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EDUCATING THE COLCHESTER COMMUNITY ABOUT MEASLES AND ITS PREVENTION

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Feb-March of 2015
Colchester, VT
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Problem Identification

- ❑ Measles is a highly contagious disease with potential complications ranging from diarrhea, pneumonia, otitis media, uveitis, and encephalitis¹
- ❑ In the United States, before the vaccination program was initiated:
 - ❑ 500,000 cases of measles were reported annually
 - ❑ 48,000 were hospitalized, 1,000 were chronically disabled, and nearly 500 died from measles annually²
- ❑ Since the introduction of the measles vaccine in 1967, incidence has drastically decreased
 - ❑ By 1985, number of cases has fallen by 99% in the U.S.
 - ❑ By 2000, measles was declared to be eliminated from the U.S.³ However despite the elimination of measles in the U.S., small outbreaks still occur due to:
 - ❑ Frequent travels to countries where measles hasn't been eliminated (i.e. parts of Africa, Asia, Europe)
 - ❑ Group of people that choose not to vaccinate their children
 - ❑ Fueled by a discredited study published by Dr. Wakefield in 1998 which linked the measles vaccine to autism
 - ❑ Complicated by involvement of public figures like Jenny McCarthy with anti-vaccine campaigns
- ❑ Over the last decade, measles cases per year has been limited to a median of 70. In recent years however, the U.S. has seen an alarming rate of measles cases...
 - ❑ The year 2008, 2011, and 2013, the U.S. saw 131, 222, and 159 measles cases, respectively.
 - ❑ In 2014, there were 644 measles cases reported due to a large outbreak in unvaccinated Amish community in Ohio and cases brought from the Philippines⁴
 - ❑ Most recently, an outbreak in a California theme park resulted in 141 measles cases only 2 months into the year 2015
- ❑ The increasing number of measles cases per year in the U.S. highlights the need for more public awareness of the efficacy and safety of the MMR vaccine.

Community Need in VT

- According to the CDC, Vermont's coverage for MMR vaccine among children aged 19-35 months in 2013 was 91.2% (slightly lower than the U.S. national average of 91.9%)⁴
- What is more concerning is Vermont's exceptionally high rate of non-medical exemptions for vaccines⁵
 - For the 2012-2013 school year, Vermont's religious and philosophical exemption rate was 5.7%, second only to Oregon's 6.5%.
 - Moreover, Vermont's religious and philosophical exemption rate reveals an upward trend from the year 2011 to 2013 (slide 4 figure 1)
- Consequently, Vermont's vaccine coverage for MMR has been trending down from the year 2011 to 2013⁵ (slide 4 figure 2)
- Conclusion: Although Vermont's vaccination rate for 2013 is only slightly below the nation's average, the high & upward trend of vaccine exemption rates and diminishing MMR vaccine coverage suggests a significant public concern for VT
 - This indicates that a growing number of people in Vermont are choosing not to vaccinate their children for disease prevention

Community Need in VT cont'd...

