

Vaccine Hesitancy

A Pediatrician's Perspective

Steve Lauer PhD MD

Associate Chair, Department of Pediatrics

University of Kansas Medical Center

November 15th, 2017

Outline

- Pediatrician Goals
- Vaccination History
- Vaccine Hesitancy
- Current Studies and Policies
- Going Forward

TUKHS-Pediatrics

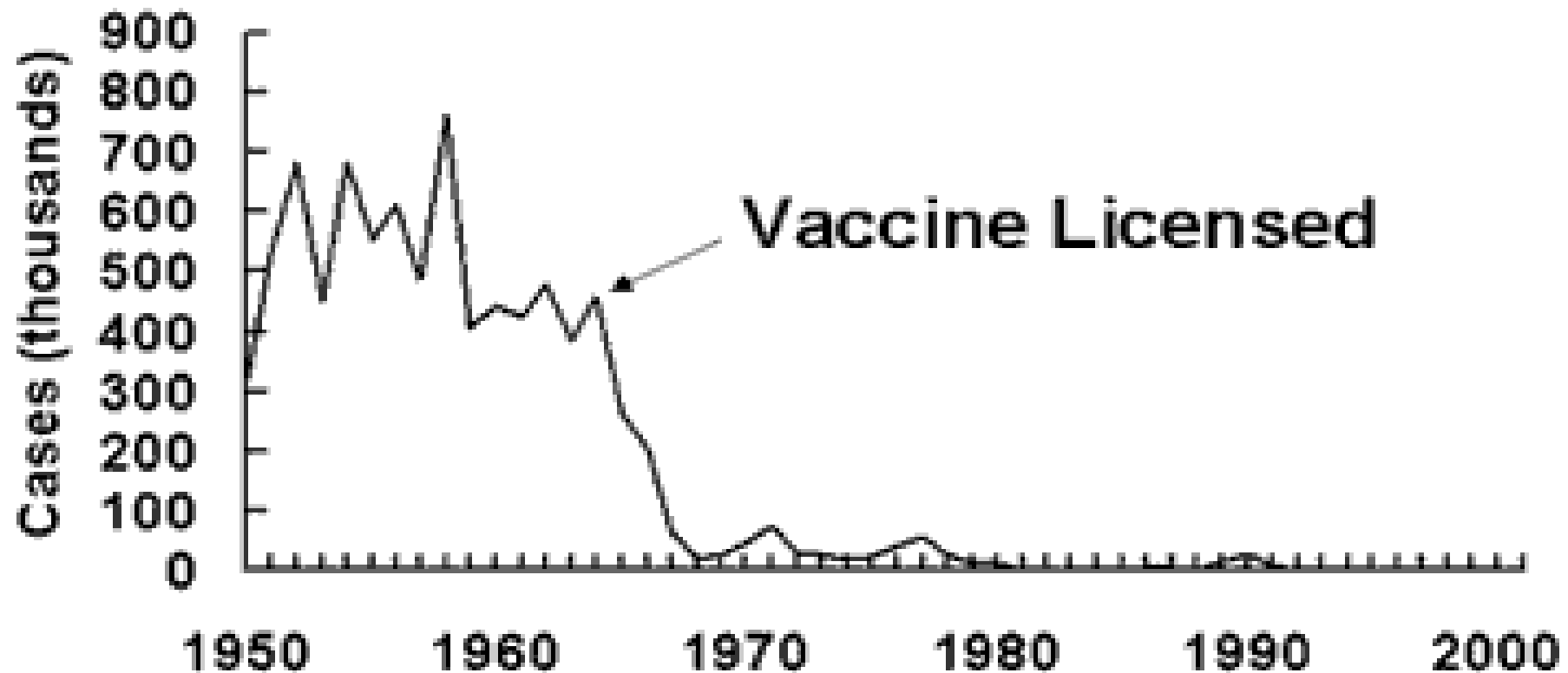
- Current Practice
 - 18,000 General Pediatric patients; 18 physicians, 5 APPs
 - Inpatient units and Pediatric Subspecialty clinic
 - Training site for Pediatric residents and KUMC medical students
- Aspire to deliver the most effective, evidence-based care possible for our patients/families
 - Balance of risks and benefits in an imperfect world
- A collaborative, patient-centered, shared decision making model
 - PCMH model
- Develop a therapeutic alliance with families and patients
 - to support optimal patient health
 - allows our infants, children and adolescents to develop to their full potential

A Brief Selective History of Vaccination

- Edward Jenner and Smallpox Vaccine
 - First tested in 1796
 - First universal vaccination law in Great Britain in 1855
 - In the 20th century, smallpox killed an estimated 300-500 Million people
 - World-wide vaccination program led to eradication of smallpox in 1978
 - Is polio next?

