

Vaccine-preventable disease update

MDCH Communicable Disease Conference
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Joel Blostein, Rachel Potter
MDCH Immunization Division



Comparison of 20th Century Annual Morbidity and Current Morbidity: Vaccine-Preventable Diseases - US

Disease	20th Century Annual Morbidity [†]	2011 Reported Cases ^{††}	Percent Decrease
Smallpox	29,005	0	100%
Diphtheria	21,053	0	100%
Measles	530,217	222	> 99%
Mumps	162,344	370	> 99%
Pertussis	200,752	15,216	92%
Polio (paralytic)	16,316	0	100%
Rubella	47,745	4	> 99%
Congenital Rubella Syndrome	152	0	100%
Tetanus	580	9	98%
<i>Haemophilus influenzae</i>	20,000	8*	> 99%

[†]Source: JAMA. 2007;298(18):2155-2163

^{††}Source: CDC (provisional 2011 data)

* *Haemophilus influenzae* type b (Hib) < 5 years of age. An additional 14 cases of Hib are estimated to have occurred among the 237 reports of Hi (< 5 years of age) with unknown serotype.

National Center for Immunization & Respiratory Diseases

Historical Comparisons of Vaccine-Preventable Disease Morbidity in the U.S.



Michigan VPD Morbidity:
Comparison of Maximum Annual and Current

Disease	Maximum Annual Morbidity	2011 Reported Cases	Percent Decrease
Diphtheria	220	0	100%
<i>H. influenzae</i> type b disease	230*	1	> 99%
Measles	48,752	2	> 99%
Mumps	19,867	21	> 99%
Pertussis	4,249	691	> 83%
Polio (paralytic)	3,912	0	100%
Rubella	18,992	0	100%
Tetanus	9	4	> 55%
Varicella	44,665	1,036	> 97%

*estimate

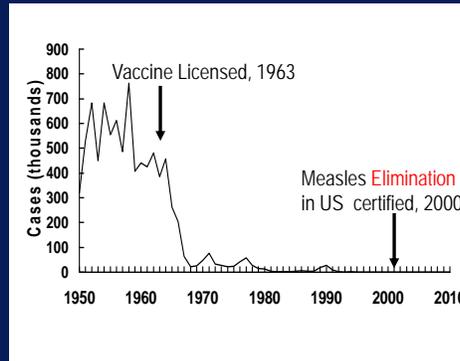
Focus on

- Measles
- Pertussis
- Varicella

Measles

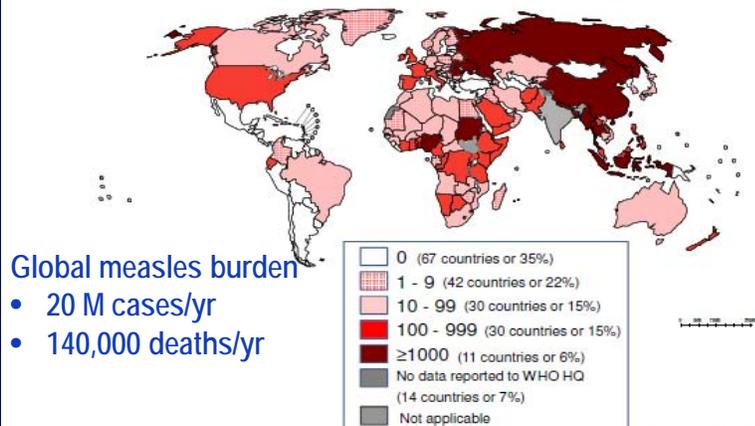
Status of measles in US:

- Eliminated
- = No indigenous transmission of virus
- Since 2000



Measles: poorly controlled elsewhere in world, results in importation to US

Number of Reported Measles Cases with onset date from Sep 2011 to Mar 2012



Global measles burden

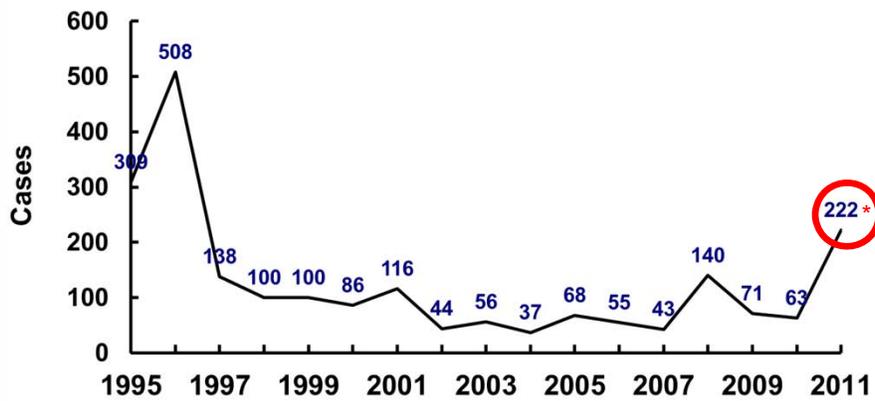
- 20 M cases/yr
- 140,000 deaths/yr

Data source: surveillance DEF file
Data in HQ as of 12 April 2012

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 or of its authorities, or concerning the delimitation of its frontiers or boundaries. ©WHO 2012. All rights reserved.



