



# IIS USE TO SUPPORT MENINGOCOCCAL SEROGROUP B OUTBREAK RESPONSE IN SAN DIEGO

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# MENINGITIS VS MENINGOCOCCAL DISEASE?



## MENINGITIS

- Inflammation of the meninges, the membranes surrounding the brain and spinal cord
- Can be caused by viruses, bacteria, fungi, parasites, and in other systemic illnesses

## MENINGOCOCCAL DISEASE

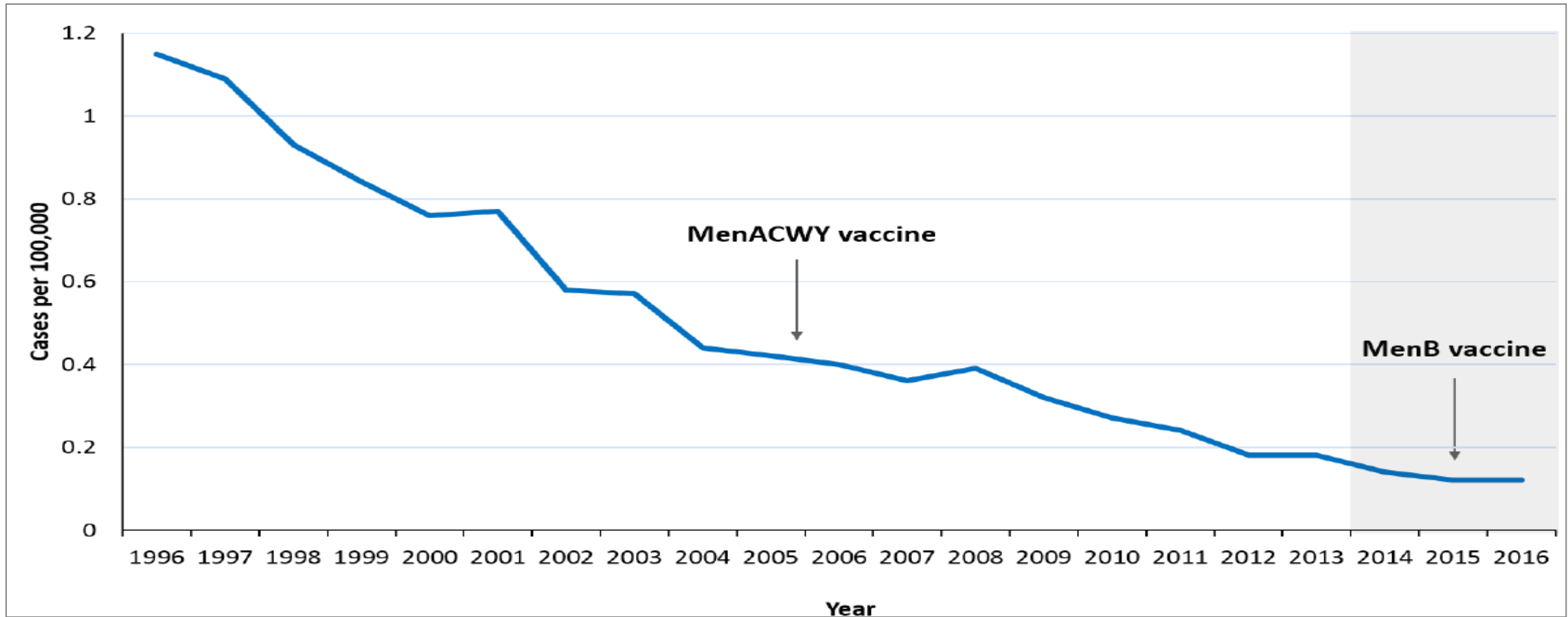
- Infection by the gram-negative diplococcus *Neisseria meningitidis* (meningococcus)
- Can cause invasive disease - a serious, life-threatening illness, requires prompt medical treatment
  - Meningococcal meningitis
  - Meningococcemia – blood infection

# IS MENINGOCOCCAL DISEASE DANGEROUS?



- 400 to 500 cases per year reported in the U.S.
- Meningococcal bacteria are not as contagious as cold or flu viruses
  - Spread through respiratory secretions
  - Close contact: kissing, sharing food, drink, smokes, lip balm
- Risk for most people is low
  - Though rare, disease can be devastating.
- Can be fatal in 10-15% of cases
- Results in long-term disabilities in 15% of survivors

## Incidence of Meningococcal Disease United States 1996-2016



**Source:** CDC National Notifiable Diseases Surveillance System.

Downloaded 10/3/18 from:

<https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2018-02/Mening-02-Meyer-508.pdf>