Measles

Measles—United States, 1950-2001

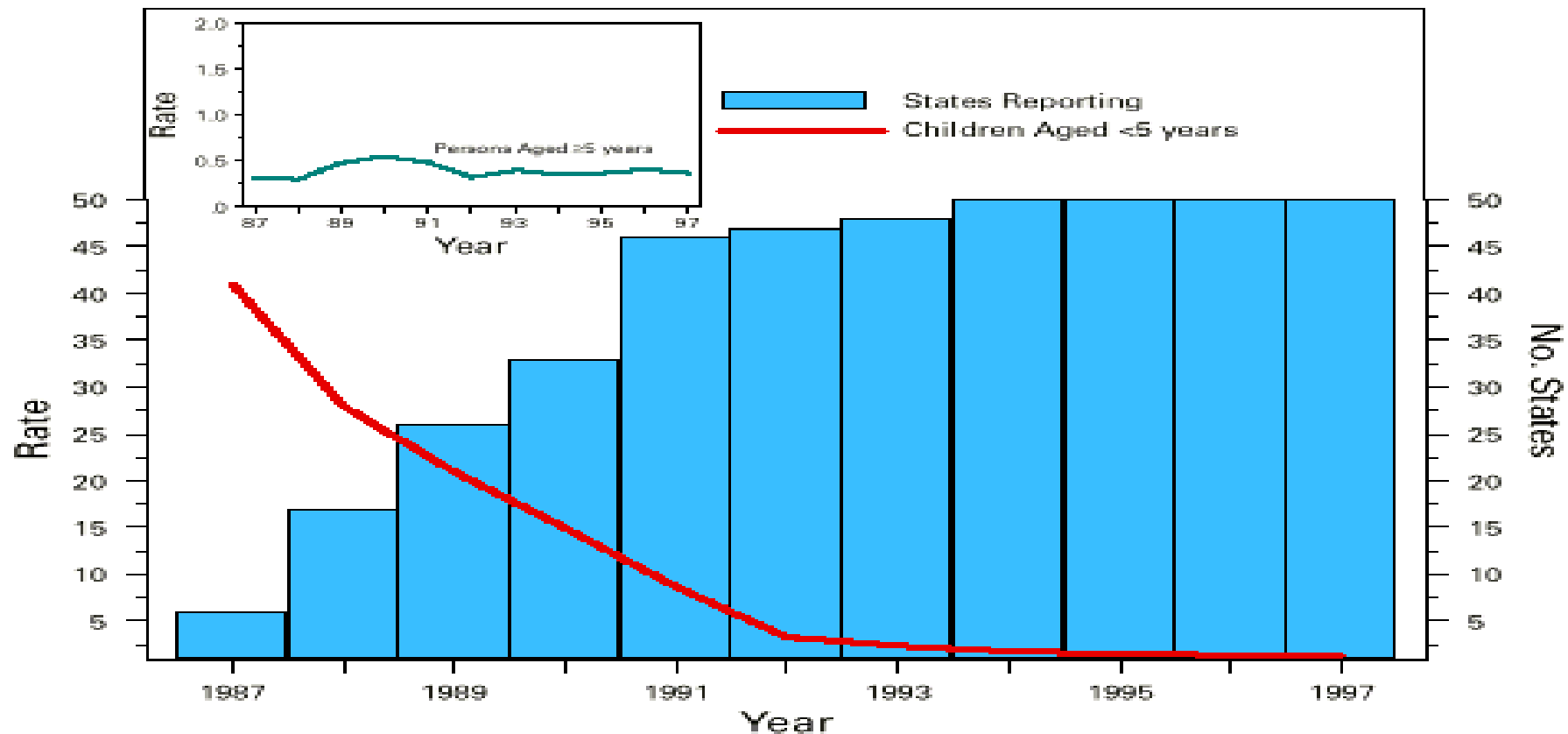


Measles Data

- 1960
 - 442,000 cases, 380 deaths
- 1989-1991
 - 53,000 cases, 120 deaths
- 1999-2001
 - 15 cases; declared no longer endemic in US
- 2015
 - Disneyland, 53 cases no deaths
 - 20 million cases worldwide
 - 145,000 deaths