Measles—United States, 1995-2011



*provisional



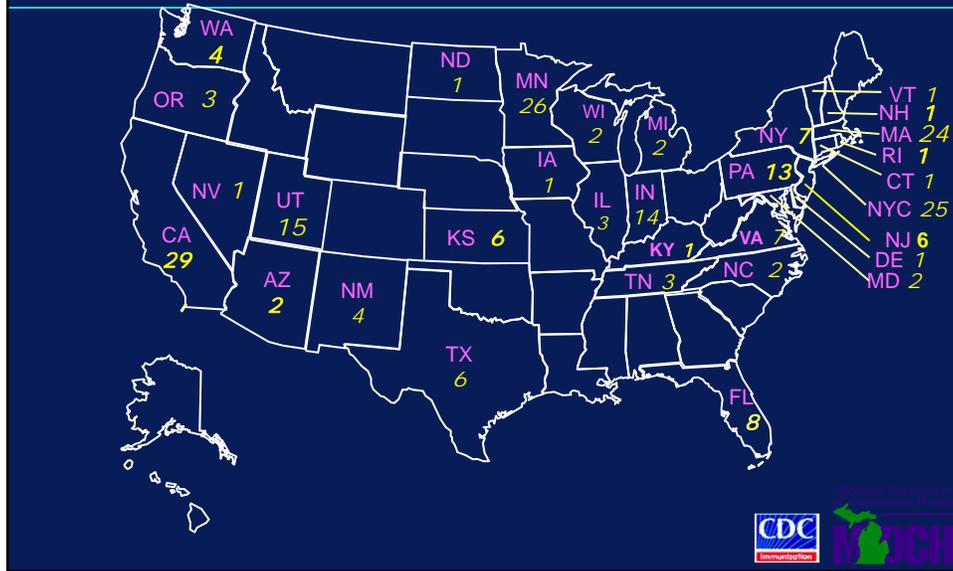
Measles worldwide impacts US

- Still endemic in most of world (exception: Americas)
- Annually imported into US
- 2011 - more cases than any year since 1996
- **Measles prevention requires high herd immunity
> 95% immunity to prevent outbreaks**
- Vaccine exemptions/refusals are cause for concern



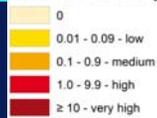
U.S. Measles Cases Reported to CDC, 2011

222 cases involving 31 states



Reported measles incidence, Europe (EU and EEA/EFTA countries), 2011

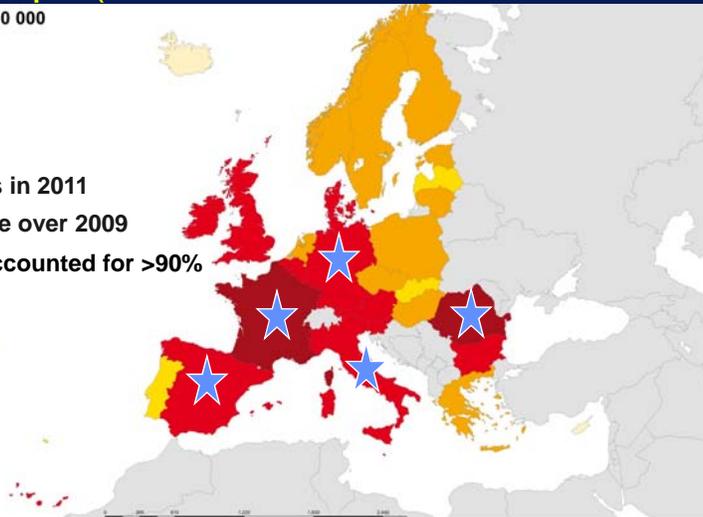
Notification rate per 100 000



- >30,000 cases in 2011
- 4-fold increase over 2009
- 5 countries accounted for >90%

