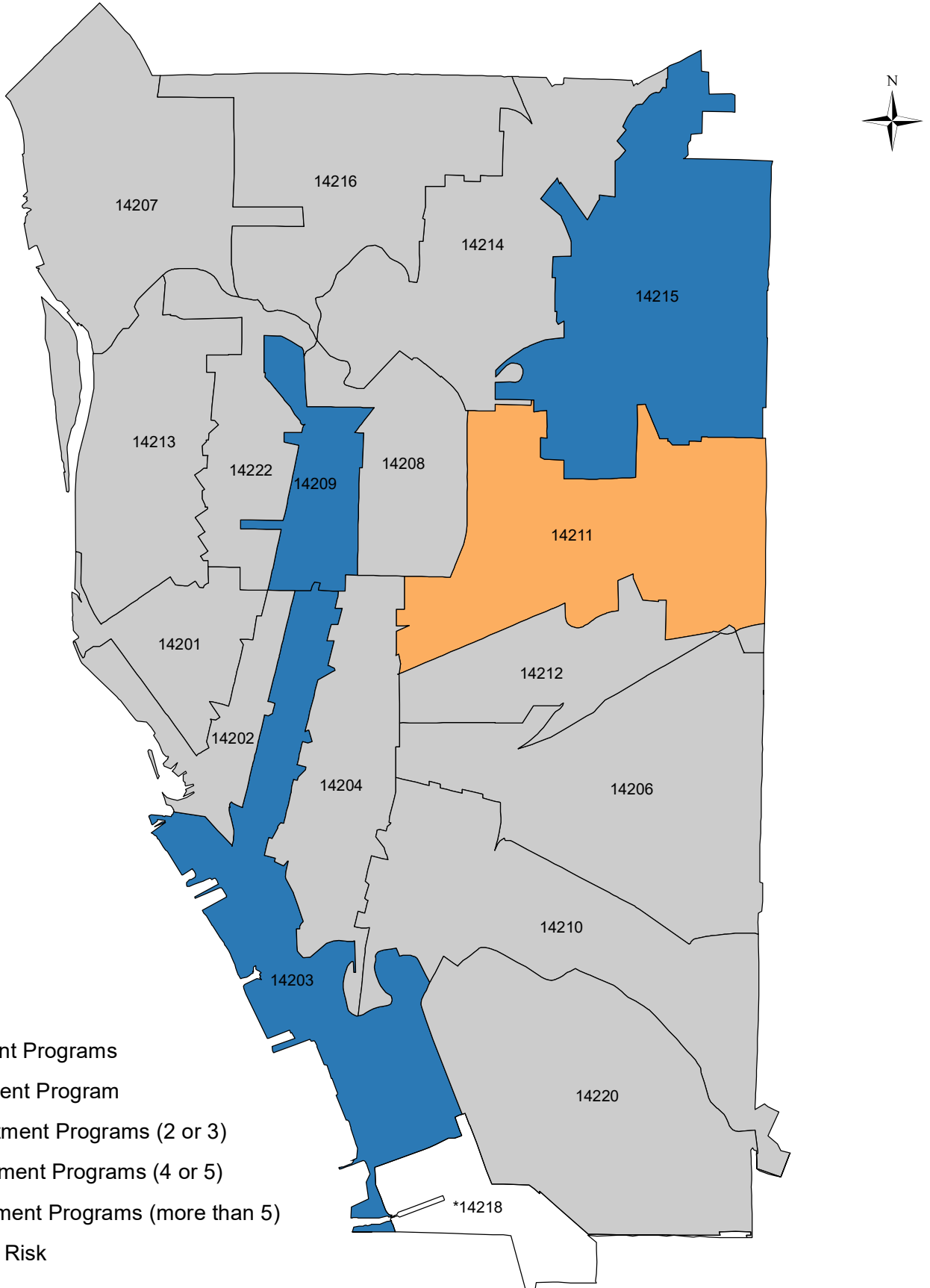
Legend

- No Treatment Programs
- One Treatment Program
- A Few Treatment Programs (2 or 3)
- Some Treatment Programs (4 or 5)
- Many Treatment Programs (more than 5)
- Not Highest Risk

0 0.5 1 2 Miles

*The majority of ZIP Code 14218 is outside the City of Buffalo

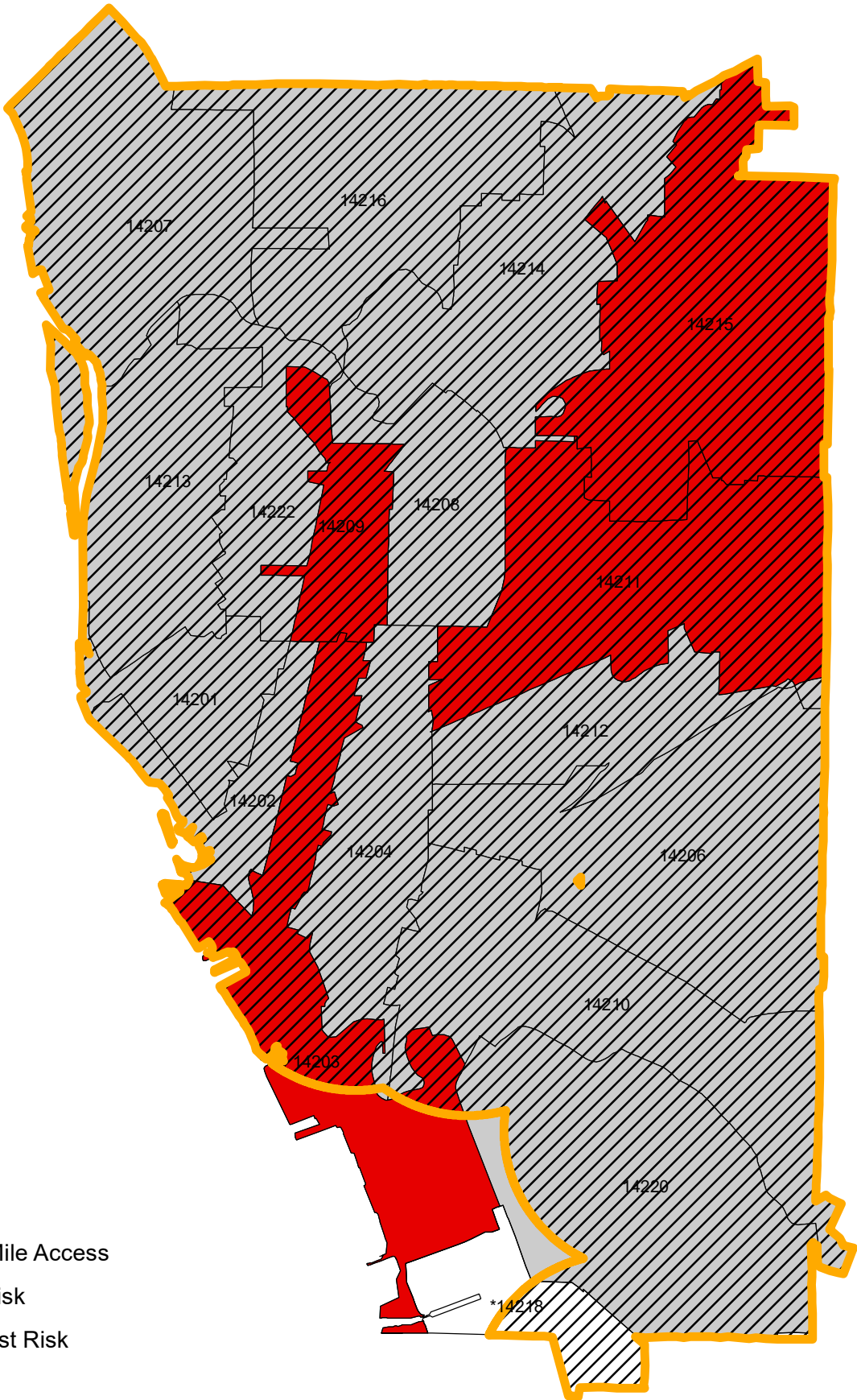
ZIP Codes with Highest Level of Aggregated Risk by Number of Support Programs [City of Buffalo Only]






0 0.5 1 2 Miles

*The majority of ZIP Code 14218 is outside the City of Buffalo

Accessibility to Mental Health Programs (Within 1 Mile Access) [City of Buffalo Only]



