

HEPATITIS A OUTBREAK SAN DIEGO, CALIFORNIA, 2016-18 LESSONS LEARNED

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**Orange County Immunization Coalition
13 March 2019**



LIVE WELL
SAN DIEGO



I have no relevant financial relationships with any commercial supporters.

Unlabeled/Investigational products and/or services will not be mentioned in this talk.

All data in this presentation are preliminary and subject to change.

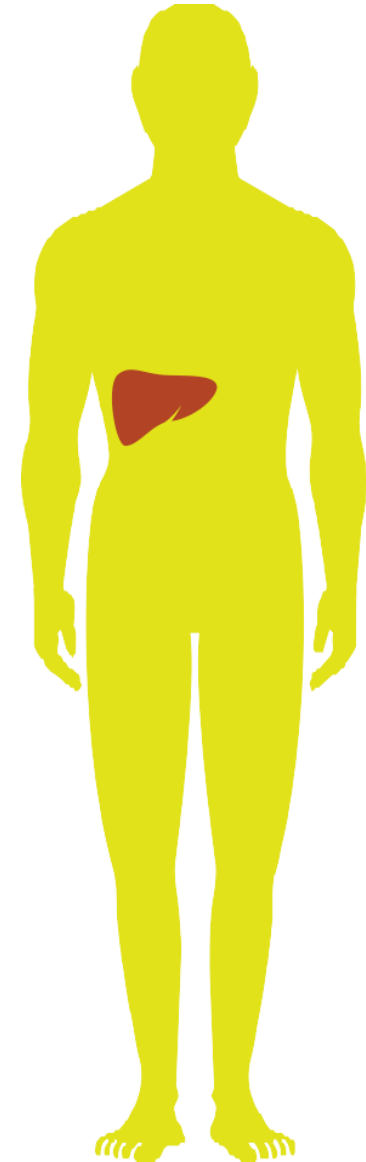


- **Participants will be able to:**
 - **Describe the epidemiology of hepatitis A**
 - **Identify the public health approach to controlling a community-wide hepatitis A outbreak**
 - **Explain the role of vaccination in pre-and post-exposure prevention of hepatitis A**
 - **Identify the challenges to public health outreach to persons experiencing homelessness**

WHAT IS HEPATITIS?



- **Hepatitis is an infection or inflammation of the liver**
- **Can be caused by:**
 - **Viruses**
 - **Drugs**
 - **Toxins**
 - **Bacteria**
 - **Parasites**
 - **Autoimmune diseases**

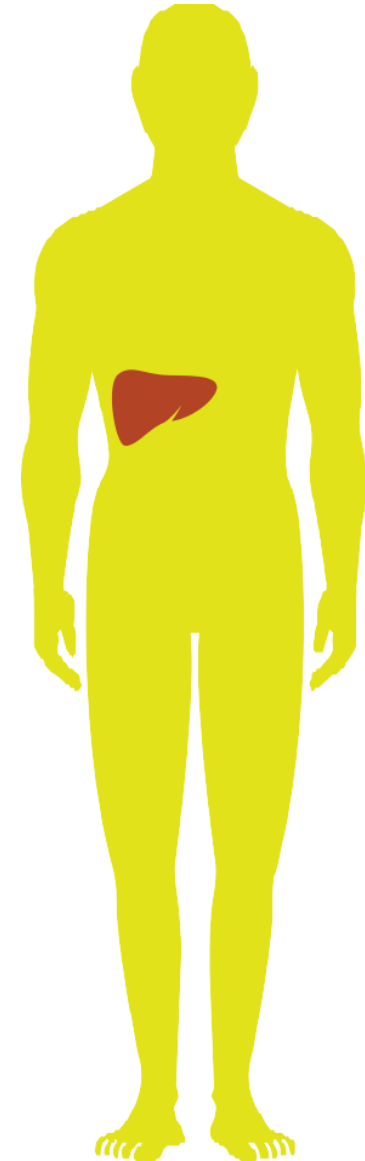


VIRAL HEPATITIS



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- **Hepatitis A to G!**
- **CMV**
- **EBV**
- **Herpes simplex**
- **Flaviviruses (YF, dengue)**
- **Varicella**

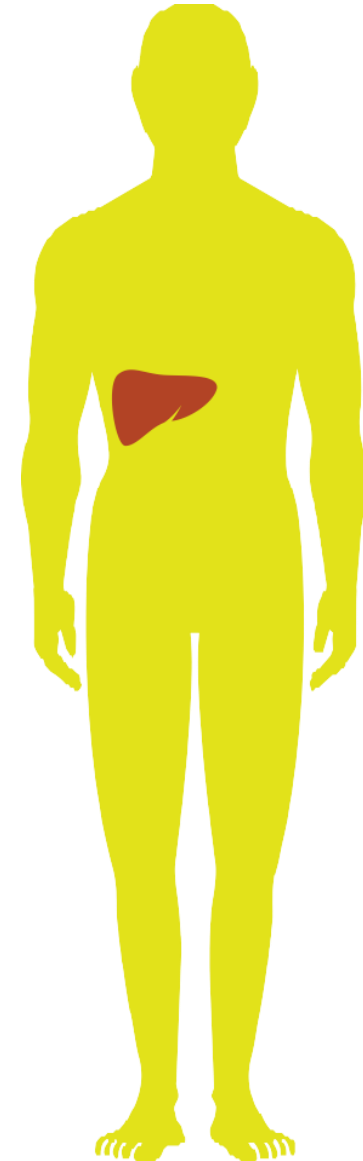


VIRAL HEPATITIS



**LIVE WELL
SAN DIEGO**

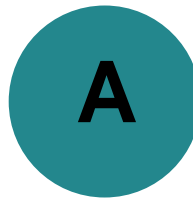
- **Hepatitis A – picornavirus (1973)**
- **Hepatitis B – hepadnavirus (1970)**
- **Hepatitis C – flavivirus (1988)**
- **Hepatitis D – unassigned (1977)**
- **Hepatitis E – hepevirus (1983)**
- **Hepatitis F – mutant of HBV**
- **Hepatitis G – flavivirus (1995) (GBV-C)**





Enterally transmitted

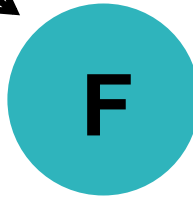
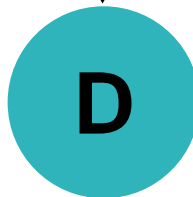
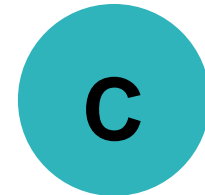
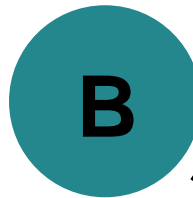
“Infectious” →



Viral hepatitis

→ **NA:NB**

“Serum” →



Parenterally transmitted

VIRAL HEPATITIS



	A	B	C	D	E
Source	Feces	Blood Body fluids	Blood Body Fluids	Blood Body fluids	Feces
Route	Feco-oral	Percutaneous Permucosal	Percutaneous Permucosal	Percutaneous Permucosal	Feco-oral
Chronic	No	Yes	Yes	Yes	No
Prevention	Immunization Hygiene	Immunization Blood donor screening	Blood donor screening	Immunization	Safe water Hygiene



- **Primarily transmitted via the fecal-oral route**
- **Incubation period ranges from 15 to 50 days (mean 28 days)**
- **Period of communicability from two weeks before through one week after the onset of jaundice or elevation of liver enzymes**
- **Virus viable outside body for months, depending on environmental conditions**

HEPATITIS A OVERVIEW



- **HAV virus inactivated by:**
 - Heating to **>185° F (>85° C)** for one minute
 - Routine water chlorination
 - **1:100 dilution of household bleach to water on surfaces**
 - Quaternary ammonium formulations with HCl
 - **2% glutaraldehyde**
- **Alcohol-based hand sanitizer not effective, need soap and running water**
- **Vaccination with the full, 2-dose series of Hepatitis A virus vaccine is the best way to prevent infection**

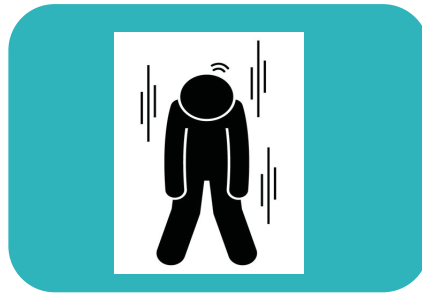
HEPATITIS A - SYMPTOMS



LIVE WELL
SAN DIEGO



Fever



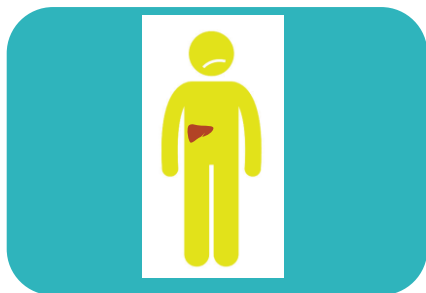
Fatigue



Nausea



Loss of Appetite



Jaundice



Stomach Pain



Vomiting



**Dark Urine, Pale
Stools and
Diarrhea**

HEPATITIS A - SYMPTOMS



- **In kids <6 years, 70% of infections are asymptomatic; if illness does occur, typically no jaundice**
- **Among older children and adults, infection is typically symptomatic, with jaundice in >70%**
- **Symptoms usually last <2 months, although 10%–15% of symptomatic persons have prolonged or relapsing disease for up to 6 months**
- **Hospitalization required in about 20%, higher (>40%) in older adults**



- **Relapsing hepatitis – up to 10% have relapse in the 6 months after acute illness**
 - Duration of clinical relapse is generally less than 3 weeks, although biochemical relapse may last as long as 12 months.
 - Cause unknown, no predisposing factors identified
 - Clinical course usually consists of apparent clinical recovery after acute infection with near normalization of the serum aminotransferases, followed by biochemical (and, in some cases, clinical) relapse
 - Clinical manifestations of relapse are often milder than the initial episode.
 - Multiple relapses can occur.



- **Cholestatic hepatitis – reported in 5%**
 - Prolonged cholestasis is characterized by a protracted period of jaundice (lasting >3 months)
 - Course usually characterized by marked jaundice, pruritus, fever, weight loss, diarrhea, and malaise
 - Laboratory findings include markedly elevated serum bilirubin (often >10 mg/dL) and alk phos, modest elevation of serum aminotransferases, and elevated serum cholesterol; peak bilirubin levels may be reached in 8th week or later.
 - Resolves spontaneously with no sequelae; recognition is important to avoid unnecessary testing. US appropriate to exclude biliary obstruction; cholangiography, liver biopsy are usually not needed



- **Fulminant hepatic failure – less than 0.1%**
 - Development of severe acute liver injury with encephalopathy and impaired synthetic function (international normalized ratio [INR] ≥ 1.5)
 - Occurs most commonly in individuals >50 years of age and individuals with other liver diseases such as hepatitis B or C

- **Autoimmune hepatitis – rare**
 - HAV infection may serve as a trigger for development of autoimmune hepatitis in susceptible individuals
 - Chronic hepatitis characterized by hyperglobulinemia, presence of circulating autoantibodies (such as anti-nuclear, anti-smooth muscle, and/or anti-actin antibodies), & inflammatory changes on liver histology

HEPATITIS A – DX, RX



- **Hepatitis IgM is part of most hospital “viral hepatitis panels”**
- **IgM is sensitive, but not specific (lots of cross-reactivity with other acute viral illnesses)**
- **IgM test may exhibit interference collected when from someone consuming supplements with a high dose of biotin (vitamin B7 or B8, vitamin H, or coenzyme R)**
- **Do not order IgM/IgG before vaccination – not useful for determining presence of immunity to HAV from either past HAV infection or vaccination against HAV**
- **Treatment is supportive**

WHO IS AT RISK?



- **Travelers to certain countries**
- **Men who have sex with men**
- **Injection and non-injection drug users**
- **Persons with clotting factor disorders**
- **Persons with chronic liver disease**



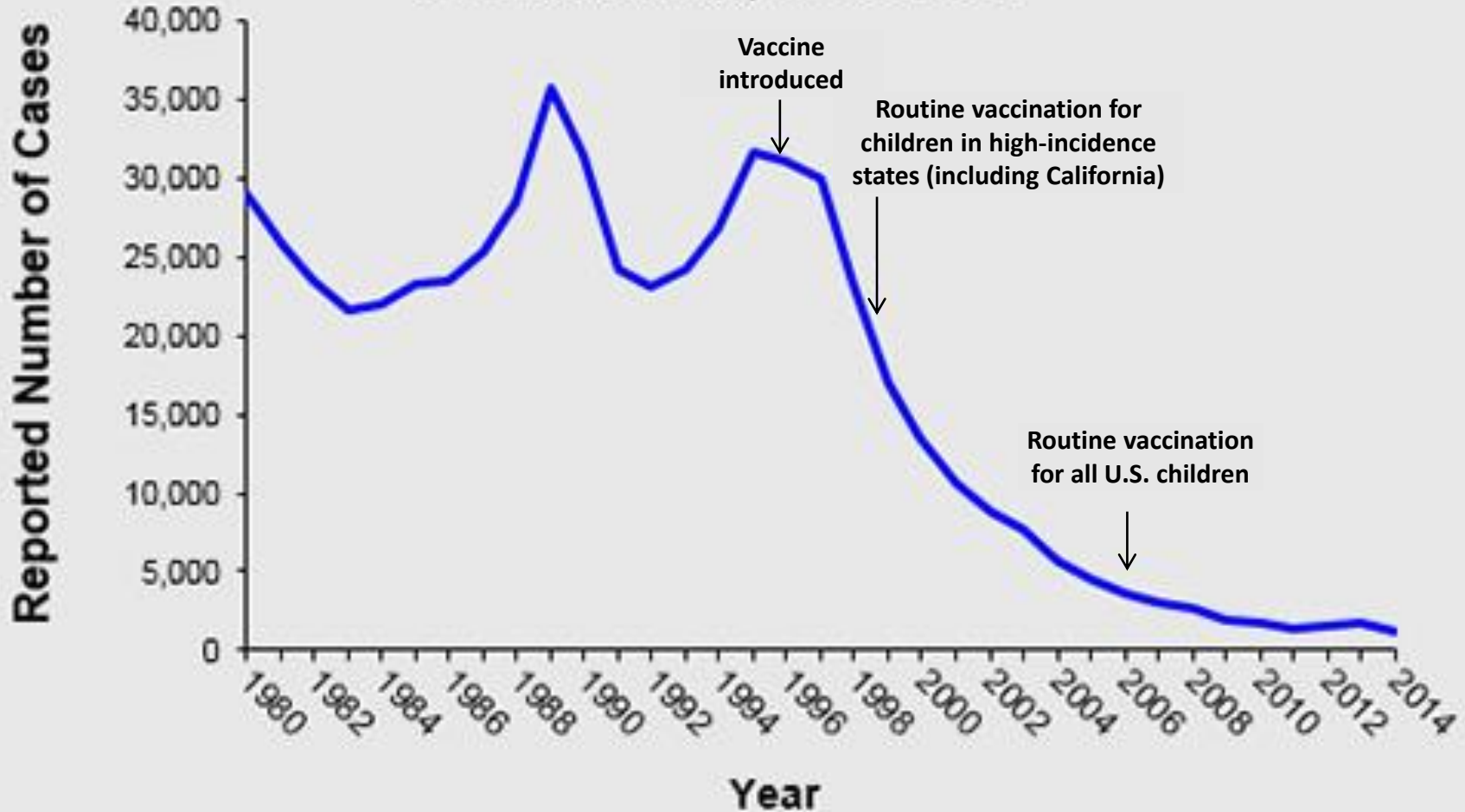
WHO IS AT RISK?