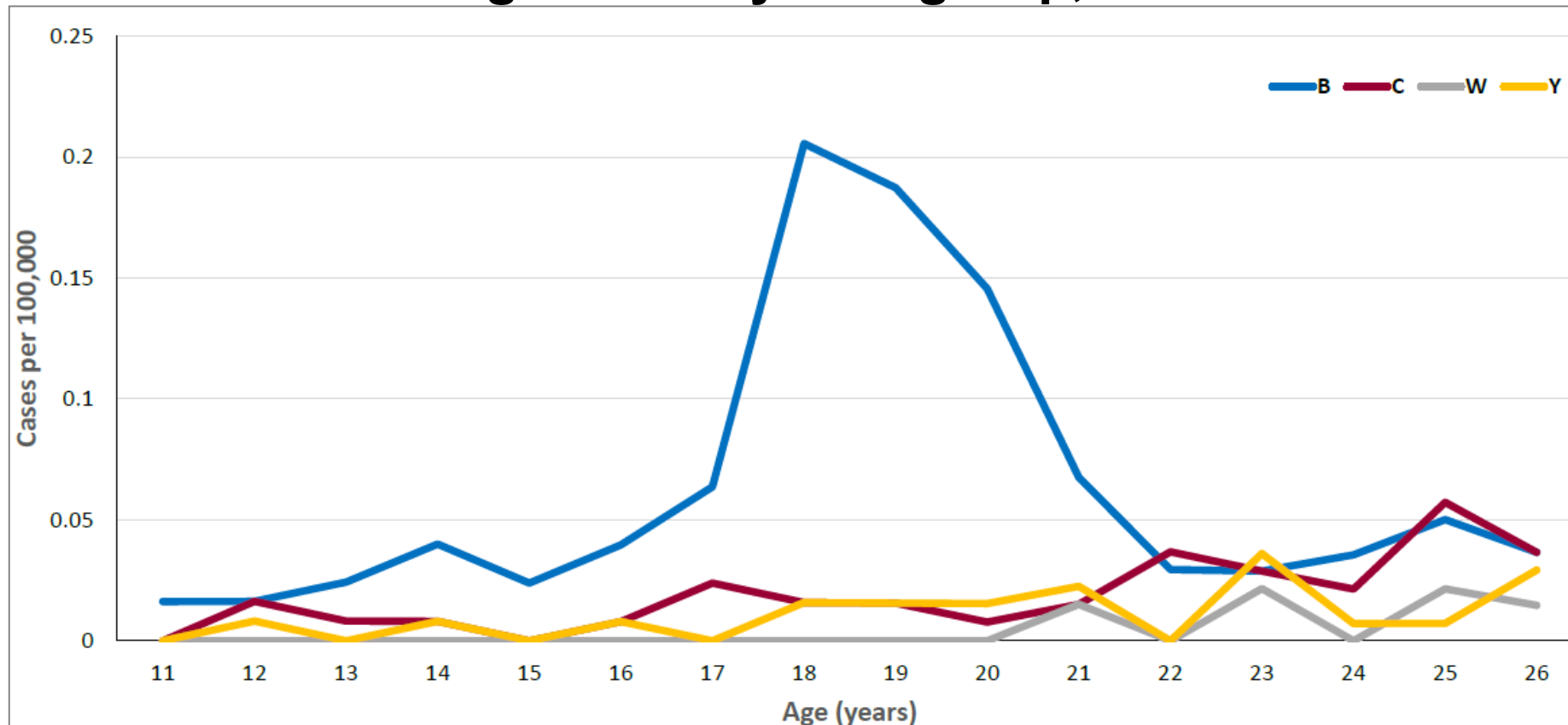


- Transmission occurs through contact with aerosols from the nose, throat, and mouth of colonized or infected persons.
  - Carried in nasopharynx of otherwise healthy individuals.
- Incubation period from 1-10 days, usually less than 4 days.
- Three main strains of *N. meningitidis* circulate in the United States - Serogroups B, C and Y
  - Serogroup B disease is common in young children and becoming more common in adolescents and adults
- 2019 outbreaks of meningococcal serogroup B at [Rutgers University](#) (2 cases) and [Columbia University](#) School of International and Public Affairs (2 cases)



- Two sets of licensed meningococcal vaccines
  - Two products protect against serogroups A, C, Y, and W
  - Two products protect against serogroup B
- 2 MenB vaccines currently licensed in the U.S.
  - MenB-4C (Bexsero®): 2-dose series
  - MenB-FHbp (Trumenba®): 2 or 3-dose series
- In 2015, ACIP recommended that MenB vaccine series **may** be administered to adolescents and young adults aged 16–23 years to provide short-term protection against most strains of serogroup B meningococcal disease.

