

PRE-DECISIONAL DRAFT



Decision Brief:

Measles, Mumps, Rubella Booster Immunization Practices

May 18, 2020

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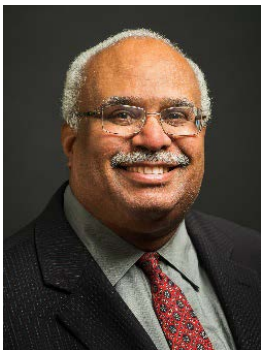
Overview

- Public Health Subcommittee Membership
- Review Tasking
- Summary of Subcommittee Activities to Date
- Mumps Background
- Determining the Risk of Mumps Infection in Service Members
- Informing DoD Policy Regarding the Need for Either Elective or Universal MMR Vaccine Booster Immunization
- Findings and Recommendations



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Public Health Subcommittee Membership



Georges Benjamin,
MD



Wilsie Bishop,
DPA



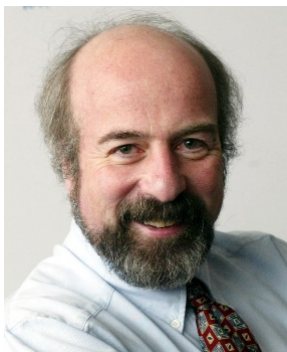
Craig Blakely, PhD,
MPH



John Clements, PhD



Charles Dodd,
DVM, PhD



John Groopman,
PhD



RADM (Ret)
H. Clifford Lane, MD



James Lockey, MD,
MS



Russell Luepker, MD,
MS

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Tasking

On November 7, 2019, the Assistant Secretary of Defense for Health Affairs directed the Defense Health Board (“the Board”), through its Public Health Subcommittee to:

1. Determine the optimal way to minimize the risk of mumps in our Military Services and maintain medical readiness
2. Inform DOD policy regarding the need for either selective or universal MMR vaccine booster immunization



Summary of Activities (1/2)

Date	Activity
February 25-26, 2020	<p>In-person “kick off” meeting in Falls Church, VA:</p> <ul style="list-style-type: none">• Subject Matter Expert briefings from:<ul style="list-style-type: none">• Preventive Medicine Service representatives• Centers of Disease Control and Prevention• Armed Forces Health Surveillance Branch• Defense Health Agency Immunization Branch• Report Development
March 17, 2020	<p>Video Teleconference:</p> <ul style="list-style-type: none">• Subject Matter Expert briefings from the Food and Drug Administration• Report Development



Summary of Activities (2/2)

Date	Activity
March 31, 2020	Video Teleconference: Report Development focusing on Findings and Recommendations
April 14, 2020	Video Teleconference: Report Development
April 21, 2020	Video Teleconference: Report Development
April 28, 2020	Video Teleconference: Report Development
May 5, 2020	Video Teleconference: Report Development focusing on the Executive Summary



Mumps Background (1/2)

- A viral illness caused by a paramyxovirus.
- The average incubation period for mumps is 16 to 18 days, with a range of 12 to 25 days.
- Typically causes fever, headache, muscle aches, fatigue and swollen salivary glands in children.
- May be more severe in adults and associated with orchitis, oophoritis, pancreatitis, encephalitis, meningitis and hearing loss.
- Patients may be infectious (contact or droplets) from 7 days before symptoms.





Mumps Background (2/2)

- Effectively prevented with a childhood immunization of two doses of MMR vaccine; the first at 12 to 15 months of age, the second at 4 to 6 years of age.
- Adults who do not have evidence of immunity are immunized with two doses of MMR vaccine, separated by at least 28 days.
- Immunity to mumps wanes over time and in outbreak settings, consideration is given to an additional dose of MMR vaccine for groups at increased risk, including those living in close quarters.

