
*Suicide and Overdose Syndromic Surveillance:
Reading CuSum and SatScan Alerts*



**AIDS Institute, Office of Drug User Health
and Center for Community Health, Bureau
of Surveillance and Data Systems**

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SECTION 1: SYNDROMES AND PARTICIPATING FACILITIES

I. SYNDROMIC SURVEILLANCE:

The definition of a syndrome is a set of signs and symptoms that appear together and characterize a disease or medical condition. 99% (133 out of 134) of the emergency departments (ED) in New York State, excluding New York City and Veteran Affairs hospitals, report syndrome data within 24 hours to Electronic Syndromic Surveillance System (ESSS), the New York State Department of Health's (NYSDOH) internal syndromic surveillance system.

II. ESSS PROCESS:

NYSDOH internal Electronic Syndromic Surveillance System (ESSS) captures these syndromes based on the emergency department ICD-10 diagnostic codes categorized by the ED facility combined with a patient's chief complaint (reason for visiting the emergency department).



III. SYNDROME DEFINITIONS:

Suicide syndrome attempts to capture non-suicidal self-harm, suicidal self-harm, suicide attempt, suicidal ideation and intentional opioid/drug overdose. Overdose syndrome attempts to capture overdose, suspected overdose, and/or exhibiting overdose symptoms for all drugs (including alcohol, prescription and OTC), Opioids, Heroin, and Stimulants.

Syndrome Category	Includes	Chief Complaint Example Terms
Suicide (Nonfatal)	Suicide Ideation and Attempt, Intentional Self-Harm, Intentional Overdose	"Harm", "Hurt", "Kill", "Cut", "Laceration", "Inflict", "Shoot", "Stab", "Suicidal Ideation (SI)" and common misspellings
Drug Overdose	All overdoses/suspected overdoses including alcohol, prescriptions, OTC medication, and Opioid/Heroin/Stimulant Syndromes	"Overdose (OD)", "Poisoning", "Abuse" "Intoxicated" "Ingest" and common misspellings
Opioid Overdose	Opioid overdoses including Heroin Syndrome	"Opioid", "Methadone", "Naloxone", "Morphine", "Fentanyl", "Buprenorphine", and common misspellings
Heroin Overdose	Heroin overdoses only	"Heroin" and common misspellings
Stimulant Overdose	Stimulant overdoses only	"Stimulant", "Methamphetamine (Meth)" "Cocaine", "Amphetamine", and common misspellings

All Reported Syndromes: Asthma, Cannabis, Carbon Monoxide, COVID-19, Drug overdose, Fever, GI, Heat, Heroin overdose, Hypothermia, Neurologic, Opioid overdose, Rash, Respiratory, Stimulant overdose, Suicide, Synthetic drugs