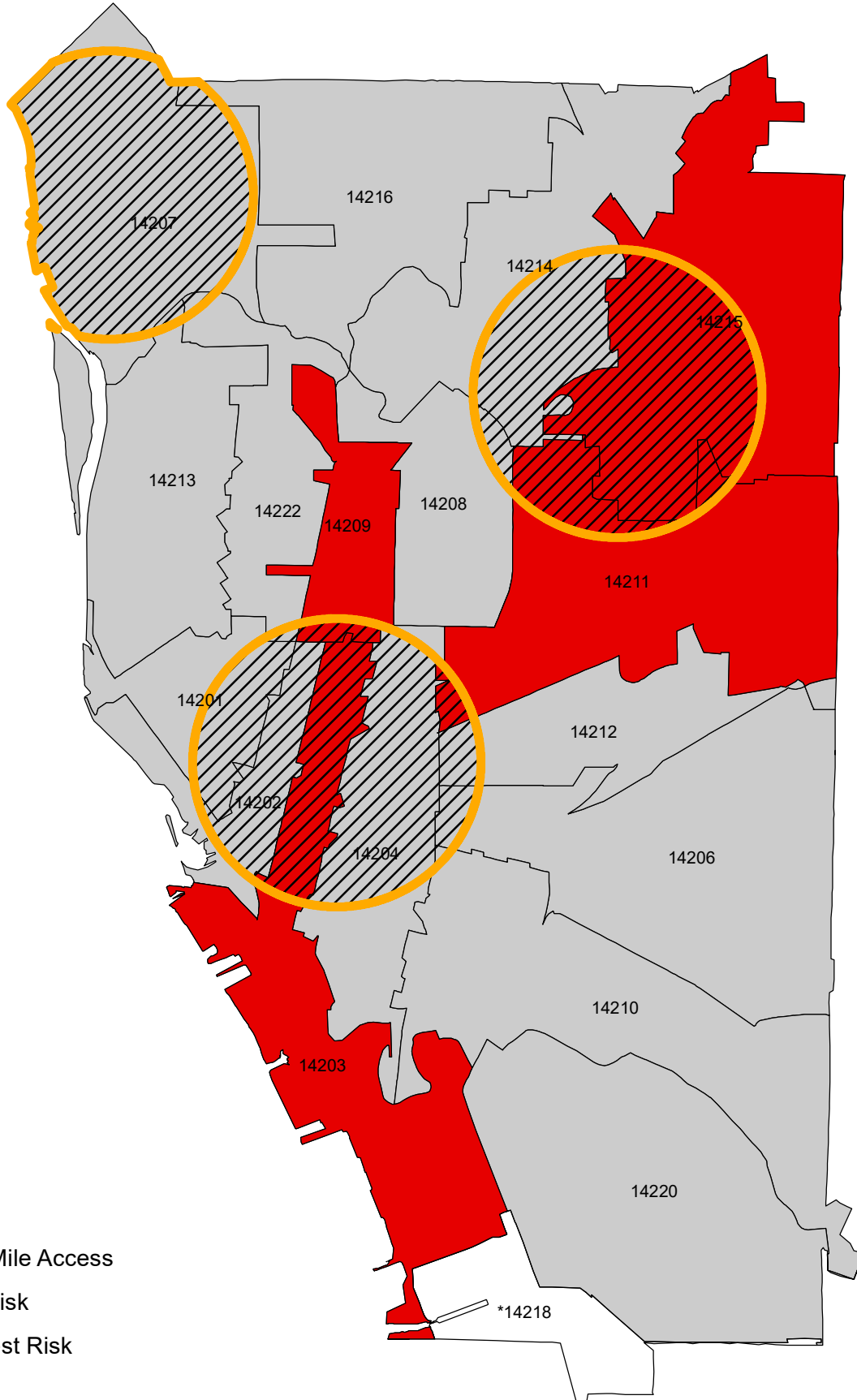
Legend

-  Within 1 Mile Access
-  Highest Risk
-  Not Highest Risk




0 0.5 1 2 Miles

*The majority of ZIP Code 14218 is outside the City of Buffalo

Accessibility to Emergency Programs (Within 1 Mile Access) [City of Buffalo Only]



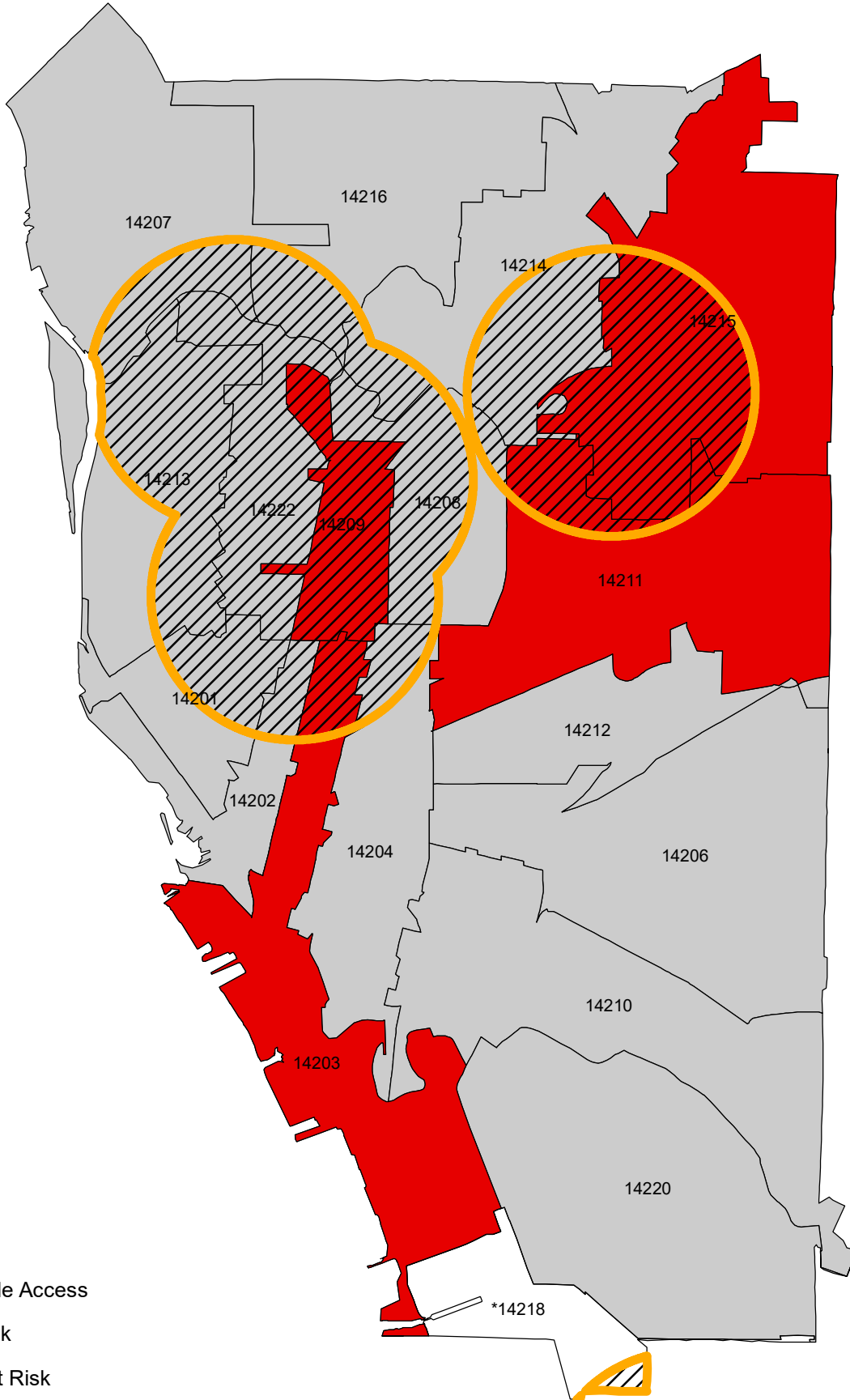
Legend

-  Within 1 Mile Access
-  Highest Risk
-  Not Highest Risk




0 0.5 1 2 Miles

*The majority of ZIP Code 14218 is outside the City of Buffalo

Accessibility to Inpatient Programs (Within 1 Mile Access) [City of Buffalo Only]



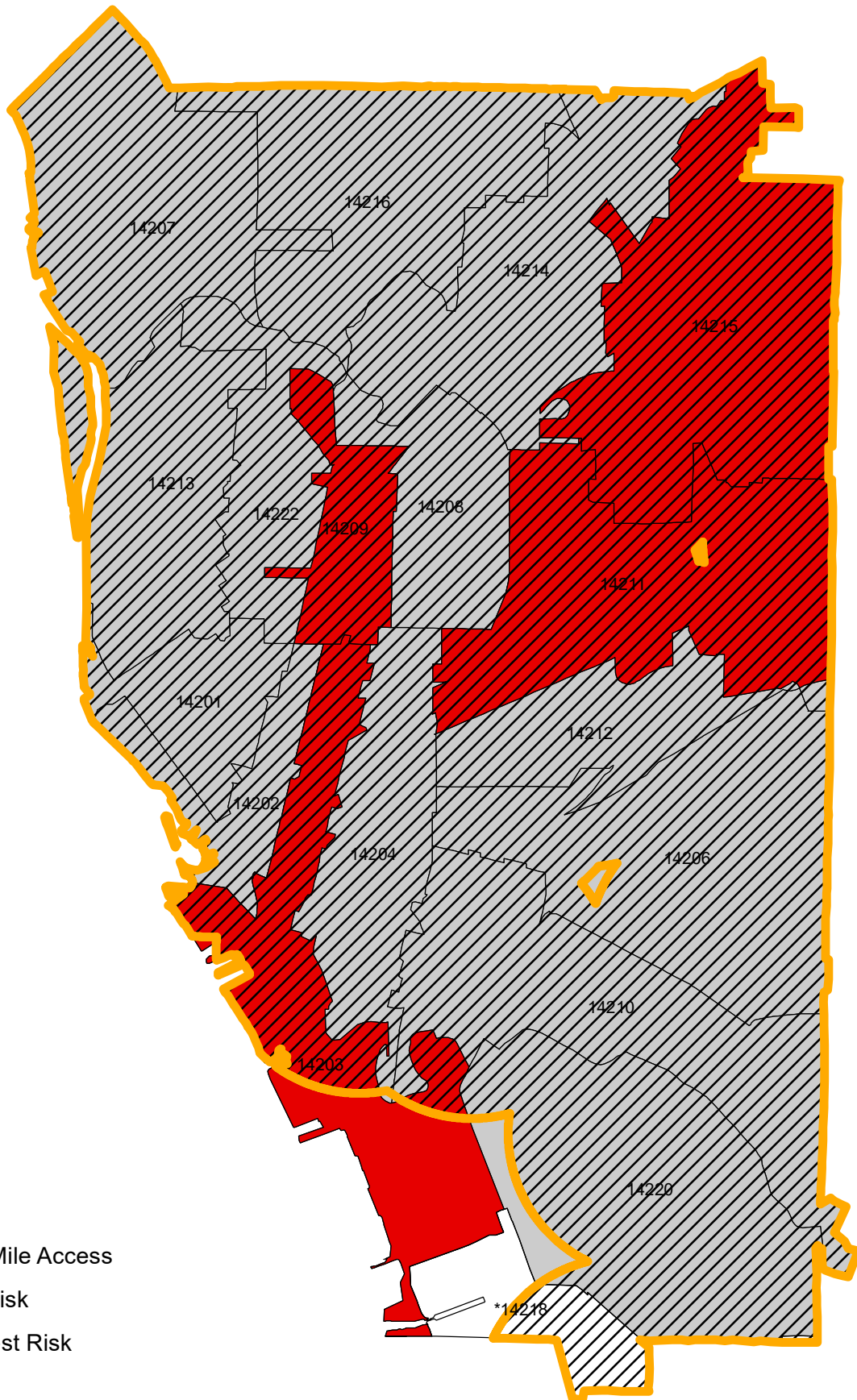
Legend

-  Within 1 Mile Access
-  Highest Risk
-  Not Highest Risk




0 0.5 1 2 Miles

*The majority of ZIP Code 14218 is outside the City of Buffalo

Accessibility to Outpatient Programs (Within 1 Mile Access) [City of Buffalo Only]