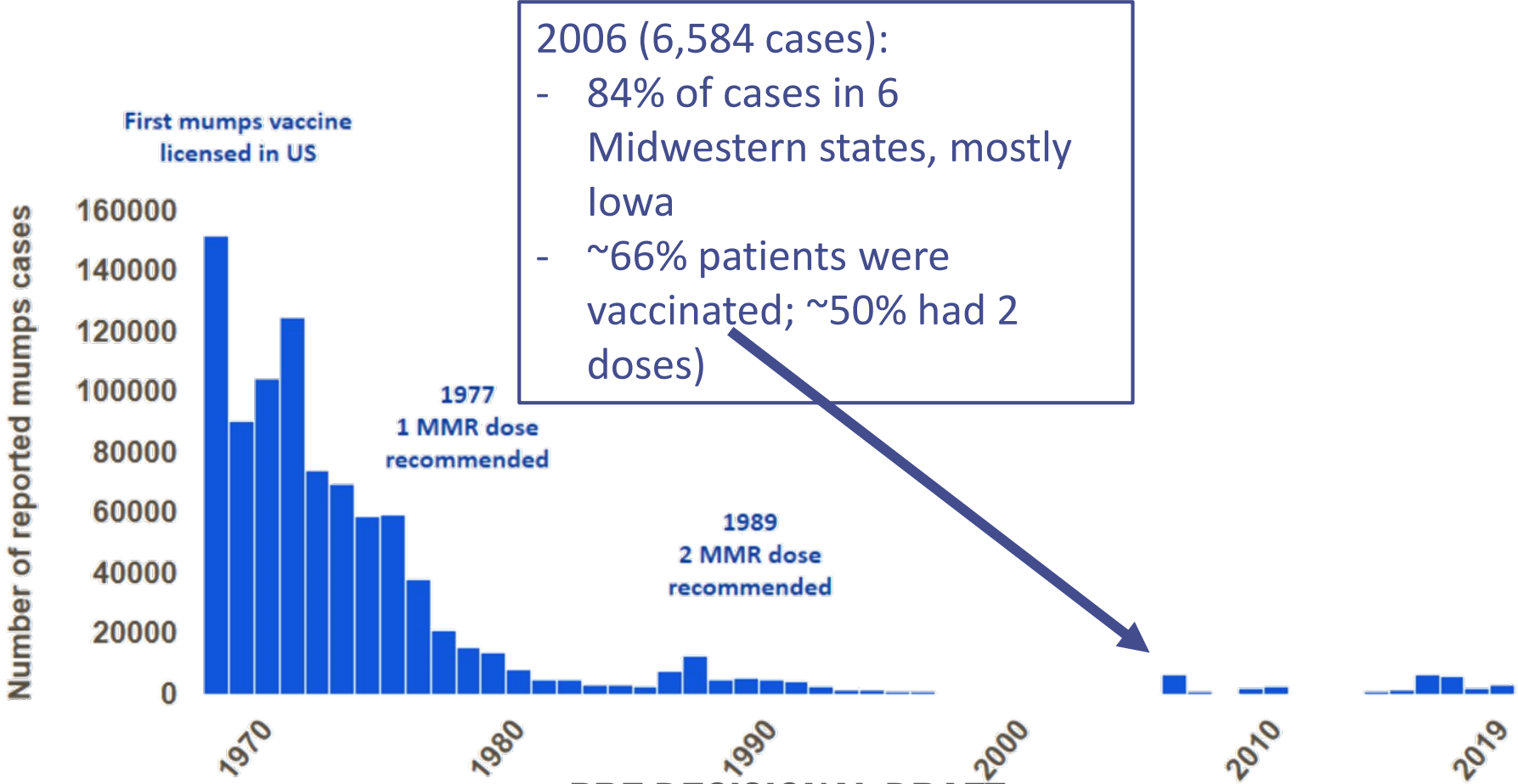


Determining the Risk of Mumps Infection in Service Members



Mumps in the United States (1/4)