VI. PARTICIPATING ED FACILITIES

Regions may be defined differently by other programs. Updated: March 11, 2020

Buffalo	Allegany	0039	JONES MEMORIAL HOSPITAL	Putnam	0752	PUTNAM HOSPITAL CENTER	
	Cattaraugus	0066	OLEAN GENERAL HOSPITAL		Rockland	0776	NYACK HOSPITAL
	Chautauqua	0111	WESTFIELD MEMORIAL HOSPITAL			0779	GOOD SAMARITAN HOSPITAL (SUFFERN)
Erie		0098	BROOKS MEMORIAL HOSPITAL	Sullivan	0968	CATSKILL REGIONAL MEDICAL CENTER (G HERMANN SITE)	
		0103	WOMANS CHRISTIAN ASSOCIATION HOSPITAL		0971	CATSKILL REGIONAL MEDICAL CENTER	
		0114	LAKE SHORE HOSPITAL	Ulster	0990	KINGSTON HOSPITAL	
		0207	BUFFALO GENERAL MEDICAL CENTER	Westchester	1039	HUDSON VALLEY HOSPITAL CENTER	
		0208	JOHN R. OISHEI CHILDRENS HOSPITAL		1045	WHITE PLAINS MEDICAL CENTER	
		0210	ERIE COUNTY MEDICAL CENTER		1061	MOUNT VERNON HOSPITAL	
		0213	BUFFALO MERCY		1072	SOUND SHORE MEDICAL CENTER OF WESTCHESTER	
		0218	SISTERS OF CHARITY HOSPITAL		1097	ST JOHNS RIVERSIDE HOSPITAL (ST JOHNS)	
		0267	KENMORE MERCY HOSPITAL		1098	ST JOSEPHS MEDICAL CENTER (YONKERS)	
		0280	BERTRAND CHAFFEE HOSPITAL		1117	NORTHERN WESTCHESTER HOSPITAL	
		0292	ST JOSEPH HOSPITAL OF CHEEKTOWAGA		1122	LAWRENCE HOSPITAL	
		3067	MILLARD FILLMORE SUBURBAN HOSPITAL		1124	ST JOHNS RIVERSIDE HOSPITAL (DOBBS FERRY)	
		5780	MERCY AMBULATORY CARE CENTER		1129	PHELPS MEMORIAL HOSPITAL	
	Genesee	0339	UNITED MEMORIAL MED CTR (NORTH ST)		1139	WESTCHESTER MEDICAL CENTER	
	Niagara	0565	EASTERN NIAGARA (LOCKPORT)	Long Island	Nassau	0490	NORTH SHORE UNIVERSITY HOSPITAL AT GLEN COVE
		0581	DEGRAFF MEMORIAL HOSPITAL			0511	WINTHROP UNIVERSITY HOSPITAL
		0583	MOUNT ST MARYS HOSPITAL AND HEALTH CENTER			0513	MERCY MEDICAL CENTER (ROCKVILLE CTR)
	Orleans	0718	MEDINA MEMORIAL HOSPITAL			0518	LONG ISLAND JEWISH VALLEY STREAM
Wyoming	1153	WYOMING COUNTY COMMUNITY HOSPITAL			0527	SOUTH NASSAU COMMUNITIES HOSPITAL	
Capital District	Albany	0001	ALBANY MEDICAL CENTER			0541	NSUH-MANHASSET
		0004	ALBANY MEMORIAL HOSPITAL			0550	NSUH-SYOSSET
		0005	ST PETERS HOSPITAL			0551	ST JOSEPH HOSPITAL
	Columbia	0146	COLUMBIA MEMORIAL HOSPITAL			0552	PLAINVIEW HOSPITAL
	Delaware	0165	OCONNOR HOSPITAL			0563	ST FRANCIS HOSPITAL (ROSLYN)
		0170	MARGARETVILLE MEMORIAL HOSPITAL			0528	NASSAU UNIVERSITY MEDICAL CENTER
		8554	TRI TOWN REGIONAL HEALTHCARE		Suffolk	0245	SUNY HOSPITAL AT STONY BROOK
	Fulton	0330	NATHAN LITTAUER HOSPITAL			0885	BROOKHAVEN MEMORIAL HOSPITAL MEDICAL CENTER
	Montgomery	0484	ST MARYS HEALTHCARE (AMSTERDAM)			0891	EASTERN LONG ISLAND HOSPITAL
	Otsego	0739	AURELIA OSBORN FOX MEMORIAL HOSPITAL			0895	JOHN T. MATHER MEMORIAL HOSPITAL
	0746	MARY IMOGENE BASSETT HOSPITAL			0896	ST CHARLES HOSPITAL	