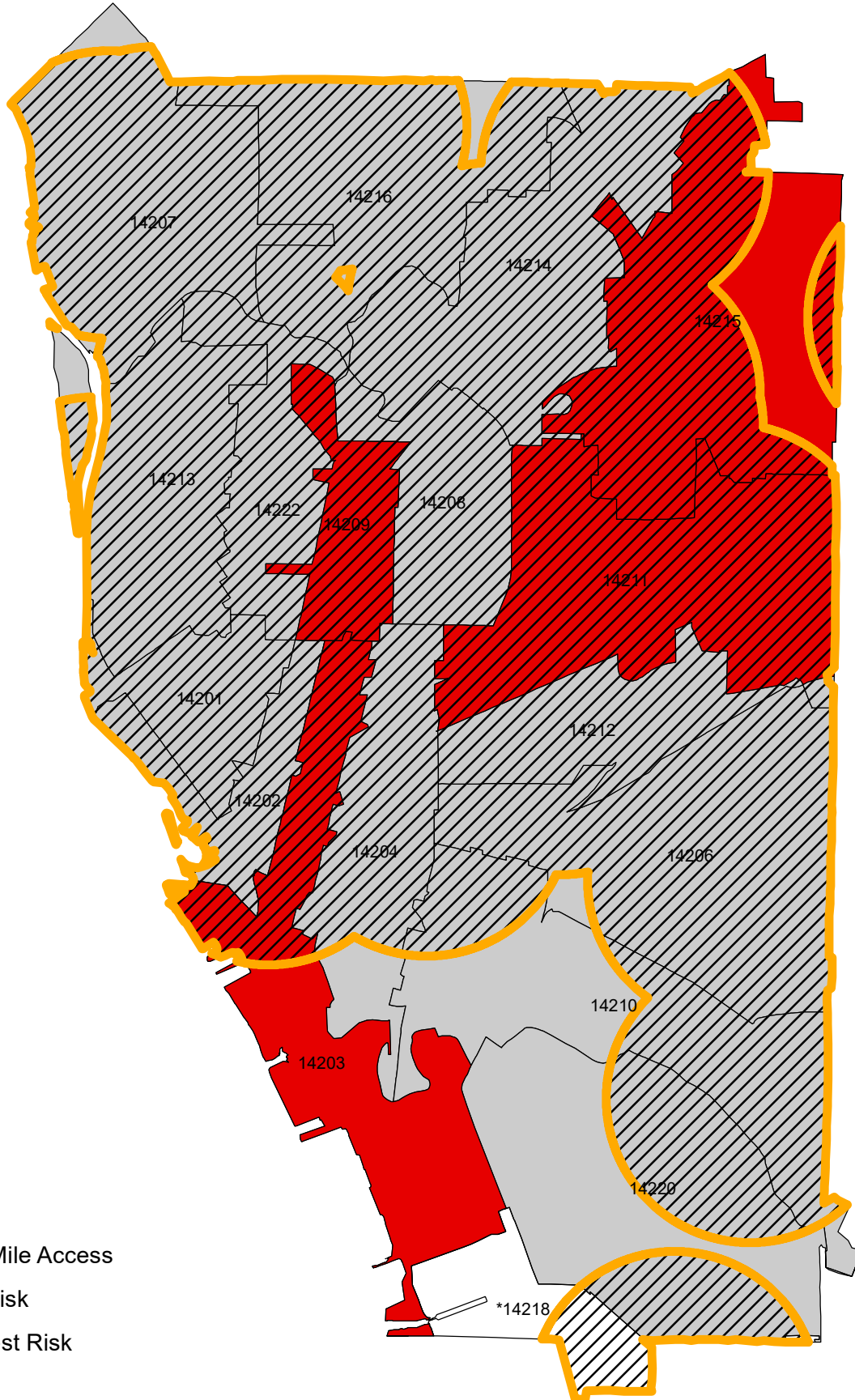
Legend

-  Within 1 Mile Access
-  Highest Risk
-  Not Highest Risk




0 0.5 1 2 Miles

*The majority of ZIP Code 14218 is outside the City of Buffalo

Accessibility to Support Programs (Within 1 Mile Access) [City of Buffalo Only]



Legend

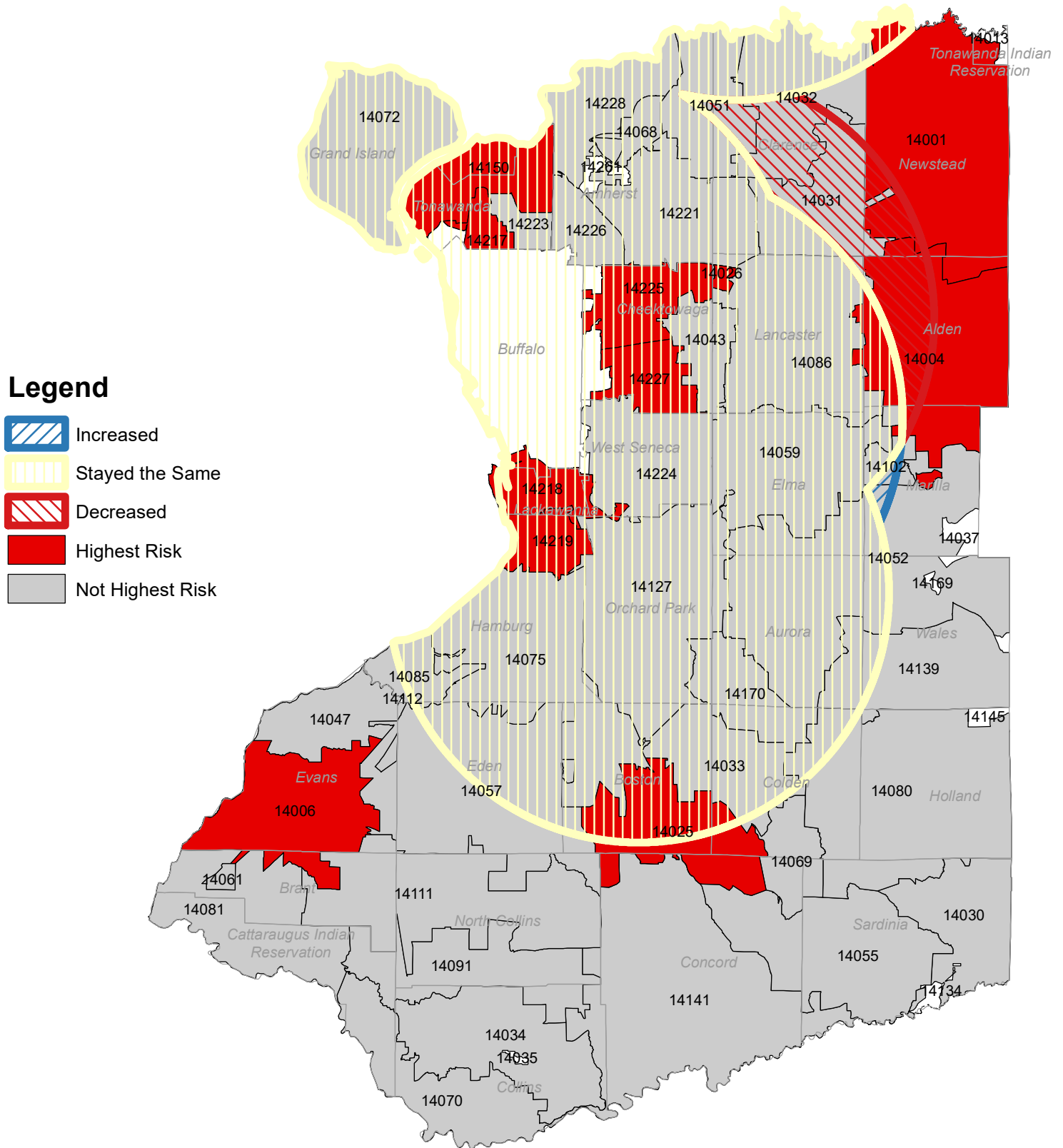
-  Within 1 Mile Access
-  Highest Risk
-  Not Highest Risk

