Maricopa County
Department of Public Health

2007 Outbreak Summary Report

Submitted By

Division of Disease Control
Office of Epidemiology & Data Services
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Introduction

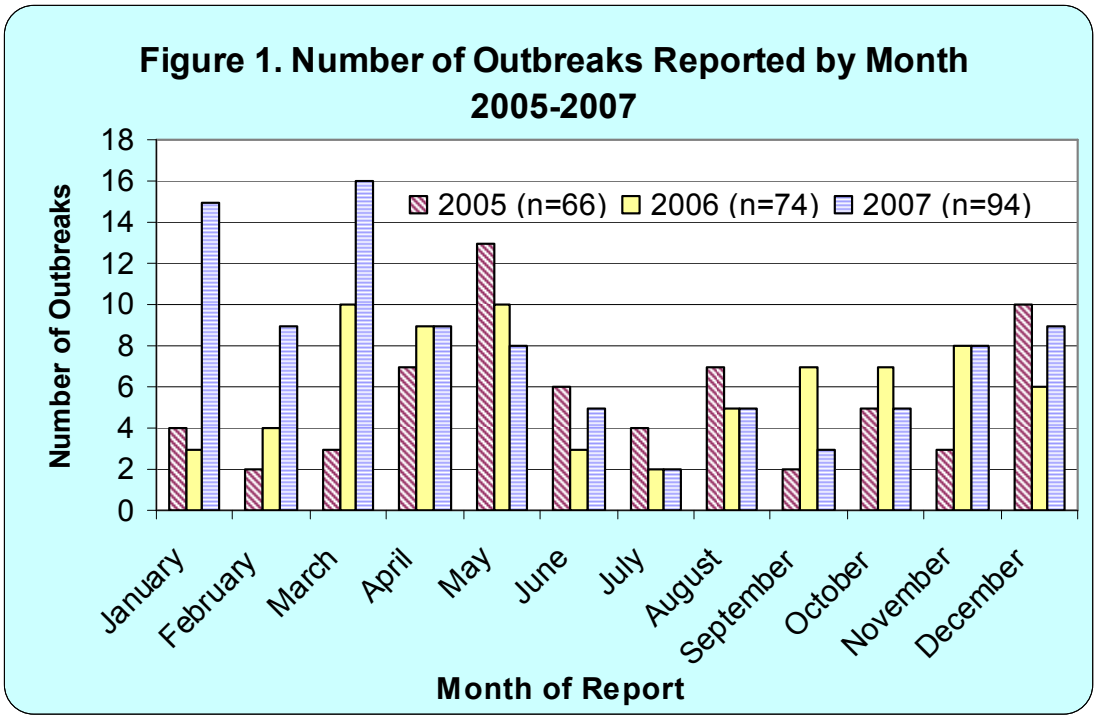
The purpose of this report is to provide a general overview of the disease outbreak investigations that were reported during 2007 in Maricopa County, Arizona. For comparison purposes, outbreaks reported in 2005 and 2006 are also included. Please see Appendix 1 for a list of diseases requiring health department notification in the event of an outbreak. For a detailed description of the methodology followed in the investigation of outbreaks, please see the 2006 Outbreak Summary Report on the website: http://www.maricopa.gov/Public_Health/epi/outbreak.aspx

