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Clinical Review

MUMPS: AN EMERGENCY MEDICINE-FOCUSED UPDATE

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☐ **Abstract—Background: Mumps is a *Paramyxoviridae* virus. This disease was rampant prior to introduction of the measles, mumps, and rubella vaccine, resulting in decreased incidence. This disease has demonstrated several outbreaks. Objective: This review provides a focused evaluation of mumps, an update on outbreaks, management recommendations, and ways to decrease transmission. Discussion: Clusters of mumps outbreaks continue to occur. The virus is a paramyxovirus, a single-stranded RNA virus. The vaccine can provide lifelong immunity if administered properly, though prior to 1967 and introduction of the vaccine, the virus was common. In the past decade, there have been several notable outbreaks. Humans are the only known hosts, with disease spread through exposure to droplets and saliva. Factors affecting transmission include age, compromised immunity, time of year, travel, and vaccination status. Upper respiratory symptoms, fever, and headache are common, with unilateral or bilateral parotitis, and the virus may spread to other systems. Diagnosis is clinical, though polymerase chain reaction and immunoglobulin testing are available. This review provides several recommendations for vaccine in pregnancy, patients living in close quarters, health care personnel, and those immunocompromised. Treatment is generally supportive, with emphasis on proper isolation to prevent widespread outbreaks. Although reporting regulations and procedures vary by state, mumps is reportable in most states. Conclusions: Mumps is an easily spread virus. Although vaccination is the most effective way to prevent transmission, early recognition of the disease is crucial. As an emergency physician, it is important to recognize the clinical presentation, recommended testing, treatment, and isolation procedures. Published by Elsevier Inc.**

☐ **Keywords—mumps; infectious disease; *Paramyxoviridae*; virus; vaccine**

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INTRODUCTION

Mumps is a viral infection caused by a *Paramyxovirus*, which is a single-stranded RNA, linear nonsegmented virus. *Paramyxoviridae* are antigenically stable viruses, meaning that unlike influenza, two different strains of virus cannot combine to form a new subtype, minimizing antigenic shift and drift. Unlike influenza, which requires new combinations and formulation of vaccine to cover the changing strains each year, because *Paramyxoviridae* are unable to shift and change, a series of immunizations in childhood generally confers lifelong immunity (1). *Paramyxoviridae* initially replicate in the epithelia of the respiratory tract, but may spread to glandular and nervous system tissue with the potential to become disseminated throughout the body, causing complications in locations remote from the respiratory tract (1–4).

Prior to the introduction of the measles, mumps, and rubella (MMR) vaccine in 1967, there was an average of 186,000 reported cases of mumps in the United States per year. With the implementation of the MMR series, which recommends that children receive their first dose

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at age 12–15 months and the second at age 4–6 years, the incidence of mumps has decreased by 99% (3). However, in the past decade, there have been several notable outbreaks, each involving spread within populations that had frequent and close contact. In 2006, there were 6500 cases in a multi-state outbreak, mostly involving colleges in the Midwestern states (4). In 2009, 3000 cases were reported in a close-knit religious community in New York where children and adolescents had close contact with each other in their schools. This outbreak was likely initiated when an infected student returned from a trip to the United Kingdom, where another large outbreak was occurring (5). From 2011–2013 there were several hundred reported cases, typically small clusters of outbreaks on college campuses in California, Virginia, and Maryland (6). In 2014, the National Hockey League experienced an outbreak among 14 players at the same time that Ohio had 400 cases associated with a university (6). Over 600 cases were reported from 2015–2016, the majority occurring at universities in Iowa and Illinois (7).

Outbreaks continue to occur in 2017, with the largest outbreak at the time of this publication occurring in Arkansas (8). As of May 13, 2017, 2570 cases have been reported, with the highest proportion of cases (n = 1669) in the 5–17-year age range, followed by the 18 years and older age range (n = 1148). Of the infected school-aged children, 90–95% were fully vaccinated, and 30–40% of infected adults were fully vaccinated (8).

Several other states are reporting clusters of outbreaks, including Washington with 771 cases, Texas with 221 cases, likely tied to the Arkansas outbreak and a popular spring break location in South Padre Island, and Oklahoma with 123 cases, 55% of which occurred in fully vaccinated individuals (6,8). Figure 1 displays these outbreaks in 2017 (6). Although the incidence of mumps has drastically declined since the late 1960s, concentrated outbreaks still occur, making early recognition of the disease important to prevent widespread outbreaks (2–12).

DISCUSSION

Epidemiology

Humans are the only known hosts for the virus that causes mumps. Although mumps incidence is highest in the winter and spring months, in warm climates it is present throughout the year (1,3,6). As discussed, outbreaks typically occur among people in close quarters such as college dorms, barracks, sports teams, and close knit communities. Mumps most commonly affects young adults, likely related to imperfect vaccination effectiveness, lack of wild-type infection exposure, and the intensity of exposure, in conjunction with high-risk behaviors such as sharing drinks or kissing (1,3–5,13).

In the United States, incidence ranges from a couple hundred cases to a few thousand cases per year. Two doses of the MMR vaccination are approximately 88% (range 66–95%) effective at preventing mumps infection, and a single dose is approximately 78% (range 49–91%) effective (3,14).

The mumps virus is antigenically stable and does not experience great shifts in ways such as the influenza virus. There are 12 genotypes, all of which are protected against by the MMR vaccine (1,2). In recent years,

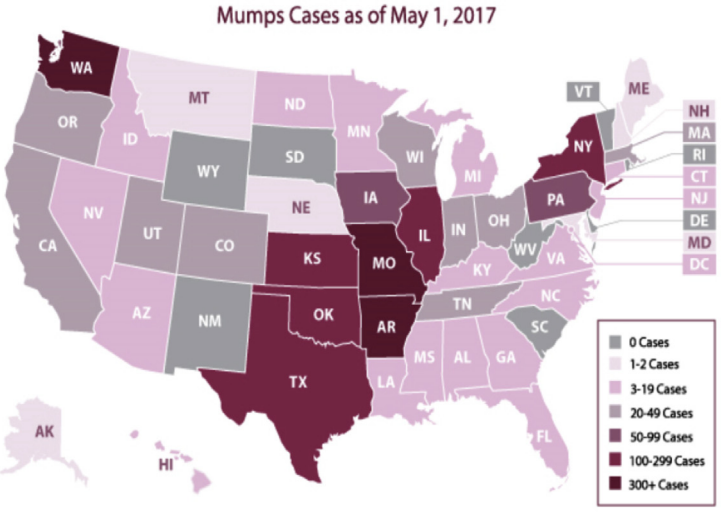

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Figure 1. Mumps cases in 2017 and ongoing. From the Centers for Disease Control and Prevention (CDC): https://www.cdc.gov/mumps/outbreaks.html (6).