Non visible countries

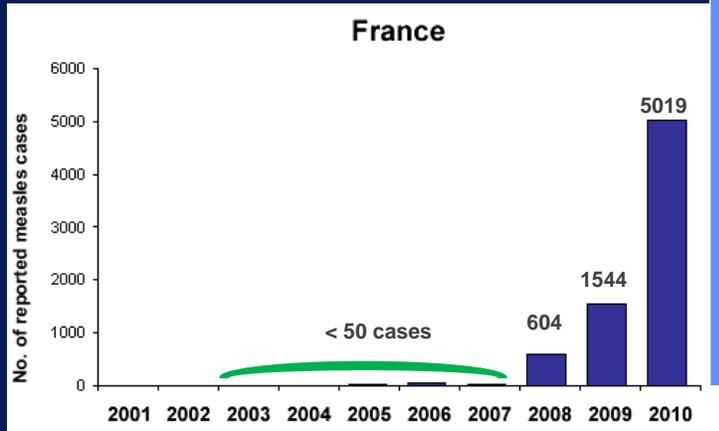
Andorra
Liechtenstein
Malta
Monaco
San Marino



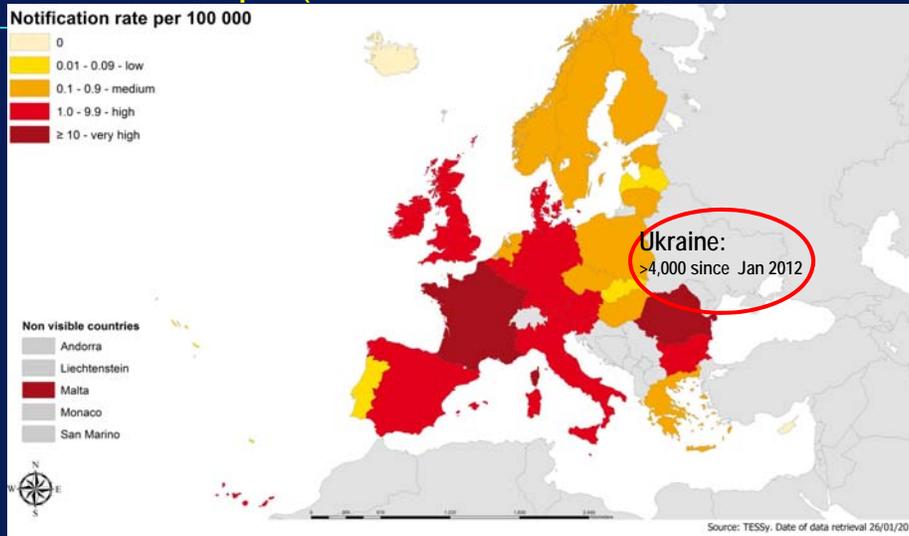
Source: TESSy. Date of data retrieval 26/01/2012

Measles trends in France

2011: 15,206 cases



Reported measles incidence, Europe (EU and EEA/EFTA countries), 2011



2012 concerns for global measles spread

- European Soccer Championship (“Euro 2012”) in Poland & Ukraine, June – July
- Olympics in London, July – August



Measles key points

- Have high index of suspicion in cases of febrile rash illness with 1 or more of “3 C’s” (cough, coryza, conjunctivitis)
- Query patient about travel, exposures
- Obtain serum, throat swab, urine
- Contact LHD > MDCH
- Rigorous surveillance & high immunization rates are critical
 - challenging, resource-intensive, and time-consuming



Pertussis

- Not well controlled
- Under-recognized, under-diagnosed, under-reported
- Diagnostic and response challenges exist

