Figure 1

Figure 1. Age-specific, Unadjusted Influenza-Associated Hospitalization Rates among Children <18 Years, by Season and by Age Category, FluSurv-NET, 2010-2019.

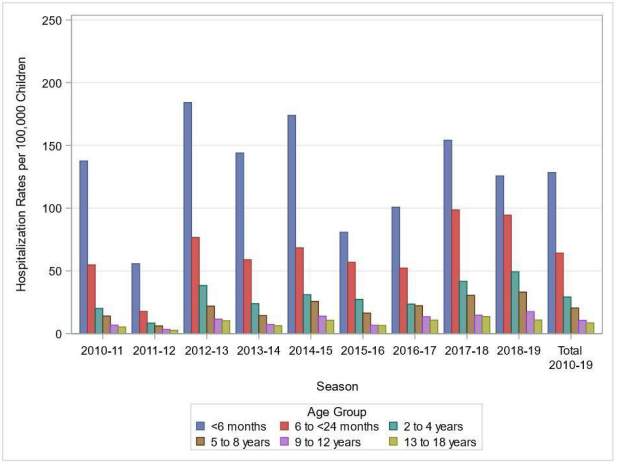

Table 1

Table 1. Characteristics and Outcome of Children <18 Years of Age Hospitalized with Laboratory-Confirmed Influenza by Age Group, FluSurv-NET, 2010-2019

Demographic characteristics and outcome	<6 Months	6 to <24 Months	2 to 4 Years	5 to 8 Years	9 to 12 Years	13 to <18 Years	Total
	n = 2029	n = 3040	n = 2791	n = 2633	n = 1366	n = 1376	n = 13235
	no. (%)	no. (%)	no. (%)	no. (%)	no. (%)	no. (%)	no. (%)
Sex							
Male	1176 (58.0)	1717 (56.5)	1571 (56.3)	1527 (58.0)	774 (56.7)	699 (50.8)	7464 (56.4)
Female	853 (42.0)	1323 (43.5)	1220 (43.7)	1106 (42.0)	592 (43.3)	677 (49.2)	5771 (43.6)
Race							
Non-Hispanic White	654 (32.2)	865 (28.5)	920 (33.0)	995 (37.8)	514 (37.6)	555 (40.3)	4503 (34.0)
Non-Hispanic Black	484 (23.9)	785 (25.8)	792 (28.4)	746 (28.3)	381 (27.9)	383 (27.8)	3571 (27.0)
American Indian or Alaska Native	22 (1.1)	59 (1.9)	42 (1.5)	23 (0.9)	12 (0.9)	11 (0.8)	169 (1.3)
Asian/Pacific islander	107 (5.3)	211 (6.9)	146 (5.2)	120 (4.6)	61 (4.5)	58 (4.2)	703 (5.3)
Multiracial	32 (1.6)	61 (2.0)	38 (1.4)	40 (1.5)	19 (1.4)	10 (0.7)	200 (1.5)
Hispanic	494 (24.3)	748 (24.6)	598 (21.4)	487 (18.5)	255 (18.7)	253 (18.4)	2835 (21.4)
Unknown	236 (11.6)	311 (10.2)	255 (9.1)	222 (8.4)	124 (9.1)	106 (7.7)	1254 (9.5)
Pre-existing medical conditions							
Immunocompromising status							
Yes	10 (0.5)	123 (4.1)	201 (7.2)	293 (11.1)	177 (13.0)	235 (17.1)	1039 (7.9)
No/Unknown	2019 (99.5)	2917 (96.0)	2590 (92.8)	2340 (88.9)	1189 (87.0)	1141 (82.9)	12196 (92.1)
Any chronic condition							
Yes	531 (26.2)	1342 (44.1)	1574 (56.4)	1748 (66.4)	1035 (75.8)	1079 (78.4)	7309 (55.2)
No/Unknown	1498 (73.8)	1698 (55.9)	1217 (43.6)	885 (33.6)	331 (24.2)	297 (21.6)	5926 (44.8)
ICU Admission							
Yes	308 (15.2)	623 (20.5)	550 (19.7)	499 (19.0)	336 (24.6)	360 (26.2)	2676 (20.2)
No	1714 (84.5)	2410 (79.3)	2228 (79.8)	2121 (80.6)	1025 (75.0)	1010 (73.4)	10508 (79.4)
Unknown	7 (0.3)	7 (0.2)	13 (0.5)	13 (0.5)	5 (0.4)	6 (0.4)	51 (0.4)
Death							
Yes	6 (0.3)	14 (0.5)	13 (0.5)	15 (0.6)	13 (1.0)	11 (0.8)	72 (0.5)
No	2020 (99.6)	3021 (99.4)	2772 (99.3)	2607 (99.0)	1350 (98.8)	1364 (99.1)	13134 (99.2)
Unknown	3 (0.2)	5 (0.2)	6 (0.2)	11 (0.4)	3 (0.2)	1 (0.1)	29 (0.2)
Mechanical Ventilation							
Yes	83 (4.1)	154 (5.1)	152 (5.5)	120 (4.6)	89 (6.5)	92 (6.7)	690 (5.2)
No	1935 (95.4)	2872 (94.5)	2623 (94.0)	2494 (94.7)	1270 (93.0)	1279 (93.0)	12473 (94.2)
Unknown	11 (0.5)	14 (0.5)	16 (0.6)	19 (0.7)	7 (0.5)	5 (0.4)	72 (0.5)
Pneumonia							
Yes	133 (6.6)	559 (18.4)	623 (22.3)	481 (18.3)	252 (18.5)	214 (15.6)	2262 (17.1)
No	1896 (93.5)	2481 (81.6)	2168 (77.7)	2152 (81.7)	1114 (81.6)	1162 (84.5)	10973 (82.9)
Unknown	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