- **Homeless persons &/or those with unstable living conditions**
- **Household members, and other close personal contacts, of adopted children newly arriving from countries with high or intermediate Hepatitis A occurrences**
- **Persons with close ongoing contact with homeless persons and/or illicit drug users or their environment via employment or volunteer activities**
(during the outbreak)



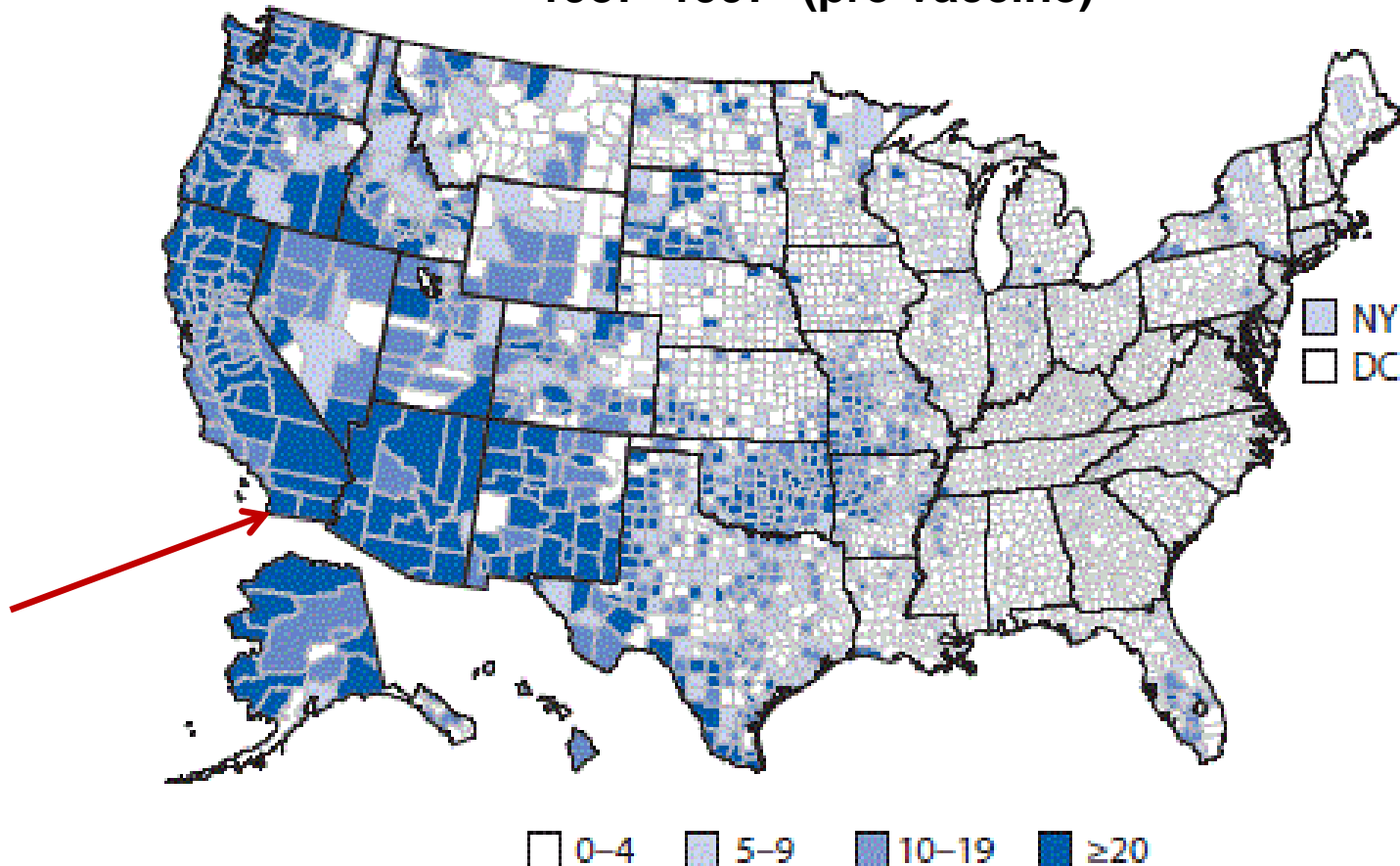
Incidence of hepatitis A, by year United States, 1980-2014



Source: CDC (adapted). Downloaded 3/7/17 from <https://www.cdc.gov/hepatitis/hav/havfaq.htm>

Incidence* of reported acute hepatitis A cases National Notifiable Diseases Surveillance System, United States

1987–1997† (pre-vaccine)



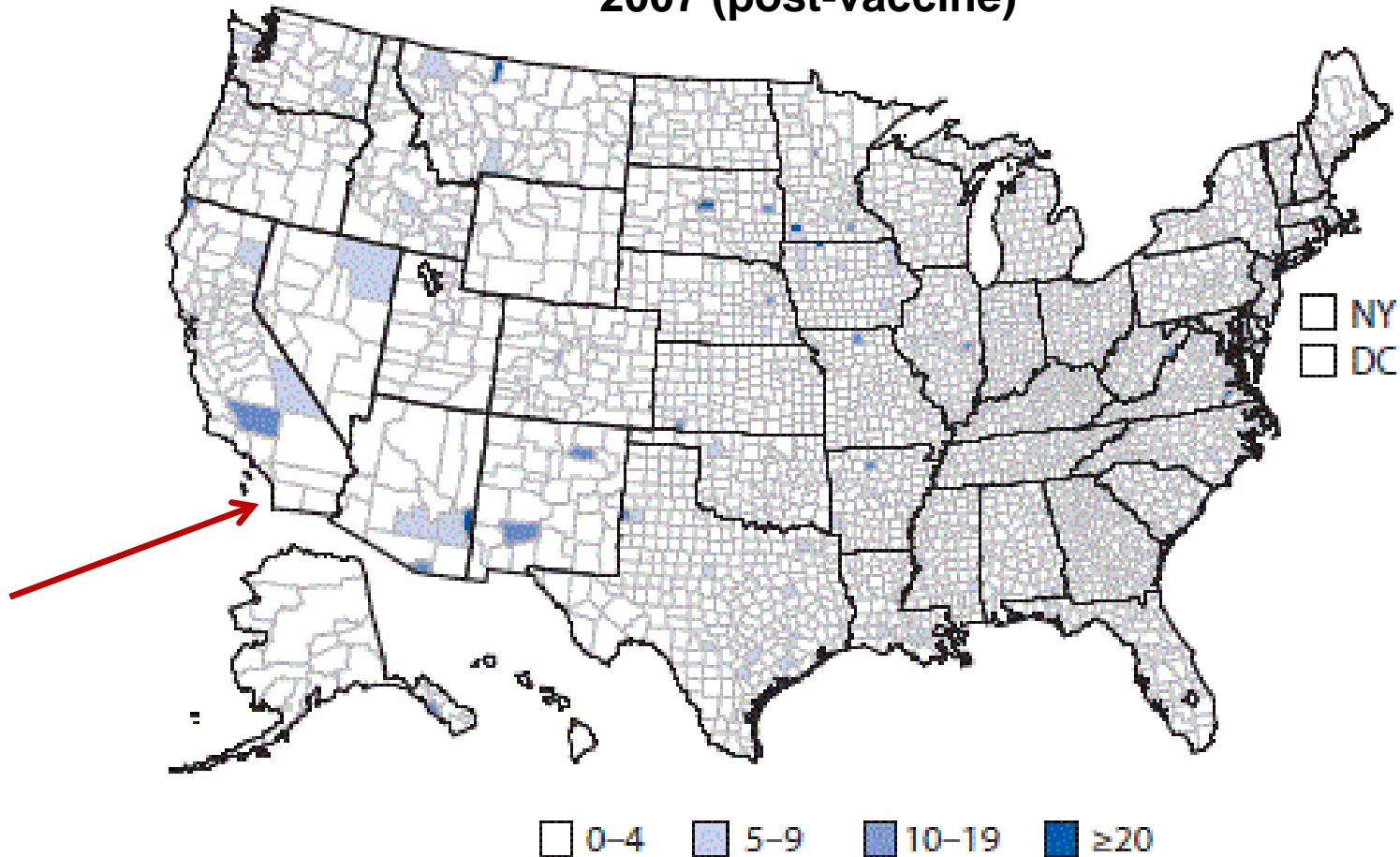
* Rate per 100,000 population. † Annual average incidence.

Source: CDC. Downloaded 7/1/17 from:

<https://www.cdc.gov/mmwr/volumes/65/su/su6501a6.htm>

Incidence* of reported acute hepatitis A cases National Notifiable Diseases Surveillance System, United States

2007 (post-vaccine)

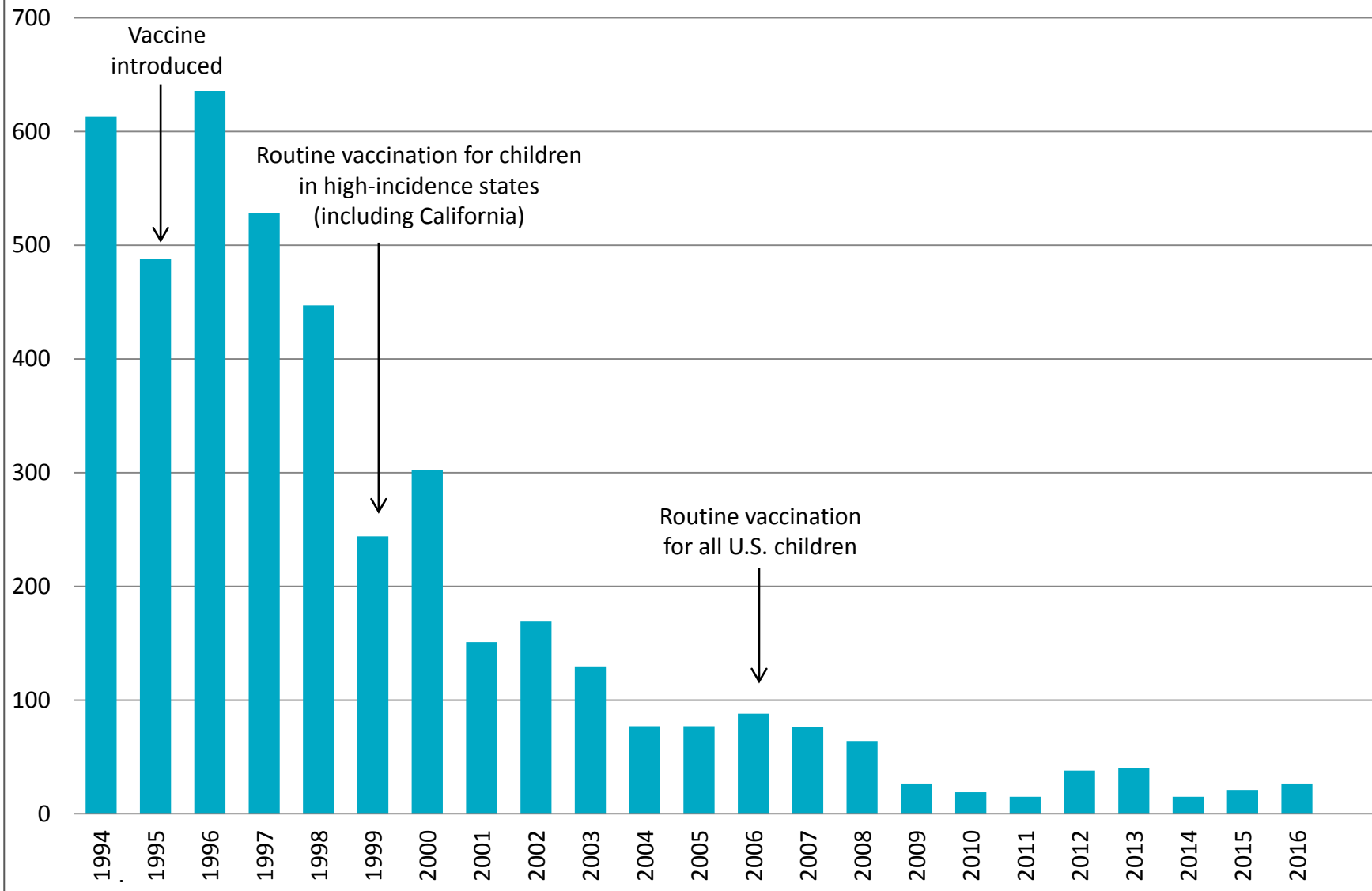


* Rate per 100,000 population.

Source: CDC. Downloaded 7/1/17 from:

<https://www.cdc.gov/mmwr/volumes/65/su/su6501a6.htm>

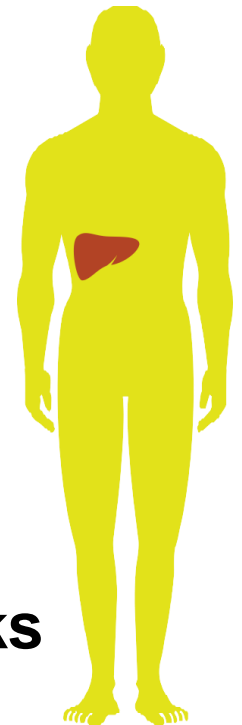
Hepatitis A Cases, San Diego County 1994 - 2016



HEPATITIS A



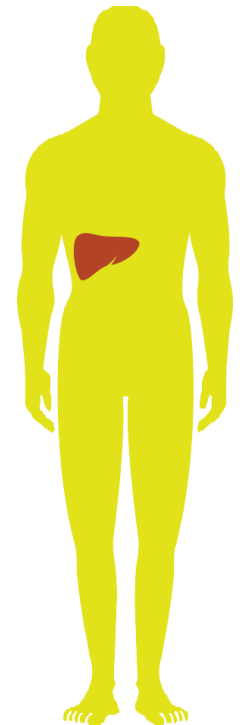
- **Reportable in California within one working day of identification by laboratory & provider (CCR Title 17 Sections 2500, 2505)**
- **Surveillance noted increase in cases above baseline in early March 2017**
- **11/16 to 2/17: 7- 9 cases expected, 19 cases reported**
- **Instead of international travel, predominant risks are drug use and homelessness.**
- **Health alert on outbreak on March 10, 2017**





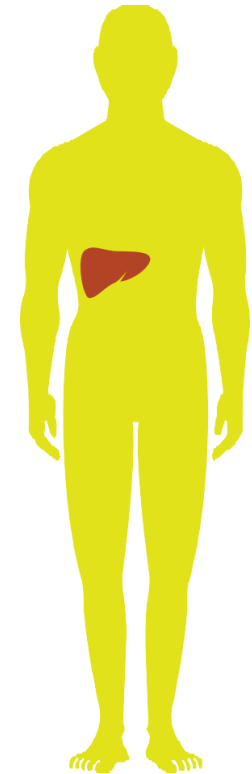
Investigation approach

- **Standard HAV investigation questionnaire**
- **Supplemental questionnaire (drug use, homeless service access, restroom use)**
- **Identification of cases with sensitive occupations**
- **Identify and provide prophylaxis to contacts**
- **Investigate common food, water, drug sources**
- **CDC laboratory provides confirmation of HAV RNA**



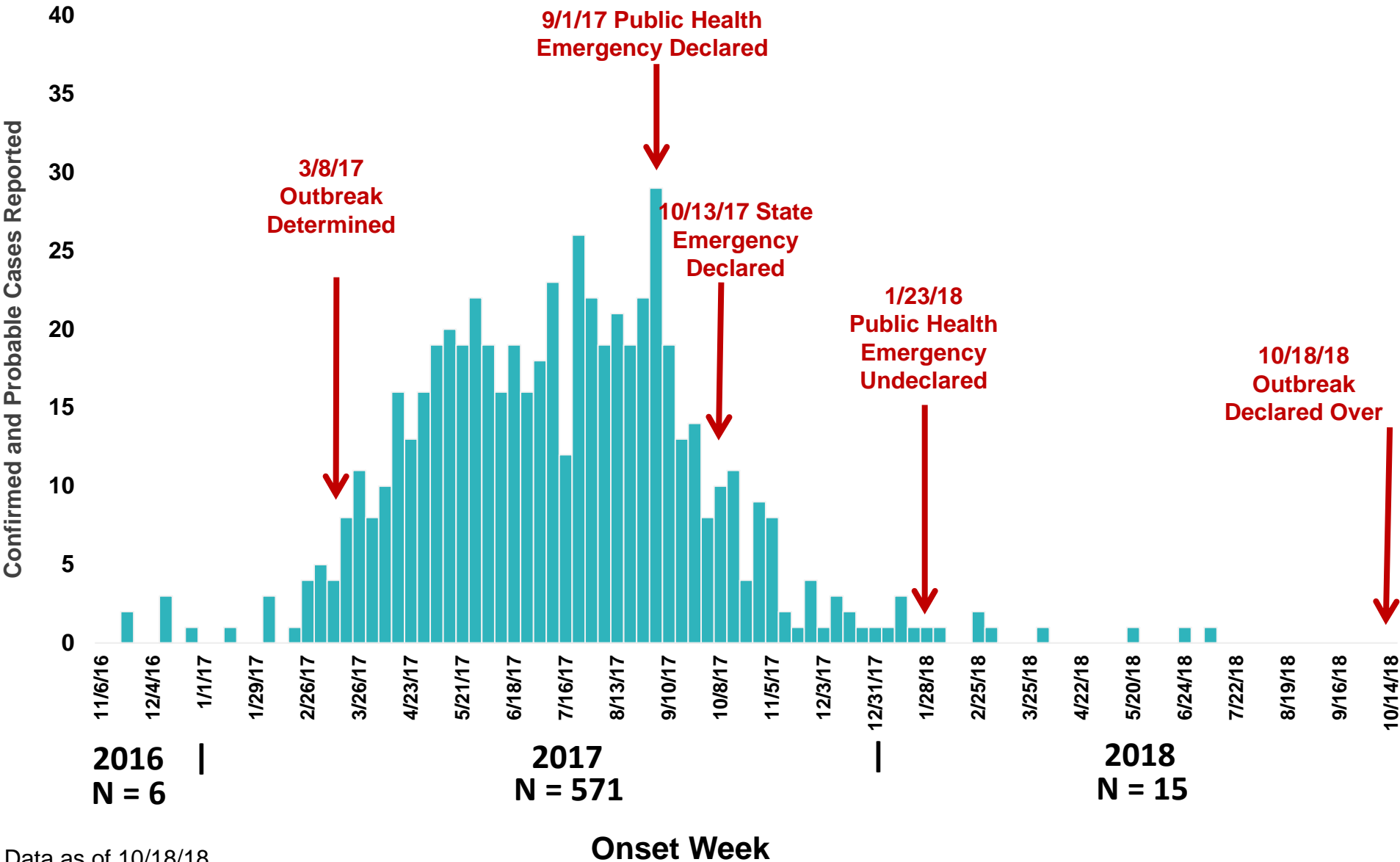


- **592 confirmed outbreak cases from 11/22/16 thru 10/18/18**
 - 407 (68%) hospitalizations, 20 (3.4%) deaths
 - 404 (68%) male (14 MSM), 188 (32%) female
 - Age range 5-87 (median 43.0)
- **Suspected Exposure Type**
 - 201 (34%) homeless and illicit drug use
 - 91(15%) homeless only
 - 79 (13%) illicit drug use only
 - 167 (28%) neither
 - 54 (9%) unknown