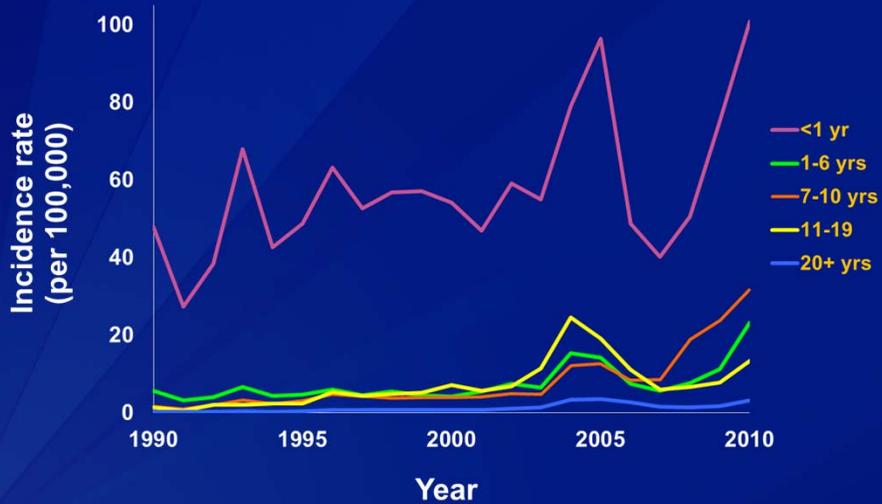


Reported pertussis cases – 1922–2010



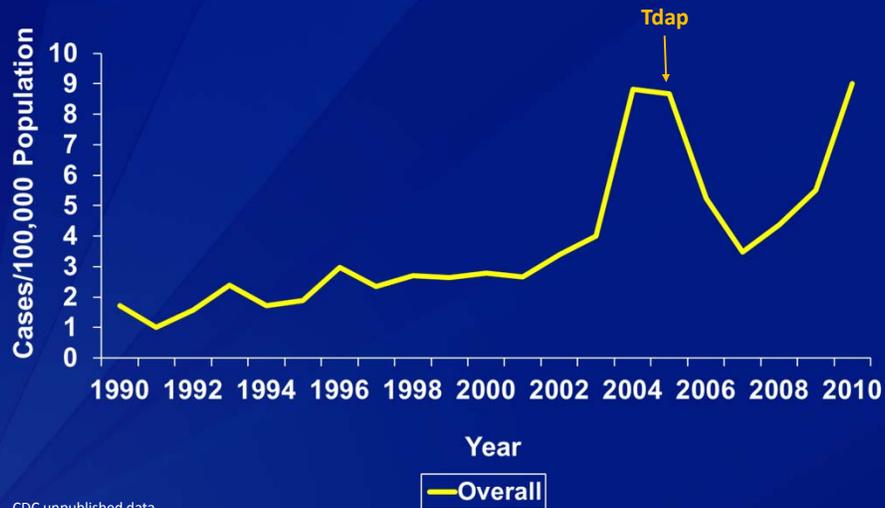
SOURCE: CDC, National Notifiable Diseases Surveillance System and Supplemental Pertussis Surveillance System and 1922-1949, passive reports to the Public Health Service

Reported pertussis incidence by age group — 1990–2010



SOURCE: CDC, National Notifiable Diseases Surveillance System and Supplemental Pertussis Surveillance System

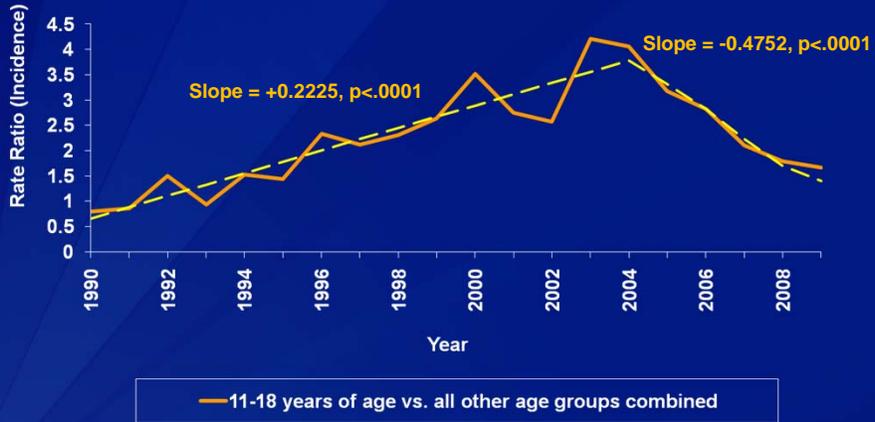
Incidence of reported pertussis — 1990–2010



CDC unpublished data

Accelerated decline of pertussis

Rate ratios of pertussis incidence among adolescents 11-18 years, 1990-2009



Skoff et al. Arch Pediatr Adolesc Med. 2012 Jan 11. [ePub ahead of print]

Absence of Indirect Effects of Tdap

Mean incidence of reported pertussis among infants

	<u>1990-2003</u> (pre-peak)	<u>2006-2009</u> (post-peak)	p-value
Mean incidence (per 100,000)	52.1	55.4	0.64

Skoff et al. Arch Pediatr Adolesc Med. 2012 Jan 11. [ePub ahead of print]

Pertussis – key points

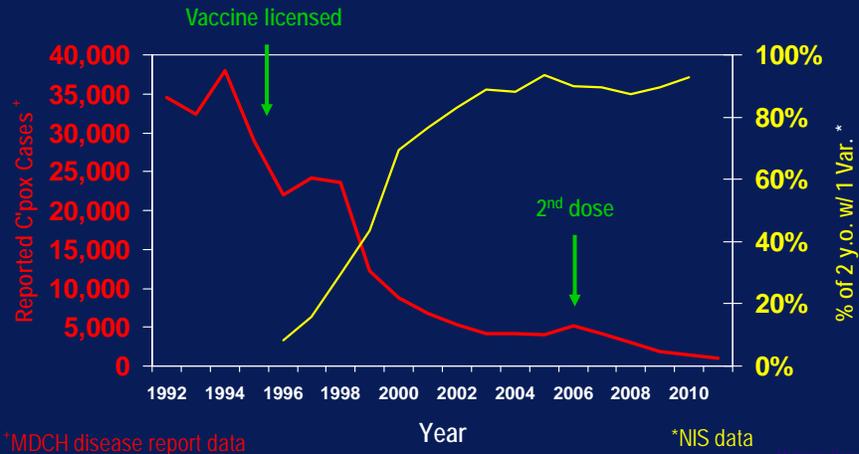
- Infants at highest risk of severe disease & complications
- Immunity wanes
- Vaccine strategies
 - Complete infant/childhood series doses on time
 - Tdap booster for teens & adults to address waning
 - Infant “cocoon” protection – Tdap for family, caregivers
- Appropriate confirmatory tests: culture or PCR
 - NP swabs, aspirates or washes
- Try to classify cases in MDSS per CSTE/CDC case definition