0 0.5 1 2 Miles

*The majority of ZIP Code 14218 is outside the City of Buffalo

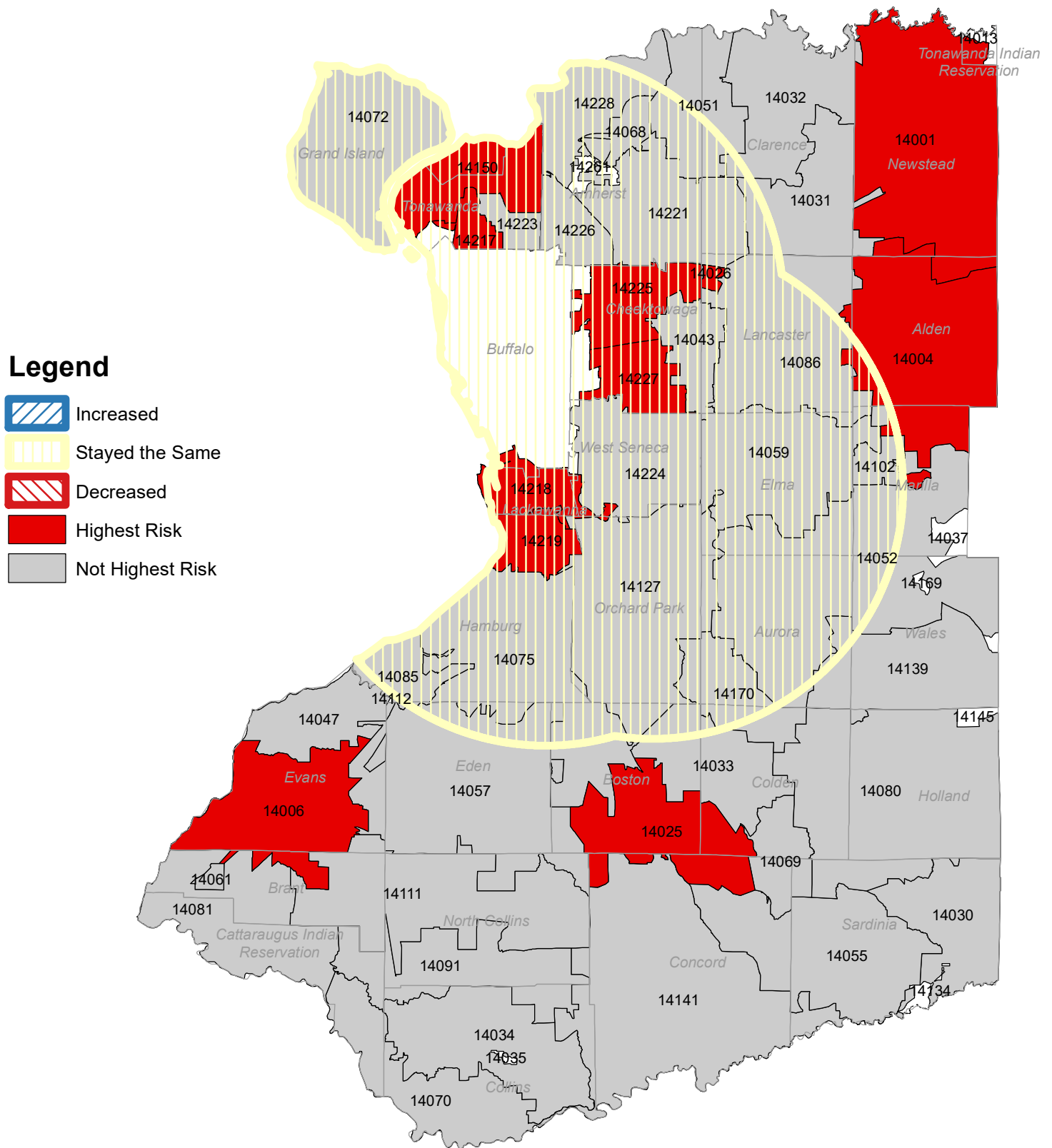
Comparison of Accessibility to Emergency Programs between 2021 & 2023 (Within 10 Miles Access, Includes Out of County Programs)

[Erie County Excluding City of Buffalo, with Municipal Boundaries]








Comparison of Accessibility to Inpatient Programs between 2021 & 2023 (Within 10 Miles Access, Includes Out of County Programs)

[Erie County Excluding City of Buffalo, with Municipal Boundaries]



Legend

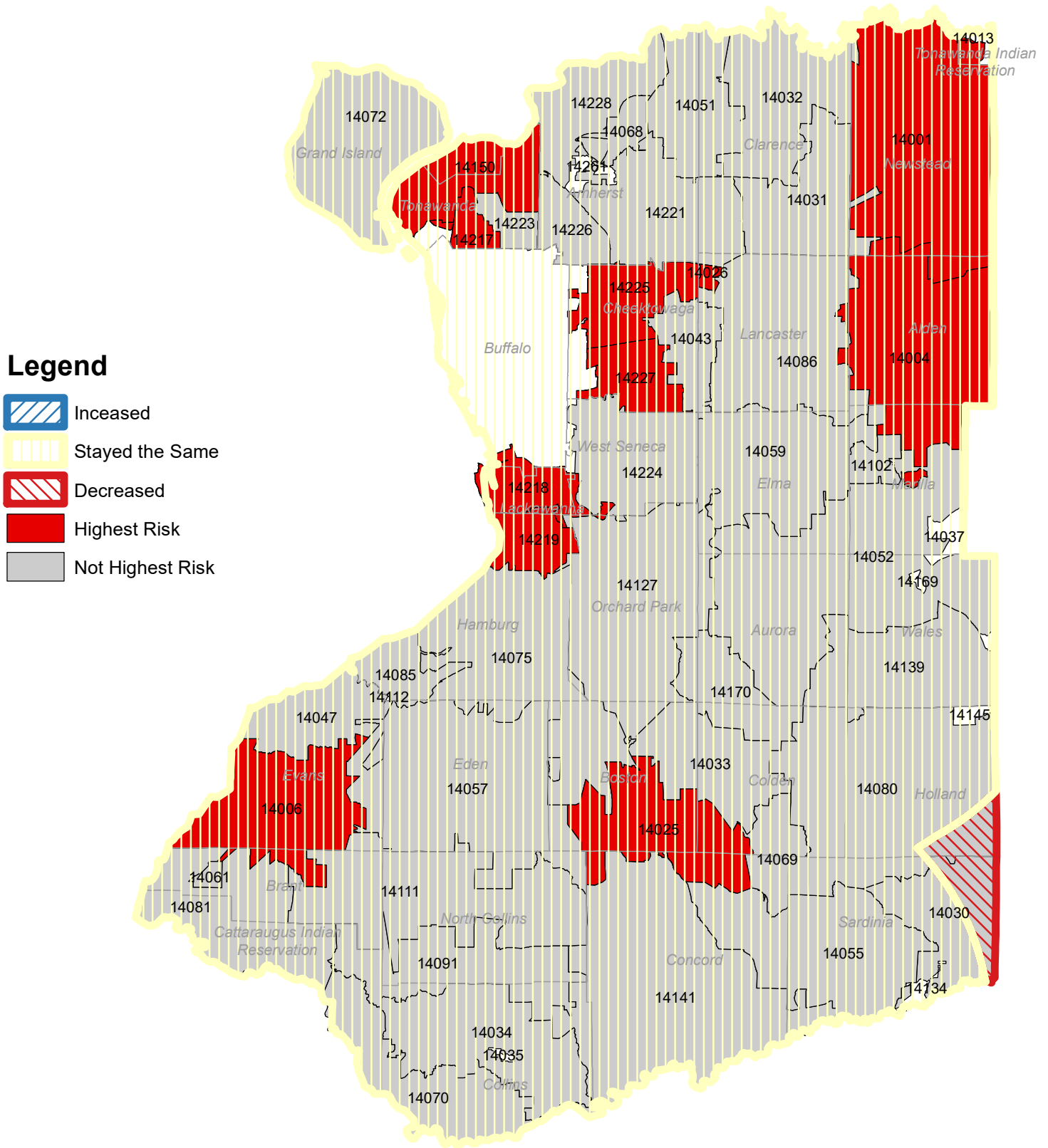
-  Increased
-  Stayed the Same
-  Decreased
-  Highest Risk
-  Not Highest Risk