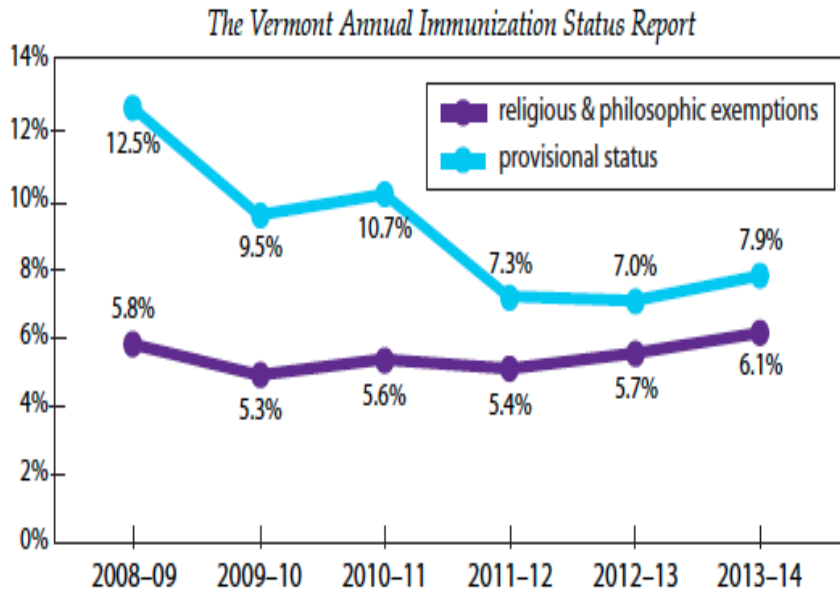


Figure 1. Immunization exemptions by Vermont kindergarten students from 2008 to 2013 school years. Notice the upward trend of exemptions (purple line). Figure generated by Vermont Dept. of Health⁵

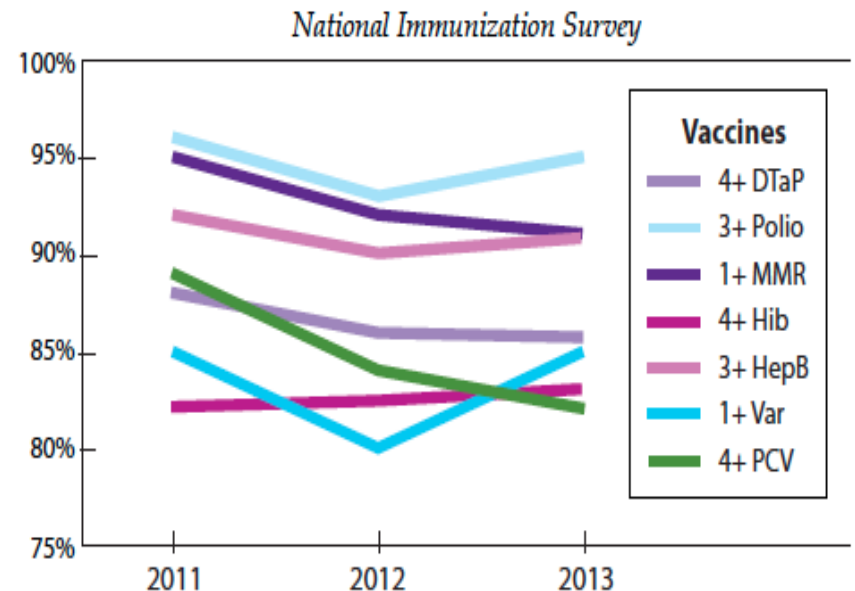


Figure 2. Vaccine cover for Vermont Children. Notice the downward trend of MMR vaccine coverage (purple line). Figure generated by Vermont Dept. of Health⁵

Public Health Costs

- ❑ There has only been 1 case of measles in Vermont since 1993 making health cost unquantifiable.
- ❑ However, Researchers at the Centers for Disease Control and Prevention (CDC) calculated that **measles outbreaks in 2011 (a total of just 222 cases) cost \$5.3 million.**
 - ❑ Meanwhile, the **MMR vaccine is free for most children via private insurances and Medicaid** (cost is ~\$19.90 at community health centers if one were to pay out of pocket)
- ❑ Emotional cost to the family of a loved one lost to measles is immeasurable
- ❑ The monetary and psychosocial costs of being chronically disabled from a measles infection (0.2%)⁶ also impose a huge toll.

Community Perspectives

- [Name Withheld], MD (Family Practice Physician at Colchester Family Practice)
 - *“It saddens me that Vermont ranks 2nd in the nation for philosophical exemptions against the MMR vaccine. This signifies that we have to make the public better aware of the safety and efficacy of the vaccine.”*
 - *“Since the measles outbreak in California, our practice has seen a higher number of parents with questions about the disease. It would be great if we could hold an information session for the local community to address questions about the disease, its associated complications, and its prevention.”*

- [Name Withheld], M.S.N./ R.N. (Nursing Supervisor of the Colchester School District)
 - *“Since the measles outbreak in California, a couple of parents have ask about the measles vaccine for their child from our school clinics.”*
 - *“The 1998 Wakefield paper which linked the MMR vaccine to autism although discredited, still concerns many of the parents. An information session couldn’t be more timely to address their concerns.”*