Summary

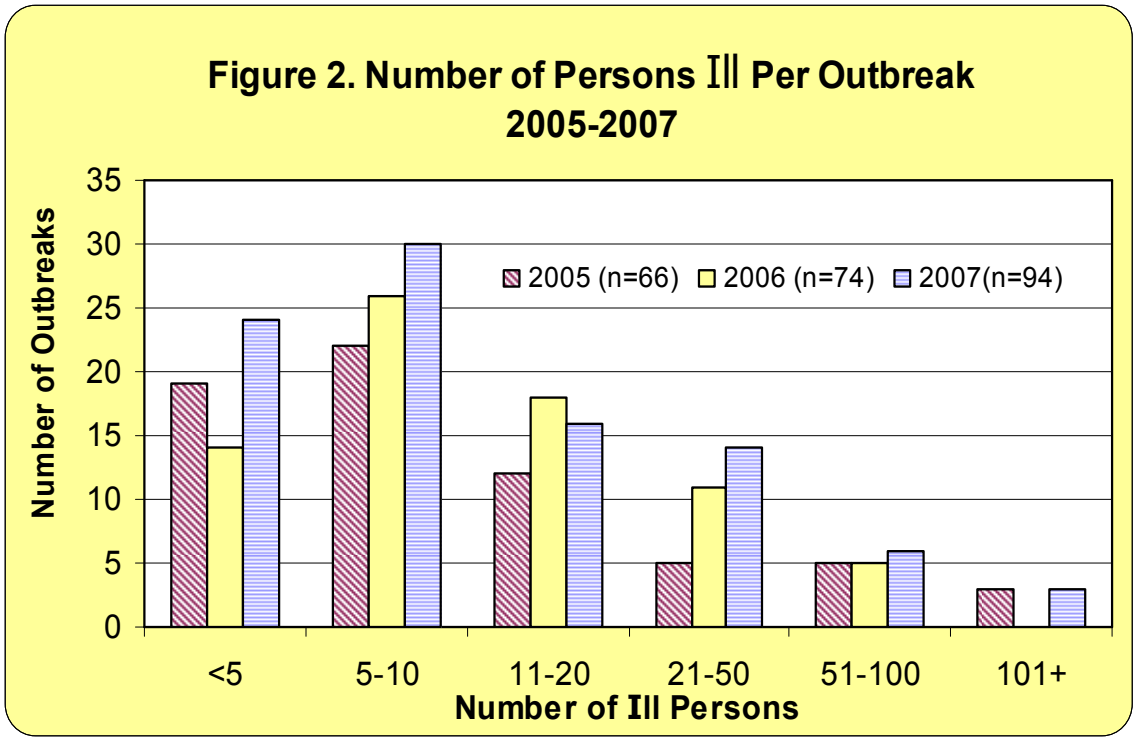
In 2007, there were 94 outbreaks investigated in Maricopa County, or an average of eight outbreaks per month, with the largest number of outbreaks occurring in January and March. The outbreaks ranged in size from 2 to 154 ill persons, with over half of the reported outbreaks affecting 10 or fewer persons. By far the most common pathogen isolated was norovirus; however, one third of outbreaks were of unknown etiology. Restaurants were the most common type of facility associated with outbreaks, followed by schools as the second most common.

Analysis

In 2007, 94 outbreaks were reported to MCDPH, or an average of 7.8 per month with a range of 2 (July) to 16 (March) per month. This represents an increase over the previous two years. In 2006, the total was 74, an average of 6.2 per month, with a range of 2-10 per month. In 2005, the total was 66, an average of 5.5 per month, with a range of 2-13 per month. As shown in Figure 1, the pattern of outbreaks is a bimodal curve with peaks in late spring and winter months.



The median number of persons ill per outbreak in 2007 was 8 (range 2-154); while in 2006 the median number of persons affected per outbreak was 10 (range 2-78); and in 2005 the median number of persons affected per outbreak was 7 (range 2-138). In 2007, 70 of the 94 outbreaks (74%) involved 20 or fewer persons (see Figure 2).



In 2007, 30% of outbreaks were of unknown etiology. In 2006, this was 38%, and in 2005, 50%. This decrease in the percent of unknown outbreaks each year may be due to better specimen collection, improved testing technology and/or other factors.

The 32 outbreaks of unknown etiology in 2007 were all gastrointestinal in nature. The pathogen of interest remained unknown for these outbreaks for a variety of reasons, including failure to obtain specimens for testing, outbreaks that were reported too late for testing, and testing which did not identify a pathogen. Table 2 summarizes the number of outbreaks by identified pathogen for the past three years

Table 2. Number of Outbreaks by Etiology

Etiology of Outbreaks	2005	2006	2007
Etiology Identified - Subtotal	33	46	62
Conjunctivitis	2	5	2
Cryptosporidiosis	0	0	1
E. coli O157:H7	0	1	0
Giardia	0	1	0
Hand, Foot, and Mouth Disease	0	0	2
Head Lice	1	0	2
Hepatitis A	0	1	0
Influenza	2	0	0
Influenza B	0	0	1
Influenza-like Illness	3	1	4
MRSA	0	2	2
Norovirus	13	21	26
Parvovirus B 19 (5th Disease)	1	0	0
Pneumonia	1	0	0
RSV	0	0	2
Scabies	6	7	6
Shigella	1	2	1
Staphylococcus (Skin Infections)	0	1	1
Strep pneumonia	1	0	0
Varicella	2	4	12
Unidentified Etiology - Subtotal	33	28	32
Unknown (GI)	33	26	32
Unknown (Rash)	0	2	0
Total	**66**	**74**	**94**

While a specific etiology is often not determined, most outbreaks can be broadly classified based on the symptoms exhibited by cases. From 2005 through 2007, the majority of outbreaks investigated by the MCDPH were gastrointestinal in nature (see Table 3). The "Other" category includes conjunctivitis and head lice.