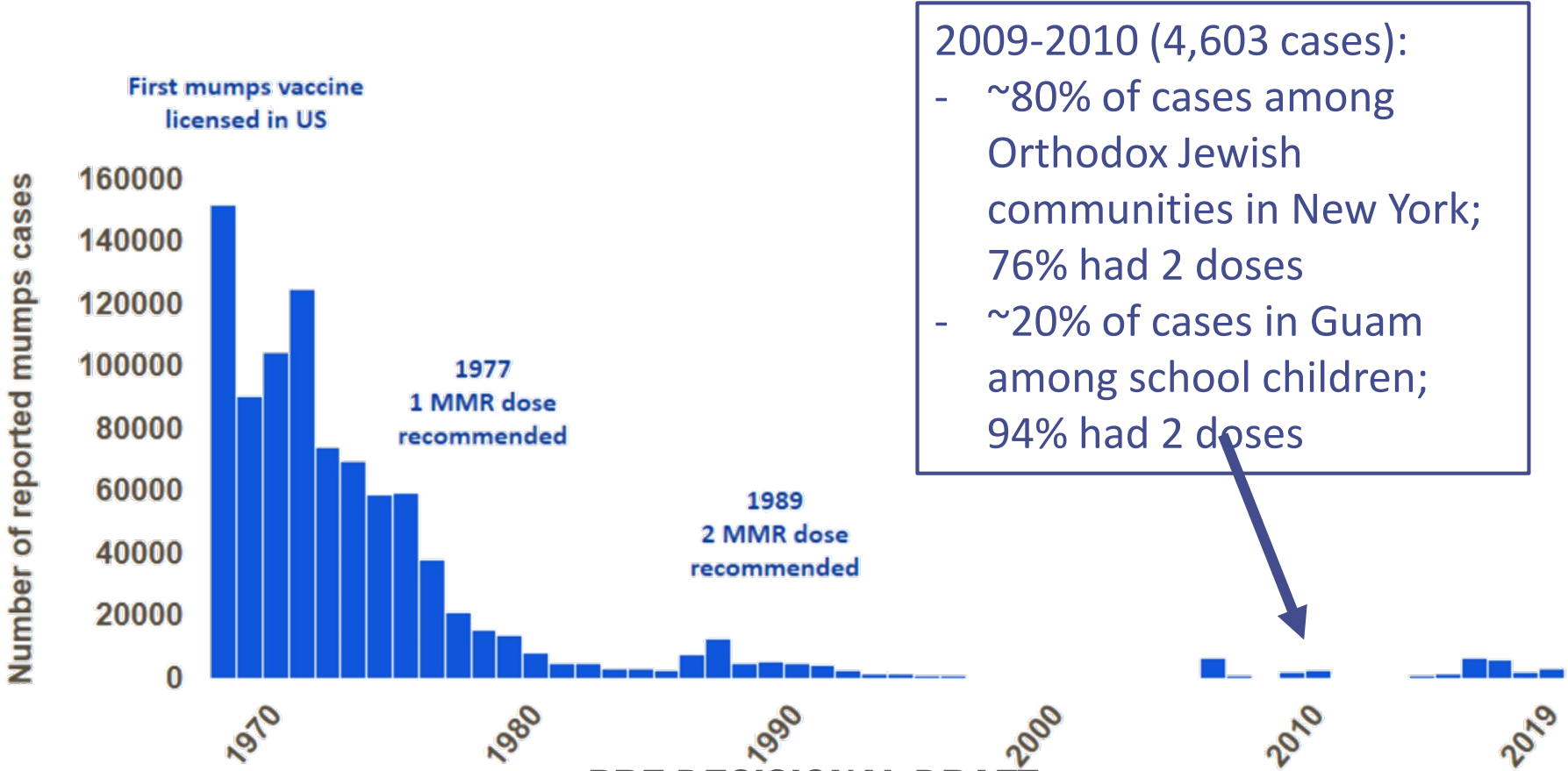
- In the United States, mumps cases decreased by >99% with the introduction of the vaccine in 1967





Mumps in the United States (2/4)