- [Name Withheld] (Library Director of the Memorial Burnham Library, Colchester VT)
 - *“Since the measles outbreak in California, many people have asked for reading materials about measles. I think an information session about measles here at the library would benefit our community”*
 - *“I once wasn’t sure whether I wanted to vaccinated my children. It took convincing from a caring physician before I agreed to vaccinate my children. Maybe you could do the same for parents during your talk”*

Intervention and Methodology

- ❑ Educate Colchester, VT about Measles.
 - ❑ Describe the 90% infectious rate associated with measles
 - ❑ Discuss symptoms and associated complications of contracting measles (i.e. chronic disability and death)
 - ❑ Highlight the 97% effectiveness of the vaccine and how it has resulted in eradication of measles in the U.S.
 - ❑ Describe the recent increase in cases of measles and the importance of vaccination
 - ❑ Point out the safety of vaccine and assure parents that the MMR vaccine is not associated with autism
 - ❑ Recommend 2 dose MMR vaccination for all children, first at 12 months and second at 4 years. Recommend catch-up vaccinations for those who haven't been vaccinated
 - ❑ Provide information of nearby health centers and family practice offices that carry the vaccines.
- ❑ A presentation for the local community was scheduled at Burnham Memorial Library in Colchester, VT on February 19, 2015 at 6:30pm.
- ❑ A hand-out which highlights the symptoms, complications, and prevention of measles was prepared to accompany the presentation (see next slide).

MEASLES

WHAT IS MEASLES AND HOW DO I POTENTIALLY CONTRACT IT?

The measles virus is a single-stranded, RNA virus (a member of the family of Paramyxoviridae).

Spread is from human to human via coughing and sneezing. Of note, measles virus can live up to 2 hrs on a surface or airspace where infected person coughed or sneezed.

Measles is highly contagious – **attack rate to a susceptible individual is 90% after exposure**. Outbreaks can occur in populations in which <10% of persons are susceptible.

Persons with measles are infectious for several days before and after the onset of rash because levels of measles virus in blood and body fluids are highest during this time.

HOW DOES IT PRESENT?

- 7-14 days after exposure:
 - ⇒ Fever, cough, runny nose (coryza), red watery eyes (conjunctivitis)
- 2-3 days after initial symptoms:
 - ⇒ Tiny white spots appear (Koplik spots) appear in the mouth
- 3-5 days after initial symptoms:
 - ⇒ Rash begins behind the ears, on the neck, and hairline which progresses to involve the face, trunk, and arms



WHAT ARE THE POTENTIAL COMPLICATIONS?

Organ Involved	Diseases	Potential Consequences
Lungs	Bronchopneumonia, laryngotracheobronchitis, bronchiolitis, bronchiectasis	Airway obstruction, recurrent lifetime respiratory infections, superinfection due to weakened immune system leading to death .
Brain	Encephalitis, encephalomyelitis, panencephalitis	Neurodevelopmental problems, behavior disorders, mental retardation, epilepsy, and death
Eye	Keratitis, corneal ulceration	Impaired vision, blindness
Gastrointestinal	Diarrhea, gastroenteritis, hepatitis, and appendicitis	Malnutrition, chronic malabsorption, chronic liver disease, and death
Heart	Myocarditis, pericarditis	Arrhythmia and damage of the heart leading to poor outcome

Note: Rate of complication is about 20%.

TREATMENT AND PROGNOSIS

- Treatment is mostly supportive (i.e. Fluids, Vitamin A, Immunoglobulins, Antibiotics)
- Measles symptoms usually last 2-3 weeks
- Most people recover but some will be **chronically disabled**

REFERENCES

- Up To Date (uptodate.com)
- U.S Government Center for Disease Control (cdc.gov)
- Harrison's Principles of Internal Medicine 18th Ed (textbook)

VACCINATION

In the United States, *before* the measles vaccination program:

- 500,000 reported cases of measles per year
- 48,000 were hospitalized, 1000 were chronically disabled, and nearly 500 died

In the United States, *after* the measles vaccination program (introduced 1967)

- By 1985, number of cases has fallen by 99%**
- From 1967 to 1985, the vaccine has prevented 52 million cases of measles, 5200 deaths, and 17,400 cases of mental retardation attributable to measles

Are vaccines safe?