Outbreak-associated Hepatitis A Cases by Onset Week

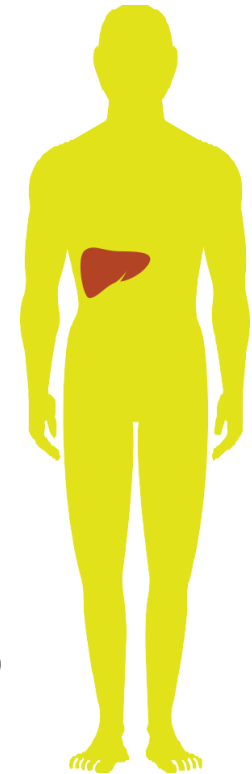
San Diego County Residents, 11/1/2016 – 10/18/2018*, N = 592



Data as of 10/18/18

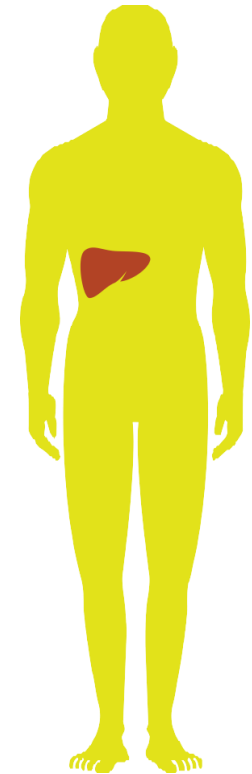


- **Co-infections**
 - 81/474 (17.1%) with hepatitis C
 - 25/474 (5.1%) with hepatitis B
- **20 (3.4%) cases diagnosed in jails**
 - 15 primary, 5 secondary
- **Sensitive occupations**
 - 24 food handlers (1 secondary case ID'ed)
 - 7 healthcare workers (1 secondary case ID'ed)
- **70 non-outbreak CSTE HAV cases**
(not included in outbreak count)





- **Case vaccination histories:**
 - **55% had ACIP indication(s) for vaccination**
 - **25% of homeless had no ACIP indication**
 - **None completed full two-dose series**
 - **39 (6.6%) received one dose prior to symptom onset:**
 - **<1 week - 9**
 - **1-2 weeks - 9**
 - **> 2 weeks - 21 (range 15 - 242 days)**





Based on the San Diego outbreak experience, persons experiencing homelessness had:

↑ risk for HAV: **aOR = 3.1** (95%CI 1.4-7.4)

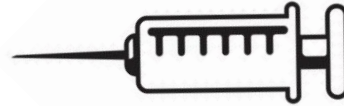
↑ risk for HAV hospitalization: **aOR = 3.8** (95% CI 2.2–6.6)

↑ risk of death from HAV: **aOR = 3.9** (95% CI 1.1–17)

**CDC recommends that persons experiencing homelessness get vaccinated against HAV
(See [MMWR article](#))**



- **Vaccinate**



- **Sanitize/hygiene**



- **Educate**





- **Vaccinate**



- **Sanitize/hygiene**



- **Educate**



www.sdepi.org



- **Local recommendations for vaccination**
 - **3/17: Homeless individuals**
 - **5/17: Homeless services providers and volunteers**
 - **5/17: Public safety workers who work with at-risk**
 - **5/17: Behavioral health who work with at-risk**
 - **5/17: Selected healthcare workers who work with at-risk (expanded 7/17)**
 - **6/17: Sanitation and janitorial workers**
 - **8/17: All food handlers in county**
- **ACIP recommendation: ANY person who desires immunity should be given vaccine**



HEPATITIS A VACCINATION



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- **Immunizing those at-risk**
 - **Mass vaccination events at social service providers, substance abuse facilities, etc.**
 - **At medical providers**
 - **Clinics**
 - **ED's**
 - **Behavioral health**
 - **In jails/detention centers**
 - **Post-exposure prophylaxis**
 - **Offer at booking & while incarcerated**
 - **Required for all food handlers**
 - **In the field – “foot teams”**
 - **PHN paired with homeless outreach workers**





Mass Vaccination at St. Vincent de Paul 4/10/17





**Mobile Vaccination in Rosecrans Parking Lot 5/15/17
with outreach workers from Family Health Centers San Diego**





“Foot team” in downtown San Diego 6/8/17 with volunteers from Friend to Friend, Episcopal Community Services



Photo credit: County of San Diego



City of San Diego paramedic gives hepatitis shot to a homeless man in San Diego in November 2017



Photo credit: San Diego Union Tribune



Vaccination first offered at intake, but much better acceptance at discharge. Staff incentives worked better than patient incentives.





Dr. Roneet Lev, examining a patient at Scripps Mercy Hospital. Dr. Lev championed providing hepatitis A shots using standing orders to any homeless or substance abuse patient in the ED.

(Photo Credit: San Diego Union Tribune)





Vaccination first offered as post-exposure prophylaxis, then routinely at intake and discharge. Required of food handler volunteers. Deputy support key to success.

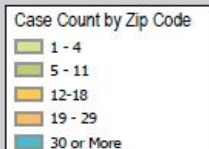
(Photo Credit: San Diego Union Tribune)



Adult HAV Vaccinations Registered San Diego Immunizations Registry 3/10/17 through 9/5/18

Vaccination Provider	Count*	Percent	
County			
Post-exposure prophylaxis	1,015	0.5%	
Jails	9,768	4.9%	
Psychiatric Hospital	467	0.2%	
Public Health Centers (IZ)	12,119	6.1%	29.1%
Public Health Clinics (TB,STD)	1,626	0.8%	
Field Events – Mobile Van	848	0.4%	
Field Events – Foot Teams	5,787	2.9%	
Field Events – POD/mass vaccination	26,521	13.3%	
Non-County			
FQHC	28,843	14.5%	70.8%
Healthcare systems (ED, hospitals, clinics)	94,025	47.2%	
Pharmacies	10,407	5.2%	
Occupational health	7,800	3.9%	
Total	199,226	100%	

Number of Hepatitis A Outbreak Associated Cases with Available Location Data by Zip Code(s)



592

Cases
as of 10/3/2018

These data reflect the patient's reported Zip Code and may not necessarily reflect the Zip Codes where the hepatitis A case exposure occurred.

3,896

Vaccination Field Events
4/7/2017 - 10/3/2018

Zip Codes with a population of less than 5,000 residents are combined with neighboring Zip Codes.

33,461

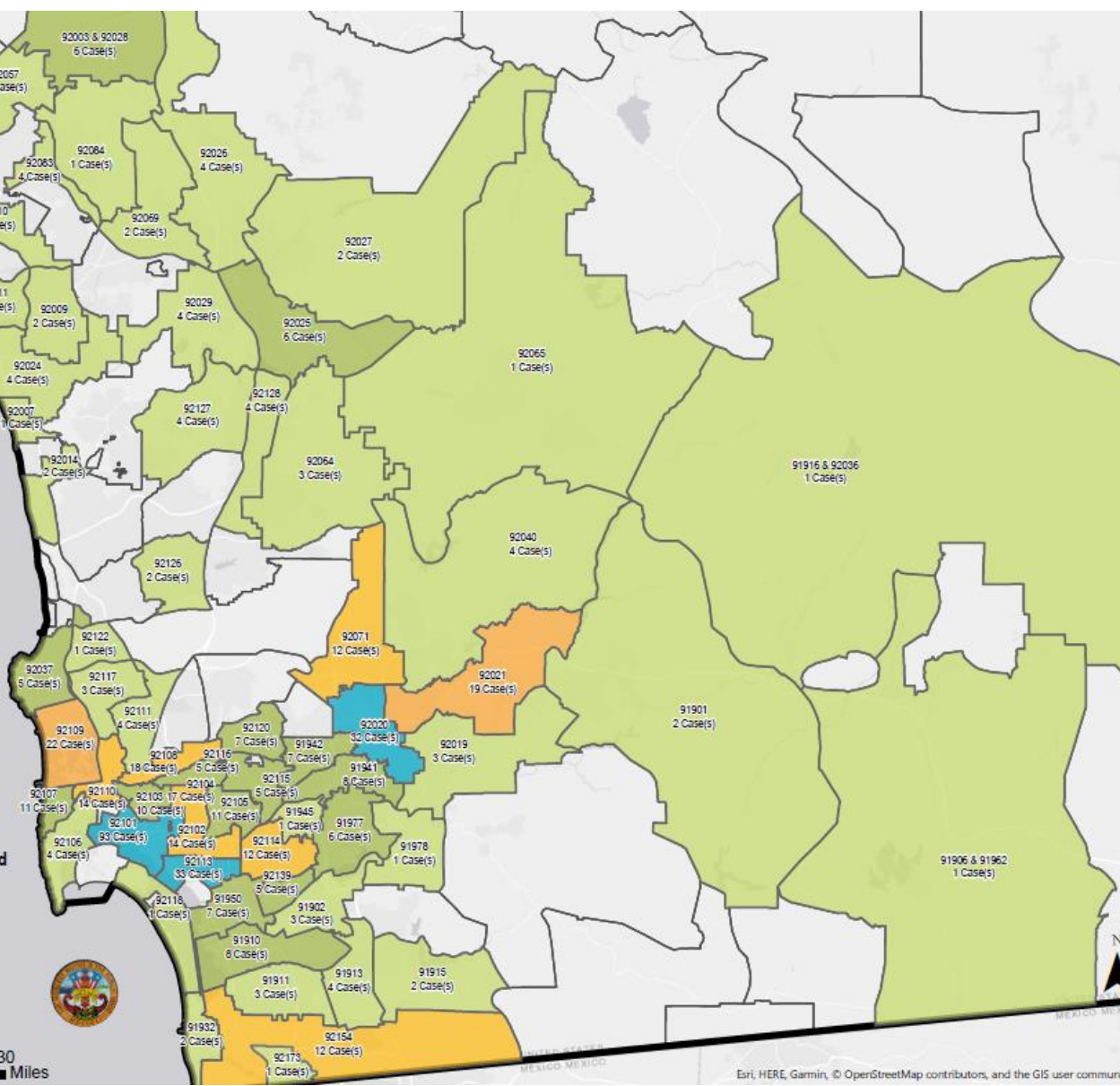
Field Vaccinations
3/5/2017 - 10/3/2018

Of the 592 total cases, 91 cases are not mapped due to incomplete location information.

203,858

Total Vaccinations Administered
3/5/2017 - 10/3/2018

Data is preliminary and subject to change based on new information.



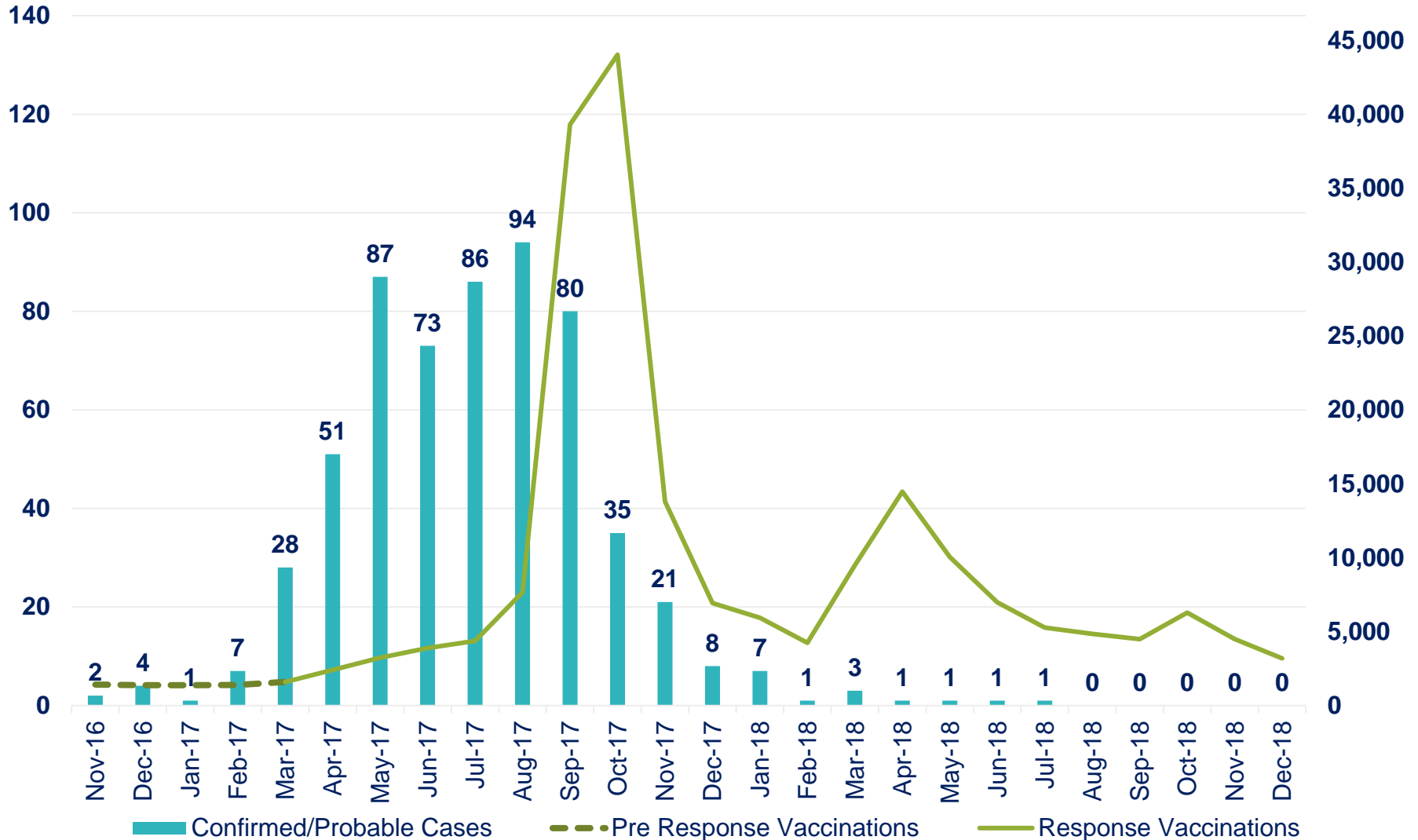
0 3.75 7.5 15 22.5 30 Miles

Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community

Outbreak-Associated Hepatitis A Cases & Vaccinations by Month, November 2016 through December 2018

Cases

Vaccinations





PHS staff member with “Hepatitis A prevention kits” for distribution to raise awareness among homeless about hepatitis.

They contain water, non-alcohol hand sanitizer, cleaning wipes, soap, clinic location information, and plastic bags.





**Volunteers cleaning along San Diego River on 4/26/17
Over 100,000 pounds of debris were removed over a 3-week period.**

(Photo: San Diego Union Tribune)



Banksy renames his shredded 'Girl With Balloon'; winning bidder will go



L.A. typhus outbreak adds fuel to debates over homelessness, housing



Facebook purged over 800 accounts and pages pushing political messages for profit



Border fence replacement hailed by Trump is completed in Calexico



L.A. NOW LOCAL

Blaze at homeless encampment in San Diego County may have exposed firefighters to hepatitis A



By ALENE TCHEKMEDIYAN SEP 25, 2017 | 5:50 PM



Nearly a dozen firefighters may have been exposed to hepatitis A while battling a vegetation fire at a homeless encampment in Spring Valley. (San Miguel Fire Protection District)

A team of firefighters may have been exposed to hepatitis A while battling a vegetation fire early Sunday at a homeless encampment in Spring Valley, officials said.

A "large amount" of urine and feces had accumulated at the encampment, prompting hazardous materials crews to require firefighters to decontaminate with soap and water before leaving the scene, according to the San Miguel Fire Protection District.

Story dated 9/25/17

Source: LA Times.

Downloaded 10/10/18 from:

<http://www.latimes.com/local/lanow/la-me-ln-hepatitis-firefighters-20170925-story.html>

For more information on Hepatitis A or to report individuals with vomiting, diarrhea or fever associated with food consumption, contact:

Email: epidemiology_fhd@sdcounty.ca.gov
Phone: (858) 505-6814
Website: www.sdcdelh.org



HEPATITIS A DISINFECTION GUIDELINES

Hepatitis A is a liver infection caused by the Hepatitis A virus. Highly contagious, the Hepatitis A virus is usually transmitted by the fecal-oral route, either through person-to-person contact or consumption of contaminated food or water. Contamination can occur when infected persons do not wash their hands properly after going to the bathroom and then touch other objects or food items. Surfaces that are frequently touched should be cleaned and sanitized often.