Rensselaer	0756	SAMARITAN HOSPITAL			0913	HUNTINGTON HOSPITAL	
Saratoga	0818	SARATOGA HOSPITAL			0925	GOOD SAMARITAN HOSPITAL (W ISLIP)	
Schenectady	0829	ELLIS HOSPITAL		0943	ST CATHERINE OF SIENA HOSPITAL		
Schoharie	0851	BASSETT HOSPITAL OF SCHOHARIE COUNTY		0889	SOUTHAMPTON HOSPITAL		
Warren	1005	GLENS FALLS HOSPITAL		0938	PECONIC BAY MEDICAL CENTER		
Central	Broome	0042	UHS - BINGHAMTON GENERAL HOSPITAL	Northeast	Clinton	0135	CHAMPLAIN VALLEY PHYSICIANS HOSPITAL MEDICAL CENTER
		0043	OUR LADY OF LOURDES MEMORIAL HOSPITAL		Essex	0303	ELIZABETHTOWN COMMUNITY HOSPITAL
		0058	UHS - WILSON MEDICAL CENTER			0306	ADIRONDACK MEDICAL CENTER (LAKE PLACID)
	Cayuga	0085	AUBURN MEMORIAL HOSPITAL		0309	MOSES-LUDINGTON HOSPITAL	
	Chenango	0128	CHENANGO MEMORIAL HOSPITAL	Franklin	0324	ADIRONDACK MEDICAL CENTER (SARANAC LAKE)	
	Cortland	0158	CORTLAND MEMORIAL HOSPITAL		0325	ALICE HYDE MEDICAL CENTER	
	Herkimer	0362	LITTLE FALLS HOSPITAL	St. Lawrence	0798	CLAXTON HEPBURN MEDICAL CENTER	
	Jefferson	0367	SAMARITAN MEDICAL CENTER (WATERTOWN)		0812	GOUVERNEUR HOSPITAL	
		0377	RIVER HOSPITAL		0815	CANTON-POTSDAM HOSPITAL	
		0379	CARTHAGE AREA HOSPITAL		0817	CLIFTON-FINE HOSPITAL	
	Lewis	0383	LEWIS COUNTY GENERAL HOSPITAL		0804	MASSENA MEMORIAL HOSPITAL	
	Madison	0397	ONEIDA HEALTHCARE	Rochester	Chemung	0116	ARNOT OGDEN MEDICAL CENTER
		0401	COMMUNITY MEMORIAL HOSPITAL (HAMILTON)			0118	ST JOSEPHS HOSPITAL (ELMIRA)
	Oneida	0589	ROME MEMORIAL HOSPITAL		Livingston	0393	NICHOLAS H NOYES MEMORIAL HOSPITAL
		0599	FAXTON-ST LUKES HEALTHCARE (ST LUKES DIVISION)	Monroe	0409	HIGHLAND HOSPITAL	
		0598	ST ELIZABETH MEDICAL CENTER		0411	ROCHESTER GENERAL HOSPITAL	
	Onondaga	0628	UPSTATE UNIVERSITY HOSPITAL AT COMMUNITY GENERAL		0413	STRONG MEMORIAL HOSPITAL	
		0630	ST JOSEPHS HOSPITAL (SYRACUSE)		0471	THE UNITY HOSPITAL OF ROCHESTER	
	0635	UNIVERSITY HOSPITAL SUNY HEALTH SCIENCE CENTER	Ontario	0671	GENEVA GENERAL HOSPITAL		
	0636	CROUSE HOSPITAL		0676	CLIFTON SPRINGS HOSPITAL AND CLINIC		
Oswego	0727	OSWEGO HOSPITAL		0678	FREDERICK FERRIS THOMPSON HOSPITAL		
Tompkins	0977	CAYUGA MEDICAL CENTER AT ITHACA	Schuyler	0858	SCHUYLER HOSPITAL		
Hudson Valley	Dutchess	0180	MID-HUDSON VALLEY DIVISION OF WESTCHESTER MEDICAL CENTER	Steuben	0866	CORNING HOSPITAL	
		0181	VASSAR BROTHERS HOSPITAL		0873	IRA DAVENPORT MEMORIAL HOSPITAL	
		0192	NORTHERN DUTCHESS HOSPITAL	Wayne	1028	NEWARK-WAYNE COMMUNITY HOSPITAL	
	Orange	0694	ST LUKES CORNWALL HOSPITAL - NEWBURGH	Yates	1158	SOLDIERS AND SAILORS MEMORIAL HOSPITAL	
		0704	ST ANTHONY COMMUNITY HOSPITAL				
		0708	BON SECOURS COMMUNITY HOSPITAL				
		0686	ORANGE REGIONAL MEDICAL CENTER - GOSHEN CAMPUS				