0 3 6 12 Miles



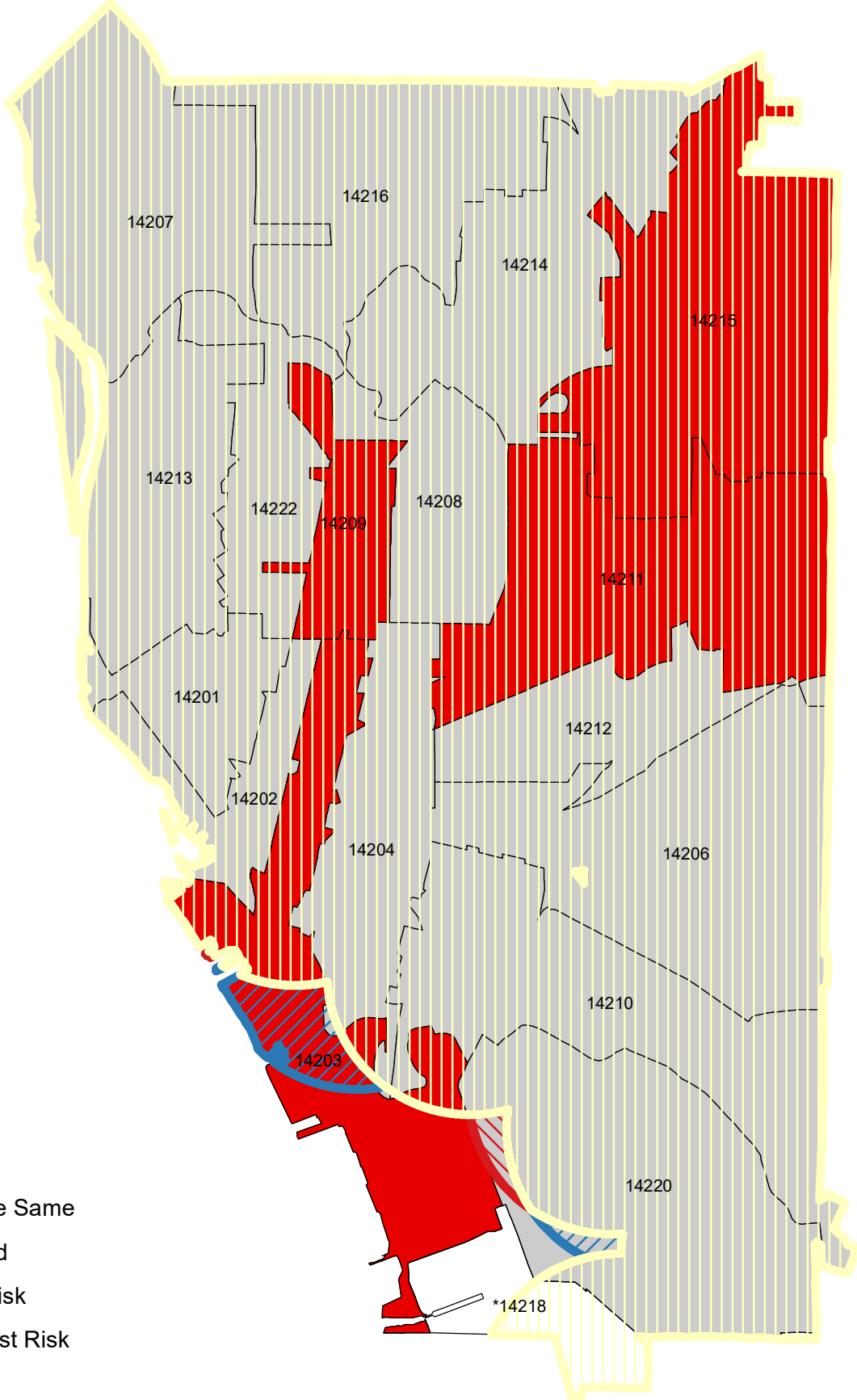
Comparison of Accessibility to Outpatient Programs between 2021 & 2023 (Within 10 Miles Access, Includes Out of County Programs)

[Erie County Excluding City of Buffalo, with Municipal Boundaries]








Comparison of Accessibility to Mental Health Programs between 2021 & 2023 (Within 1 Mile Access)

[City of Buffalo Only]



Legend

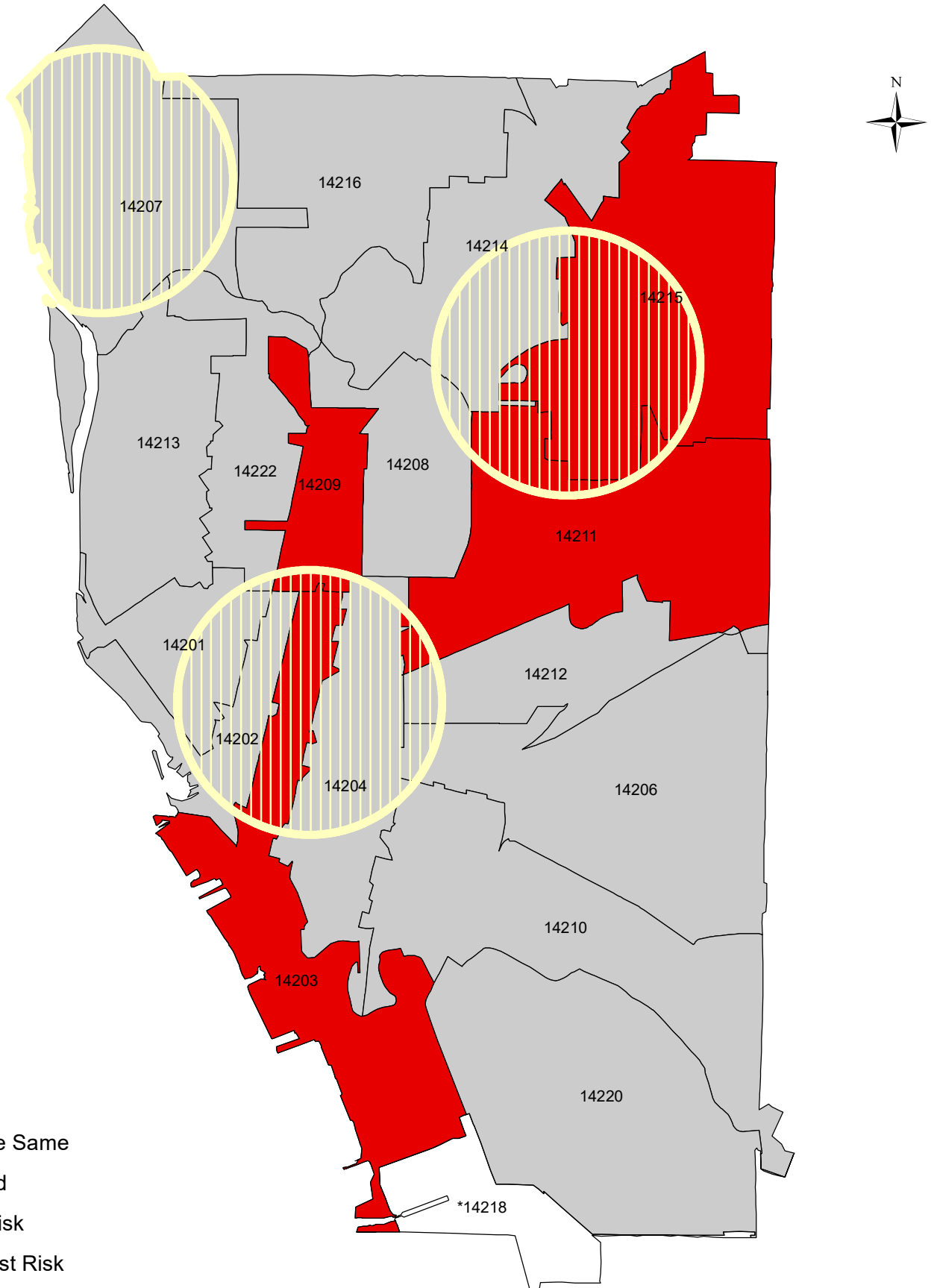
-  Increased
-  Stayed the Same
-  Decreased
-  Highest Risk
-  Not Highest Risk



*The majority of ZIP Code 14218 is outside the City of Buffalo

Comparison of Accessibility to Emergency Programs between 2021 & 2023 (Within 1 Mile Access)

[City of Buffalo Only]



Legend

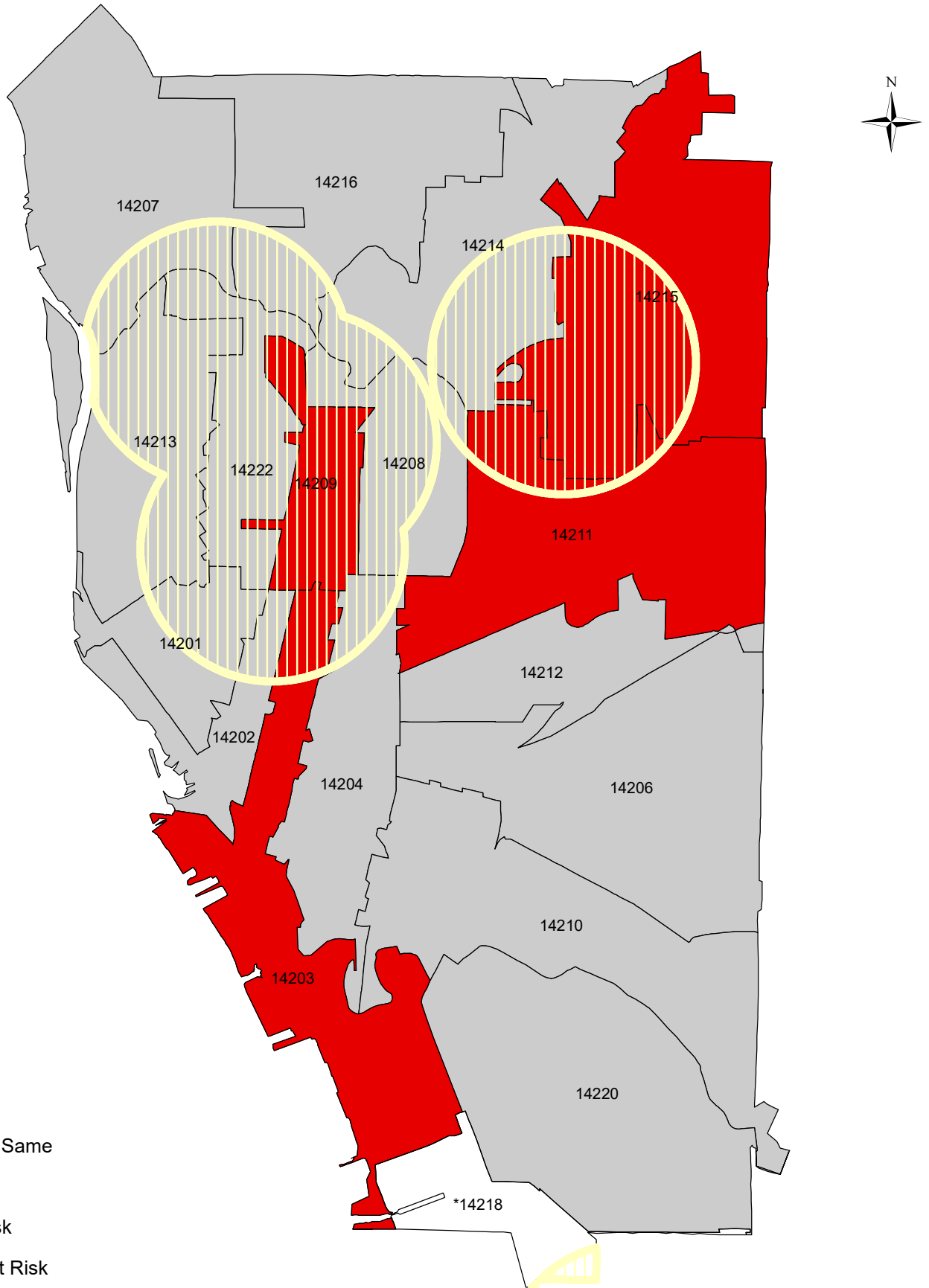
- Increased
- Stayed the Same
- Decreased
- Highest Risk
- Not Highest Risk