Table 2

Table 2. Odds Ratios for ICU Admission, Mechanical Ventilation, and Pneumonia among Children Hospitalized with Laboratory-Confirmed Influenza, FluSurv-NET, 2010-2019.

	ICU Admission[a]		Mechanical Ventilation[b]		Pneumonia[c]	
	Univariable Analysis		Univariable Analysis		Univariable Analysis	
	OR	95% CI	OR	95% CI	OR	95% CI
Age, years						
≥0 months to <6 months	reference		reference		reference	
≥6 months to <2 years	**1.4**	**1.2 - 1.7**	1.3	1.0 - 1.6	**3.2**	**2.6 - 3.9**
2 - 4 years	**1.4**	**1.2 - 1.6**	**1.4**	**1.0 - 1.8**	**4.1**	**3.4 – 5.0**
5 - 8 years	**1.3**	**1.1 - 1.5**	1.1	0.8 - 1.5	**3.2**	**2.6 - 3.9**
9 – 12 years	**1.8**	**1.5 – 2.2**	**1.6**	**1.2 - 2.2**	**3.2**	**2.6 - 4.0**
13 - <18 years	**2.0**	**1.7 – 2.4**	**1.7**	**1.2 - 2.3**	**2.6**	**2.1 - 3.3**

[a]For the univariable analysis, n = 13184 and 2676 cases with ICU admission.

[b]For the univariable analysis, n = 13163 and 690 cases with mechanical ventilation.

[c]For the univariable analysis, n = 13235 and 2262 cases with pneumonia.

Conclusion: Although influenza-related hospitalization rates decreased with increasing age, severe outcomes were more common among hospitalized older children. Room for improvement exists in influenza vaccination coverage and antiviral use. While 20% of children were admitted to ICU, death was uncommon.

Disclosures. Sue Kim, MPH, Council of State and Territorial Epidemiologists (CSTE) (Grant/Research Support) Melissa Sutton, MD, MPH, CDC funding (Emerging Infections Program) (Grant/Research Support) Evan J. Anderson, MD, Sanofi Pasteur (Scientific Research Study Investigator)

1713. Factors Associated with Viral Rebound post Blip in Patients from a Community HIV Clinic

Eduardo Sanchez, MD[1]; Jody Borgman, MD[1]; Aviva Joffe, MSW, LSW[1]; Catherine Holdsworth, PhD, CRNP[1]; [1]Albert Einstein Medical Center, Philadelphia, PA

Session: P-75. Virology: Studies of the Epidemiology of Viral Infections

Background. Blips are detectable increases in the HIV viral load (VL) that occur after therapy has effectively suppressed the virus to an undetectable level. There is no clear etiology for the development of blips. The association between blips and viral failure remains unclear.