H. influenzae Meningitis

FIGURE 1. Incidence* of *Haemophilus influenzae* (Hi) invasive disease among children aged <5 years, incidence† of Hi invasive disease among persons aged ≥5 years, and number of states reporting Hi surveillance data — United States, 1987–1997[‡]



*Per 100,000 children aged <5 years.

†Per 100,000 persons aged ≥5 years.

‡Because of the low number of states reporting surveillance data during 1987–1990, rates for those years were race-adjusted using the 1990 U.S. population.

Deaths from VPD, 2015

- Diphtheria
 - World - 25,000; US – 0
- Hepatitis B
 - World – 1 million; US 5000
- Hemophilus influenzae
 - World – 200,000; US < 5
- HPV
 - World – 270,00; US 4000
- Influenza
 - World – 300,000; US up to 40,000
- Measles
 - World – 145,000; US – 0
- Pertussis
 - World – 300,000; US – 20
- Pneumococcus
 - World – 475,000; US 60-70,000
- Tuberculosis
 - World – 1.5 million; US 536

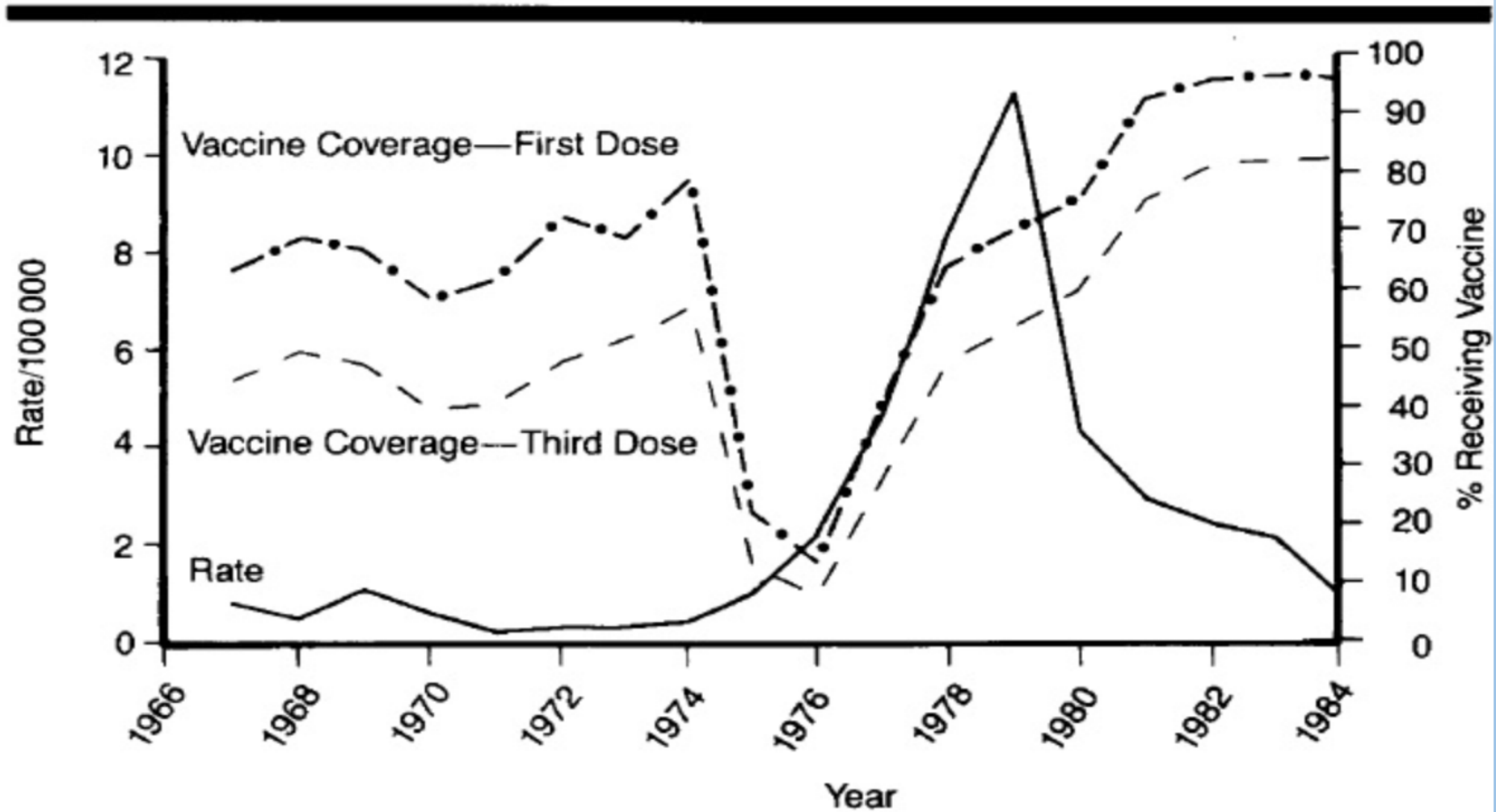
Vaccine Preventable Diseases Morbidity and Mortality