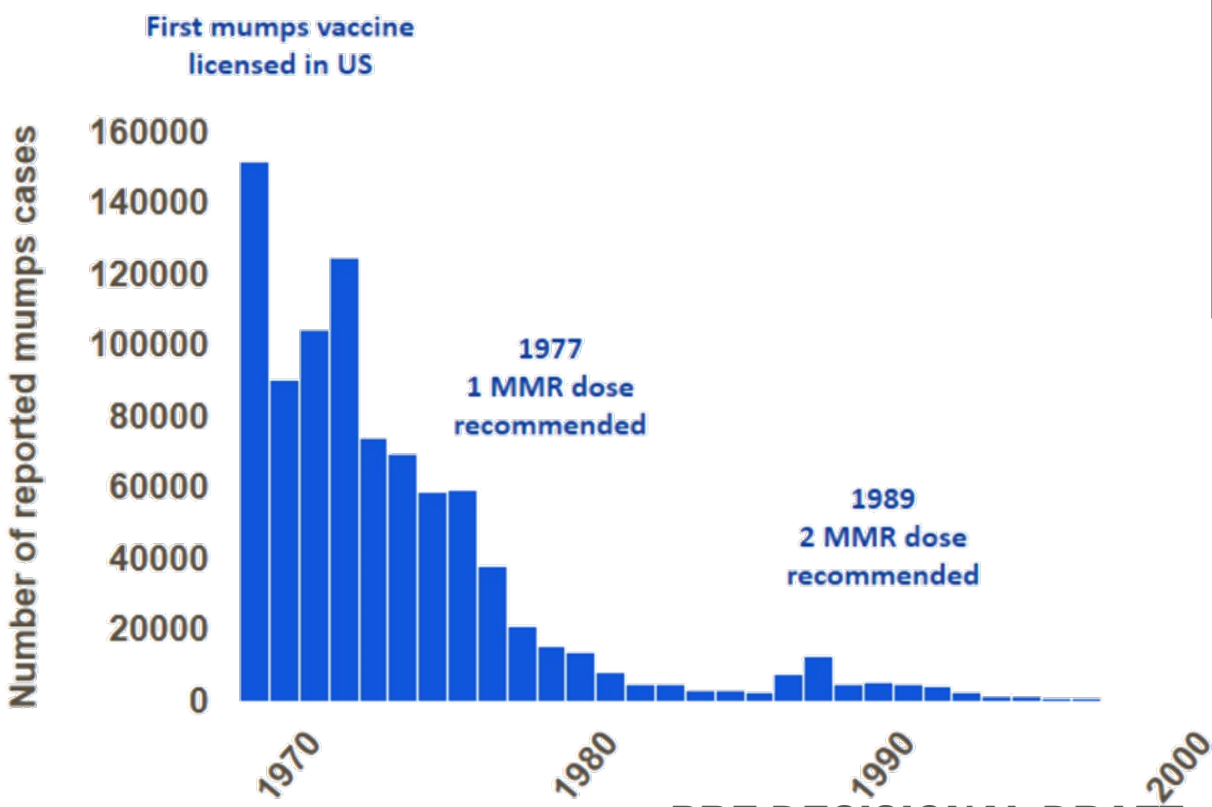
- In the United States, mumps cases decreased by >99% with the introduction of the vaccine in 1967





Mumps in the United States (3/4)

- In the United States, mumps cases decreased by >99% with the introduction of the vaccine in 1967



2016-2017 (~9,000 cases):