Table 3. Type of Outbreaks

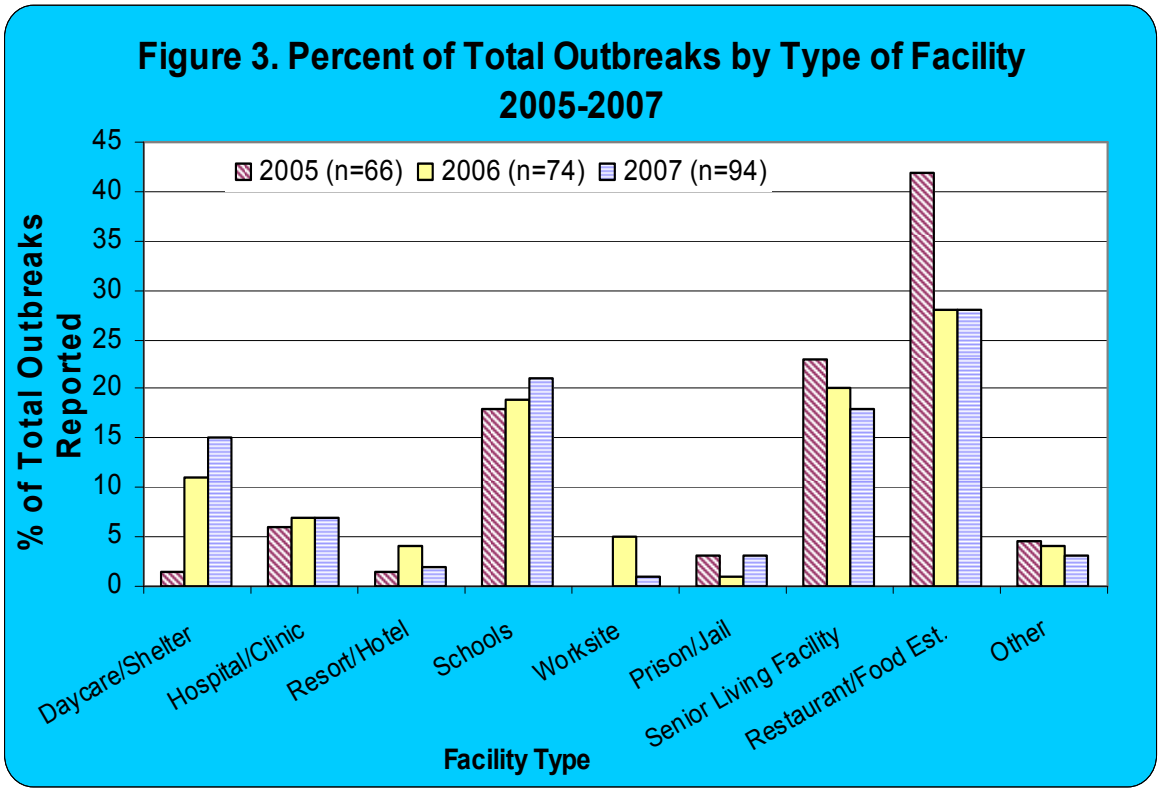
Outbreak Type	2005	2006	2007
Gastrointestinal	47	51	59
Rash	9	17	24
Respiratory	7	1	7
Other	3	5	4
Total	**66**	**74**	**94**

As shown in Table 4, more outbreaks in schools and daycare centers were reported in 2007 than had been reported in previous years. The largest numbers of reports for any one category were for restaurants and food establishments, followed by schools and senior living facilities (including assisted living centers, long term care facilities, and senior apartments). The "Other" category includes caterers, churches and private residences.

Table 4. Number of Outbreaks by Facility

Facility Type	2005	2006	2007
Daycare/Shelter	1	8	14
Hospital/Clinic	4	5	7
Resort/Hotel	1	3	2
Schools	12	14	20
Worksite	0	4	1
Prison/Jail	2	1	3
Senior Living Facility	15	15	17
Restaurant/Food Est.	28	21	26
Other	3	3	3
Total	**66**	**74**	**94**

Figure 3 shows that senior living facilities and restaurants have actually decreased as a percent of all outbreaks, while daycare/shelters increased. In 2005, 42% of reported outbreaks were associated with restaurants. In both 2006 and 2007, restaurants accounted for 28% of outbreaks. Outbreaks in senior living facilities were 23% in 2005, 20% in 2006, and 18% of all reported outbreaks in 2007. The percent of outbreaks associated with daycare/shelters increased between 2005 and 2007 with 2% of outbreaks associated with this type of facility in 2005, 11% in 2006, and 15% in 2007.