- Deaths from VPD in the world, 2015
 - 5.5 million, mostly children
- Deaths from VPD in the US, children
 - <100 (not counting influenza)
 - Without vaccines, estimates of thousands of childhood deaths annually
- Cases of VPD in the US, children
 - Varies with vaccination rates
 - For most VPDs, >99% reduction in cases when herd immunity rates achieved

Herd Immunity rates

- Concept
 - Infectivity
 - Spread
 - Not all patients can receive vaccines
 - 80-95% vaccination rates needed for herd immunity
- Outbreaks rise as population vaccination rates sink below certain thresholds
- Vaccines are a Personal and Public Health Issue

Japan and Pertussis



Vaccine Side-Effects

- No perfect medication
 - Benefits vs Risk
 - Millions of cases and thousands of deaths VS known side effects
- Common Side-effects
 - Pain
 - Fever
 - Febrile seizures
 - Rash
 - Illness (not from inactivated flu vaccine)
- Rare Side-Effects (1/1,000,000)
 - Seizures
 - Anaphylaxis
- Not Side-Effects
 - Autism
- VAERS and VICP

Current Vaccine-Preventable Diseases (US)

- Diphtheria (1940s)
- Pertussis (1940s)
- Tetanus (1940s)
- Polio (1950s)
- Measles (1963)
- Mumps(1967)
- Rubella (1969)
- Hepatitis B (1981)
- H. Flu (1985)
- Varicella (1996)
- DTaP (1997)
- Rotavirus (1998, 2008)
- Pneumomococcus (2001)
- Influenza (1974, 2002)
- Hepatitis A (2006)
- HPV (2006)
- Meningococcus (2005, 2015)

Current Pediatric Vaccine Schedule

These recommendations must be read with the footnotes that follow. For those who fall behind or start late, provide catch-up vaccination at the earliest opportunity as indicated by the green bars in Figure 1. To determine minimum intervals between doses, see the catch-up schedule (Figure 2). School entry and adolescent vaccine age groups are in bold.

Vaccines	Birth	1 mo	2 mos	4 mos	6 mos	9 mos	12 mos	15 mos	18 mos	19-23 mos	2-3 yrs	4-6 yrs	7-10 yrs	11-12 yrs	13-15 yrs	16-18 yrs
Hepatitis B ¹ (HepB)	1 st dose	← 2 nd dose →			← 3 rd dose →											
Rotavirus ² (RV) RV1 (2-dose series); RV5 (3-dose series)			1 st dose	2 nd dose	See footnote 2											
Diphtheria, tetanus, & acellular pertussis ³ (DTaP: <7 yrs)			1 st dose	2 nd dose	3 rd dose			← 4 th dose →				5 th dose				
Tetanus, diphtheria, & acellular pertussis ⁴ (Tdap: ≥7 yrs)													(Tdap)			
<i>Haemophilus influenzae</i> type b ⁵ (Hib)			1 st dose	2 nd dose	See footnote 5		← 3 rd or 4 th dose, See footnote 5 →									
Pneumococcal conjugate ⁶ (PCV13)			1 st dose	2 nd dose	3 rd dose		← 4 th dose →									
Pneumococcal polysaccharide ⁶ (PPSV23)																
Inactivated Poliovirus ⁷ (IPV) (<18 yrs)			1 st dose	2 nd dose	← 3 rd dose →							4 th dose				
Influenza ⁸ (IIV; LAIV) 2 doses for some: See footnote 8					Annual vaccination (IIV only)			Annual vaccination (IIV or LAIV)								
Measles, mumps, rubella ⁹ (MMR)							← 1 st dose →					2 nd dose				
Varicella ¹⁰ (VAR)							← 1 st dose →					2 nd dose				
Hepatitis A ¹¹ (HepA)							← 2-dose series, See footnote 11 →									
Human papillomavirus ¹² (HPV2: females only; HPV4: males and females)														(3-dose series)		
Meningococcal ¹³ (Hib-Men-CY ≥ 6 weeks; MenACWY-D ≥ 9 mos; MenACWY-CRM ≥ 2 mos)			See footnote 13											1 st dose		Booster