SECTION 2: READING A CUSUM “SIGNAL” ALERT

CuSum “signal” alerts compare the daily counts of different types of overdoses or nonfatal suicide-related syndromes seen in a county and/or at a facility to a baseline. Baseline is the average of the previous 28 days of data. If a daily count is sufficiently above this baseline average, a signal alert is generated. If there is more than one syndrome identified for one patient case listing (ex: intentional overdose would be captured in both drug overdose and suicide syndrome), it would appear on signals for both syndromes. Signal alerts include a case listing, 10-day syndrome counts, short- and long-term graphs, and resource guides. If a diagnostic code was identified in the case listing, that would be included.

Patient case listing are updated 8 times daily on Health Commerce System (Appendix 1), and is available immediately for users to search. CuSum reports update 2 times a day, with the final daily report finishing approximately 2:30pm. When a signal is detected, the report is typically disseminated via email to the designated county representative(s) within 24-72 hours. All reports receive human review before dissemination.

1 Suicide CuSum Signal for EXAMPLE County on 12/10/2021

This signal is NOT Historically High.

Suicide Case-list

2	3	4	5	6	7	8	9	10	
#	Visit Time	Patient Zip Code	Hospital Name	CCDD	Age	Gender	Diagnostic Texts	Race	Ethnicity
1	4:28	00000	Example Hospital	Suicidal Ideation, Homicidal Ideation	38	F	Threatened self and family, mental health evaluation (MHE)	WHITE	Non-Hispanic/La
2	8:20	11111	Example Hospital	Ran away from home, suicide attempt	14	F	Pt presents with parents, Hx of cutting and depression, suicidal ideation	OTHER	Hispanic/Latino
3	10:37	12345	Example Hospital	Mental Health/Psych Evaluation, Suicidal Ideation	60	M	Depression, Anxiety, Suicidal	ASIAN	Non-Hispanic/La
4	11:27	00000	Example Hospital	EMS, suicide attempt	55	M	Trauma, self-inflicted gun shot wound (GSW)	BLACK	Non-Hispanic/La
5	12:19	11111	Example Hospital	Psych evaluation, crisis, Suicidal Ideation	51	F	Suicidal with plan to overdose, intoxication	AMERI_ INDIAN_ ALASKA	Non-Hispanic/La

Fictional patient case list

- 1 County and/or ED facility and date of signal
- 2 Number of cases organized by visit time
- 3 Time of patient ED visit
- 4 Patient residential zip code. May not be a resident of the county identified on the signal
- 5 ED hospital
- 6 Patient chief complaint and diagnostic codes
- 7 Patient age at intake
- 8 Patient-identified gender
- 9 Additional notes, if applicable
- 10 Self-identified race/ethnicity (suicide only)

Suicide CuSum Alert Report for EXAMPLE County on 12/10/2021

11 by NYS County

Date_of_Visit	Count
12/10/2021	13
12/09/2021	4
12/08/2021	4
12/07/2021	5
12/06/2021	7
12/05/2021	6
12/04/2021	2
12/03/2021	5
12/02/2021	6
12/01/2021	5
11/30/2021	10
11/29/2021	7
11/28/2021	4
11/27/2021	1
11/26/2021	2
11/25/2021	4