As indicated in Figure 4, GI outbreaks were prevalent in all but jail facilities and worksites, accounting for 59 of 94 (63%) of the total outbreaks reported. Respiratory accounted for 7% and rashes for 25%. The category with the highest number of GI outbreaks was restaurants/food establishments. The outbreaks that were not respiratory or GI-related and rash (labeled as "other" type) were outbreaks of conjunctivitis and head lice. The "other" category for facility type, listed across the bottom of the chart, includes private homes, churches, and senior centers.

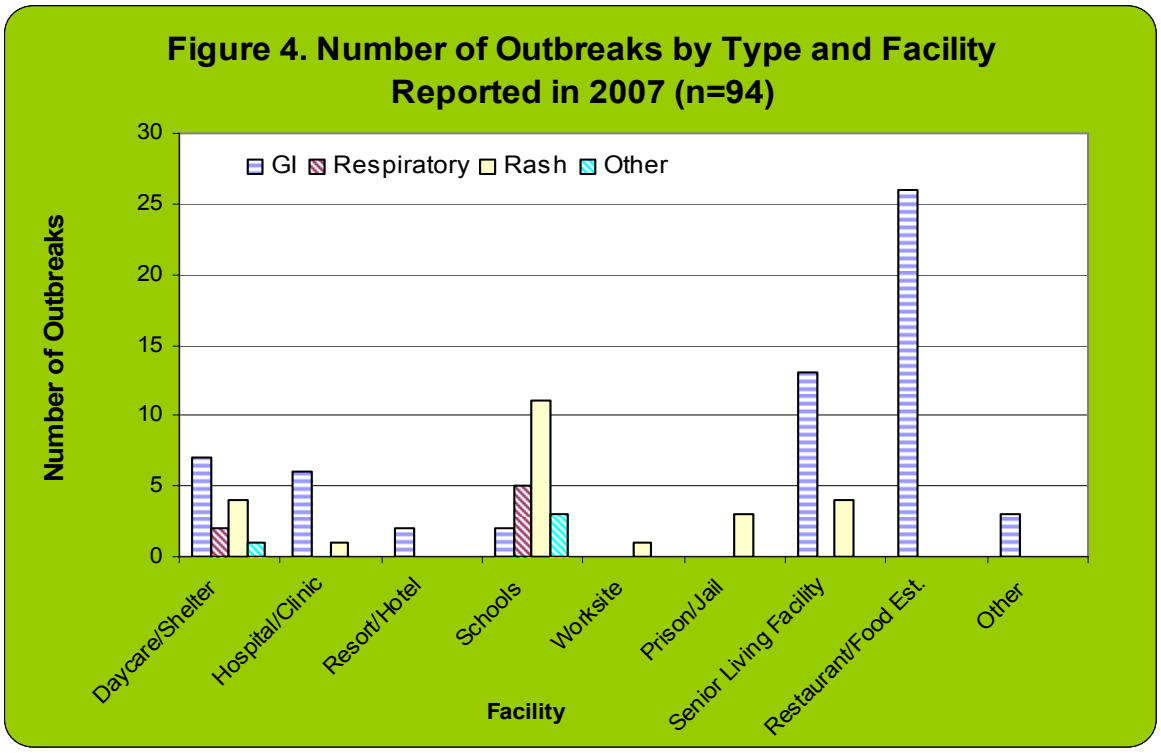


Figure 5 illustrates GI outbreaks in 2007 by type of facility. Figure 6 shows rash outbreaks by facility type for 2007.