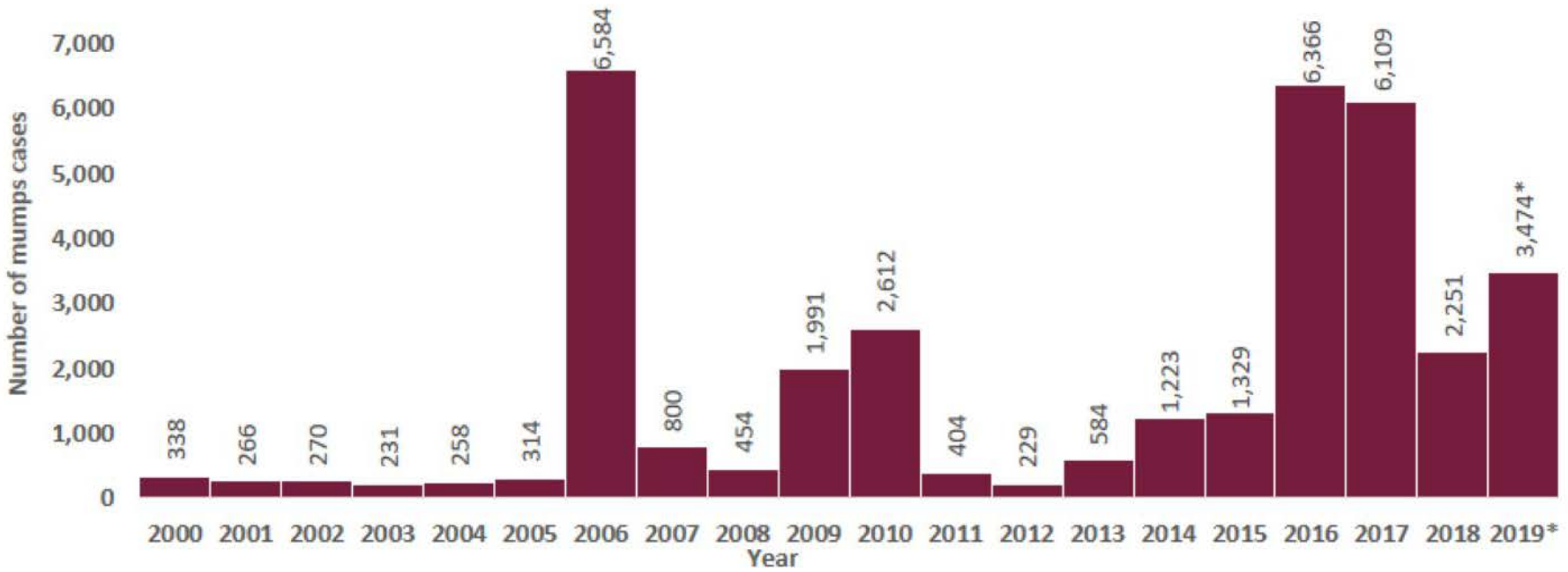
- 150 outbreaks in 37 states and DC
- Median outbreak size = 10 (3-2,954)
- 70% of cases had 2 doses





Mumps in the United States (4/4)