- Toilet Room Surfaces
- Kitchen Surfaces
- Doorknobs
- Recreation Equipment
- Light Switch Plates
- Phones
- Computer Keyboards
- Railings
- High Chairs
- Tables and Chairs
- Wheelchairs and Walkers
- Remote Controls

Effective Disinfectants

Chlorine Bleach: Mix and use the chlorine solution promptly. Allow 1 minute of contact time and then rinse with water.

- **5000 ppm:** 1 and 2/3 cups bleach in 1 gallon water. Use for stainless steel, food/mouth contact items, tile floors, nonporous surfaces, counters, sinks and toilets.

Other Disinfectants:

To determine if a product is effective against Hepatitis A, review the product label or product specification sheet and ensure it states “**effective against Hepatitis A**” or “**effective against Feline Calicivirus**”. You may also search the product name in the Environmental Protection Agency’s registered product database at:

<https://iaspub.epa.gov/apex/pesticides/f?p=PPLS:1>

Specific Cleaning Methods

Wear Gloves and Protect Your Clothing

Hard Surfaces

Disinfect surface with bleach, or other approved disinfectant, ensuring the correct contact time is being met. If the surface is in a food preparation area, make sure to rinse with water after. For surfaces that are corroded or damaged by bleach, use another product that is effective against Hepatitis A.



Steps to Clean Spills of Vomit or Feces

- Put on personal protective equipment, including two sets of gloves, masks and gowns.
- Block-off area immediately.
- Clean up visible debris using disposable absorbent material (paper towels or other type of disposable cloths) and minimize aerosols.
- Discard soiled items carefully in an impervious plastic bag.
- Thoroughly clean affected area
- Disinfect area and objects surrounding the contamination with an appropriate disinfectant effective against Hepatitis A. See box to the left “Effective Disinfectants” for 5000 ppm sanitizing solution.
- Take off outer set of gloves, gown and mask, in that order, and discard before exiting contaminated clean-up area.
- Place discarded PPE in an impervious plastic bag.
- Wearing the inner set of gloves, transport bag to a secure trash container; do not allow the bag to come into contact with clothing.
- Always wash your hands after handling any contaminated material, trash or waste.

Proper Handling

- Use chemicals in well-ventilated areas.
- Avoid contact between incompatible chemicals.
- Prevent chemical contact with food during cleaning.
- Handle contaminated material as little as possible and with minimal agitation to reduce aerosols.
- Manage waste safely and dispose in a secure trash container.

DEH staff developed and disseminated disinfection guidelines to >13,000 businesses, government, and other stakeholders to focus attention on proper cleaning of public areas accessed by the public and at-risk populations.

Available at the County [Hepatitis A website.](#)





Handwashing station being installed in downtown San Diego on 9/2/17

(Photo: San Diego Union Tribune)





Portable restrooms with security in downtown San Diego on 9/2/17

(Photo: San Diego Union Tribune)





City contractor cleaning a street in downtown San Diego on 9/11/17

(Photo: San Diego Union Tribune)





**Photo of “tent city” set up in September 2017
by the City of San Diego**

(Photo credit: San Diego Union Tribune)





**Exterior photo of one of three homeless tents set up
by the City of San Diego January 2018**

(Photo credit: San Diego Union Tribune)





**Interior photo of one of three homeless tents set up
by the City of San Diego January 2018**

(Photo credit: San Diego Union Tribune)



Protect yourself from Hepatitis A

Get vaccinated and
wash your hands after using
the restroom and before eating.

San Diego is in the midst of a Hepatitis A outbreak.
Call 2-1-1 to find a vaccine clinic near you.



11 health advisories

16 news stories

Website established

**Education campaigns
(medical, homeless
services, business,
at-risk groups)**

**Poster developed for
ad campaign at mass
transit and other
public locations**

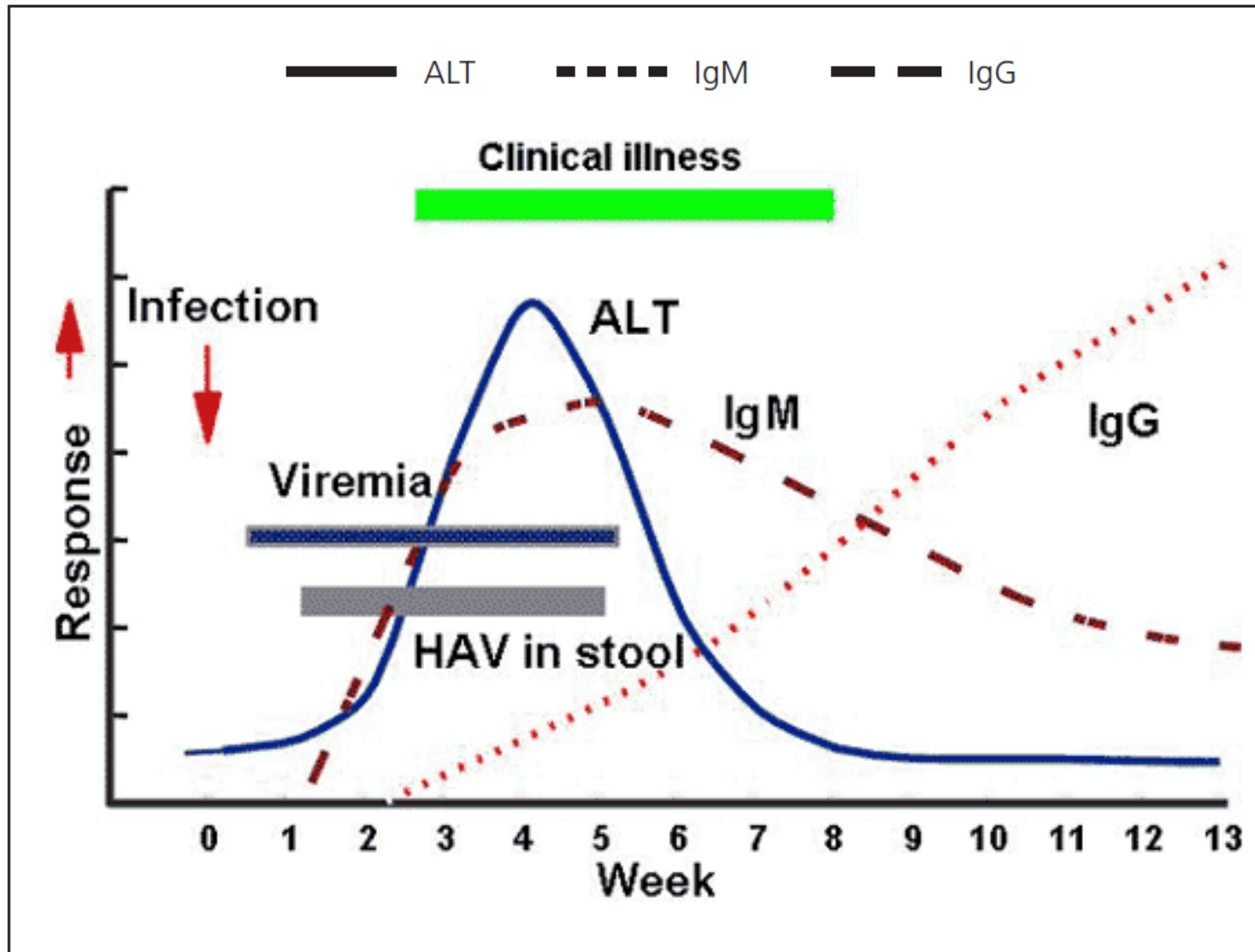




- **Infection control issues**
- **Adult vaccinations – we need to do better!**
- **Public health/behavior health partnerships are critical**
- **Homelessness is an independent risk factor for HAV**
- **Plan for data collection**
- **HAV PCR and genotype/strain information very useful**
- **Food handlers rarely pass on the disease**

Timeline for hepatitis A manifestations.

(ALT = alanine transaminase; HAV = hepatitis A virus; Ig = immunoglobulin.)





HAV PCR SCREENING ASSAY

Determined a need to confirm by molecular methods in addition to serology methods with a short TAT

No commercial PCR assays available.

TaqMan assay for Hepatitis A screening in different matrices such as food, water, and clinical samples.

(N. Jothikumar et al. 2005. Development and Evaluation of a Broadly Reactive TaqMan Assay for Rapid Detection of Hepatitis A Virus. Appl. Environ. Micro. Vol. 71 No.6)

Performance characteristics: accuracy, sensitivity, and specificity of 96%, 98%, and 96%, respectively

Began reporting results October 30, 2017

HAV NGS GENOTYPING ASSAY

First began with a WGS approach *(C. Chiapponi et al. 2014. Isolation and Genomic Sequence of Hepatitis A Virus from Mixed Frozen Berries in Italy. Food Environ. Virol. 2014 Sep; 6(3):202-6)*

- WGS assay produced non-uniform genome coverage, and low sensitivity, prompting a move to targeted NGS approach
- NGS improved sensitivity and coverage in the region of interest

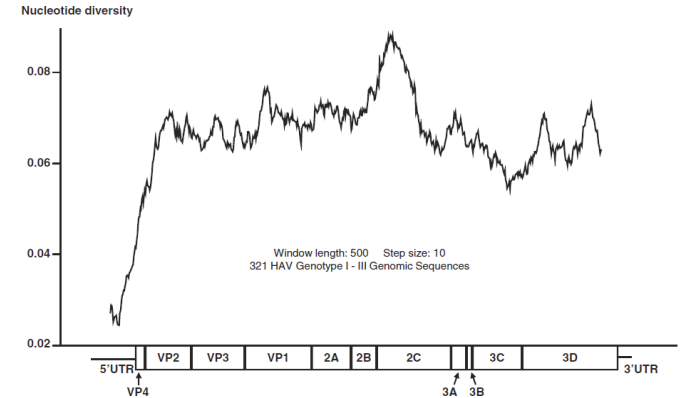
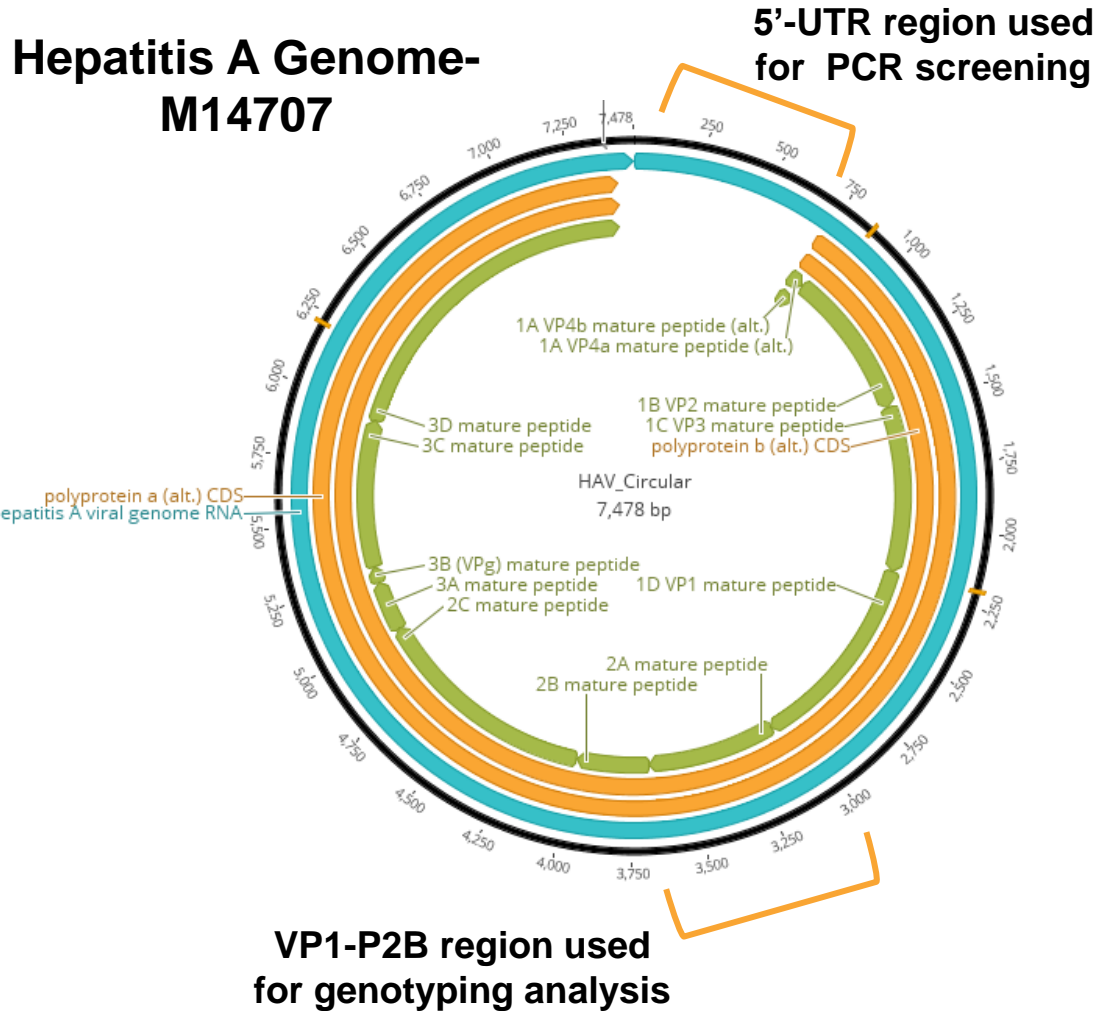
Adopted GHOST HAV protocol in January 2018

- GHOST Analysis Portal and Geneious software used to determine genotype and sub-cluster, if any
- Processed 480 HAV specimens via GHOST

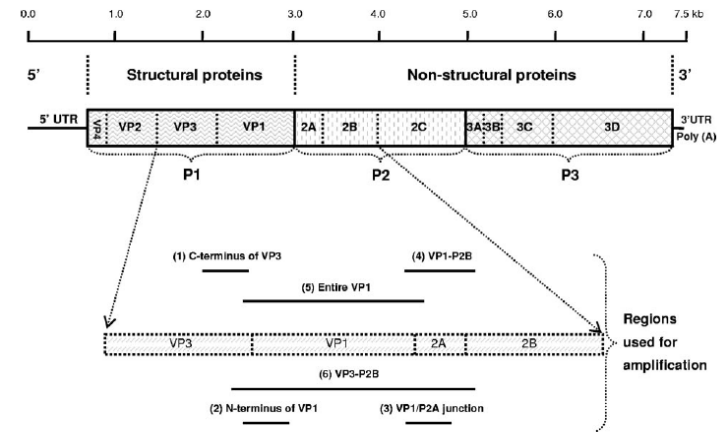
HEPATITIS A GENOME



Hepatitis A Genome- M14707



Nucleotide diversity of the genome provided by Nainan et al., 2014



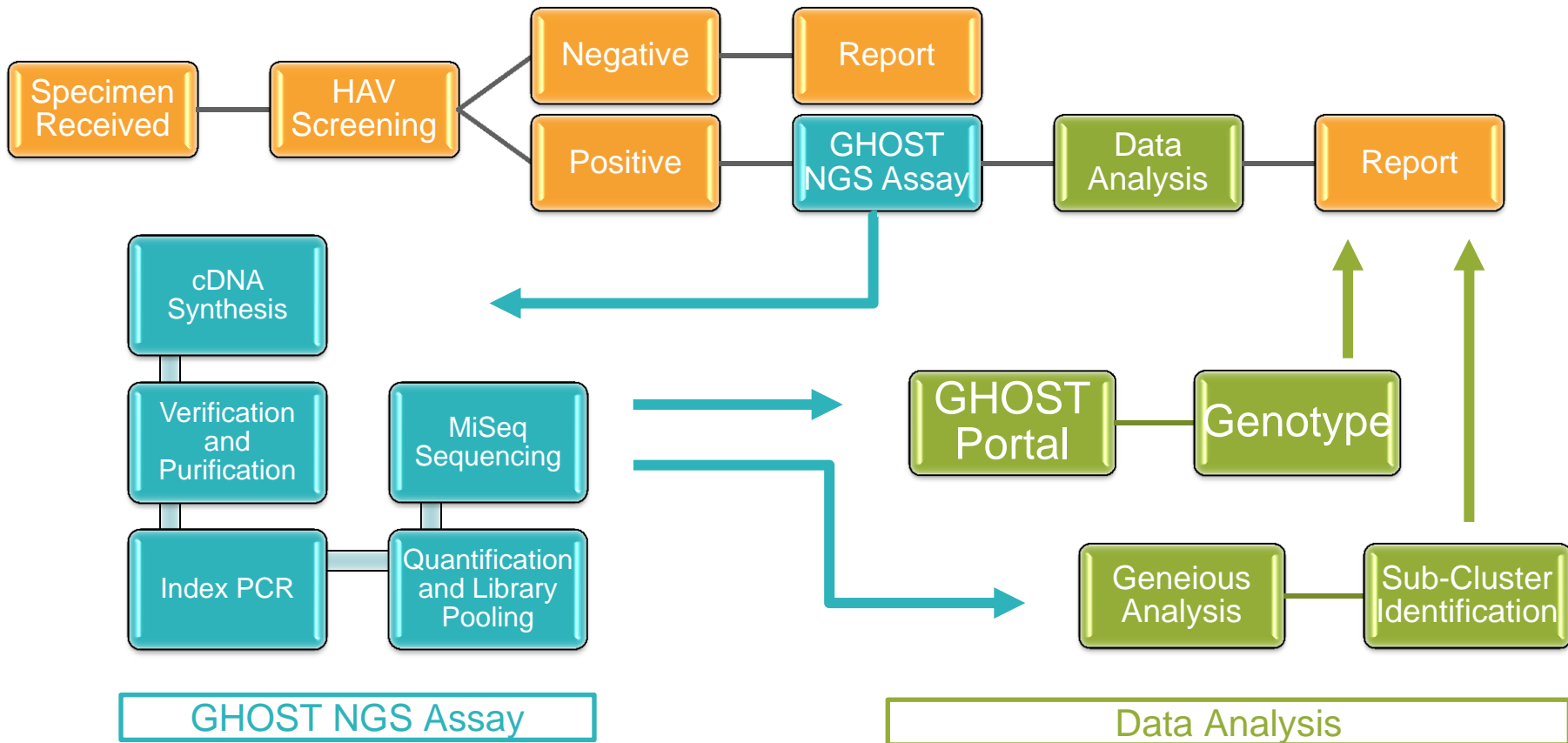
Expanded view of the viral proteins used in HAV assays provided by Nainan et al., 2006