Figure 5. Percentage of GI Outbreaks by Facility 2007 (n=59)

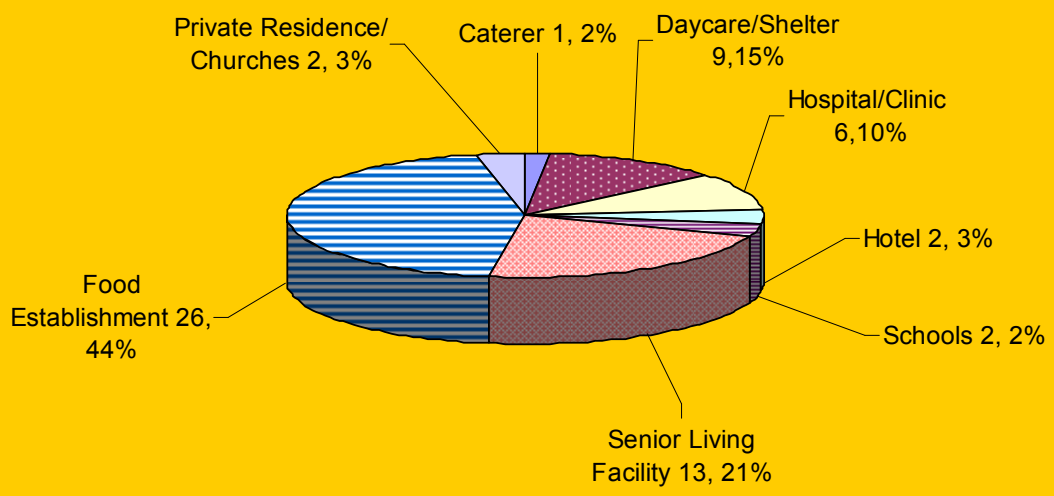
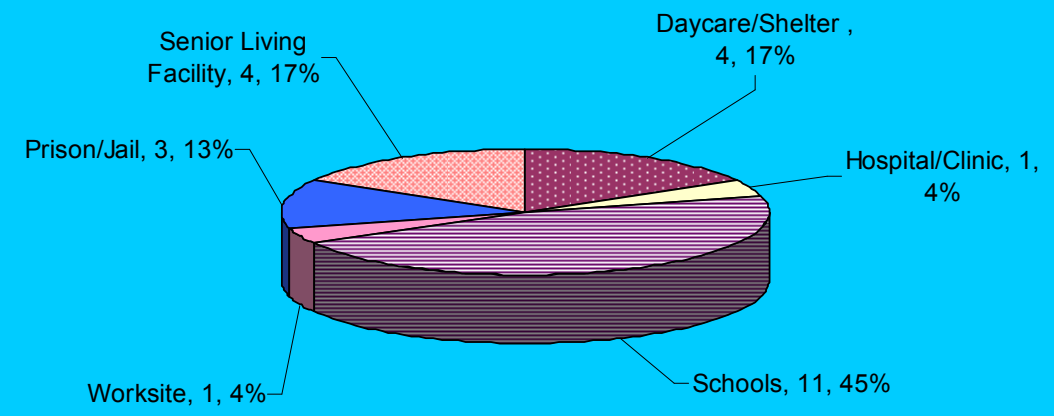


Figure 6. Percentage of Rash Outbreaks by Facility 2007 (n=24)



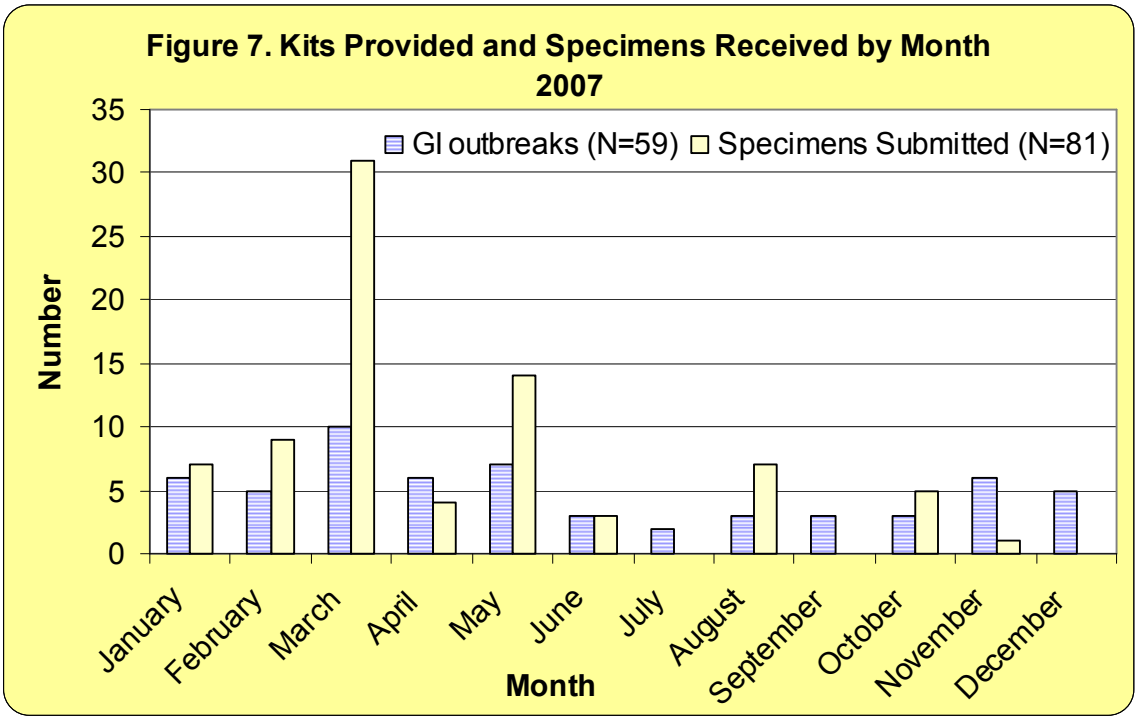
Among respiratory outbreaks in 2007 (not shown), two outbreaks occurred at daycares/shelters and five occurred at schools. The other four outbreaks in 2007 were one conjunctivitis outbreak in a school, one conjunctivitis outbreak in a child care facility, and two head lice outbreaks in schools. These outbreaks are also not shown in a figure.