Methods. This retrospective chart review aimed to clinically characterize patients who developed blips in a community HIV clinic in north Philadelphia between 2014-2018. A blip was defined as a single detectable VL < 500 copies/mL which appears between two undetectable VL measurements. Multivariate analysis was performed to examine the relationship of certain variables and viral rebound (VR) in patients with blips. Viral rebound was defined as post blip VL > 200 copies/mL that was not followed by an undetectable viral load.

Results. Of a total of 666 patients, 225 (33.7%) had at least 1 blip. 59% were male and 41% were female. The majority were African American (84.4%). Sixty seven percent were heterosexuals and 25.7% were MSM. Analyzing CD4 counts at the moment of blip, 68% had >500 cells/mm3. The average value of the blips was 85 copies/mL with 48.8% of the patients having a blip between 20-50 copies/mL. Most of the patients were on INSTIs (49.5%) followed by NNRTIs (35.6%). Of the 225 patients, 148 had at least 1 year of follow up post-blip. Those who were followed for less than 1-year post-blip were not included in the statistical analysis to find potential factors associated with VR. Thirty-two (21.6%) patients developed rebound. The multivariate analysis showed that being male and having a higher blip value were factors associated to increased likelihood of VR. Factors associated to decreased likelihood of rebound were the use of NNRTIs at blip and an HIV transmission factor that was not heterosexual sex (MSM and IDU). All of these associations were noted to be statistically significant.

Conclusion. The variables that were found to be associated to viral rebound could help guide clinicians during the surveillance of patient's with blips. Further research in larger cohorts would help clarify the role of these variables in patients who develop treatment failure.

Disclosures. **All Authors**: No reported disclosures

1714. Influenza C Virus in U.S. Children with Acute Respiratory Infection 2016-2019

Bethany K. Sederdahl, n/a[1]; Geoffrey A. Weinberg, MD[2]; Angela P. Campbell, MD, MPH[3]; Rangaraj Selvarangan, BVSc, PhD[4]; Jennifer E. Schuster, MD[4]; Christopher J. Harrison, MD[5]; Brian Rha, MD, MSPH[3]; Joana Y. Lively, MPH[3]; Manish Patel, MD[3]; Bo Shu, MD[6]; Julie A. Boom, MD[7]; Vasanthi Avadhanula, PhD[8]; Natasha B. Halasa, MD, MPH[9]; Laura S. Stewart, PhD[9]; Peter G. Szilagyi, MD, MPH[10]; Robert Hickey, MD[11]; Marian G. Michaels, MD, MPH[12]; John V. Williams, MD[1]; [1]University of Pittsburgh, Pittsburgh, Pennsylvania; [2]University of Rochester, Rochester, New York [3]Centers for Disease Control and Prevention, Atlanta, Georgia; [4]Children's Mercy Hospital, Kansas City, Missouri; [5]The Children's Mercy Hospital-Kansas City, Kansas City, Missouri; [6]CDC, Atlanta, Georgia; [7]Baylor College of Medicine and Texas Children's Hospital, Houston, Texas; [8]Baylor college of medicine, Houston, TX; [9]Vanderbilt University Medical Center, Nashville, Tennessee; [10]University of California, Los Angeles, Los Angeles, California; [11]Childrens Hospital of Pittsburgh, Pittsburgh, Pennsylvania; [12]UPMC Children's Hospital of Pittsburgh, Pittsburgh, Pennsylvania

Session: P-75. Virology: Studies of the Epidemiology of Viral Infections

Background. Influenza C virus (ICV) is associated with acute respiratory infection (ARI); however, the burden of ICV is not well-described. We sought to determine the burden and characteristics of ICV in a prospective, population-based cohort.

Methods. The study was conducted within the New Vaccine Surveillance Network (NVSN), a CDC-led, seven-site network that performs population-based surveillance for ARI in children < 5 years. Nasal/throat swabs were collected from emergency department (ED) or inpatient children with ARI, or healthy controls in clinic, between 12/05/2016-10/31/2019 and tested by real-time RT-PCR for ICV and other respiratory viruses. Preliminary data were extracted and demographic/clinical features of ICV+ cases analyzed. We sequenced the hemagglutinin-esterase (HE) gene from ICV+ Pittsburgh samples.