Reported mumps cases — United States, 2000–2019*

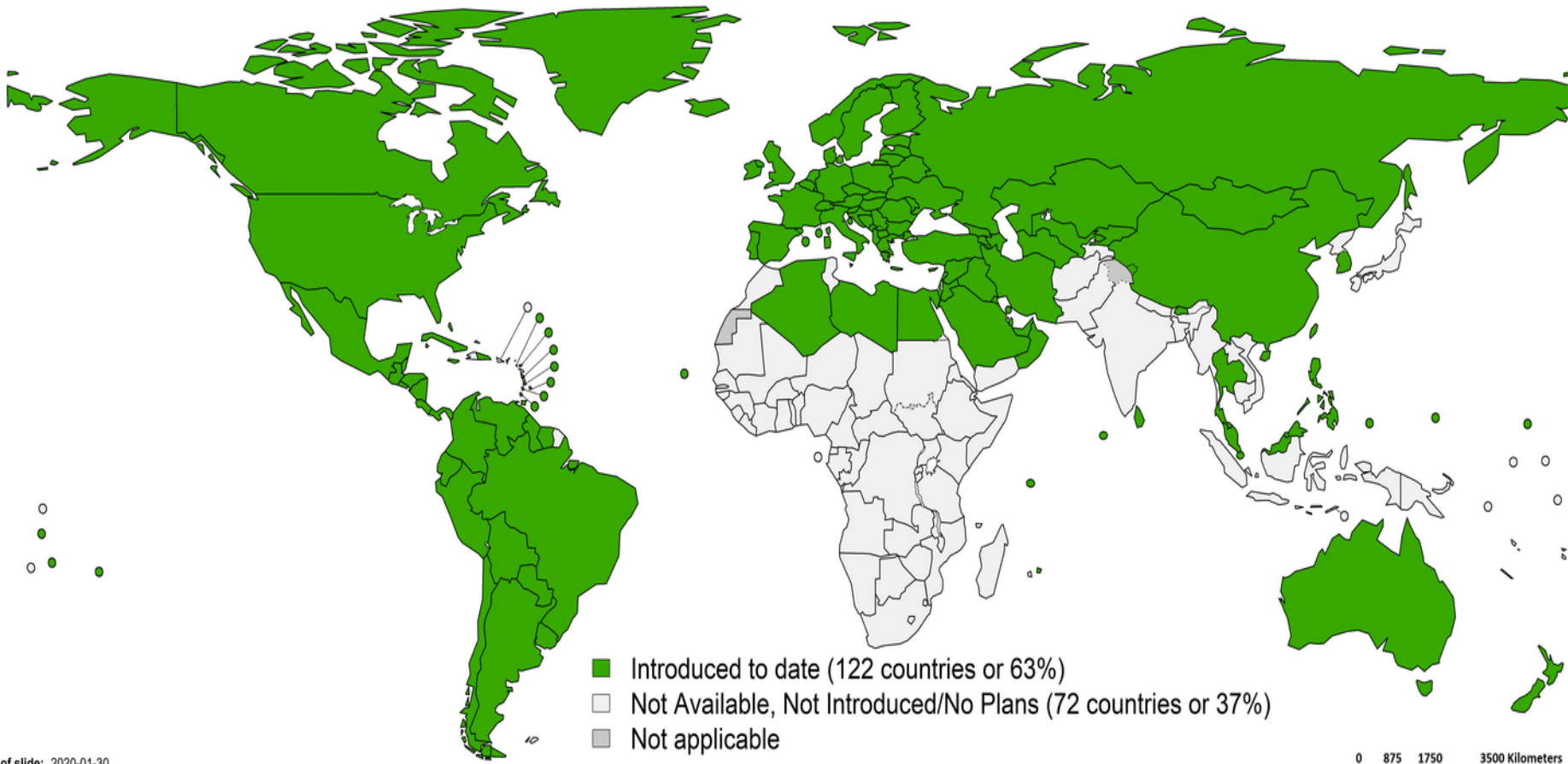


*Cases as of Jan 25, 2020; case count preliminary and subject to change; source: [Morbidity and Mortality Weekly Report \(MMWR\), Notifiable Diseases and Mortality Tables](#)



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Countries with Mumps Containing Vaccines in their National Immunization Programs



Date of slide: 2020-01-30
Map production: Immunization, Vaccines and Biologicals (IVB), World Health Organization(WHO)
Data source: IVB database as at 30th January 2020

Disclaimer:
The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area nor of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.
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Mumps Infection the Military (1/2)

- In April, 2017, five Army Soldiers were admitted to Brooke Army Medical Center with parotitis and suspected mumps.
 - 3 cases confirmed
 - Contact tracing identified an additional 4 confirmed and 2 presumptive cases
- In November, 2018 a Marine was exposed to mumps from a civilian in North Carolina; embarked on the USS FORT MCHENRY in mid-December and shortly after presented with mumps.
 - 5 additional cases by mid-January; 28 confirmed cases in total
 - MMR vaccine flown to the ship and give to each person onboard
 - Ship quarantined at sea until mid-May



Mumps Infection the Military (2/2)