0 0.5 1 2 Miles

*The majority of ZIP Code 14218 is outside the City of Buffalo

Comparison of Accessibility to Inpatient Programs between 2021 & 2023 (Within 1 Mile Access)

[City of Buffalo Only]



Legend

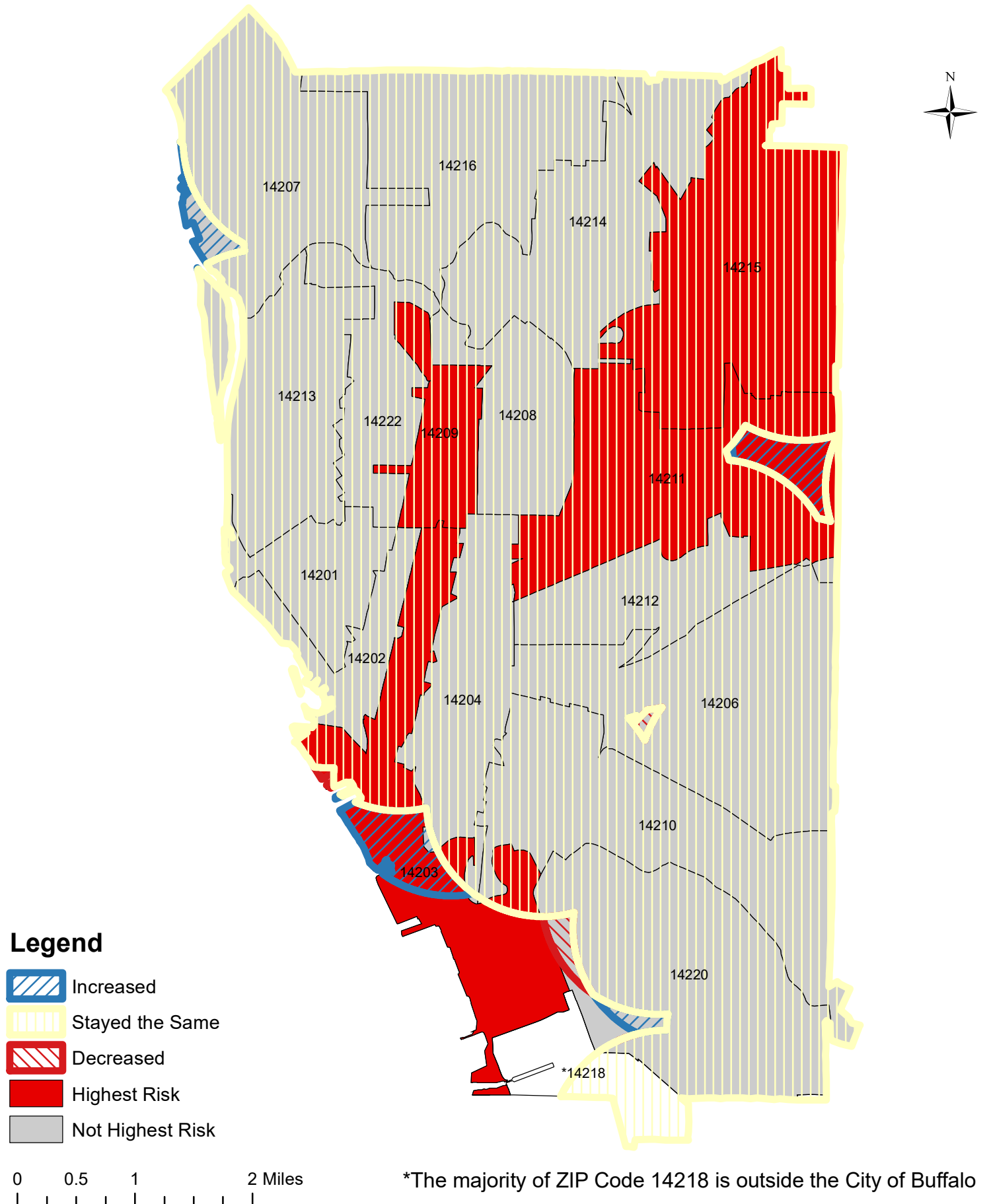
- Increased
- Stayed the Same
- Decreased
- Highest Risk
- Not Highest Risk

0 0.5 1 2 Miles

*The majority of ZIP Code 14218 is outside the City of Buffalo

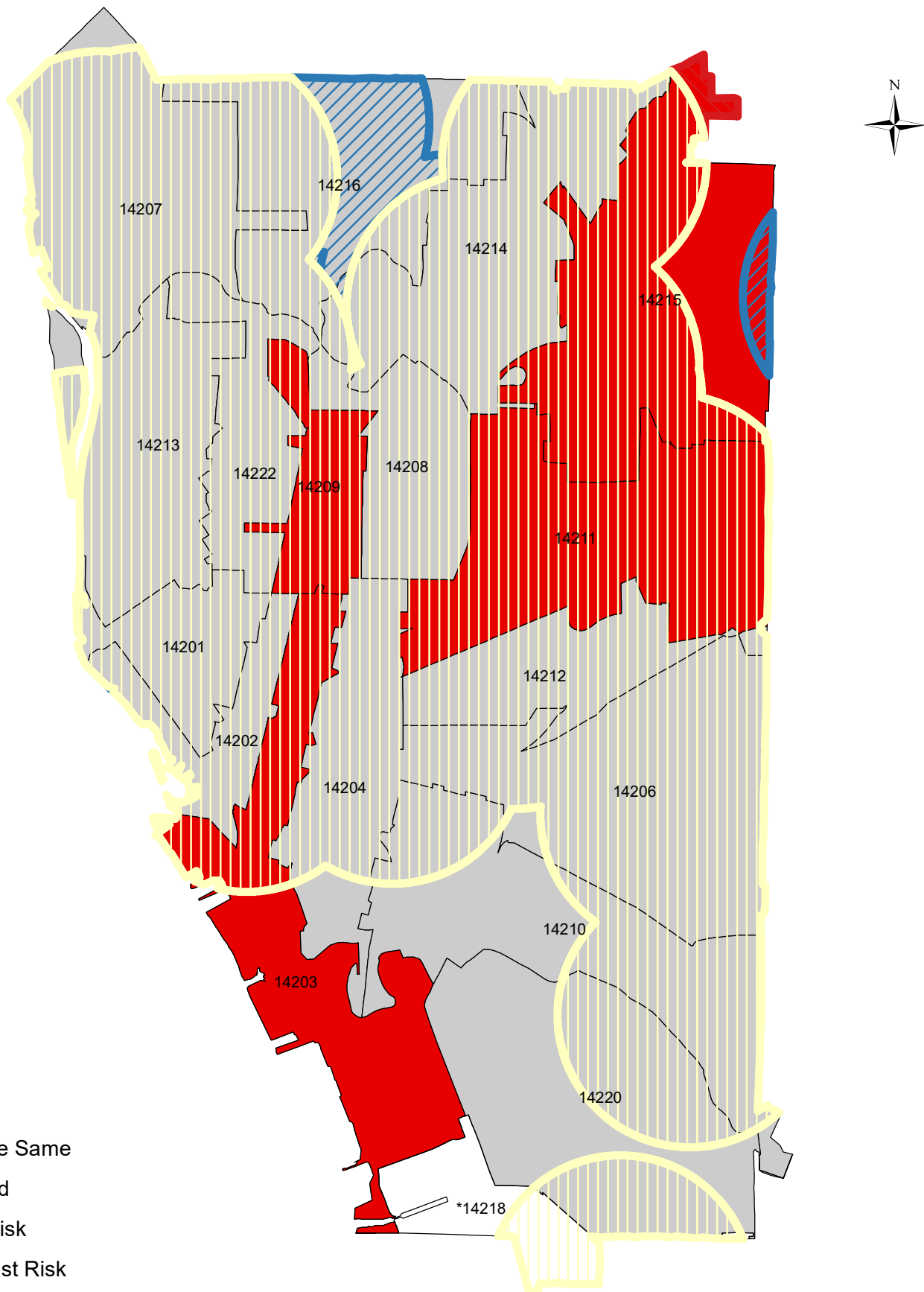
Comparison of Accessibility to Outpatient Programs between 2021 & 2023 (Within 1 Mile Access)

[City of Buffalo Only]



Comparison of Accessibility to Support Programs between 2021 & 2023 (Within 1 Mile Access)

[City of Buffalo Only]



0 0.5 1 2 Miles

*The majority of ZIP Code 14218 is outside the City of Buffalo

Appendix

Erie County Mental Health Risk Indicator Database (version 13.2)