Varicella (chickenpox)



Reported Chickenpox and 2 y.o. Varicella Vx Coverage, 1992 – 2011, Michigan

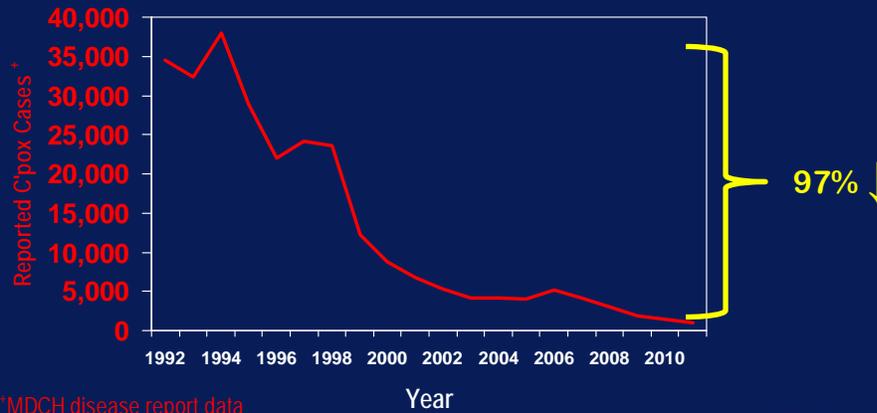


*MDCH disease report data

*NIS data



Reported Chickenpox, 1992 – 2011, Michigan



*MDCH disease report data

Year



Varicella key points

- 97% decline in MI since vaccine licensure
- 2 dose series since 2006
- Exclude susceptibles in outbreaks (≥ 5 cases)
- Lab confirmation increasingly important
 - ✓ PCR
 - ✓ DFA



Vaccine uptake and coverage update

*MDCH Communicable Disease Conference
Spring 2012*

MMR
Tdap
Varicella



MEASLES-MUMPS-RUBELLA (MMR)



The Lancet Vol 351 February 28, 1998

Early Report:
Wakefield AJ, et al

Commentary:
Chen RT, DeStefano F

Early report

Smallpox nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children

A Wakefield AJ, Murchio J, Ashwin E, Linn S, Gold L, Frith CD, et al. *Lancet* 1998; 351: 83-87.

Summary

The authors describe a case of a child with smallpox nodular hyperplasia, non-specific colitis, and pervasive developmental disorder. The child had a history of seizures and developmental delay. The authors suggest that the child may have had a viral infection that caused these conditions.

Introduction

The authors describe a case of a child with smallpox nodular hyperplasia, non-specific colitis, and pervasive developmental disorder. The child had a history of seizures and developmental delay. The authors suggest that the child may have had a viral infection that caused these conditions.

Case report

The authors describe a case of a child with smallpox nodular hyperplasia, non-specific colitis, and pervasive developmental disorder. The child had a history of seizures and developmental delay. The authors suggest that the child may have had a viral infection that caused these conditions.

Discussion

The authors discuss the possibility that the child's conditions are related to a viral infection. They suggest that the child may have had a viral infection that caused these conditions.

Conclusion

The authors conclude that the child's conditions are likely related to a viral infection. They suggest that the child may have had a viral infection that caused these conditions.

Commentary

Smallpox nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children

A Chen RT, DeStefano F. *Lancet* 1998; 351: 88-90.

Summary

The authors comment on the case report by Wakefield et al. They suggest that the child's conditions are likely related to a viral infection. They suggest that the child may have had a viral infection that caused these conditions.

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Commentary

“...vaccine-safety concerns such as that reported by Wakefield and colleagues may snowball into societal tragedies when the media and the public confuse association with causality and shun immunisation. This painful history was shared by the UK (among others) over pertussis in the 1970s after another similar case-series was widely publicised, and it is likely to be repeated all too easily over MMR. This would be tragic because passion would then conquer reason and the facts again in the UK.”

Chen RT, DeStefano F. Vaccine adverse events: causal or coincidental? *Lancet* (1998); 351(9103): 611-612.