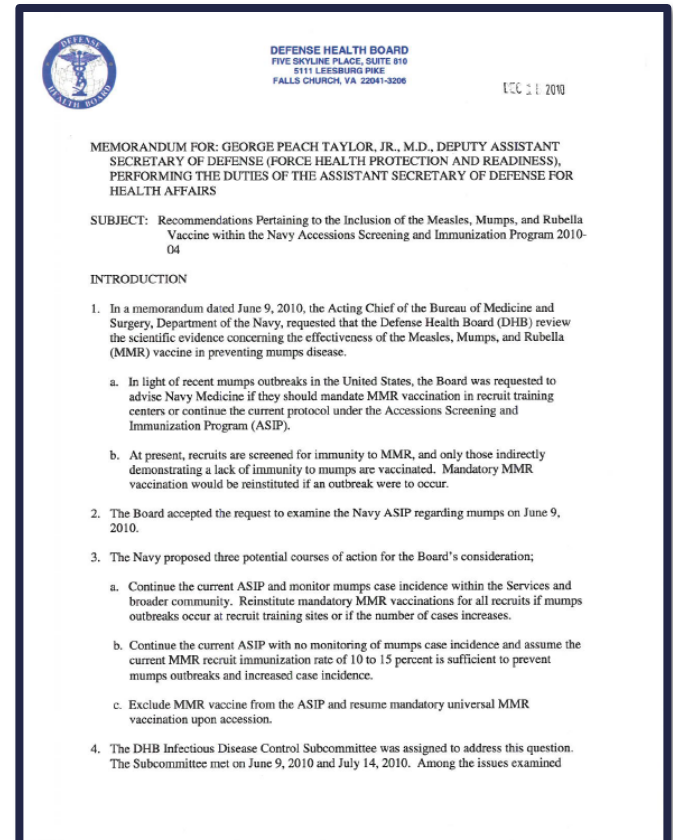
- In July, 2019 a Soldier was treated for parotitis in Vicenza, Italy.
 - Nine suspected cases of mumps in the prior 2 months
 - The Battalion Commander developed mumps
 - 375 contacts received MMR vaccine
 - Training exercises were delayed
 - Mumps is endemic in Italy
- In October, 2019 four Sailors from a Pacific fleet Navy ship presented with suspected mumps during a period of a community outbreak.
 - Their warship left for a mission without them
 - All members of the ship received MMR vaccine

Informing DoD Policy Regarding the Need for Either Elective or Universal MMR Vaccine Booster Immunization

Tasking

- In 2010, the Board reviewed the topic of for the Navy and **did not recommend a universal third MMR immunization strategy:**

- Current practices should be continued
- Selective immunization for those with:
 - < 2 documented MMR vaccines, or
 - Low titers of measles or rubella antibodies
- Consider universal MMR vaccination if the risk of mumps outbreaks increase





Current DoD Immunization Policies

- Army: At basic training, administers MMR vaccine to eligible recruits who lack antibodies to measles or rubella.
- Navy, Marines, Air Force: At basic training, administers MMR vaccine to eligible recruits who lack antibodies to measles, rubella or mumps.
- A revision of the joint instruction on immunization and chemoprophylaxis is underway.



Mumps Vaccine (1/2)

- In the US, Mumps vaccine is only available for adults as part of a combination vaccine with Measles and Rubella (MMR vaccine).
- Among the 3 components of MMR vaccine, immunity to mumps is the least robust based upon studies of efficacy.
- There is currently no lab test that provides clear evidence of protective immunity to mumps.



Mumps Vaccine (2/2)

- The Korean Armed Forces administers a routine 3rd dose at the time of enlistment
 - The incidence of mumps fell from 58.1 to 26.2 per 100,000 in the military while increasing from 6.7 to 29.7 in civilians
- While not extremely well-defined, serious adverse effects following a third dose of MMR vaccine appear to be rare



Estimated Annual Vaccine and Laboratory Costs of Immunization and Laboratory Screening Strategies for Protection Against Measles, Mumps, and Rubella in U.S. Military Recruits (in \$ millions)

	Vaccines (\$m)	Lab Tests (\$m)	Total (\$m)
Selective immunization with measles/rubella lab screening	\$ 2.8	\$ 1.9	\$ 4.7
Selective immunization with measles/rubella/mumps lab screening	\$ 3.6	\$ 3.9	\$ 7.5
Universal vaccination with no laboratory testing	\$ 9.5	\$ 0	\$ 9.5