## Incidence of Meningococcal Disease among Adolescents And Young Adults by Serogroup, 2014-2016



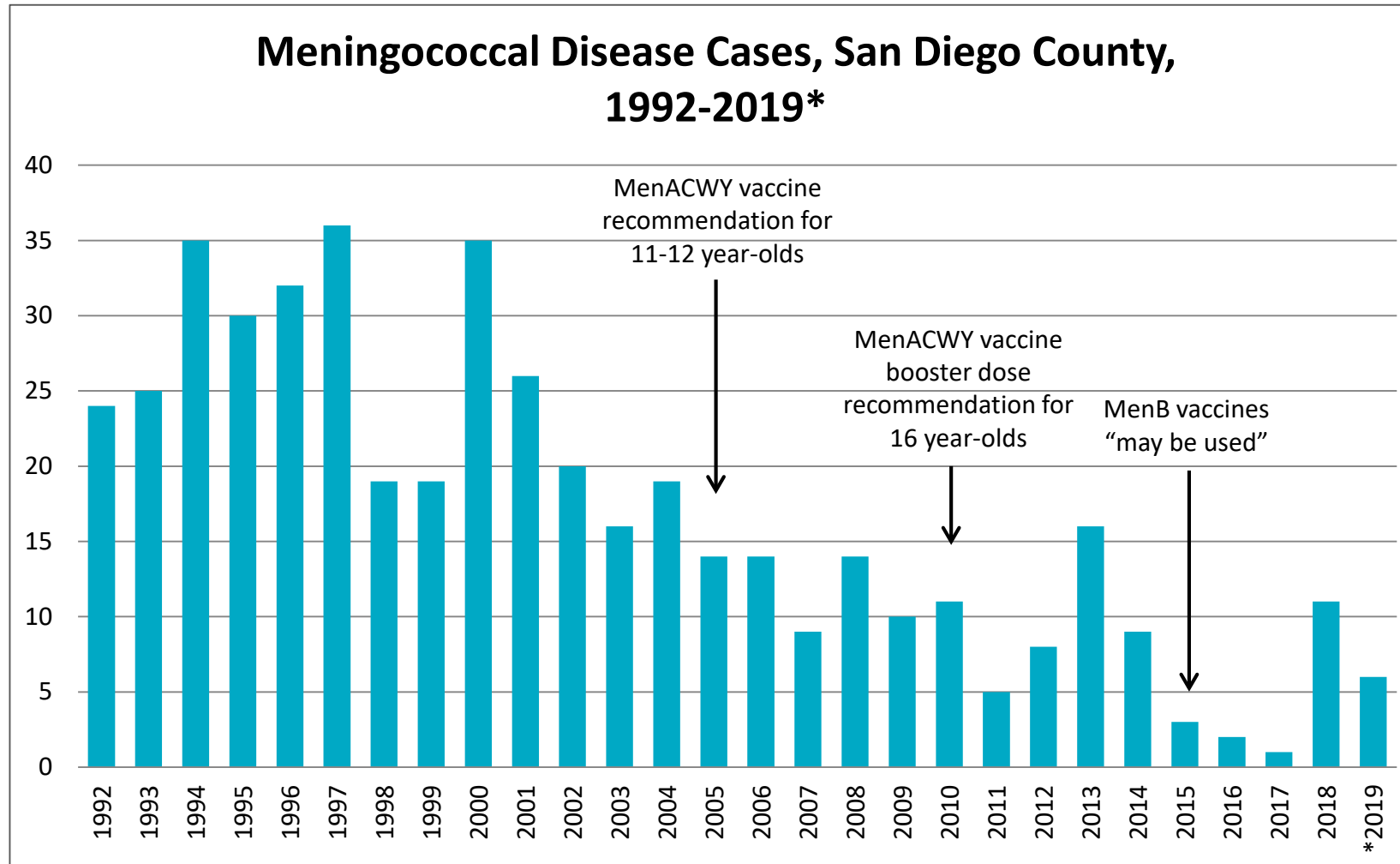
NNDSS data with additional serogroup data from Active Bacterial Core surveillance (ABCs) and state health departments. Unknown serogroups excluded.

**Source:** CDC National Notifiable Diseases Surveillance System.

Downloaded 10/3/18 from:

<https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2018-02/Mening-02-Meyer-508.pdf>

# DISEASE CASES



\*2019 data are year-to-date; current as of 7/17/19.

Data are provisional and subject to change as additional information becomes available.

Grouped by CDC disease years.