12

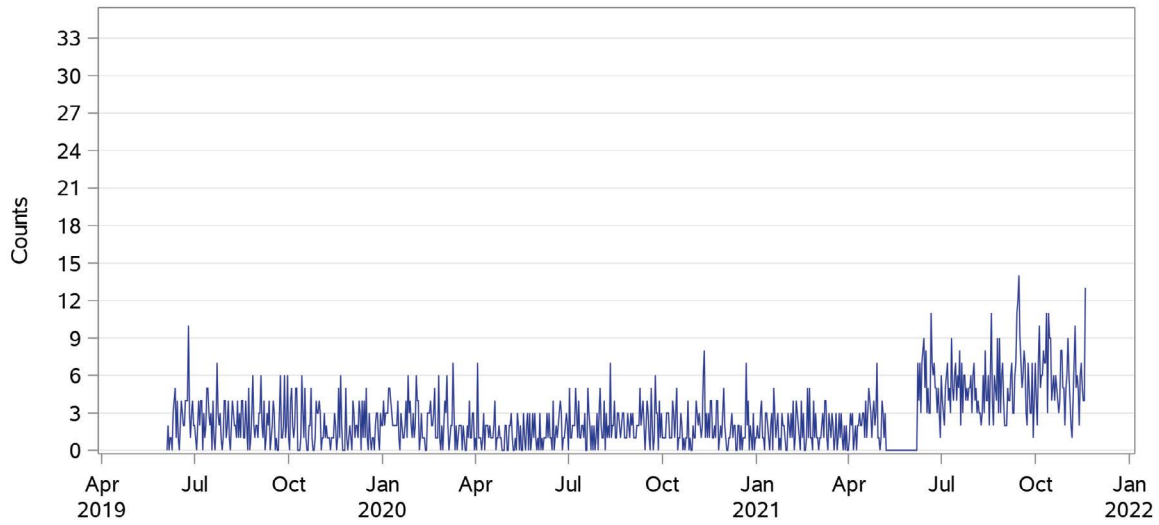
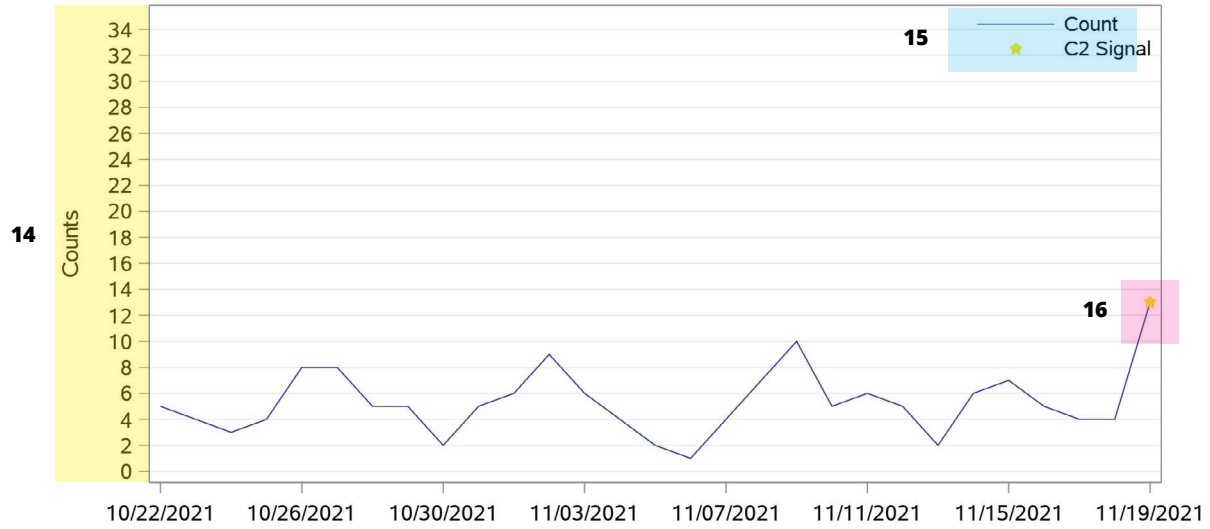
13

Pink - C1 Signal; Yellow - C2 Signal; Red - C1C2 Signal

Reported by NYSDOH Syndromic Surveillance, Division of Epidemiology

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- **11** "by NYS County" may include several ED hospitals within the county. "By NYS Hospital" is only the ED hospital identified on the signal heading
 - **12** 16-day history for that hospital or county. Previous signals will also be highlighted
 - **13** Refers to sensitivity of the alerts (Appendix 1)