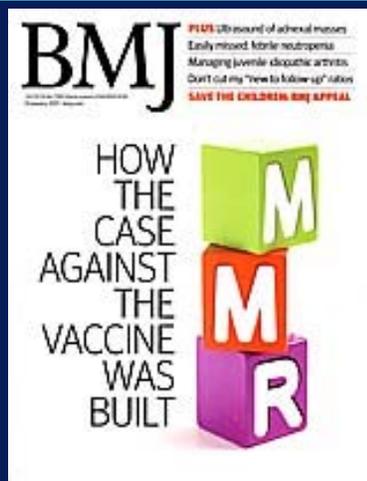


Studies Showing No Association Between MMR and autism

- Hornig M, Briese T, Buie T, Bauman ML, Lauwers G, et al. Lack of Association between Measles Virus Vaccine and Autism with Enteropathy: A Case-Control Study. *PLoS ONE* (2008); 3(9): e3140.
- Richler J, Luyster R, Risi S, Hsu W-L, Dawson G, Bernier R, Dunn M, Hepburn S, Hyman SL, McMahon WM, et al. Is there a 'regressive phenotype' of autism spectrum disorder associated with the measles-mumps-rubella vaccine? A CPEA study. *Journal of Autism and Developmental Disorders* (2006); 36(3): 299-316.
- Fombonne E, Zakarian R, Bennett A, Meng L, McLean-Heywood D. Pervasive Developmental Disorders in Montreal, Quebec, Canada: Prevalence and Links with Immunizations. *Pediatrics* (2006); 118(1): e139-e150.
- Madsen KM, Hviid A, Vestergaard M, Schendel D, Wohlfahrt, Thorsen P, Olsen J, Melbye M. A population-based study of measles, mumps, and rubella vaccination and autism. *NEJM* (2002); 347: 1477-1482.
- Makela A, Nuorti P, Peltola H. Neurologic disorders after measles-mumps-rubella vaccination. *Pediatrics* (2002); 110:957-63.
- Farrington CP, Miller E, Taylor B. MMR and autism: further evidence against a causal association. *Vaccine* (2001); 19: 3632-5.
- Fombonn E, Chakrabarti S. No evidence for a new variant of measles-mumps-rubella-induced autism. *Pediatrics* (2001); 108: e58.
- Dales L, Hammer SJ, Smith NJ. Time trends in autism and in MMR immunization coverage in California. *JAMA*(2001); 285-1183-5.
- Kaye JA, Melero-Montes M, Jick H. Mumps, measles, and rubella vaccine and the incidence of autism recorded by general practitioners a time trend analysis. *BMJ* (2001); 322:460-3.
- Taylor B, Miller E, Farrington P, Petropoulos M, Favot-Mayaud I, Li J, et al. Autism and measles, mumps, and rubella vaccine: no epidemiologic evidence for a causal association. *Lancet* (1999); 353; 2026-9.