Results. Among 19,321 children with ARI or healthy controls enrolled and tested for ICV from 2016-2019, 115/17,668 (0.7%) ARI cases and 8/1653 (0.5%) healthy controls tested positive for ICV. The median age of ICV+ ARI subjects was 19 months (IQR 10,46) and 81(70%) were ≤36 months. 42.6% (49) were white, 33.9% (39) black, and 16.5% (19) Hispanic, with the remainder Asian or unknown; 56.5% (62) attended daycare. Among ICV+ ARI cases, 67.8% (78) had fever, 94.8% (109) cough, and 60.8% (70) wheezing. 45.2% (52) ICV+ cases occurred in 2016-17, 6.5% (8) in 2017-2018, and 47.8% (55) in 2018-19 (**Table**). 40% (46) of ICV+ cases were seen in the ED, while the remainder were inpatients. Median length of stay was 2d (IQR,1-3) with 15 admitted to ICU. 67.8% (78/115) ARI cases had 1 or 2 co-detected pathogens, with rhinovirus (26), respiratory syncytial virus (26), and adenovirus (14) most frequently co-detected. ARI symptoms including fever, myalgias, chills, and wheezing did not differ significantly between coinfected subjects and those who were only ICV+. HE sequences were in the two currently circulating Kanagawa and Sao Paulo lineages.

ICV+ Cases by Site and Year

Table. ICV+ cases per study site per year

	Site #				Total
Year	1	2	5	8	
2016-2017	12	8	5	27	52
2017-2018	1	0	2	5	8
2018-2019	20	5	5	25	55
Total	33	13	12	57	

Conclusion: ICV was an uncommon cause of ARI symptoms leading to healthcare encounters in young children. The prevalence varied year-to-year and between different geographic regions. Most children infected with ICV were ≤3 years old and had co-detected pathogens. ICV was similarly rarely detected in healthy controls.

Disclosures. **Christopher J. Harrison, MD**, **GSK** (Grant/Research Support, Infant menigicicccal B conjugate vaccine trial)**Merck** (Research Grant or Support, Infant pneumococcal conjugate vaccine trial) **Natasha B. Halasa, MD, MPH**, **Genentech** (Other Financial or Material Support, I receive an honorarium for lectures - it's a education grant, supported by genetech)**Karius** (Consultant)**Moderna** (Consultant)**Quidel** (Grant/Research Support, Research Grant or Support)**Sanofi** (Grant/Research Support, Research Grant or Support) **John V. Williams, MD**, **GlaxoSmithKline** (Advisor or Review Panel member)**IDConnect** (Advisor or Review Panel member)**Quidel** (Advisor or Review Panel member)

1715. Influenza-like Illness (ILI) Experience Among Healthcare Workers in Military Treatment Facilities: An Offshoot of the Pragmatic Assessment of Influenza Vaccine Effectiveness in the DoD (PAIVED) Study