HAV SPECIMEN WORKFLOW

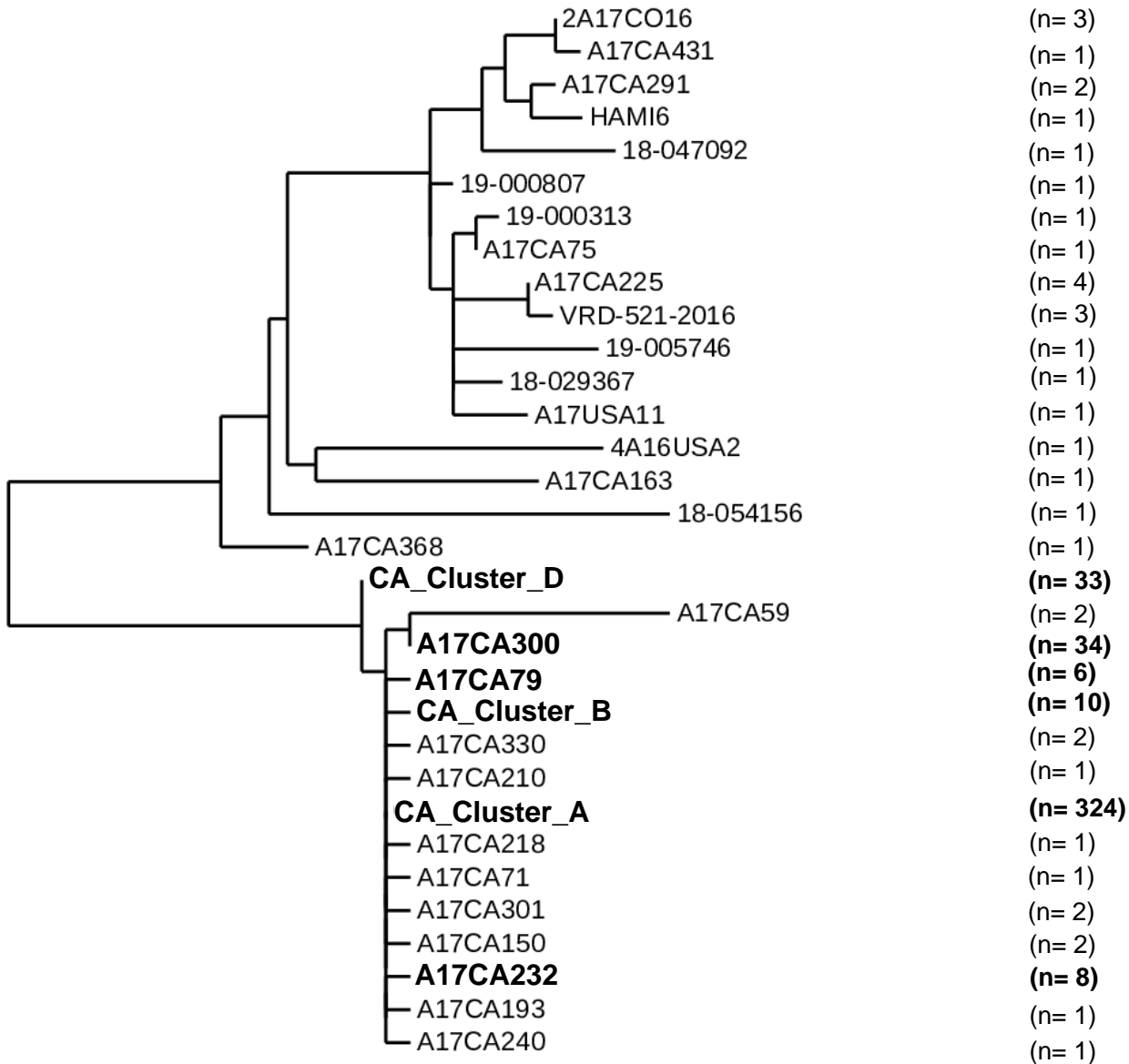


LIVE WELL
SAN DIEGO

HAV Specimen Workflow



HAV STRAIN DIVERSITY



IA - Non-Outbreak

**Total Specimen
= 454**

IB - Outbreak

0.03



SPECIMEN SUMMARY

- 480 Positive specimens processed
- 454 genotype identified
- 26 PCR screened positive, did not amplify on GHOST
 - High Ct values

VALIDATION RESULTS

- Accuracy
 - Genotype: 100% match CA State/CDC result
 - HAV IB Sub-Cluster: 95% match CA State/CDC result
- Precision
 - 100% concordance
- Specificity
 - 100% concordance

Hepatitis A Strain Diversity

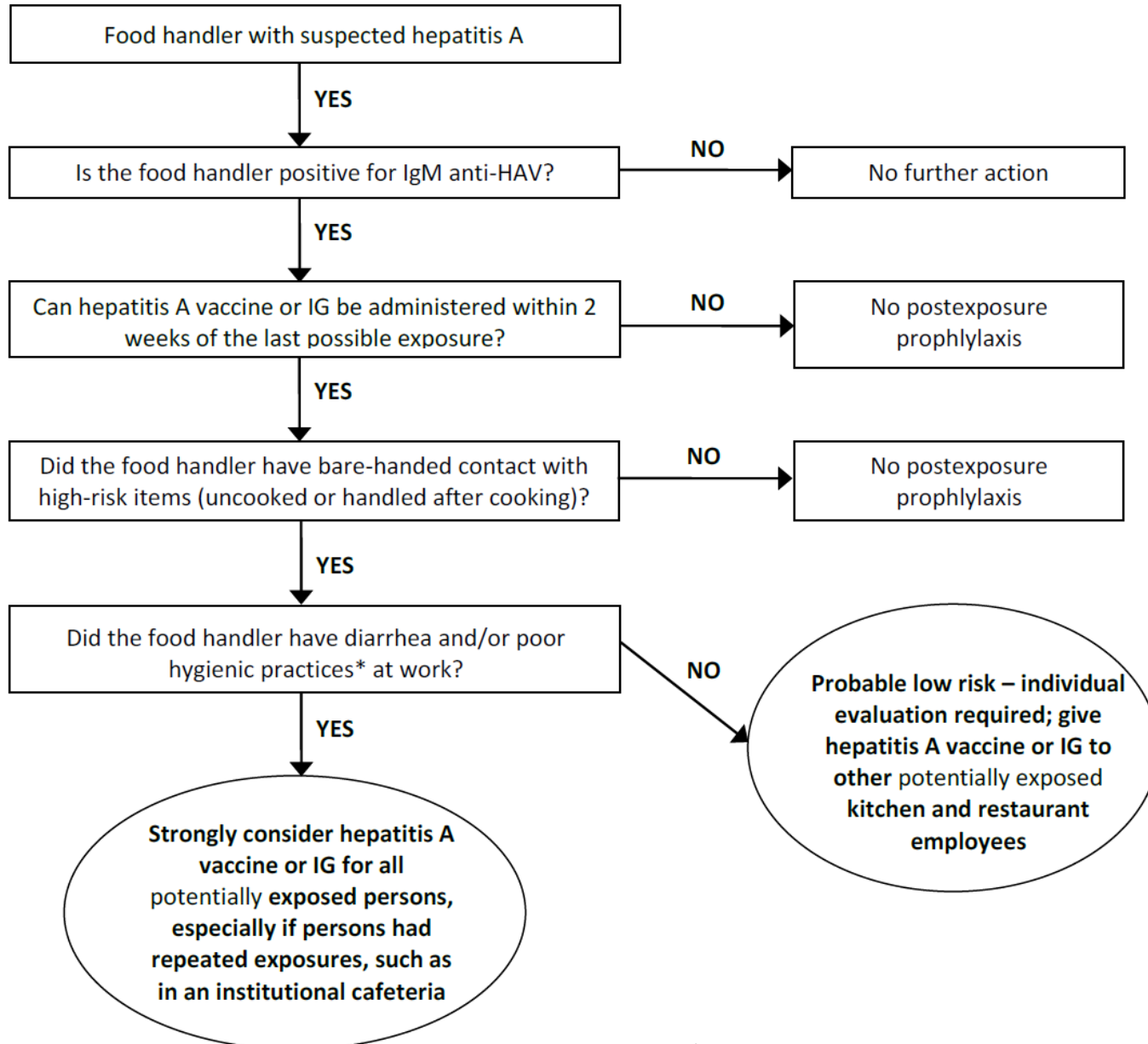
Genotype IB							Genotype IA
CA Cluster A	CA Cluster B	CA Cluster D	A17CA300	A17CA232	A17CA79	Other Unique Sequences	
324	10	33	34	8	6	14	25

Total Specimen : 454



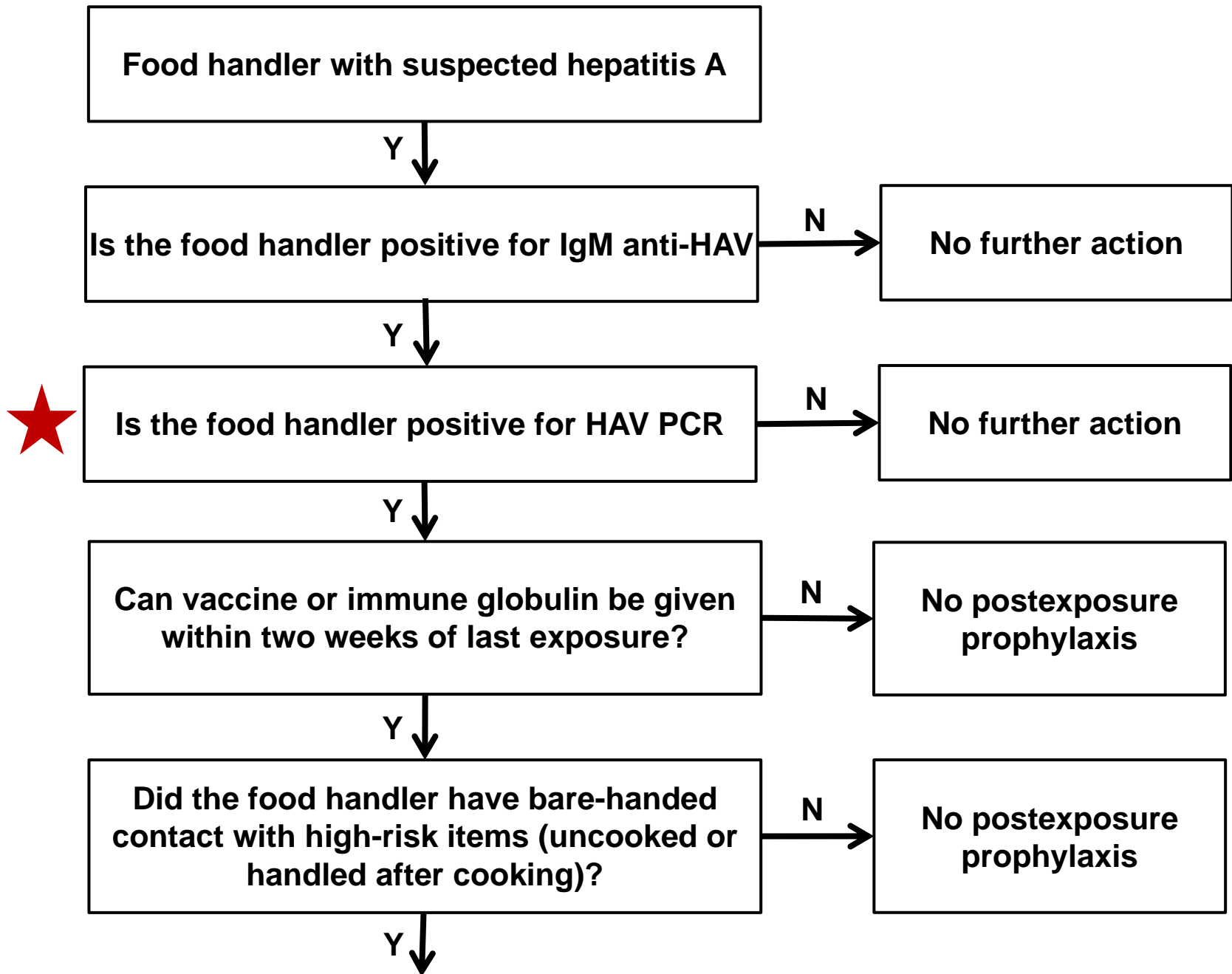
- **Follow a protocol**
- **Assess the patient (patient and coworker interviews)**
- **Assess the facility (standard inspection)**
- **Will post-exposure prophylaxis be effective? (Timing!)**
- **Should there be a notice for symptom watch?**

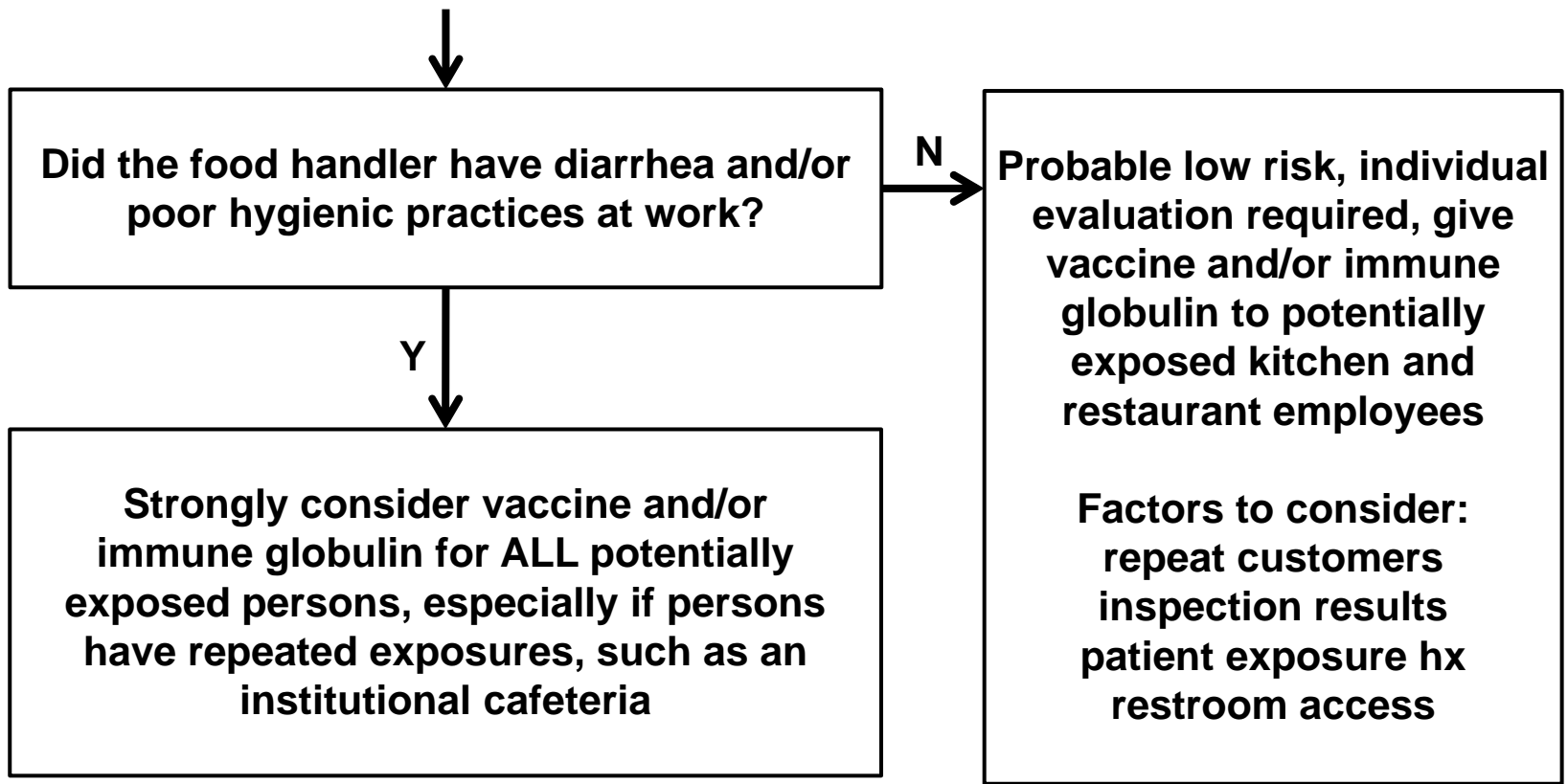
Algorithm for determining the need for postexposure prophylaxis after exposure to food prepared by a food handler with hepatitis A infection



Algorithm adapted from:

Fiore AE. Hepatitis A Transmitted by Food. *Clinical Infectious Diseases* 2004; 38:705-15.