Prepared by County of San Diego, Epidemiology and Immunization Services Branch, 7/17/2019



# LOCAL OUTBREAK



- Between June and September 2018, three cases of serogroup B meningococcal disease in students at a local university were reported to the County of San Diego Health and Human Services Agency (HHSA).
  - **June 2018** - First case reported to Epidemiology
  - Post-exposure prophylaxis (PEP) provided for close contacts of first case
  - **September 2018** - Second case reported to Epidemiology
  - Two PEP events at university for students who may have been exposed
  - Third case reported to Epidemiology
  - Determined that outbreak criteria had been met - declaration of a local outbreak on September 28, 2018
  - The second and third cases were detected in September in first year students living in on-campus traditional residence
  - **April 2019** - Fourth case identified
  - 2 PEP events at university for students who may have been exposed
  - Vaccination POD held at university

# MASS VACCINATION CHALLENGES



- Despite recommendation by ACIP during outbreaks, achieving high uptake has been difficult.
  - Estimated 1<sup>st</sup> dose coverage following initial mass vaccination efforts at 6 large universities has been <60%.
- Gaps in awareness of MenB vaccines among parents & providers.
  - 43% of parents of adolescents aged 16-19 years report being aware of MenB vaccines.
  - Only 70% of pediatricians and 21% of family practitioners report being 'very aware' of MenB vaccines.
- Uptake of MenB vaccines among adolescents and young adults is low.
  - Coverage of at least one MenB vaccine among 16-18 year olds <10%
  - Uptake in college students unknown
  - Only 2% of colleges specifically require MenB vaccine and 24% stock MenB vaccine.

# MASS VACCINATION CAMPAIGN



- 26,641 undergraduate students  $\leq 23$  years of age
  - 2,327 of these live in “traditional residence halls”
  - 3,185 of these live on campus in non-traditional housing
  - 21,129 of these live off campus
- Goal to vaccinate as many as possible, with priority to those in traditional residence halls
- Mass vaccination campaigns, availability through “usual sources of care,” and student health services.





**University students line up to meningococcal vaccinations at mass vaccination event on 10/5/18.**

Photo Credit: San Diego Union Tribune. Downloaded 3/27/19:

<https://www.trbimg.com/img-5bf051f6/turbine/sd-paul-sisson-1025-am-sd-no-meningitis-update-20181116>



## VACCINATION TARGETS BASED ON TIERS

Target Population	Vaccination Target
TIER I: Traditional residence halls	90%
TIER II: On-campus non-traditional housing only	60%
TIER III: Off-campus undergraduate students 23 years of age and younger	50%
Total undergraduate students 23 years of age and younger	55%





# USING SDIR TO RECORD VACCINES GIVEN



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- Points of Dispensing (PODs)
  - Web-based data entry system
- San Diego State University Student Health Services
  - Used SDIR to query vaccination status of students
  - Expanded hours for vaccination clinics
  - Entered into SDIR



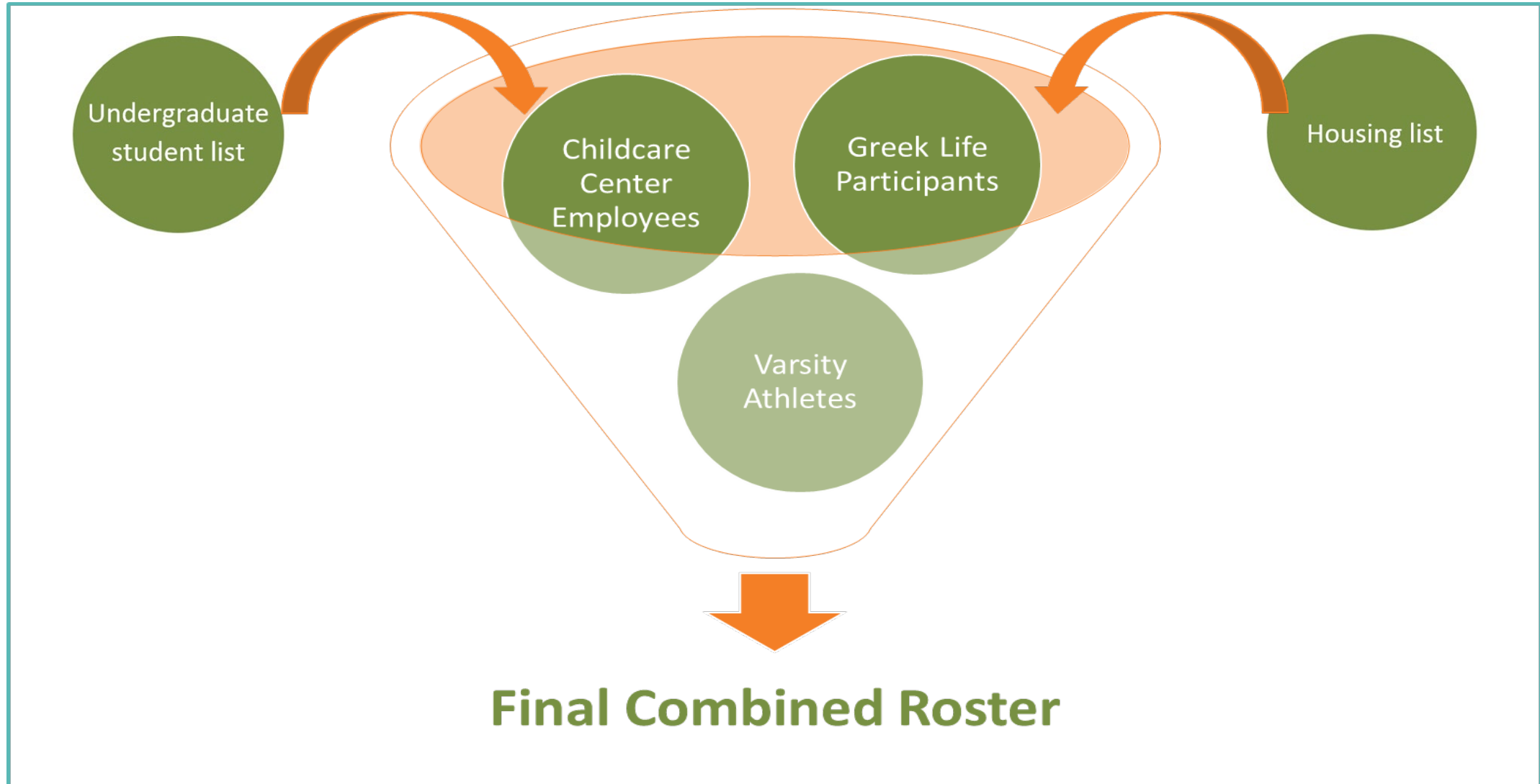
- Tracking vaccination status by target group – student rosters matched to SDIR
  - On-campus housing: traditional/non-traditional residence halls
  - Off-campus housing
  - Varsity athletes
  - Fraternity and sorority members
  - Childcare center employees