Specimens

Stool specimens were collected for 34 outbreaks, some of which did not require dispensation of specimen kits. This is 57% of the 60 GI outbreaks.

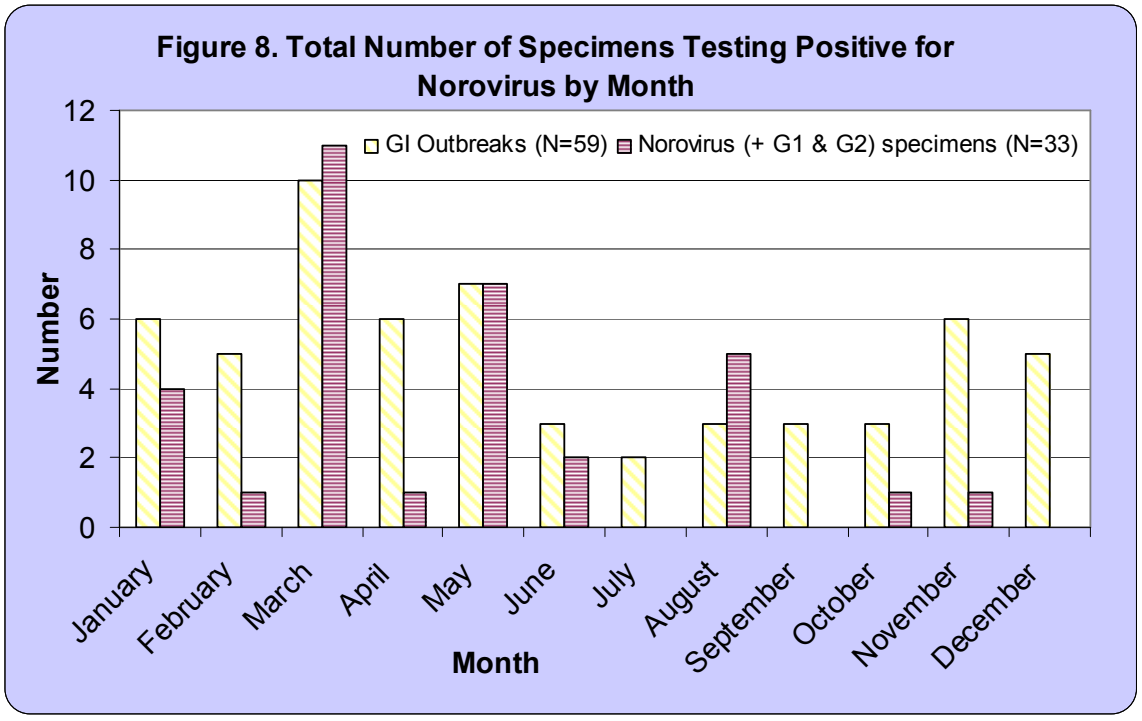
86 specimen collection kits were provided for a range of 1-6 kits per outbreak. Of these, 55 (64%) of the recipients provided stool specimens, which were submitted for testing at the Arizona State Laboratory. An additional 26 specimens were generated at facilities such as hospitals and long-term care facilities. Figure 7 shows the distribution of specimens submitted and tested in 2007.

Specimens were not collected for all GI outbreaks. Reasons for not collecting specimens included too much time elapsing between an event and reports of illness, unwillingness to provided specimens, or hard-to-reach cases.