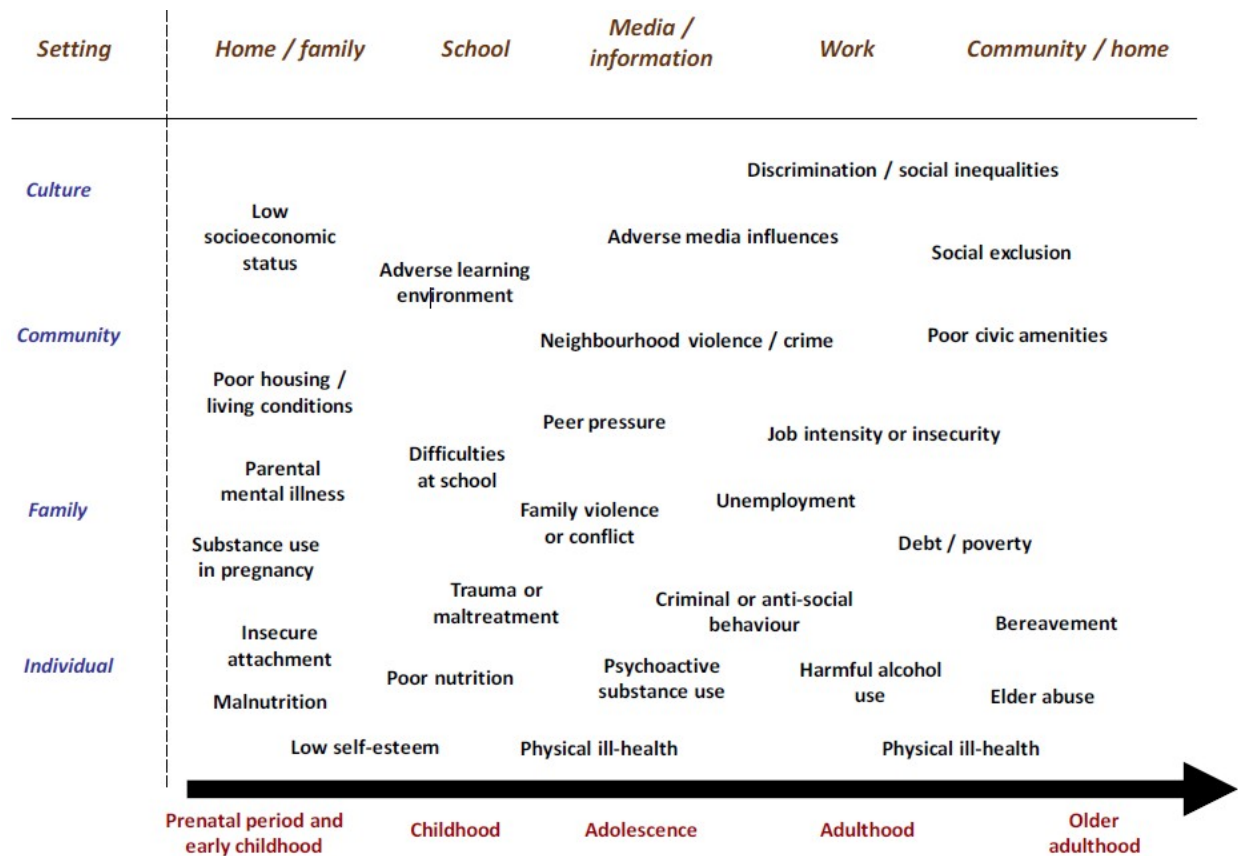
Technical Documentation

November 8, 2022

Introduction

This document provides technical information for the Erie County Mental Health Risk Indicator Maps developed by the Center for Health and Social Research (CHSR). The data were gathered from the existing Erie County Risk Indicator Database (RIDB) and a variety of publicly available sources. A list of suggested risk indicators was compiled using the World Health Organization schema below:

In 2012 the WHO Secretariat released a background paper detailing risk factors for mental health issues and a preliminary schema for understanding when these indicators most negatively affect a person in terms of social scale (individual, family, community, and culture), setting (home/family, school, media/information, work, and community/home), and life course (prenatal period and early childhood, childhood, adolescence, adulthood, and older adulthood) as based on existing mental health literature (WHO 2012).



Schematic overview of risks to mental health over the life course. World Health Organization (WHO). 2012. Risks to Mental Health: An Overview of Vulnerabilities and Risk Factors. Background Paper by WHO Secretariat for the Development of a Comprehensive Mental Health Action Plan.

The selected risk indicators presented in these maps encompass many of the categories outlined in the WHO document, however not all were included due to the impracticality of obtaining relevant data (e.g., adverse media influences, bereavement). The selected risk indicators provide detailed population, social, economic, crime, overall and mental health, substance abuse, and school information.

These indicator maps have three main purposes: (1) to assist in needs assessment for the planning and geographic targeting of mental health services, (2) to provide detailed information to service providers, which allows programs to be tailored to local needs, and (3) to serve as a resource for the development of funding applications. This documentation accompanies three sets of .pdf risk indicator maps – Erie County Including Buffalo, Erie County Excluding Buffalo, and the City of Buffalo Only.

Database Geography

The risk indicators are compiled at a level of geography suitable for analysis at the community scale: 5-digit ZIP code tabulation areas (ZCTA). The ZCTAs are defined as in Census 2010 maps.

Contact Information

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Suggested citation for this resource:

Center for Health and Social Research (2022). Erie County Mental Health Risk Indicator Database, Version 13.2. Retrieved on [Date of retrieval], from <http://www.erieidb.org>.

Risk Indicators

The table below documents the risk indicators that were compiled for this project. These notes explain how to use the table.

- The Risk Indicators Description column lists descriptions of specific indicator variables (e.g., *Mental Related Emergency Room Visits, per 10,000 population*).
- Most indicator variables are essentially rates. The majority of them are expressed as percent, e.g., percent of households receiving food stamps. When it is clear, the [Universe: ...] clause is omitted. In some cases, it may not be clear what denominator (i.e., population in question) is used to calculate the rate. In these instances, the exact denominator is provided, i.e., [Universe ...]. For some indicators, such as those of disease and crime, the rate is per 10,000 population, rather than percent, while others, such as those for alcohol availability, the rate is per 100 road miles.
- The [Source/Native Geography] tag on the right side of the Risk Indicator column identifies the data source (see “Technical Notes”, “Data Sources” on page 8 for the list of data sources) and the original geography level of the source data (“Z” for ZIP code, “O” for other – see footnotes in this case). For example, for Gini Coefficient the tag is [CEN/Z] meaning that these data come from the Census and was originally available at 5- digit ZIP code area geography levels.

<i>Risk Indicator Description</i> [Source/Native Geography]	<i>Variable Name</i>
<p>Mental Health [CDC/Z]</p> <ul style="list-style-type: none"> • 2020 Estimated confidence interval for crude prevalence of mental health not good for >=14 days among adults aged >=18 years 	mh_lith_2
<p>Alcohol Sales Establishments [SLA/O]</p> <ul style="list-style-type: none"> • 2021 Off premise alcohol sales establishments, per 100 road miles [Universe: aggregate road miles per areal unit] • 2021 Off premise alcohol sales establishments, per 10,000 population [Universe: total population] 	alc_of_pr_rd alc_off_pr_pop
<p>Chronic Liver Disease and Cirrhosis Deaths [DH/Z]</p> <ul style="list-style-type: none"> • 2016-2018 average annual deaths from cirrhosis, per 10,000 population [Universe: total population] 	de_cirrhos
<p>Reported Crimes [DCJS,BPD/O]</p> <ul style="list-style-type: none"> • 2019-2021 average annual reported criminal mischief (vandalism, etc.) offenses, per 10,000 population. Index of criminal activity taken as the summation of the standard deviation units of crm_crms and the following: <ul style="list-style-type: none"> ▪ 2019-2021 average annual reported violent offenses (aggravated assault, forcible rape, murder, robbery), per 10,000 population [Universe: total population] ▪ 2019-2021 average annual arrests for violent offenses (aggravated assault, forcible rape, murder, robbery) among juveniles, per 10,000 population [Universe: population under age 18] 	crm_crms crime_index
<p>Juvenile Arrests [DCJS,BPD/O]</p> <ul style="list-style-type: none"> • 2019-2021 average annual arrests for violent offenses among juveniles (aggravated assault, forcible rape, murder, robbery), per 10,000 population [Universe: population under age 18] 	jar_viol
<p>Youth Index [DCJS,BPD/O]</p> <ul style="list-style-type: none"> • The summation of standard deviation unites of the following indicators: <ul style="list-style-type: none"> ▪ 2019-2021 average annual arrests for violent offenses (aggravated assault, forcible rape, murder, robbery) among juveniles, per 10,000 population [Universe: population under age 18] ▪ 2016-2018 average annual pregnancies by mother's age, per 1,000 population [Universe: population ages 15-19] ▪ 2018-2021 average rate of poor (levels 1-2 English performance [Universe: all students tested]) 	youth_index
<p>Gini Coefficient [CEN/Z]</p> <ul style="list-style-type: none"> • Index of income inequality, 2017-2021 American Community Survey data [Universe: total population] 	Gini

<p>Extreme Economic Deprivation [CEN/Z]</p> <ul style="list-style-type: none"> • Composite Poverty Index (summation of standard deviation units of the following indicators, all data from 2017-2021 American Community Survey): <ul style="list-style-type: none"> ▪ Percent families with income below poverty level [Universe: all families] ▪ Percent families with female householder and no husband present, with income below poverty level and with related children under 18 years [Universe: all families] ▪ Percent children under 18 years living below poverty level [Universe: population under age 18] ▪ Percent aggregate income that is coming from assistance sources: social security, supplemental security income, public assistance [Universe: aggregate income from all sources] ▪ Median household income [Universe: all households reporting income] 	z_pov
<p>Rental Residential Properties [CEN/Z]</p> <ul style="list-style-type: none"> • Percent of population in renter occupied housing units, 2017-2021 American Community Survey Data [Universe: population in occupied housing units] 	rent_pop
<p>Population Instability (Migration) [CEN/Z]</p> <ul style="list-style-type: none"> • Percent of population 5 years and over that moved into current residence from another house in Erie County, 2017-2021 American Community Survey data [Universe: population 5 years and over] 	mov_county
<p>Employment Stability [CEN/Z]</p> <ul style="list-style-type: none"> • Percent of the population currently employed working at least 35 hours per week, 50-52 weeks per year, 2016-2020 American Community Survey data [Universe: total population over age 16] • Percent of working age (ages 20-64) population currently employed, 2016- 2020 American Community Survey data [Universe: total population aged 20- 64] • Percent of population currently employed who has high school diploma or equivalent, 2016-2020 American Community Survey data [Universe: total population with high school or equivalent level education] • Percent of disabled population (any disability) currently employed, 2016-2020 American Community Survey data [Universe: all disabled persons] 	emp_ft emp_24_60 emp_hs emp_dis_any