- Multiple student rosters provided by the university were combined into a master roster that was electronically queried against the San Diego Immunization Registry (SDIR) and the California Immunization Registry (CAIR2) to assess individual vaccination status.
  - Result files were joined using SPSS code
- This process required a variety of matching techniques to account for differences in how names were listed on the student roster and in the immunization registries.



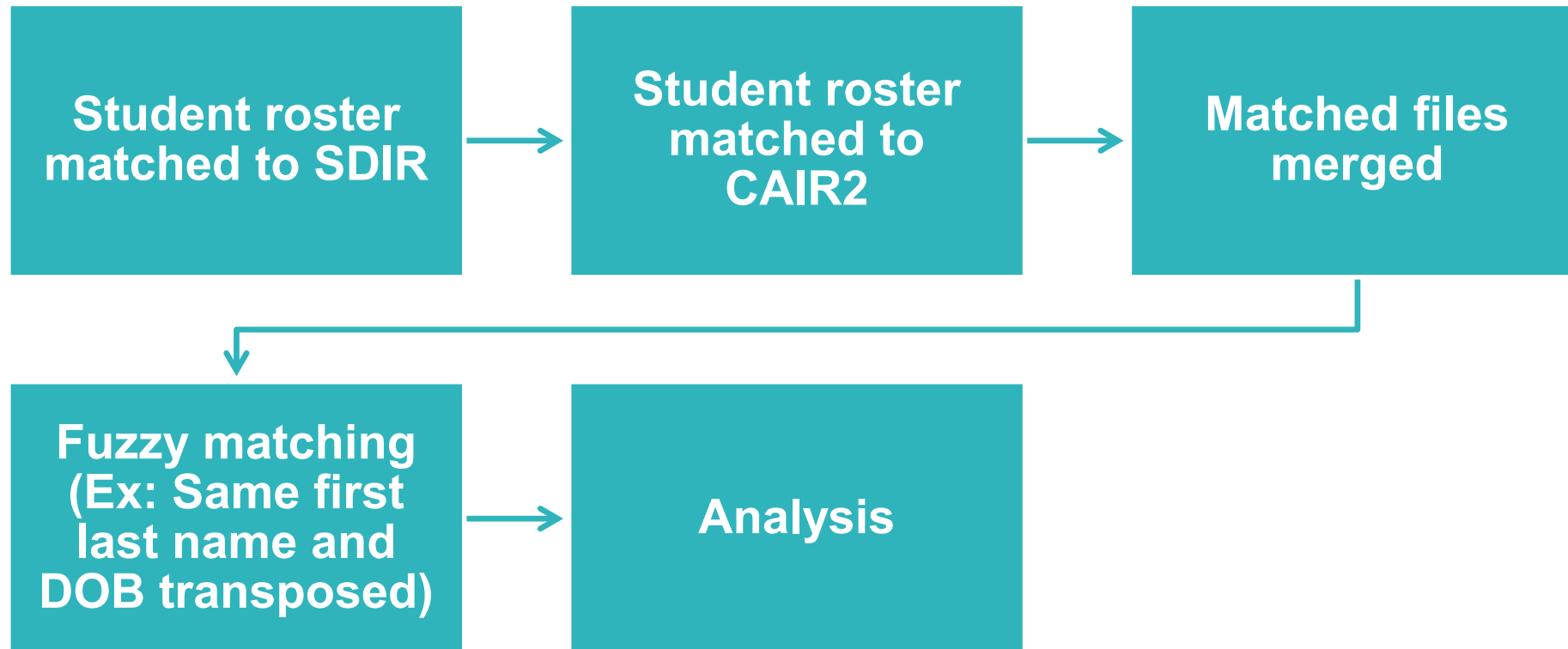
# DATA MATCHING PROCESS



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# MONITORING RESULTS



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- Of the initial 26,641 students matched against SDIR, 1,754 (6.6%) were found to have received at least one dose of meningococcal serogroup B vaccine.
- Routine report developed to:
  - Monitor progress of vaccinations
  - Guide outreach efforts
  - Report to stakeholders
- Format revised over time
- Schedule
  - Started 2x weekly and decreased in frequency over time – monthly at end of school year

# ROUTINE REPORTING



CONFIDENTIAL - Not for Distribution  
5/9/2019

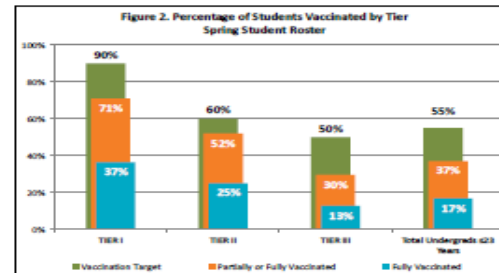
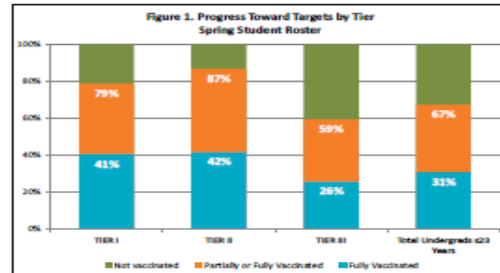