Suicide EXAMPLE County Short-term & Long-term Graphs



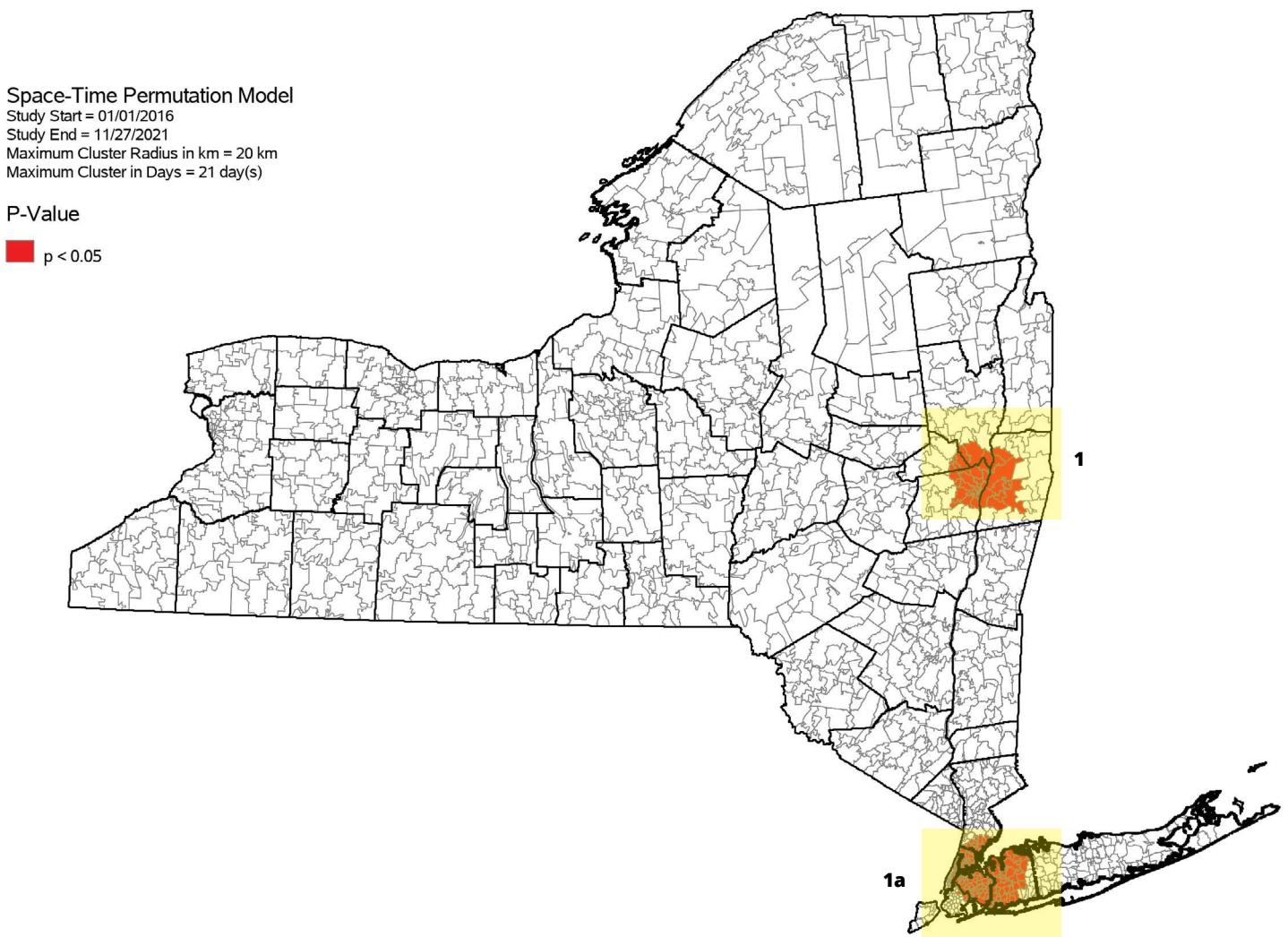
- **14** Number of cases
- **15** Number of cases for each date indicated. Current and other signals identified over a 7-day period
- **16** Number of cases on current signal

SECTION 3: READING A SATSCAN "CLUSTER" ALERT

SatScan "cluster" alerts are based on both location (at the patient's residential zip code level) and time. The cluster detection parameters are set to identify any grouping of overdose cases that are significantly larger than expected in a maximum geographic radius of 20 km (12.4 miles) and a maximum time span of 21 days. Each cluster alert is accompanied by an individual case listing report, similar to signal "CuSum" alert reports. SatScan case listings include facility name and county, ED visit date, age, patient-identified gender, race, ethnicity, and patient chief complaint and diagnostic code.

SatScan cluster reports are run daily and are sent out as needed if a cluster is detected. All reports receive human review before dissemination. Cluster reports and maps are not available for view in ESSS; however, the data included in a cluster can be searched by zip code, county, and ED facility similar to the CuSum reports.