In ALL foodhandler cases, provide vaccine to all unimmunized staff.

HEALTH

Hepatitis A Case Reported at Pacific Beach Restaurant



By **Tom Christensen**, County of San Diego Communications Office
Sep. 15, 2017 | 10:11 AM

September 15, 2017

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Board Approves New McClellan Palomar Airport Master Plan



Get into the Halloween Spirit at County Parks



Source: COSD. Downloaded 10/10/18 from

<https://www.countynewscenter.com/hepatitis-a-case-reported-at-pacific-beach-restaurant/>



Judy Starks of La Mesa winces as San Diego County Public Health Nurse Rosalinda Ruezga gives her the first of a two-part hepatitis A vaccination at the county's North Central Regional Center on 9/16/17.

Photo credit: San Diego Union Tribune

CDPH Hepatitis A Postexposure Prophylaxis Guidance Quicksheet

Age/years	<1†	1-40	41-59	60-74†	75+
Healthy	IG only	Vaccine preferred	Vaccine	IG + vaccine	IG + vaccine
Other‡	IG	IG	IG	IG	IG

† When IG is unavailable or in short supply, single-antigen HAV vaccine may be used for PEP in healthy people 60-74 years of age and in infants >6 months of age.

‡ Examples: persons with chronic liver disease (e.g., cirrhosis); immune compromised persons, including persons with HIV/AIDS; people undergoing hemodialysis; those who have received solid organ, bone marrow or stem cell transplants; patients receiving high dose steroids (>2mg/kg/day); those receiving chemotherapy, immunomodulators and/or biologic medications; and persons who are otherwise less capable of developing a normal response to immunization

HEPATITIS A – PRE-EXPOSURE PROPHYLAXIS



**LIVE WELL
SAN DIEGO**

Vaccine	Age	Dose	# of doses	Schedule
Havrix	12 months to 18 years	720 ELISA units per 0.5cc	2	0* and 6 to 12 months
	18 years and older	1,440 ELISA units per cc	2	0* and 6 to 12 months
Vaqta	12 months to 18 years	25 U per 0.5cc	2	0* and 6 to 18 months
	18 years and older	50 U per cc	2	0 and 6 to 18 months
Twinrix	18 years and older, regular schedule	720 ELISA units/20 mcg per cc	3	0*, 1, and 6 months
	18 years and older, accelerated schedule	720 ELISA units/20 mcg per cc	4	Days 0*, 7, and 21 to 30, with a booster at 12 months

ELISA = enzyme-linked immunosorbent assay.

* - 0 represents initial dose.

Why San Diego?



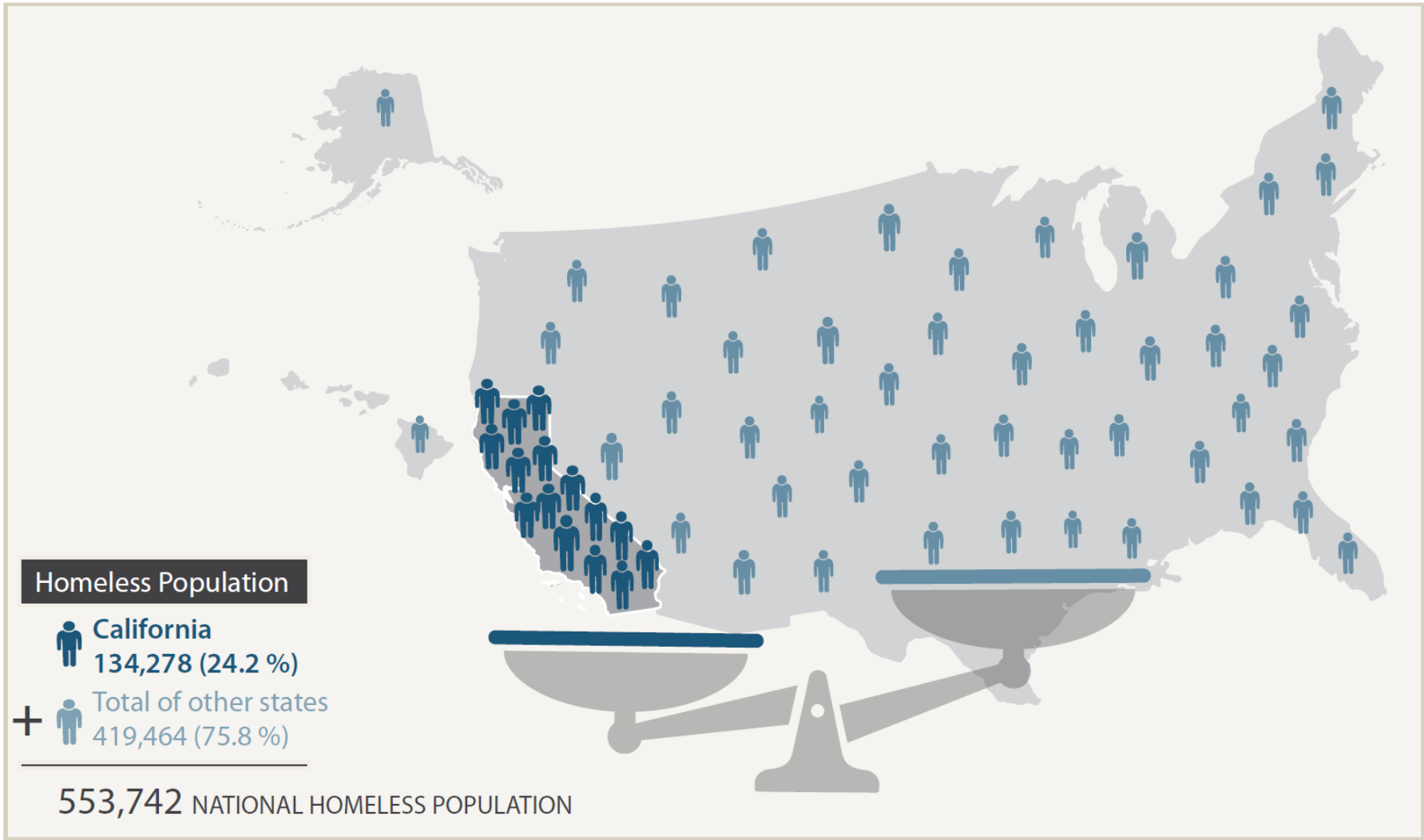
A homeless man is passed out on a public sidewalk on July 23, 2016, in downtown San Diego.

(Photo credit: George Rose/Getty Images)



10 U.S. Cities with largest populations of homeless people

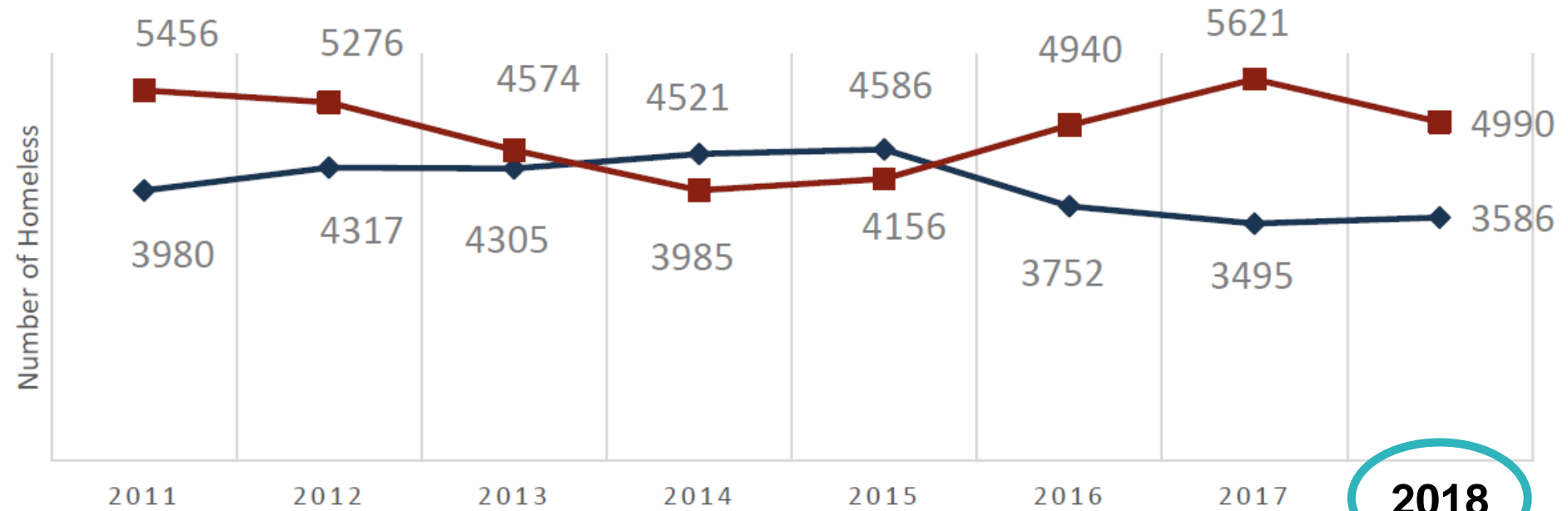
City Area	Total Homeless	Number Unsheltered (%)
New York City, NY	76,501	3,902 (5.1%)
Los Angeles City & County, CA	55,188	41,225 (74.7%)
Seattle & King County, WA	11,643	5,484 (47.1%)
San Diego City & County, CA	9,160	5,624 (61.4%)
San Francisco, CA	7,499	3,150 (42.0%)
District of Columbia	7,473	897 (12.0%)
San Jose/Santa Clara City & County, CA	7,394	5,449 (73.7%)
Las Vegas & Clark County, NV	6,490	4,355 (67.1%)
Boston, MA	6,135	184 (3.0%)
Philadelphia, PA	5,693	956 (16.8%)



CA – 68% unsheltered
All other states – 24% unsheltered

Source: CA State Auditor, using 2017 HUD data
Downloaded 6/10/18 from:
www.bsa.ca.gov/pdfs/reports/2017-112.pdf

Homelessness in San Diego County



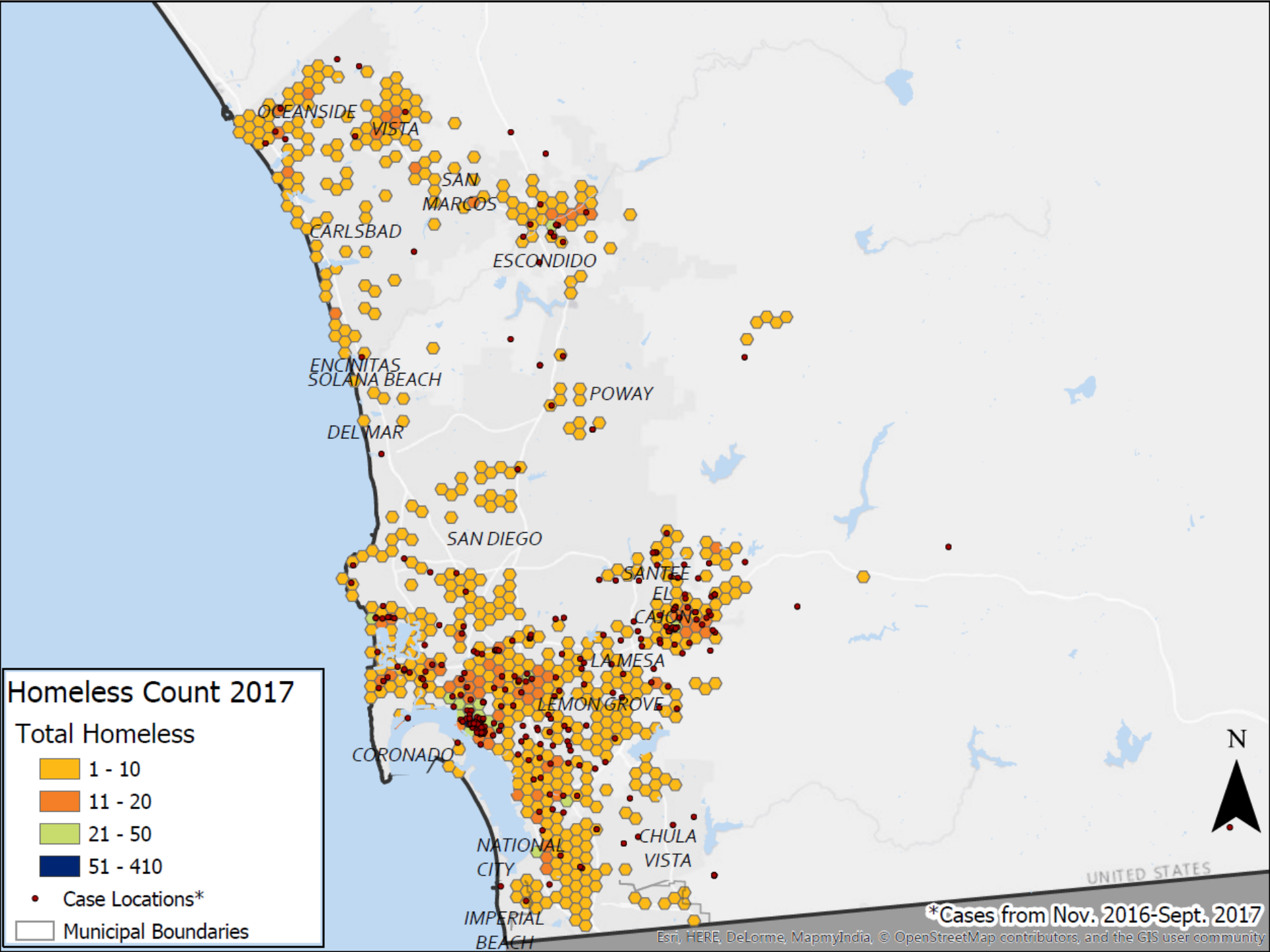
Sheltered			Unsheltered		
Emergency Shelter	Safe Haven	Transitional Housing	Individual	Vehicle*	Hand-Built Structure/Tent*
1,947	64	1,575	2,475	1,262	1,253
3,586**			4,990		
8,576 Total Homeless Persons					



2018

Source: San Diego Regional Task Force on Homelessness. Downloaded 5/17/18 from:

<https://www.rtfhsd.org/wp-content/uploads/2017/06/2018-WPoint-in-Time-Count-Annual-Report.pdf>



Homeless Count 2017

Total Homeless

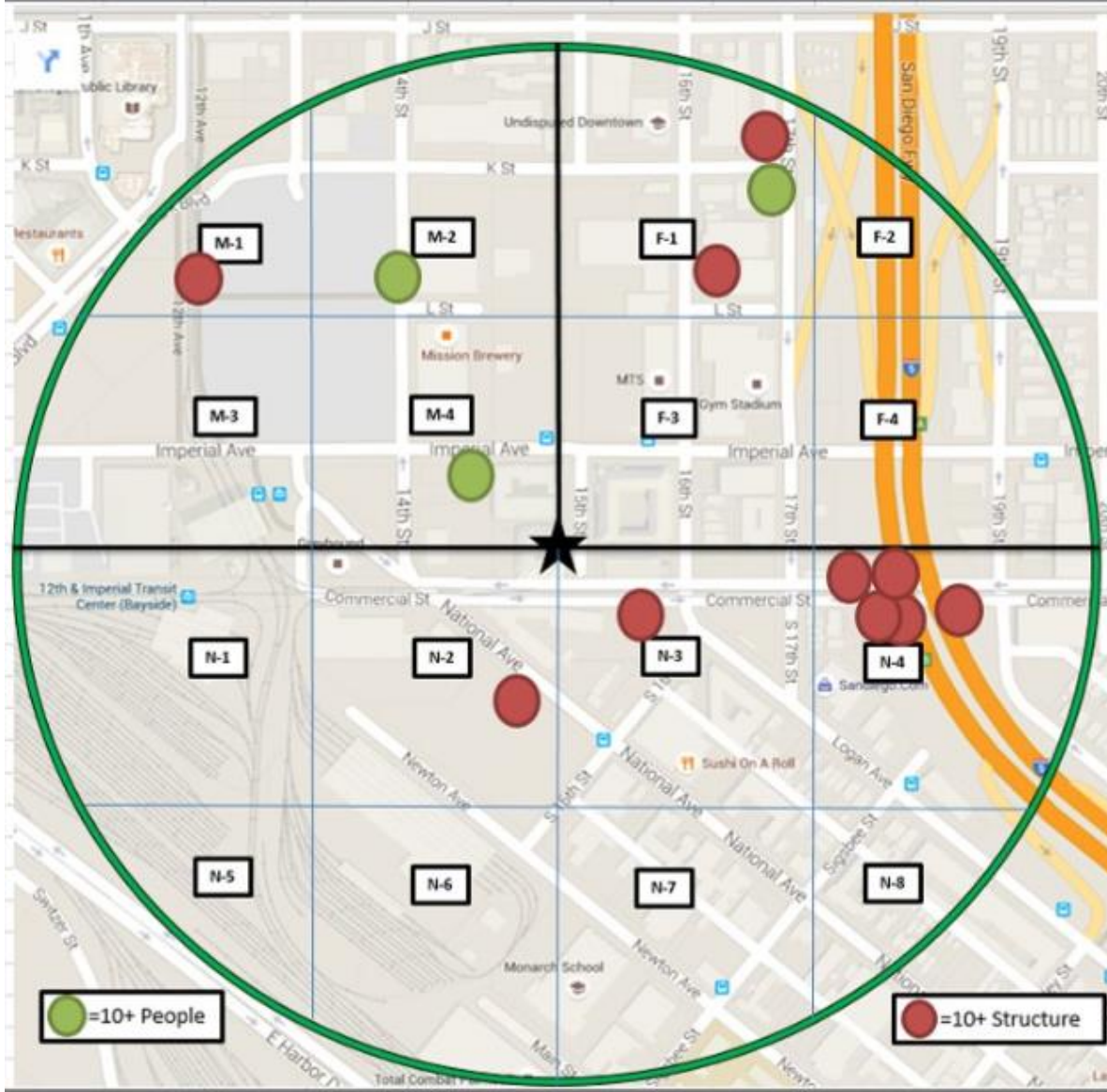
- 1 - 10
- 11 - 20
- 21 - 50
- 51 - 410

• Case Locations*

□ Municipal Boundaries

*Cases from Nov. 2016-Sept. 2017

Date: **3/4/16**



#		Persn		Struct	
M-1	7	15			Mission
M-2	11	0		p	34
M-3	0	0		s	15
M-4	16	0		t	49
F-1	15	24			Family
F-2	3	8		p	30
F-3	9	3		s	36
F-4	3	1		t	66
N-1	0	0			Newton
N-2	9	12		p	10
N-3	0	15		s	77
N-4	1	50		t	87
N-5	0	0			
N-6	0	0			
N-7	0	0			
N-8	0	0			