## Meningococcal Serogroup B Outbreak - Summary Vaccination Data Report (Preliminary data - subject to change)



### SPRING STUDENT ROSTER

TABLE 1. Progress Toward Vaccination<sup>1</sup> Targets by Tier - Spring Student Roster

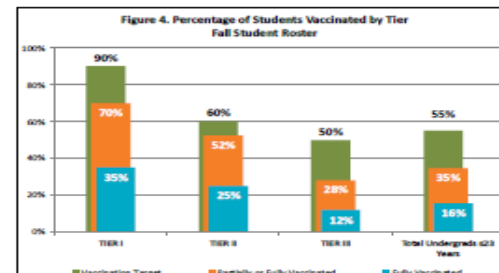
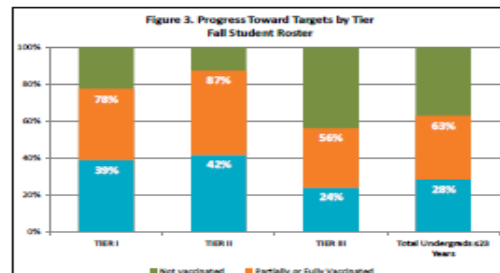
Target Population	Number of Students <sup>2</sup>	Vaccination Target <sup>3</sup> # (%)	Number Vaccinated		Progress Toward Targets		Percentage Vaccinated	
			Total # Students Vaccinated (Fully or Partially) <sup>4</sup>	# Students Fully Vaccinated	% Progress Toward Target # (Fully or Partially Vaccinated)	% Progress Toward Target # (Fully Vaccinated)	% Fully or Partially Vaccinated	% Fully Vaccinated
TIER I: Traditional residence halls	2,287	2,058 (90%)	1,623	836	70%	41%	71%	37%
TIER II: On-campus non-traditional housing only	3,455	2,074 (60%)	1,799	988	87%	47%	52%	25%
TIER III: Off-campus undergraduate students 22 years of age and younger	17,639	8,820 (50%)	5,238	2,363	59%	26%	30%	13%
Total undergraduate students 22 years of age and younger	23,381	12,952 (55%)	8,660	3,964	62%	31%	37%	17%



### FALL STUDENT ROSTER

TABLE 2. Progress Toward Vaccination<sup>1</sup> Targets by Tier - Fall Student Roster