<p>Unemployment [CEN/Z]</p> <ul style="list-style-type: none"> • Unemployment rate among working age population, 2016-2020 American Community Survey data (ages 20-64) [Universe: total population aged 20-64] • Unemployment rate among population with high school diploma or equivalent, 2016-2020 American Community Survey data [Universe: total population with high school or equivalent level education] • Unemployment rate among disabled population (any disability) currently employed, 2016-2020 American Community Survey data [Universe: all disabled persons] 	<p>uemp_20_64</p> <p>uemp_hs</p> <p>uemp_dis_any</p>
<p>OASAS Alcohol and Substance Abuse Admissions [DMH/Z]</p> <ul style="list-style-type: none"> • 2017-2019 average annual admissions of persons under 18 to treatment at the Office of Alcoholism and Substance Abuse (OASAS), per 10,000 population [Universe: population under age 18] • 2017-2019 average annual admissions of persons 18 or older to treatment at the Office of Alcoholism and Substance Abuse (OASAS), per 10,000 population [Universe: population 18 or older] 	<p>oasas_u18</p> <p>oasas_o18</p>
<p>Nutrition [CEN/Z]</p> <ul style="list-style-type: none"> • Percent of households receiving food stamps, 2016-2020 American Community Survey data [Universe: all households] 	<p>snaps_per</p>
<p>Early Childhood Attachment [UB/Z]</p> <ul style="list-style-type: none"> • Percent of mothers who reported breastfeeding exclusively or partially upon discharge from the hospital post-delivery, 2017-2019 [Universe: all interviewed mothers] 	<p>bf_per</p>
<p>Substance Abuse among Pregnant Women [UB/Z]</p> <ul style="list-style-type: none"> • Percent of women who reported smoking during pregnancy or up 3 months prior to becoming pregnant, 2017-2019 [Universe: all interviewed women] 	<p>smk_prg</p>

<p>Neighborhood Index [CEN/Z]</p> <p>Composite neighborhood instability score taken as the summation of standard deviation units of the following indicators:</p> <ul style="list-style-type: none"> • Percent of population 5 years and over that moved into current residence from another house in Erie County, 2017-2021 American Community Survey [Universe: population in occupied housing units] • Percent of population 15 years and over who have never been married, 2017-2021 American Community Survey data [Universe: population age 15 and over] • Percent population in renter occupied housing units, 2017-2021 American Community Survey [Universe: population in occupied housing units] 	<p>ngh_index</p>
<p>Aggregated Risk Index</p> <p>The summation of standard deviation units of all risk indicators.</p>	<p>agg_risk</p>

Selected Indicators Matched with WHO Risk Categories

<i>WHO Risk Category</i>	<i>Matching Indicators</i>
Adverse Learning Environment/Difficulties at School	edu_att edu_susps edu_regs g8_eng_112
Criminal or Anti-Social Behavior	crm-crmis youth_index
Debt/Poverty	gini z_pov
Low Socio-Economic Status	gini z_pov
Job Intensity or Insecurity	emp_ft emp_20_64 emp_hs emp_dis_any
Unemployment	uemp_20_64 uemp_hs uemp_dis_any
Malnutrition/Poor Nutrition	snaps_per
Neighborhood Violence/Crime	crime_index jar_viol
Parental Mental Illness	mh_lith_2
Poor housing/Living Conditions	rent_pop mov_county
Psychoactive Substance Use	oasas_u18 oasas_o18
Insecure Attachment	bf_per
Substance Use in Pregnancy	smk_prg

Technical Notes

1. Data sources. Risk indicators were compiled using data from several sources. Below is the list of data sources and abbreviations identifying them in the table of risk indicators:

(a) Federal and state sources:

U.S. Census Bureau American Community Survey	CEN
Health Data New York	HDNY
New York State Education Department	NYSED
New York State Department of Criminal Justice Services	DCJS
New York State Liquor Authority	SLA
Centers for Disease Control and Prevention	CDC

(b) Erie County and local sources:

City of Buffalo Police Department	BPD
Erie County Department of Health	DH
Erie County Department of Mental Health	DMH
Keys to Health	KTH
University at Buffalo Department of OB/GYN	UB

2. Missing data values. Even when an indicator is available, not every ZIP code record will have an associated value, for some the value will be missing. Common reasons for missing data are data availability and small populations (see below).

3. Small populations. Since all indicators are essentially ratios of the form cases/population (expressed as percent or per 10,000), it is important to avoid unreliable indicator values due to small populations. For this reason, an arbitrary threshold of population greater than 100 was set. If the total population for a particular ZIP code area is less than 100, then most population-based (i.e., with population in denominator) indicators will be missing for this record.

❖ Some data are suppressed by the data source due to small numbers and the potential to violate confidentiality.

4. Imputation of indicators. Sometimes the source data for calculation of the indicators were available at a spatial level other than ZIP code area. In these cases risk indicators were first calculated at the available level, and then imputed (transferred) to the ZIP code level.

Four imputation schemes were utilized in calculating the risk indicators:

(a) From school districts to ZIP code areas. This scheme was used to transfer data collected for school districts (e.g., performance on English tests) to ZIP code areas and calculate

corresponding risk indicators.

(b) From police departments' areas of responsibility to ZIP code areas. Crime statistics obtained from New York State Department of Criminal Justice Services (DCJS) are tabulated by law enforcement agencies in Erie County. Areas served by each law enforcement agency (usually a town or an incorporated place) were delineated and data were interpolated to ZIP code areas for ease of use and for compatibility with crime data from Buffalo Police Department (see below).

(c) Data from the Buffalo PD for 2004 and beyond are incident-based (inclusive of all known crimes) and do not use the UCR coding system. Address-level records for crimes reported to DCJS by the Buffalo PD were geocoded and aggregated to compute their proportional shares per ZIP-code for each crime category. These proportions were in turn used to interpolate the 2015- 2017 DCJS crime counts to provide better spatial detail of crime within Buffalo; this method is more appropriate and reflective of actual crime patterns when compared to simple population or areal interpolation.

As an example of how this spatial interpolation works, consider interpolating school data from school districts to ZIP code areas. Specifically, let's calculate the risk variable $g8_eng_112$ (low grade 8 English exam scores as percentage of tested students) for ZIP code area 14001.

- ❖ We start by allocating low score counts (e.g. numbers of cases of students with low scores) from each school district to ZIP code areas, proportionately to the percent of population of each school district which lives in a specific ZIP code area (as determined by spatial overlay operation in a GIS). For example, the population living inside the boundaries of Akron Central School District is distributed in the following way: 90.0% of the population lives in ZIP code area 14001, 4.6% in 14004, 3.5% in 14032, and 1.9% in 14013. Hence, the total number of low-scoring students for the Akron district, 80, is split up between these ZIP code areas as follows: 72.00 for ZIP code area 14001, 3.68 for 14004, 2.80 for 14032, and 1.52 for 14013.
- ❖ Next, we sum up allocated counts for each ZIP code area. ZIP code 14001 receives counts from three school districts: Akron (90.0% of Akron's total count of suspensions), Alden (5.0% of its count), and Clarence (14.9% of its count). The total suspension count for ZIP code area 14001 is then:

$$g8_eng_112_{14001} = g8_eng_112_{Akron} * 0.900 + g8_eng_112_{Alden} * 0.050 + g8_eng_112_{Clarence} * 0.149$$

- ❖ Repeating the above procedure for the total students tested in ZIP code area 14001, we can now compute the risk indicator variable suspension (low grade 8 English performance as% of tested students) for this ZIP code area.

5. Decimal places. Values of risk indicators were rounded to two decimal digits.

6. New York State Liquor Authority data. Data provided by the SLA was initially edited to remove locations that are not reflective of typical alcohol consumption patterns (e.g. concessions at the First Niagara Center where patrons must first gain entrance to the arena) as well as

additional liquor licenses for singular locations (e.g. Soho Bar at 64 Chippewa Street in Buffalo has three on-premise licenses to accommodate the three separate bars located on the two levels of the single location). These data were then geocoded and aggregated to determine the counts of locations per ZIP code which were then standardized by dividing by both 100 road miles and 10,000 population to reflect road network and population densities.

7. Adolescent Pregnancy Rate. Due to changes in policies at the Department of Health, disclosure of the adolescent pregnancy rates is limited to ages 15-19, rather than ages 10-19 as used in some previous versions of the database.
8. Gini Coefficient. A measure of statistical dispersion capturing inequality in a frequency distribution, in this case of household income. In this measure, 0 represents perfect equality, while 100 represents perfect inequality. Income inequality as measured by the Gini Coefficient is a risk indicator for mental health problems, particularly among adolescents.
9. The database includes several index variables: Composite Poverty, Youth, Crime, Neighborhood, Mental Health¹ and Aggregated Risk. To capture the information contained in several of the composite indices were constructed by converting several indicators (detailed above in the Risk Indicator Description Table) into standard deviation units (z scores) and then summing their scores.
10. School district level data at the ZIP code level is not included for the City of Buffalo Only because Buffalo consists of a single school district, and meaningful differences between many of the ZIP codes could not be discerned.

¹ Summary measure included in database but not visualized separate from the individual variables