Rhonda Colombo, MD, MHS[1]; Stephanie Richard, PhD, MHS[2]; Christina Schofield, MD[3]; Limone Collins, MD[4]; Anuradha Ganesan, MBBS, MPH[5]; Casey Geaney, MD[6]; David Hrncir, MD[7]; Tahaniyat Lalani, MBBS[8]; Ana E. Markelz, MD[9]; Ryan C. Maves, MD[10]; Bruce McClenathan, MD, FACP,FAAAAI[11]; Katrin Mende, PhD[12]; Jitendrakumar Modi, MD[13]; Jay R. Montgomery, MD[14]; Srihari Seshadri, MBBS, MPH[15]; Catherine Skerrett, MSN, FNP, RN[16]; Christina Spooner, MS[15]; Gregory Utz, MD[17]; Tyler Warkentien, MD, MPH[18]; Timothy Burgess, MD, MPH[19]; Timothy Burgess, MD, MPH[19]; Christian L. Coles, PhD[20]; [1]Madigan Army Medical Center, Tacoma, WA, Infectious Disease Clinical Research Program, Bethesda, MD, and Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., Bethesda, MD, Tacoma, Washington; [2]Infectious Disease Clinical Research Program, Department of Preventive Medicine and Biostatistics, Uniformed Services University of the Health Sciences, Bethesda, MD and Henry M. Jackson Foundation, Bethesda, MD, Bethesda, MD; [3]Madigan Army Medical Center, Tacoma, WA, Tacoma, Washington; [4]Immunization Health Branch, Defense Health Agency Bethesda, MD, Falls Church, VA, San Diego, CA, Falls Church, VA; [5]Infectious Disease Clinical Research Program and the Henry M. Jackson Foundation for the Advancement of Military Medicine and Walter Reed National Military Medical Center, Bethesda, Maryland; [6]Walter Reed National Military Medical Center, Bethesda, MD; [7]Lackland Air Force Base & Carl R. Darnall Army Medical Center, San Antonio, Texas; [8]Infectious Disease Clinical Research Program, Bethesda, MD, The Henry M. Jackson Foundation, Bethesda, MD, and Naval Medical Center Portsmouth, VA, Portsmouth, Virginia; [9]Brooke Army Medical Center, Fort Sam Houston, Texas; [10]Naval Medical Center San Diego, San Diego, CA and Infectious Disease Clinical Research Program, Bethesda, MD, San DIego, California; [11]Womack Army Medical Center, Fort Bragg, NC 28310, Fort Bragg, North Carolina; [12]Infectious Disease Clinical Research Program, Bethesda, MD, The Henry M. Jackson Foundation, Bethesda, MD, and Brooke Army Medical Center, Fort Sam Houston, TX, San Antonio, TX; [13]NHC Annapolis, Laurel, Maryland; [14]Defense Health Agency, Vienna, Virginia; [15]Immunization Health Branch, Defense Health Agency, Falls Church, VA; [16]Lackland Air Force Base, San Antonio, Texas; [17]Naval Medical Center San Diego, Infectious Disease Clinical Research Program, Bethesda, MD, and Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., Bethesda, MD, San Diego, California; [18]Naval Medical Center Portsmouth, Portsmouth, VA, Portsmouth, VA; [19]Infectious Disease Clinical Research Program, Bethesda, MD, Bethesda, Maryland; [20]Infectious Disease Clinical Research Program, Bethesda, MD, The Henry M. Jackson Foundation, Bethesda, MD, Bethesda, MD

Session: P-75. Virology: Studies of the Epidemiology of Viral Infections

Background. Healthcare workers (HCWs) are at heightened risk of exposure to respiratory pathogens. There are limited published data on influenza-like illness (ILI) experience among HCWs, and the few available studies were hampered by incomplete vaccination histories. PAIVED, a multicenter, multiservice study assessing influenza vaccine effectiveness in the Department of Defense, provides a unique opportunity to describe ILI experience among vaccinated HCWs compared to vaccinated non-HCWs.

Methods. PAIVED participants were randomized to receive either egg-based, cell-based, or recombinant-derived influenza vaccine then surveyed weekly for ILI. At enrollment, participants provided key demographic data including whether they were HCWs with direct patient contact. ILI was defined *a priori* as 1) having cough or sore throat plus 2) feeling feverish/having chills or having body aches/fatigue. Participants with ILI completed a daily symptom diary for seven days and submitted a nasal swab for pathogen detection.

Results. Of 4433 eligible participants enrolled during the 2019-20 influenza season, 1551 (35%) were HCWs. A higher percentage of HCWs experienced an ILI than non-HCWs (34% vs 26%, p< 0.001). Overall, HCWs were more likely to be female (42% vs 32%), age 25-34 years (39% vs 28%), active-duty military (81% vs 62%), non-smokers (88% vs 75%), and physically active (92% vs 85%). Self-reported race differed between HCWs and non-HCWs; a higher proportion of HCWs identified as White (63% vs 56%) or Asian (8% vs 5%). Similar demographic differences existed among HCWs and non-HCWs with ILI. HCWs were more likely to respond to at least 50% of weekly surveillance messages, irrespective of ILI status. HCWs with ILI had less severe lower respiratory symptoms (p< 0.001) and a shorter duration of illness (12.4±8.1 days vs 13.7±9.0, p=0.005) than non-HCWs. Pathogen data is pending.

Conclusion. HCWs in PAIVED were more likely to report ILI than their non-HCW counterparts yet tended to have lower illness severity, possibly reflecting a higher level of baseline health or enhanced awareness of early ILI symptoms. The important epidemiologic position HCWs occupy for ILI has been apparent in the COVID-19 pandemic. Exploring ways to mitigate ILI risk in HCWs beyond influenza vaccination is warranted.