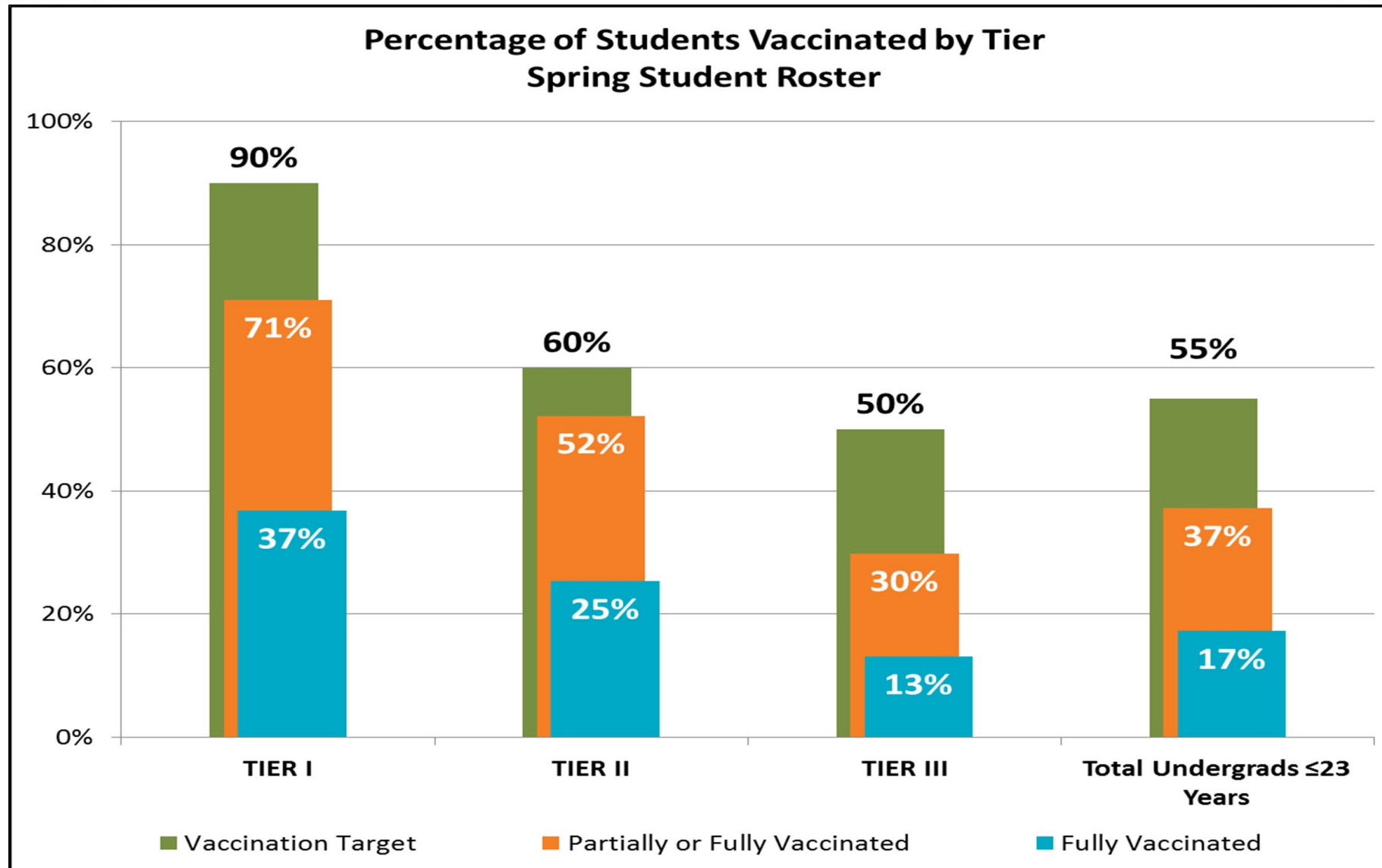
Target Population	Number of Students <sup>2</sup>	Vaccination Target <sup>3</sup> # (%)	Number Vaccinated		Progress Toward Targets		Percentage Vaccinated	
			Total # Students Vaccinated (Fully or Partially) <sup>4</sup>	# Students Fully Vaccinated	% Progress Toward Target # (Fully or Partially Vaccinated)	% Progress Toward Target # (Fully Vaccinated)	% Fully or Partially Vaccinated	% Fully Vaccinated
TIER I: Traditional residence halls	2,237	2,064 (92%)	1,625	837	73%	40%	70%	35%
TIER II: On-campus non-traditional housing only	3,495	2,011 (58%)	1,672	796	87%	42%	52%	25%
TIER III: Off-campus undergraduate students 22 years of age and younger	21,129	10,565 (50%)	5,940	2,548	59%	24%	30%	12%
Total undergraduate students 22 years of age and younger	26,861	14,640 (54%)	9,237	4,181	63%	28%	35%	16%