- Yes!!!
- About 5-15% will develop a minor reaction to the vaccine
 - ⇒ Fever, rash, swollen lymph nodes, hypersensitivity
- Numerous well-designed studies** have failed to demonstrate any association between vaccine and autism

Measles—United States, 1950-2001



2015 Recommended Immunizations for Children from Birth Through 6 Years Old



Results

- ❑ Unfortunately, due to the harsh winter conditions on Feb 19th 2015, no community member attended the presentation arranged to take place at the Burnham Memorial Library.

- ❑ Instead, copies of the the measles handout that was originally made to accompany the presentation was distributed to the following facilities:
 - Colchester School District:
 1. Colchester High School
 2. Colchester Middle School
 3. Malletts Bay School
 4. Pointers Point School
 5. Union Memorial School
 - UVM Family Practice Offices
 1. Colchester Family Practice
 2. Milton Family Practice
 3. South Burlington Family Practice
 - Burnham Memorial Library

- ❑ Family practice physicians, the Colchester school district nurse supervisor, and the Burnham library director commended the content and quality of the handout.

Effectiveness & Limitations

- Effectiveness of the intervention could be evaluated by:
 - Looking at health records to compare vaccination rates before and after the handouts were distributed. To be more specific, patients receiving the MMR vaccine should be handed a questionnaire which asks how they heard about the vaccine.
 - Attaching a detachable survey questionnaire with the handout. The survey will be filled out by the readers and returned at a local drop box.
 - Due to the limited scope and time assigned to this project, neither of the suggestions above were feasible.
 - However, family physicians, the Colchester school district nurse manager, and the Memorial Burnham library director approved highly of the measles handout and were certain that it would make a measurable impact to the readers.

- Limitations include:
 - Small populations size affected by the intervention
 - Handouts could have been distributed to more places (i.e. Local establishments, day-care centers, churches, etc.)
 - No chance to personally follow-up and answer questions that readers may have
 - Giving a live presentation is the more optimal mode of spreading information

Recommendations for Future Interventions/ Projects

- ❑ When the harsh winter season is over, presentations about measles and vaccines could be attempted once again. Here are the possible venues:
 - ❑ Burnham Memorial Library (contact person: Library Director [Name Withheld])
 - ❑ Schools in the Colchester school district (contact person: Nursing supervisor [Name Withheld])
 - ❑ Day Care centers in Colchester, VT
 - ❑ Educational establishments such as the Green Mountain Center for Gifted Education and Vermont Adult Learning

- ❑ Although it will require more resources, a measles intervention team could be formed with the following goals:
 - ❑ Identify communities/cohorts of people in Vermont that chooses not to vaccinate their children (coordination with the Vermont Dept. of Health will be critical)
 - ❑ Assemble a team of educators to give information sessions about the safety and efficacy of the MMR vaccine
 - ❑ Provide these residents with resources to help them determine where and how they could receive the MMR vaccine

References

1. Longo D, Fauci A, Kasper D, et al. 18th Edition Harrison's Principles of Internal Medicine. New York: McGraw-Hill, Medical Division. 2011; (18):1600-1604.
2. Bloch A, Orenstein W, Stetler H, et al. Health impact of measles vaccination in the United States. Pediatrics. 1985;76(4):524-32.
3. Measles--United States, 1999. MMWR Morb Mortal Wkly Rep. 2000;49(25):557-60.
4. Measles--United States, 2013. MMWR Morb Mortal Wkly Rep. 2013; 62(36);741-743.
5. 2014 Annual Report. Vermont Immunization Program, Dept. of Health-Vermont.
6. Measles--United States, 1990. MMWR Morb Mortal Wkly Rep. 1991;40(22):369-72.
7. U.S. Center for Disease Control (<http://www.cdc.gov/measles/>)