Summary	
Totals	
Person Total	74
Structure Total	128
Grand Total	202

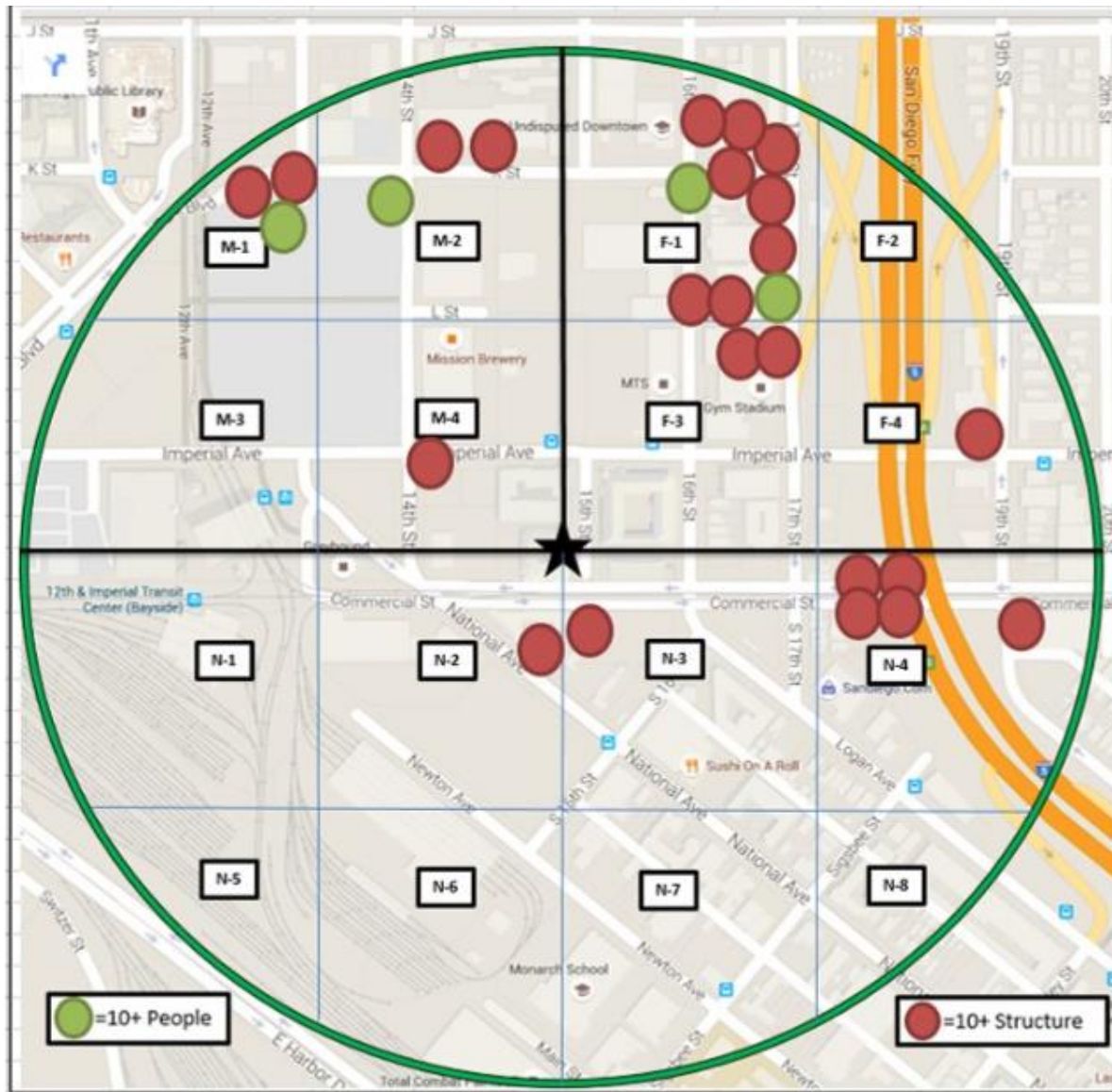
Percentages	
Mission	p 46%
	s 12%
	t 24%
Family	p 41%
	s 28%
	t 33%
Newton	p 14%
	s 60%
	t 43%

202

Homeless count surrounding Imperial and 15th Street, downtown San Diego. 3/4/16

(Map courtesy of St. Vincent de Paul Village)

Date: 9/2/16



Date: 9/2/16			
#	Person	Struct	Totals
M-1	11	25	Mission
M-2	16	21	p 29
M-3	0	0	s 57
M-4	2	11	t 86
F-1	27	80	Family
F-2	0	4	p 35
F-3	7	23	s 117
F-4	1	10	t 152
N-1	0	0	Newton
N-2	0	12	p 8
N-3	4	10	s 81
N-4	4	59	t 89
N-5	0	0	
N-6	0	0	
N-7	0	0	
N-8	0	0	

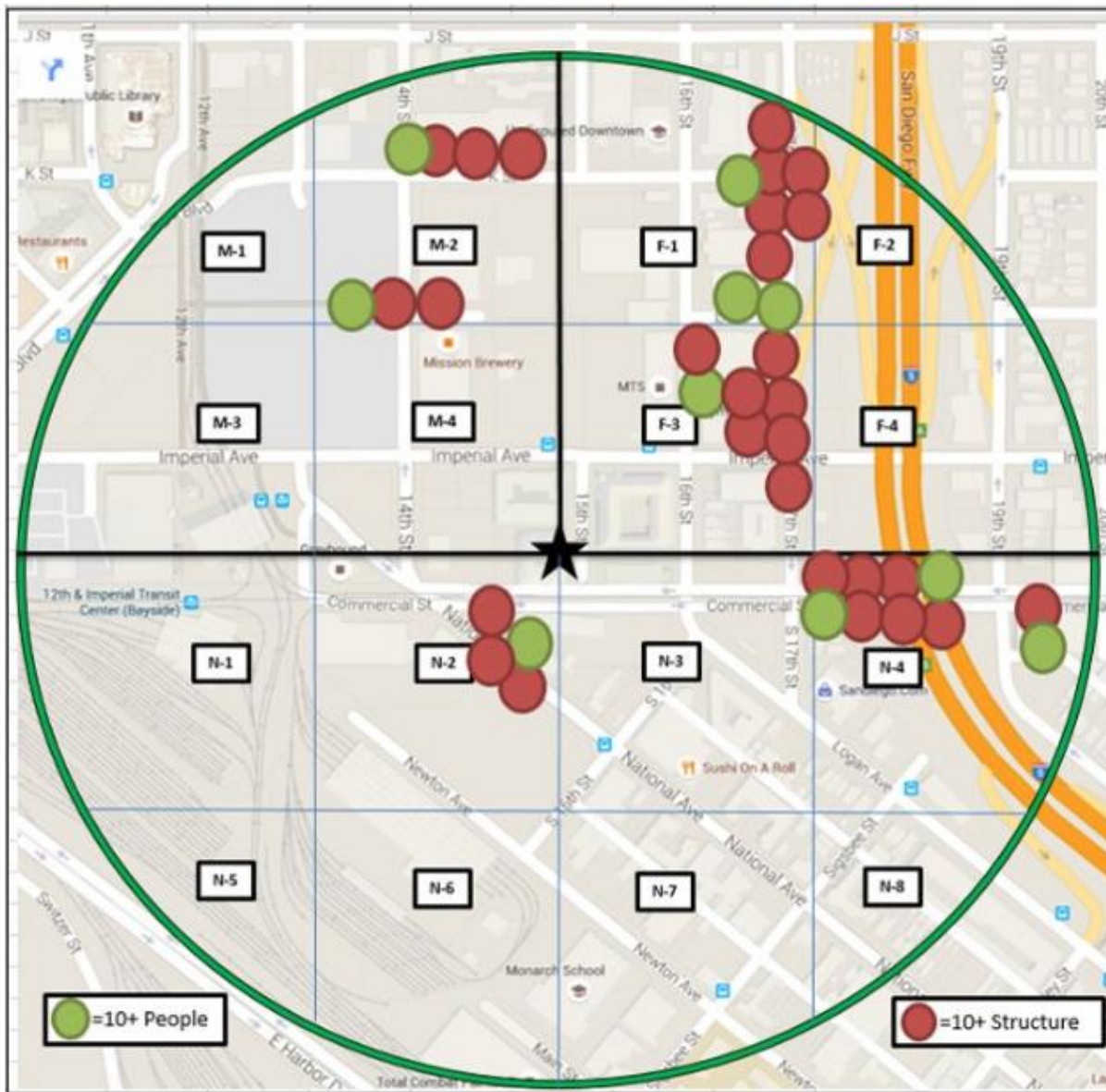
Summary	
Totals	
Person Total	72
Structure Total	255
Grand Total	327

Percentages		
Mission	p	40%
	s	22%
	t	26%
Family	p	49%
	s	46%
	t	46%
Newton	p	11%
	s	32%
	t	27%

327

Homeless count surrounding Imperial and 15th Street, downtown San Diego. 9/2/16
 (Map courtesy of St. Vincent de Paul Village)

Date: **1/6/17**



# Persn		Struct	TOTALS
M-1	8	5	Mission
M-2	20	50	p 28
M-3	0	0	s 55
M-4	0	0	t 83
F-1	31	66	Family
F-2	0	0	p 49
F-3	16	77	s 147
F-4	2	4	t 196
N-1	0	0	Newton
N-2	17	38	p 34
N-3	3	5	s 121
N-4	14	78	t 155
N-5	0	0	
N-6	0	0	
N-7	0	0	
N-8	0	0	

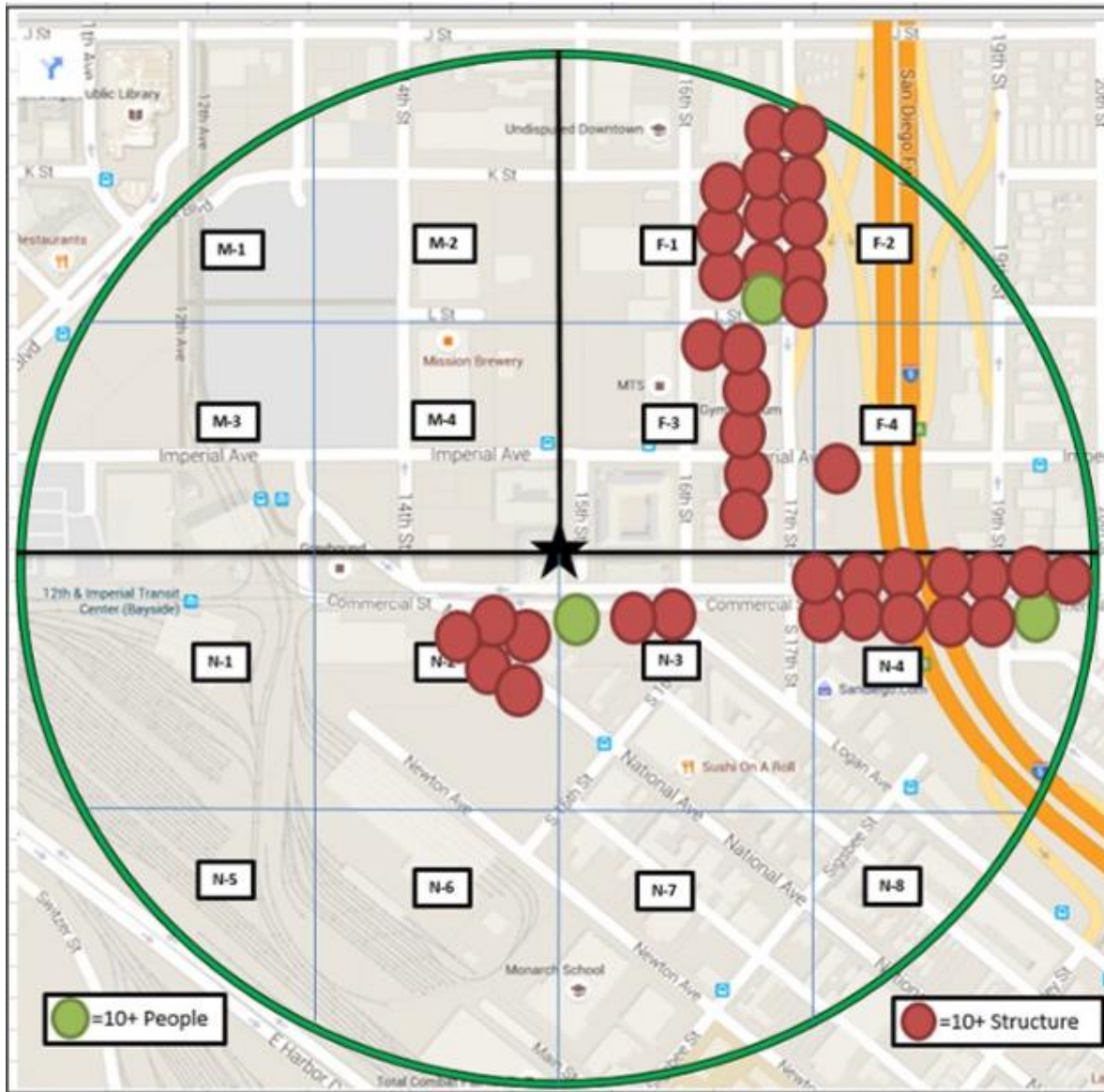
Summary	
Totals	
Person Total	111
Structure Total	323
Grand Total	434

Percentages	
Mission	p 25%
	s 17%
	t 19%
Family	p 44%
	s 46%
	t 45%
Newton	p 31%
	s 37%
	t 36%

434

Homeless count surrounding Imperial and 15th Street, downtown San Diego. 1/6/17
 (Map courtesy of St. Vincent de Paul Village)