1. Vaccination status is determined by matching lists of student names to San Diego Immunization Registry (SDIR) and California Immunization Registry (CAIR). SDIR match date 6/6/2018, CAIR match date 5/6/2018.  
2. Student census based on student data provided by SDIR. Total excludes Imperial County students; includes students 22 years of age and younger only.  
3. All undergraduates 22 years of age and younger are recommended to receive the vaccine. These targets are established on a minimum number of students in each tier who should receive vaccination. The target numbers are based on 90% of students in Tier I (90% at Tier I, 50% at Tier II, and 50% of off-undergraduate age 22 and under).  
4. Partial vaccination refers to receiving 1 dose of Boostrix or 1-2 doses of Trimenor.

- Data elements reported:
  - Vaccination target
  - Total number students vaccinated – partially and fully
  - Progress toward targets
  - Percentage vaccinated
- Residence hall level and targeted group (e.g. Greek system) level analysis rates included

# RESULTS



Based on matches to SDIR and CAIR on 5/28/2019.

- From October 5 through May 28, 6,983 meningococcal serogroup B vaccinations were administered at campus events.
- By May 28, 37% of undergraduates age 23 and under had received at least one dose.
- In addition, 71% of the highest risk students (Tier1) had received at least one dose and 37% were fully vaccinated by the end of the spring semester.
- The rate achieved in the highest risk students in this outbreak was similar to the median seen in similar settings (median = 67%).<sup>1</sup>

# SUPPLEMENTAL VACCINATION COVERAGE



**Supplemental Table. Summary of Vaccinations<sup>1</sup> by Target Group**

Specific Target Groups	Number of Students <sup>2</sup>	Fully Vaccinated		Partially Vaccinated <sup>3</sup>		Total Students Vaccinated (Fully and Partially)		Declinations <sup>4</sup>		Total Students Vaccinated or Declined	
		#	%	#	%	#	%	#	%	#	%
<b>Traditional residence halls (Tier I)</b>	2,287	841	37%	783	34%	1,624	71%	33	1%	1,657	72%
Hall 1	729	254	35%	272	37%	526	72%	8	1%	534	73%
Hall 2	280	109	39%	90	32%	199	71%	8	3%	207	74%
Hall 3	510	187	37%	166	33%	353	69%	3	1%	356	70%
Hall 4	768	291	38%	255	33%	546	71%	14	2%	560	73%
<b>Other residence halls (Tier II)</b>	3,456	875	25%	929	27%	1,804	52%	-	-	-	-
<b>Other Priority Groups</b>											
Varsity athletes	517	43	8%	183	35%	226	44%	-	-	-	-
Fraternity and sorority members	3,698	738	20%	980	27%	1,718	46%	-	-	-	-
Child Center Workers	195	53	27%	56	29%	109	56%	-	-	-	-

1. Vaccination status was determined by matching lists of student names to San Diego Immunization Registry (SDIR) and California Immunization Registry (CAIR).
2. Students may belong to and be counted in more than one group; number of students in each group based on student lists provided by the university.
3. Partial vaccination refers to receiving 1 dose of Bexsero or 1-2 doses of Trumenba.
4. Declinations tracked for Tier I.



# CONCLUSIONS



- Immunization Information Systems (IIS) may be used in public health emergencies to assist with mass vaccination campaigns, targeting at-risk individuals and preventing unnecessary vaccinations.
- The meningococcal serogroup B outbreak at a local university provided an opportunity to use the local IIS to target a vulnerable population and frequently track progress toward vaccination goals.
- Data linkages and coordination between public and private entities in San Diego County were essential to the efforts to vaccinate students at risk for meningococcal serogroup B disease.



# LIMITATIONS/CHALLENGES



- Some students already vaccinated, but not included in SDIR
- Student could be vaccinated at multiple locations
- Two vaccines with two dosing requirements
  - Two-dose series (Bexsero<sup>®</sup>)
  - Three-dose series (Trumenba<sup>®</sup>)
- Changes in the student population from fall to spring semester
- Students vaccinated outside of county or state
- Matching challenges (e.g., transposed DOB or names)
- Multiple data sources

# NEXT STEPS



- Monitor for additional meningococcal serogroup B cases
- Complete SDIR and CAIR data exchange

- 1. Soeters HM, McNamara LA, Blain AE, et al. University-Based Outbreaks of Meningococcal Disease Caused by Serogroup B, United States, 2013–2018. *Emerging Infectious Diseases*. 2019;25(3):434-440.  
doi:10.3201/eid2503.181574.



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# Thank you!

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