Disclaimer

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The authors have no conflict of interest to disclose.

The investigators have adhered to the policies for protection of human subjects as prescribed in 45 CFR 46.

Disclosures. **All Authors**: No reported disclosures

1716. Prospective Multicenter Observational Cohort Study to Assess the Burden of Herpes Zoster Disease in the Eye: Baseline Results of Initial Patients

Laura T. Pizzi, PharmD, MPH, ORCID:0000-0002-7366-76611; Benjamin Leiby, PhD, ORCID:0000-0003-0761-83832; David S. Chu, MD[3]; Emily W. Gower, PhD, ORCID:0000-0003-1016-99104; Haresh Ailani, MD[5]; Joseph Shovlin, OD, FAAO[6]; Katherine M. Prioli, MS, ORCID:0000-0003-3987-17381; Soham Shukla, PharmD, ORCID:0000-0002-4139-08561; Brandon J. Patterson, PharmD, PhD[7]; Debora A. Rausch, MD, ORCID:0000-0001-9759-26877; Philip O. Buck, PhD, MPH, ORCID:0000-0002-3898-36697; Ann P. Murchison, MD, MPH[8]; [1]Rutgers University, Piscataway, New Jersey; [2]Thomas Jefferson University, Philadelphia, Pennsylvania; [3]Metropolitan Eye Research and Surgery Institute, Palisades Park, New Jersey; [4]Gillings School of Global Public Health, University of North Carolina, Chapel Hill, North Carolina; [5]Eye Consultants of Northern Virginia, Springfield, Virginia; [6]Northeastern Eye Institute, Scranton, Pennsylvania; [7]GSK, Philadelphia, PA; [8]Wills Eye Hospital, Philadelphia, Pennsylvania

Session: P-75. Virology: Studies of the Epidemiology of Viral Infections

Background. Herpes Zoster Ophthalmicus (HZO) affects 10-20% of adults with herpes zoster; ≥ 50% of these cases manifest as serious ocular diseases. This 1-year prospective observational cohort study aims to determine patient-reported HZO symptoms as well as economic and quality of life burden among 300 HZO patients from 6 major US ophthalmology practices. Here, we report baseline data from 13 initial enrollees.

Methods. Inclusion criteria were: participants ≥ 18 years, diagnosis of clinically active HZO, English or Spanish speaking, be willing and able to respond to study assessments, not be enrolled in a concurrent interventional HZO trial. Information are collected via 1) a clinical assessment form completed by the practice (baseline) and 2) patient questionnaires (baseline, 3, 6, and 12 months) on symptoms, medications, healthcare use, vision function, depression, and work productivity impact. Baseline results are presented for patients recruited during the first 6 months of enrollment from the first 4 sites to go live: diagnoses, and patient-reported symptoms and outcomes (eight-item Patient Health Questionnaire [PHQ-8] for depressive symptoms, National Eye Institute 25-item Visual Function Questionnaire [NEI-VFQ-25] for vision-related quality of life, and Zoster Brief Pain Inventory [ZBPI] for pain).

Results. The mean age of participants is 71 years; 11 are female and 9 are retired. Seven participants are college graduates or hold other degrees. All have health insurance coverage, with most (10) having primary insurance through Medicare. HZO diagnoses (Table 1) were: keratitis (4), iridocyclitis (4), conjunctivitis (1), other HZO diagnosis (3), other ocular diagnosis (6). Patient-reported symptoms (Table 2) were: pain above the eye, sensitivity to light, redness, feeling of sand/grit in the eye (9 each). The mean overall PHQ-8 and NEI-VFQ-25 scores were 5.9 (Standard Deviation [SD]:4.5) and 74.6 (SD:13.9), respectively; the mean ZBPI score for worst pain severity was 3.3 (SD:3.8) (Table 3).

Table 1. HZO Diagnosis at Baseline based on Clinical Assessment Form (N=13)

Table 1. HZO Diagnosis at Baseline based on Clinical Assessment Form (N=13)[a]

Diagnosis	n
Herpes zoster iridocyclitis	4
Herpes zoster keratitis	4
Herpes zoster conjunctivitis	1
Other HZO disease	3
Other ocular diagnosis	6

[a]Participants may have more than one diagnosis.
HZO, Herpes Zoster Ophthalmicus