Assumptions: 232,000 recruits/year⁴², \$41/vaccine (Federal contract price 2020)⁴³, \$8.63 for mumps antibody (Ab) testing, \$3.25 for measles Ab, and \$4.89 for Rubella Ab; (based on 2020 Navy contract pricing);⁴⁴ 30% receive vaccine under measles/rubella serology testing, 38% receive vaccine with measles/rubella/mumps serology testing⁴⁵

Findings and Recommendations



Guiding Principles (1/2)

- The objective of this tasking is to minimize - not eliminate – the risks of mumps to the readiness of the U.S. armed forces.
- The readiness costs to DoD of outbreaks of mumps and other infectious diseases can include loss of critical operational capacity and thus is more than the traditional measurable or estimated financial costs of vaccines, laboratory testing, medications, and individual personnel hours.



Guiding Principles (2/2)

- The DoD should generally follow the recommendations of the Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices however, it is important to acknowledge that there may be military-specific considerations when operational readiness may dictate an alternate course of action.



Findings (1/3)

- 1. Outbreaks of mumps can have a significant impact on military readiness.**
 - 2. Two doses of the MMR vaccine reduces the risk of developing mumps infections, but protection is not complete.**
- Recent outbreaks within the U.S. military put both military and civilian personnel at risk, are financially costly, disrupt training, and potentially compromise unit readiness
 - Despite relatively high mumps vaccination rates, there have been recent large-scale outbreaks of mumps in the U.S.



Findings (2/3)

3. **There is no reliable laboratory surrogate of protection against mumps infection. The presence or absence of antibodies against the mumps virus detected with current methodologies is not a reliable indicator of protection or future susceptibility to mumps infection.**
 - There is discordance between mumps antibody titers and protection
 - There are numerous examples where groups with high anti-mumps titers are susceptible to infection while others with low anti-mumps titers are resistant
 - The loss of mumps protection is best correlated with time since last immunization



Findings (3/3)

4. **Administration of a third mumps vaccine dose offers an additional margin of protection against mumps infection. At present, this is only available for those older than 18 years of age through the trivalent MMR vaccine.**
 - Epidemiologic studies reported lower attack rates among persons who received the third dose during the outbreak compared with persons who had received 2 doses before the outbreak
 - The Korean Armed Forces reported a 3-year decrease in the incidence of mumps in military personnel following universal administration of a third dose of MMR vaccine at enlistment



Recommendations (1/4)

1. Immunization strategy for new recruits:

Administer one dose of MMR vaccine to all new recruits regardless of their previously documented immunization history (e.g., immunization records). Administer another dose of MMR vaccine one month later for recruits who had zero or only one documented MMR vaccination prior to entering the DoD. The DoD should continue to follow Centers for Disease Control and Prevention guidelines for individuals with a contraindication for use of the MMR vaccine.



Recommendations (2/4)

2. Immunization strategy for other Service members who have not received documented 3 doses:

Administer one dose of MMR vaccine to:

- Service members assigned to bases in host countries with endemic mumps, as determined by the Centers for Disease Control and Prevention
- Service members assigned to submarines or other units to be deployed for an extended period of time without access to regular communication, without logistical support in the event of a mumps outbreak, or in times of significant conflict

This does not prescribe or prohibit the use of an outbreak dose should circumstance warrant.



Recommendations (3/4)

3. Family member screening to protect Service members overseas:

Ensure family members older than 4 years of age who are accompanying Service members to countries with endemic mumps have received the CDC recommended 2 doses of MMR vaccine, unless the family member can provide documentation for a medical exemption.



Recommendations (4/4)

4. Inclusion of Mumps Vaccine Research as a DoD Research Priority:

The DoD should establish intramural or extramural research programs to help develop a monovalent genotype G mumps vaccine or mumps vaccine against all genotypes, identify correlates of protective immunity, and better define the duration of protection.

Questions ?