Map of Opioid_OD Clusters by Patient's ZIP Code, ending 2021-11-28 (With Diagnostic Codes)



Reported by NYSDOH Syndromic Surveillance, Division of Epidemiology

1 and **1a**. Location of cluster(s) identified. May be one or more. Cluster thresholds determined by space-time permutation model. Grey map lines indicate zip code areas

"Table of Opioid_OD Clusters by Patient's ZIP Code"

Study Start = 01/01/2016

Study End = 11/27/2021

2 Maximum Cluster Radius in km = 20 km
Maximum Cluster in Days = 21 day(s)

3	4	5	6	7	8	9				
Cluster	P_Value	Recurrence Interval (days)	Latitude	Longitude	Radius (km)	Start_Date	End_Date	ZIP_Code	Observed_#	Expected_#
1	0.0000	527075853165	42.7355	-73.7176	19.5	2021/11/7	2021/11/27	00000	4	3
								11111	2	1
								12345	8	5

10	Total ZIP Codes =	35
	Total Observed Cases =	191
	Total Expected Cases =	95

Cases Listing of Identified Clusters of Opioid_OD

Study Start = 01/01/2016

Study End = 11/27/2021

Maximum Cluster Radius in km = 20 km
Maximum Cluster in Days = 21 day(s)

11 CLUSTER=1

12	13	14	15	16		
Obs	Facility_Name	Case_County	ed_date	age	sex	CCDD
1	EXAMPLE HOSPITAL	EXAMPLE	11/27/2001	18	M	# Opiate overdose # Deliberate overdose of benzodiazepine # T40.601A # T42.4X4A # T42.4X1A # F17.290 # X58.XXXA # Y93.9 # Y92.9
2	EXAMPLE HOSPITAL	EXAMPLE	11/26/2001	41	F	Overdosed found unresponsive, given narcain, bg over 500 # T40.1X1A
3	EXAMPLE HOSPITAL	EXAMPLE	11/23/2001	32	M	# Accidental drug overdose # F11.10

- 2 All clusters indicate patient zip code within a 20 km (12.4 miles) radius and ED visits within 21 days
- 3 If there is more than one red cluster identified, there will be separate tables organized by largest to smallest cluster
- 4 Exact locations
- 5 Exact radius in km (20 or under)
- 6 Start and end of cluster. May be 21 days or less
- 7 Patient residential zip code (not zip code of ED facility visited)
- 8 Number of cases per zip code
- 9 Number of expected cases that are not abnormal for the zip code based on a space-time permutation model
- 10 Total number of zip codes in the area affected and total observed vs. expected cases
- 11 Cluster identified for one region. May be more than one (see #3)
- 12 Name and county of ED hospital visited (may not be patients residential county)
- 13 Date of ED visit
- 14 Patient age at intake
- 15 Patient-identified sex
- 16 Case notes and ICD-10 codes, if available

SECTION 4: CONSIDERATIONS WHEN RESPONDING TO AN ALERT

- Assess or consult crisis response protocol,
- Reach out to the identified ED facility for follow up,
- Notify and partner with local agencies and organizations,
- Look to neighboring counties,
- Monitor patterns from other channels of resources such as law enforcement, Emergency Medical Services (EMS), Syringe Exchange Programs (SEP), etc.,
- Utilize collaboration with other programs such as peer programs and MATTERS,
- Ensure suicide/overdose resources are updated and accessible to high-risk areas or “hotspots”,
- Reach out to NYSDOH for developing harm reduction interventions.

SECTION 5: CONTACT INFORMATION

- Questions about suicide syndrome or response: suicideprevention@health.ny.gov
- Questions about overdose syndrome or response: opioidprevention@health.ny.gov
- Questions about syndromic surveillance or CuSum/SatScan alerts: syndsurv@health.ny.gov

SECTION 6: APPENDIX

1. Request access to ESSS in the [Health Commerce System](#): Custom syndromic data search, training webinar, FAQ including definitions for all syndromes, C1/C2 Sensitivity Flags
2. More information on [Suicide and Self-Inflicted Injuries in NYS](#)
3. More information on the [Office of Drug User Health and Harm Reduction in NYS](#)
4. For more information on [self-harm and suicide-related data](#)