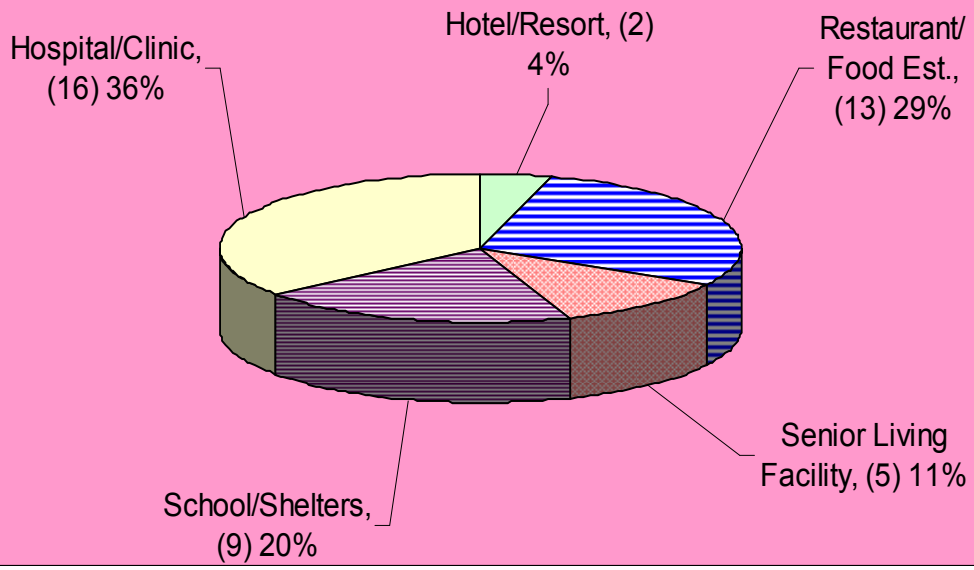
For the majority of the specimens collected, testing for both bacterial (*Salmonella*, *Shigella*, *Campylobacter*, and *E. coli* O157:H7*)* and viral (norovirus) pathogens was conducted. All of the 85 stool specimens submitted for bacterial testing tested negative. Of the 81 specimens submitted for viral testing in 2007, 33 (41%) were positive for norovirus, and 48 (59%) were negative for norovirus. For the 33 norovirus positive specimens whose strains were identified; 4 (12%) specimens typed as norovirus G1 and the other 29 (88%) specimens typed as norovirus G2.

Figure 8 shows the distribution of GI outbreaks and positive norovirus (G1 & G2) specimens by month. The highest number of GI outbreaks and specimens testing positive for norovirus occurred in March and May. There were no specimens submitted for any type of testing in July, September, and December. Hence, there were no norovirus positive specimens during these months.