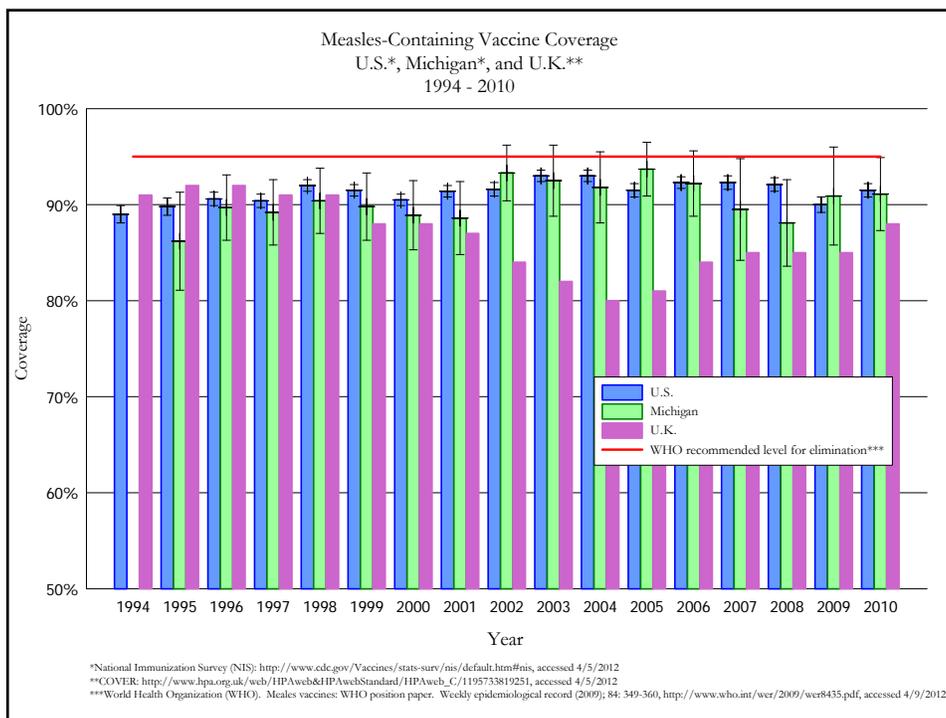


Secrets of the MMR Score

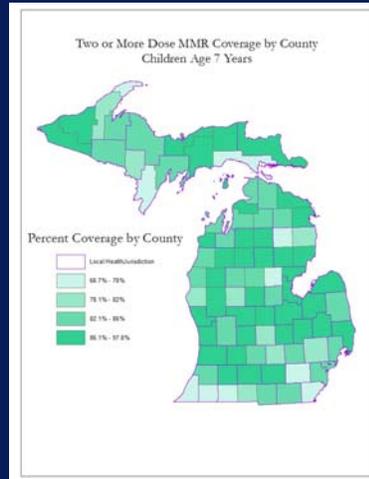
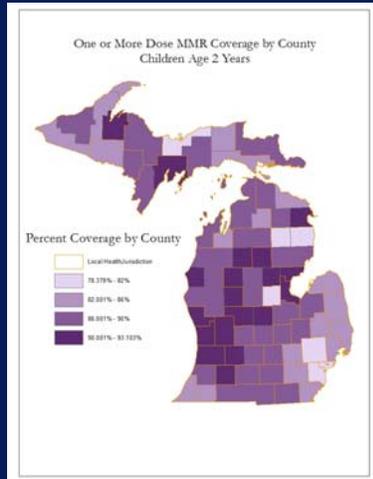


- Godlee F, Smith J, Marcovitch H. Editorial: Wakefield's article linking MMR vaccine and autism was fraudulent. *BMJ* (2011); 342: c7452.
 - "...not one of the 12 cases reported in the 1998 Lancet paper was free of misrepresentation or undisclosed alteration."
 - "...in no single case could the medical records be fully reconciled with the descriptions, diagnoses, or histories published in the journal."

Deer, Brian. How the case against the MMR vaccine was fixed. *BMJ* (2011); 342: c5347
 Deer, Brian. How the vaccine crisis was meant to make money. *BMJ* (2011); 342: c5258
 Deer, Brian. The Lancet's two days to bury bad news. *BMJ* (2011); 342: c7001