Date: **3/3/17**



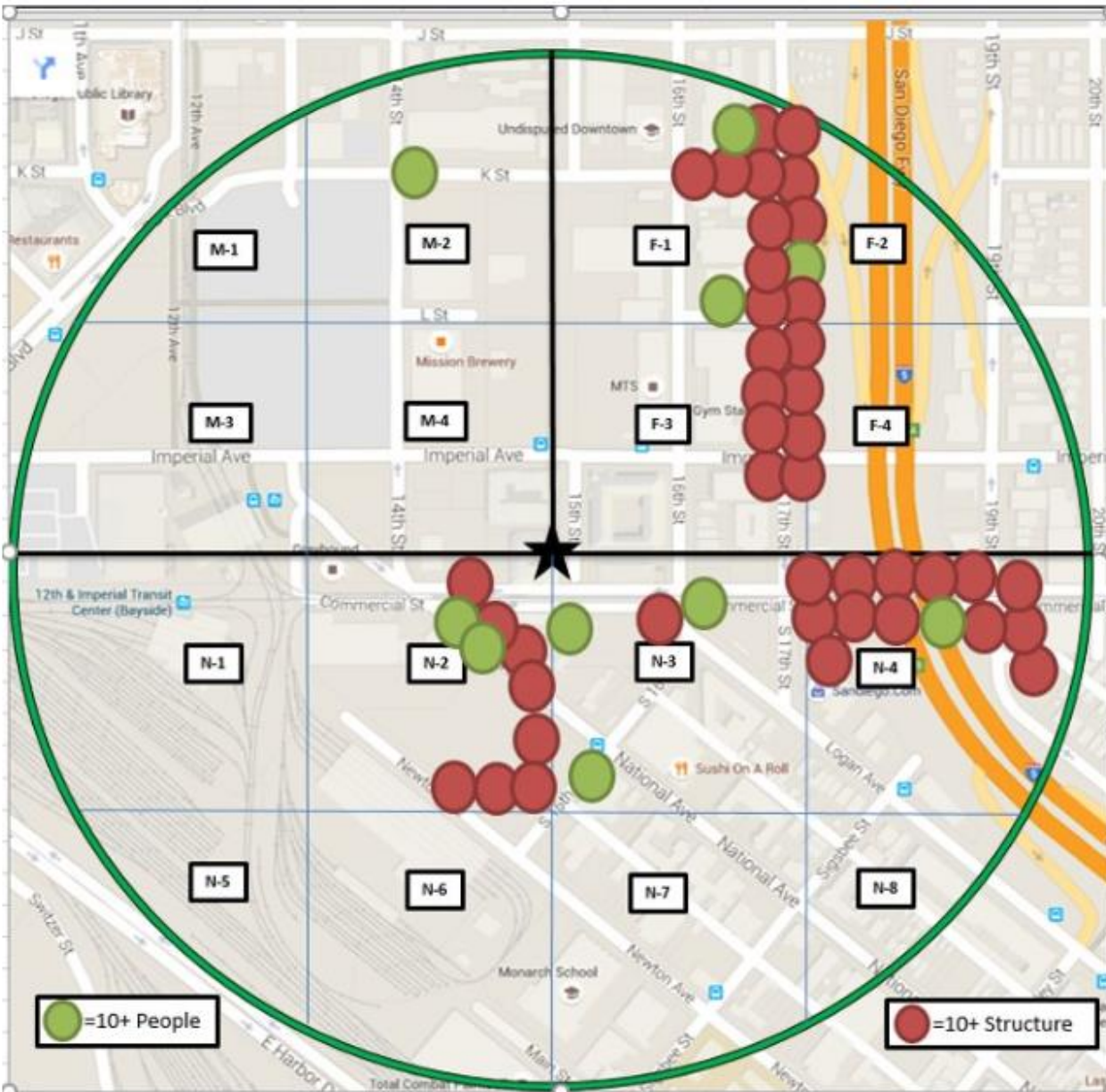
#	Person	Struct	Category
M-1	7	0	Mission
M-2	3	0	p 19
M-3	0	0	s 6
M-4	9	6	t 25
F-1	16	126	Family
F-2	0	0	p 27
F-3	9	66	s 208
F-4	2	16	t 235
N-1	0	0	Newton
N-2	7	52	p 32
N-3	12	29	s 206
N-4	13	125	t 238
N-5	0	0	
N-6	0	0	
N-7	0	0	
N-8	0	0	

Summary	
Totals	
Person Total	78
Structure Total	420
Grand Total	498
Percentages	
Mission	p 24%
	s 1%
	t 5%
Family	p 35%
	s 50%
	t 47%
Newton	p 41%
	s 49%
	t 48%

498

Homeless count surrounding Imperial and 15th Street, downtown San Diego. 3/3/17
 (Map courtesy of St. Vincent de Paul Village)

Date: **9/1/17**

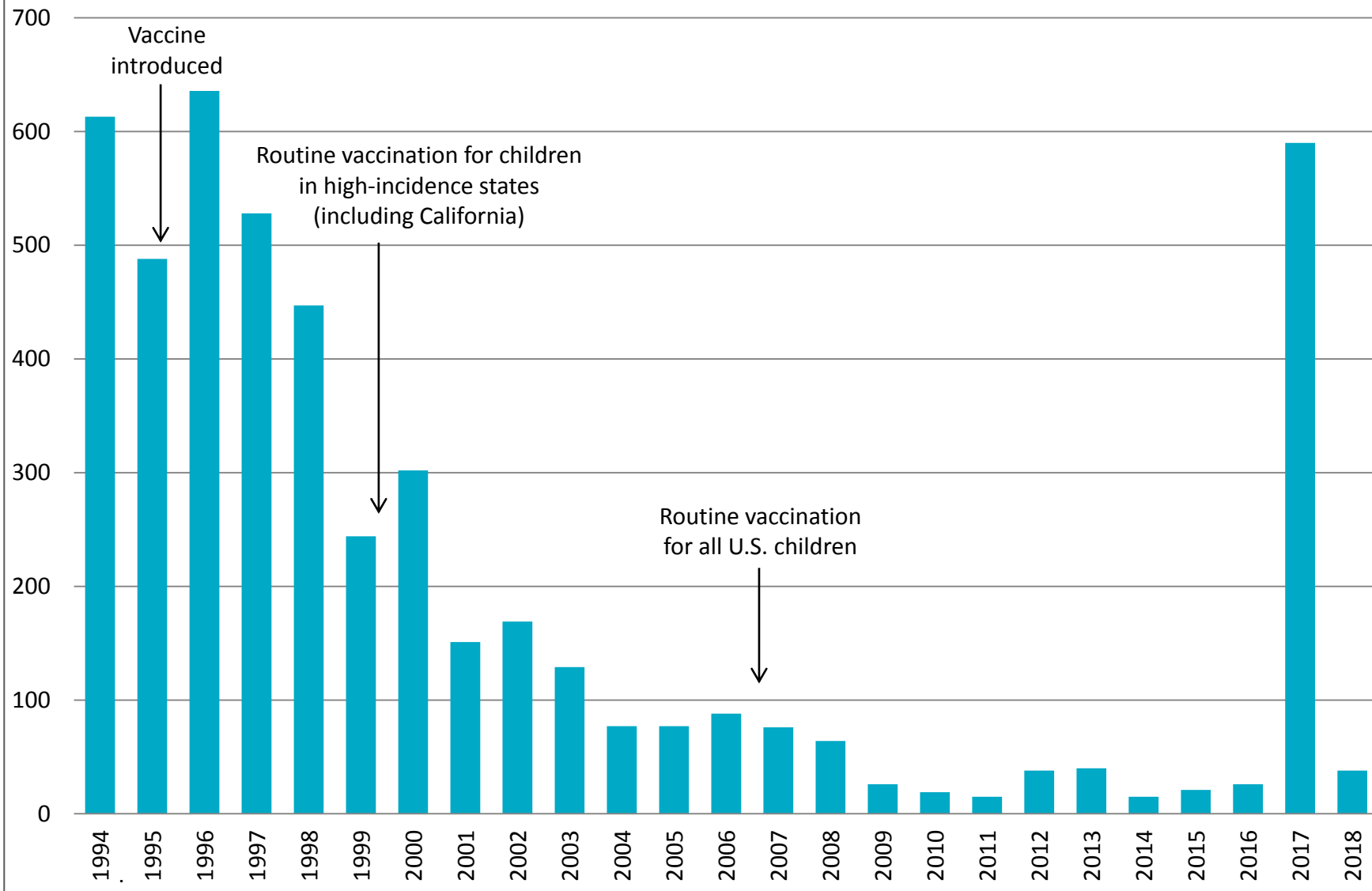


Date: 9/1/17			
#	Person	Struct	
M-1	0	0	Mission
M-2	12	6	p 12
M-3	0	0	s 6
M-4	0	0	t 18
F-1	36	117	Family
F-2	0	0	p 46
F-3	9	85	s 205
F-4	1	3	t 251
N-1	0	0	Newton
N-2	19	88	p 51
N-3	14	13	s 237
N-4	17	134	t 288
N-5	0	0	
N-6	0	0	
N-7	1	2	
N-8	0	0	
Summary			
Totals			
Person Total	109		
Structure Total	448		
Grand Total	557		
Percentages			
	p	11%	
Mission	s	1%	
	t	3%	
	p	42%	
Family	s	46%	
	t	45%	
	p	47%	
Newton	s	53%	
	t	52%	

557

Homeless count surrounding Imperial and 15th Street, downtown San Diego. 9/1/17
 (Map courtesy of St. Vincent de Paul Village)

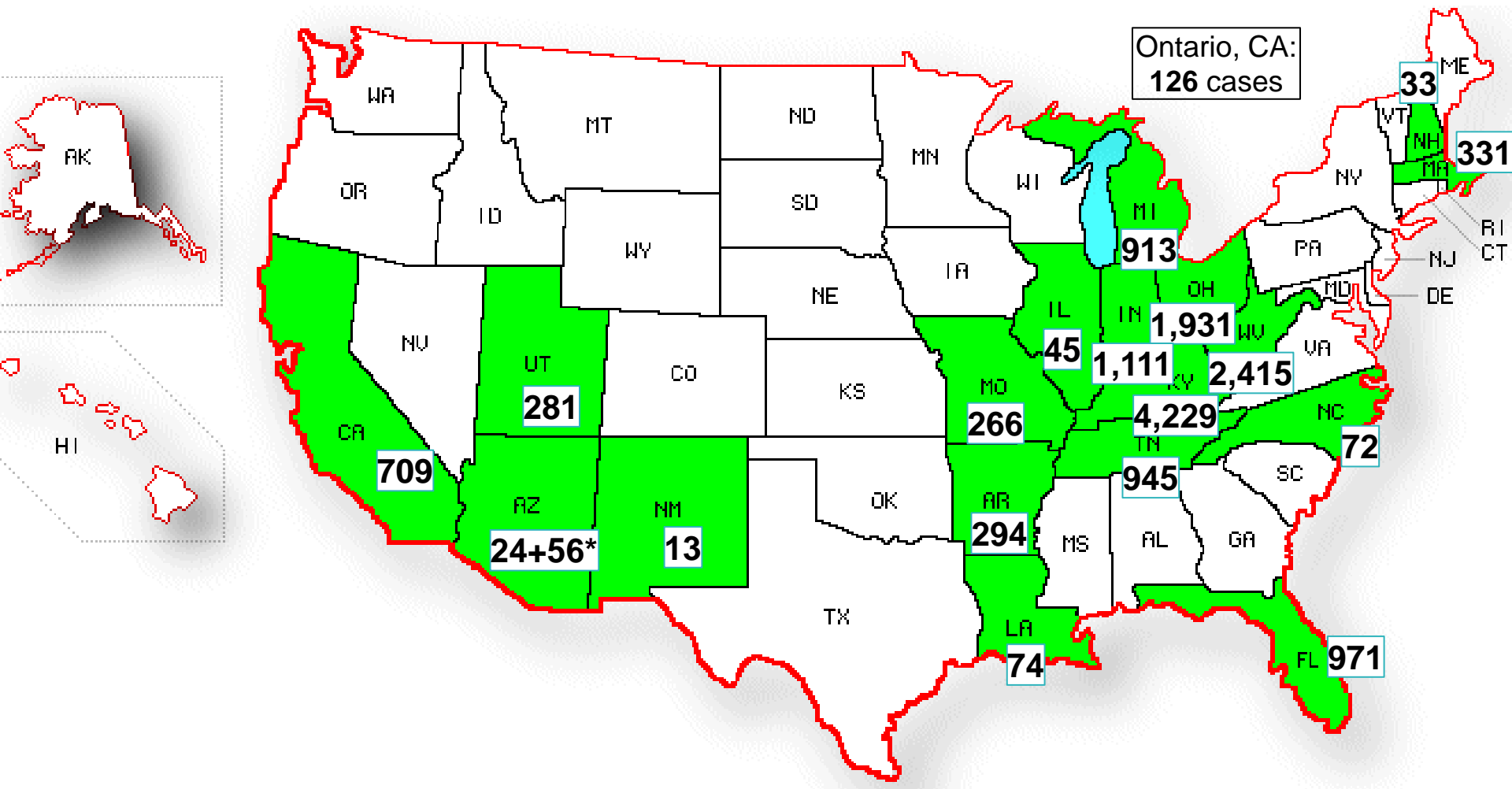
Hepatitis A Cases, San Diego County 1994 - 2018



HEPATITIS A – UNITED STATES



LIVE WELL
SAN DIEGO



Map prepared on 3/11/19 using data from state department of health websites and software on: <http://diymaps.net/>

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Health

Expert panel urges hepatitis A shots for homeless in U.S.



**ACIP voted on
10/24/18
to recommend HAV
vaccine to homeless
persons over one
year of age**

Source: Washington Post. Downloaded 10/26/18 from:

https://www.washingtonpost.com/health/2018/10/24/expert-panel-urges-hepatitis-shots-homeless-us/?noredirect=on&utm_term=.43477ff4d349



WHAT CAN YOU DO?

- **Vaccinate children and ADULTS according to ACIP guidelines**
- **Report suspect cases while patients are still at the medical facility**
- **Do not discharge a suspect or confirmed HAV case unless they have shelter and a restroom that is not shared**
- **Be aware of continued outbreaks in persons experiencing homelessness and using illicit drugs**

ACKNOWLEDGMENTS



Stakeholders in San Diego County

- Hospitals, health systems, FQHC's, behavioral health and substance abuse providers, pharmacies throughout the county
- Homeless service providers
- San Diego County Sheriff's Medical Services Division
- Law enforcement homeless outreach teams
- County of San Diego Health and Human Services
- County of San Diego Department of Environmental Health
- 18 incorporated cities in San Diego County + MORE!

County of San Diego Public Health Services

- Sarah Stous
- Melissa Thun
- Annie Kao
- Whitney Pinto
- Jeff Johnson
- Hepatitis A Team
- Public Health Laboratory
- Tracy Basler

CDPH

- Jennifer Zipprich
- Kathy Harriman

CDC EIS Program

- Corey Peak
- Jessica Healy
- Wences Arvelo

CDC Division of Viral Hepatitis

- Monique Foster
- Megan Hofmeister
- Sumathi Ramachandran
- Yulin Lin
- Yury Khudyakov



LIVE WELL
SAN DIEGO



For more information contact:

Eric C. McDonald, MD, MPH, FACEP

Medical Director, Epidemiology and Immunizations Services
Public Health Services

County of San Diego Health and Human Services Agency

3851 Rosecrans Street (MS-P578)

San Diego, CA 92110

Phone: (619) 692-8436

Fax: (858) 715-6458

	PCR- positive Cases (n=498)	PCR- negative Controls (n=94)	Odds Ratio (95% Confidence Interval [CI])	Adjusted Odds Ratio (95% CI)
Homelessness				
Homeless	247	20	<u>2.37 (1.36–</u>	<u>3.06 (1.41–</u>
	214	41	<u>4.24)</u>	<u>7.42)</u>
Nonhomeless	037	33	Ref.	Ref.
Missing			---	---
Age (years)				
Median	0043	047	<u>0.97 (0.96–</u>	<u>0.97 (0.95–</u>
			<u>0.99)</u>	<u>0.99)</u>
			per year	per year
Sex				
Male	333	44	<u>2.31 (1.48–</u>	<u>2.42 (1.24–</u>
Female	164	50	<u>3.62)</u>	<u>4.81)</u>
Other	001	00	Ref.	Ref.
			---	---
International Travel				
Yes	036	08	<u>0.39 (0.21–</u>	<u>0.42 (0.22–</u>
	358	36	<u>0.76)</u>	<u>0.86)</u>
No	119	50	Ref.	Ref.
Missing			---	---

	Hospitalized n=403	Not Hospitalized n=185	Percent Hospitalized (%)	Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
Homelessness					
Yes	234	054	81%	<u>3.09 (2.10–</u>	<u>3.77 (2.18–</u>
No	146	104	58%	<u>4.57)</u>	<u>6.63)</u>
Missing	023	027	---	Ref.	Ref.
				---	---
Age (years)					
Median	044	040	---	1.01 (1.00–	1.02 (1.00–
				1.03)	1.03)
				per year	per year
Illicit drug use					
Yes	212	062	77%	<u>1.88 (1.27–</u>	<u>1.12 (0.64–</u>
No	142	078	65%	<u>2.80)</u>	<u>1.93)</u>
Missing	049	045	---	Ref.	Ref.
				---	---
Coinfection (HBV/HCV)					
Yes	081	018	82%	<u>1.66 (1.14–</u>	<u>1.19 (0.75–</u>
No	276	126	69%	<u>2.51)</u>	<u>1.95)</u>
Missing	046	041	---	Ref.	Ref.
				---	---

	Hospitalized n=403	Not Hospitalized n=185	Percent Hospitalized (%)	Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
Homelessness					
Yes	234	054	81%	<u>3.09 (2.10–</u>	<u>3.77 (2.18–</u>
No	146	104	58%	<u>4.57)</u>	<u>6.63)</u>
Missing	023	027	---	Ref.	Ref.
				---	---
Age (years)					
Median	044	040	---	1.01 (1.00–	1.02 (1.00–
				1.03)	1.03)
				per year	per year
Illicit drug use					
Yes	212	062	77%	<u>1.88 (1.27–</u>	<u>1.12 (0.64–</u>
No	142	078	65%	<u>2.80)</u>	<u>1.93)</u>
Missing	049	045	---	Ref.	Ref.
				---	---
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Yes	081	018	82%	<u>1.66 (1.14–</u>	<u>1.19 (0.75–</u>
No	276	126	69%	<u>2.51)</u>	<u>1.95)</u>
Missing	046	041	---	Ref.	Ref.
				---	---