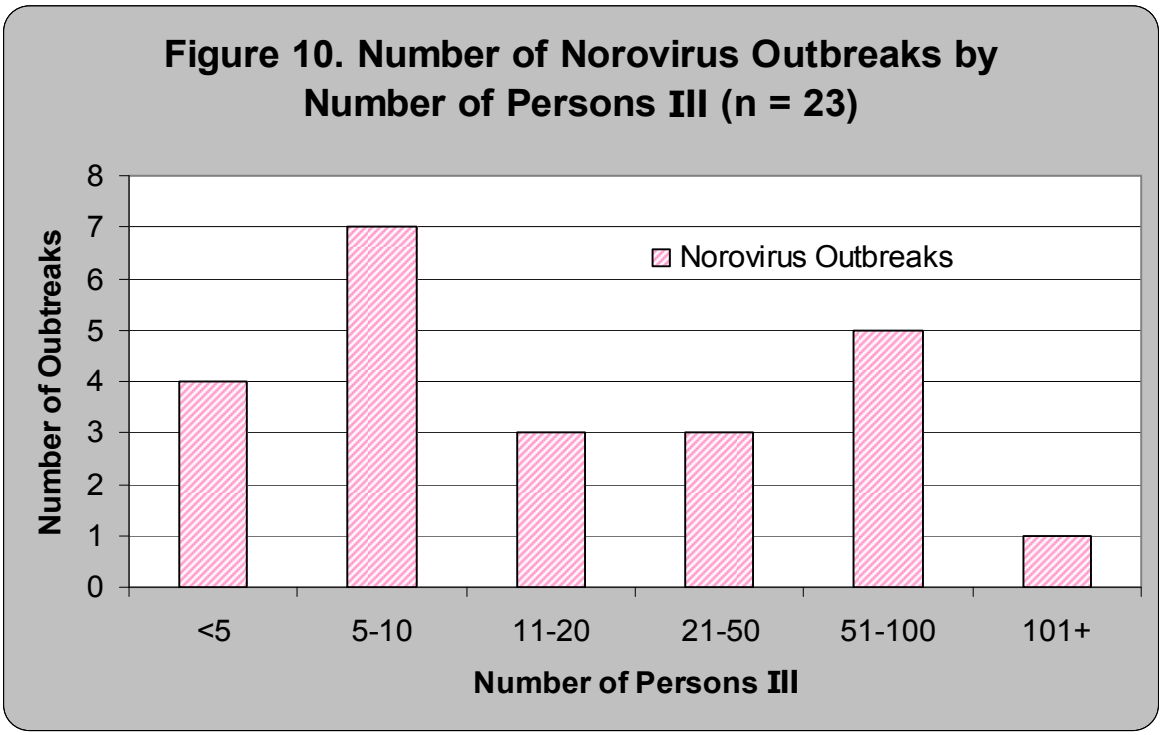


Outbreaks of norovirus occurred in all types of facilities, most commonly in hospital/clinics (n = 16, 36%) followed by restaurant/food establishments (n = 13, 29%) as shown in Figure 9. This distribution is somewhat different from the distribution of total gastrointestinal outbreaks (Figure 5) which showed restaurant/food establishments as most common followed by senior living facilities (44% vs. 21%) This may reflect the fact that is often easier to collect stool specimens from hospitals and clinics than from patrons of restaurants reporting an outbreak.

Figure 9. Number of Positive Norovirus Outbreaks by Facility 2007



Reported Norovirus outbreaks by number of persons ill are shown in Figure 10. Many norovirus outbreaks affected fewer than 10 individuals (48%), yet 26% occurred in groups of more than 50 individuals



Discussion

The numbers and patterns of foodborne outbreaks in Maricopa County suggest several implications for disease control and public health impact.

- Given the prevalence of norovirus in outbreaks and presumably in the community, more effort should be expended on preventive measures, especially in schools, long term care facilities, and other places where individuals have close contact daily. Control measures include proper hand washing, routine clean-up of areas at risk of contamination with norovirus, use of bleach cleaners, isolating ill persons so that spread of the pathogen is limited, and ensuring that all food handlers with diarrhea or vomiting are properly excluded from work.

- Given the annual pattern of outbreaks, prevention education would be best in the fall, just prior to the peak season for norovirus and influenza.

- Since 2003, there has been a steady rise in the number of outbreaks each year. Given the increasing population in Maricopa County, and the documented upward trend in the number of outbreaks reported, additional resources are

needed to maintain the current level of investigation and implement the necessary control measures.

- As no bacterial pathogens were isolated during testing of stool specimens collected during outbreaks in 2007, bacterial testing should be limited only to instances where evidence for a bacterial pathogen exists, e.g. when a case has a bloody rather than a watery stool.

- Since 2005, the number of outbreaks of unknown etiology has decreased. This increase in identification of a specific pathogen is most likely due to improvements in the collection of specimens for analysis. Continued improvements in specimen collection and testing should be sought to further decrease the numbers of outbreaks of unknown etiology.

Appendix 1

In Arizona, health care providers (HCP), health care institutions (HCI), correctional facilities (CF), childcare establishments (CCE), administrators of schools, and shelters are all required to report outbreaks of infectious diseases to the Local Public Health Authority (see Table 1.) under Arizona Administrative Code A.A.C. R9-6-203 and ARS Title 36. Also, hotel, motels, and resorts are required to report contagious or epidemic diseases occurring in their establishments within 24 hours under Arizona Revised Statutes Title 36, Chapter 6, Article 2.

Table 1. Diseases requiring outbreak notification within 24 hours

Disease/Condition	Reporting by HCPs, HCIs, and CFs	Reporting by Schools, CCEs, and Shelters
Amebiasis	X	
Campylobacteriosis	X	
Conjunctivitis: acute	X	X
Cryptosporidiosis	X	
Diarrhea, Nausea, or Vomiting	X	X
Giardiasis	X	
Hepatitis A	X	
Hepatitis E	X	
Salmonellosis	X	
Scabies	X	X
Shigellosis	X	
Streptococcal Group A Infection		X
Taeniasis	X	
Vibrio Infection	X	
Yersiniosis	X	