MMR Coverage Varies



School rules

TDAP

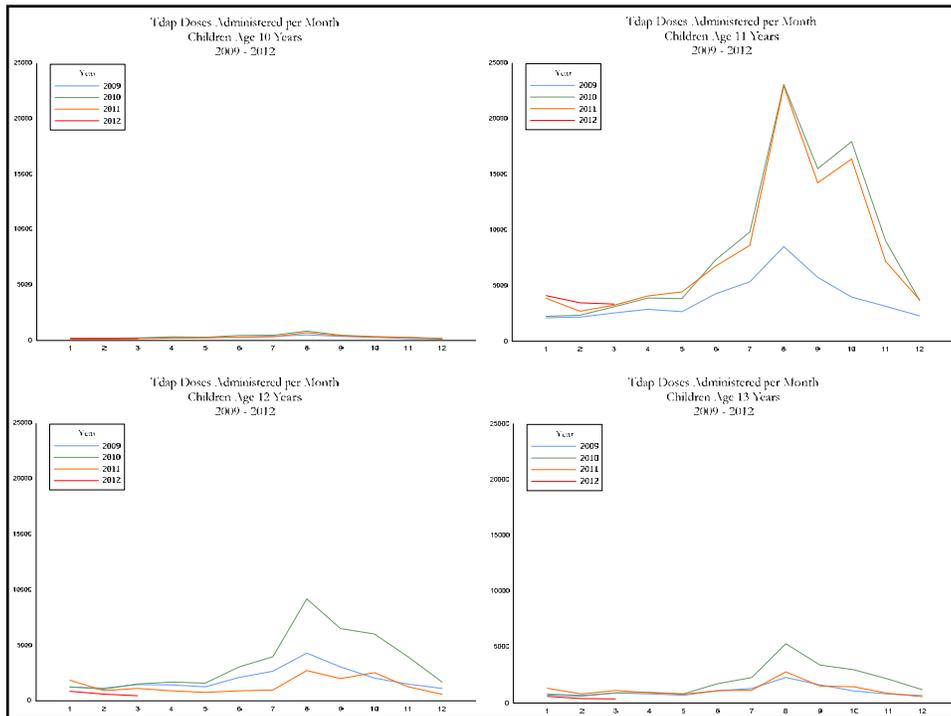


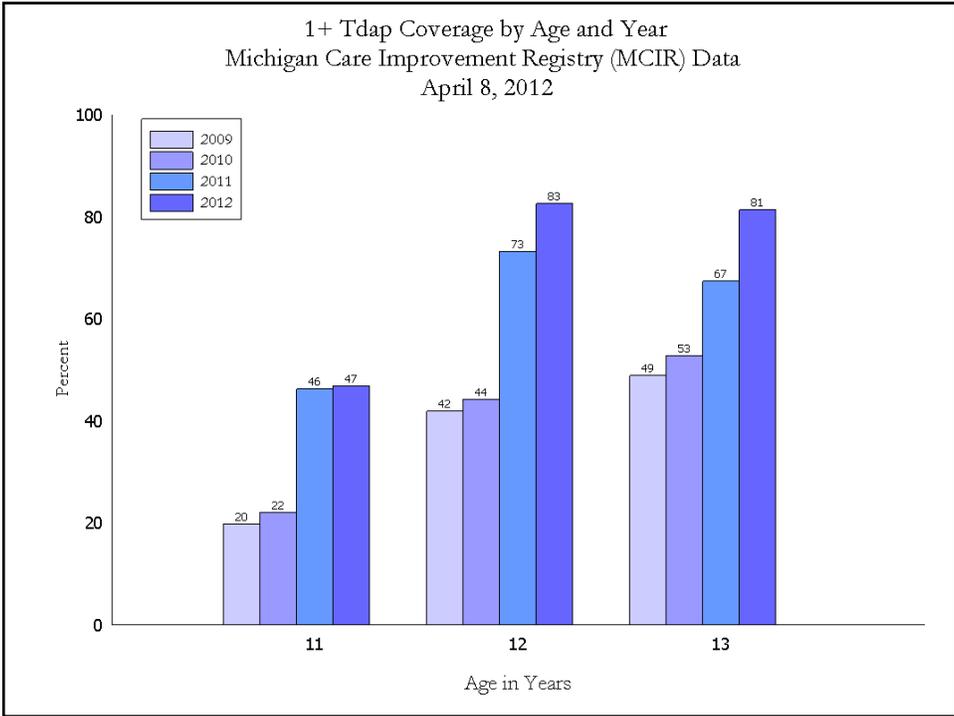
Excerpt from the Department of Community Health Bureau of Epidemiology Communicable and Related Diseases: R 325.176

(9) A child who is 7 through 18 years of age and who is entering school or enrolled in grade 6, shall be in compliance with all of the following immunization requirements:

- (a) Have received 4 doses of any appropriate diphtheria vaccine - 3 doses if the first dose was received on or after the seventh birthday.
- (b) Have received 4 doses of any appropriate tetanus vaccine - 3 doses if the first dose was received on or after the seventh birthday.
- (c) Beginning January 1, 2010, have received a dose of Tdap vaccine on or after the 11th birthday if 5 years have lapsed since the last dose of tetanus or diphtheria containing vaccine.
- (d) Have received 3 doses of any appropriate poliovirus vaccine.
- (e) Have evidence of measles immunity as shown by either of the following:
 - (i) Two doses of any appropriate live measles vaccine received after the first birthday, not less than 28 days apart.
 - (ii) Laboratory evidence of measles immunity.
- (f) Have evidence of mumps immunity as shown by either of the following:
 - (i) Two doses of any appropriate live mumps vaccine received after the first birthday, not less than 28 days apart.
 - (ii) Laboratory evidence of mumps immunity.
- (g) Have evidence of rubella immunity as shown by either of the following:
 - (i) Two doses of any appropriate live rubella vaccine received after the first birthday, not less than 28 days apart.
 - (ii) Laboratory evidence of rubella immunity.
- (h) Receipt of a complete series of any appropriate hepatitis B vaccine or a laboratory finding of hepatitis b immunity or disease satisfies this requirement.
- (i) Have evidence of varicella immunity as shown by any of the following:
 - (i) Beginning January 1, 2010, two doses of any appropriate live varicella vaccine at or after 12 months of age.
 - (ii) Laboratory evidence of varicella immunity.
 - (iii) A parent, guardian, person in loco parentis, or physician statement that the child has had varicella disease.
- (j) Beginning January 1, 2010, individual 11 years of age or older have received 1 dose of meningococcal conjugate vaccine upon entry into 6th grade.

the entire document can be viewed at: http://www.michigan.gov/documents/mdch/2007-027_CH_Communicable_and_Related_Diseases_8-10-09_norstrike_bold_298507_7.pdf.





VARICELLA

Update

- MMWR March 30, 2012; 61(12): 212
- Period after exposure to varicella zoster virus during which a patient may receive VariZIG is now 10 days.
- ACIP recommendations for the use of VariZIG remain unchanged.



Key Points

- Assess immunization status for everyone at every visit
- Keep population immunity high; identify pockets of need
- Report all immunization administrations in MCIR