Range of recommended ages for all children
 Range of recommended ages for catch-up immunization
 Range of recommended ages for certain high-risk groups
 Range of recommended ages during which catch-up is encouraged and for certain high-risk groups
 Not routinely recommended

This schedule includes recommendations in effect as of January 1, 2014. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible. The use of a combination vaccine generally is preferred over separate injections of its equivalent component vaccines. Vaccination providers should consult the relevant Advisory Committee on Immunization Practices (ACIP) statement for detailed recommendations, available online at <http://www.cdc.gov/vaccines/hcp/acip-recs/index.html>. Clinically significant adverse events that follow vaccination should be reported to the Vaccine Adverse Event Reporting System (VAERS) online (<http://www.vaers.hhs.gov>) or by telephone (800-822-7967). Suspected cases of vaccine-preventable diseases should be reported to the state or local health department. Additional information, including precautions and contraindications for vaccination, is available from CDC online (<http://www.cdc.gov/vaccines>) or by telephone (800-CDC-INFO [800-232-4636]).

This schedule is approved by the Advisory Committee on Immunization Practices (<http://www.cdc.gov/vaccines/acip>), the American Academy of Pediatrics (<http://www.aap.org>), the American Academy of Family Physicians (<http://www.aafp.org>), and the American College of Obstetricians and Gynecologists (<http://www.acog.org>).

NOTE: The above recommendations must be read along with the footnotes of this schedule.

Pediatrician View

- Vaccines are one of the greatest success stories in medical history
- The most effective tool we have to prevent a host of terrible diseases
- No treatment is perfect and work continues to increase effectiveness and lower side-effect profile
- Helps parents and health care providers protect the most vulnerable
 - The patient in front of me
 - Other patients in the practice
 - My staff

Vaccine Hesitancy

Nothing New

- 1866 – Anti-compulsory Vaccination League – United Kingdom
- 1879 – Anti-Vaccination League of America
- 1885 – Compulsory smallpox vaccination law reversal in UK
- *Jacobson v Massachusetts* 1905
- 1970s - Pertussis
- 1990s - Marin County
- 1998 - Wakefield

Victim of Success

- Most physicians today in the US have not seen a case of measles
- *H.flu* and Pneumococcal meningitis are historical facts, not current problems
- My patients are the 3rd US generation to not have experience with many of the VPD
- Not knowing the risks of low vaccination rates, the benefits of vaccines began to be questioned

Vaccine Hesitancy

What are the Concerns?

- How Many
 - about 20% (2000) nationally had concerns
 - 2010 up to 75% had at least a question
 - 0.5-2% opposed
- Immunize Kansas Kids study in 2014 “*Attitudes and Concerns of Kansas Parents Related to Childhood Immunizations*” LaClair, Smith and Woodward
 - Safety – Side-effects (pain, autism); Too many, Too early
 - Efficacy – Do they really work (mainly around influenza vaccine)
 - Necessity – The diseases aren’t around anymore
 - Opposition to government mandates – No one is telling me what to do!

Vaccine Hesitancy

Mayo Clinic

- Vaccine Success = Necessity of Vaccines
 - VPD are not a concern of parents
 - Risks vs benefits when benefits are underestimated
- Unclear Language from Science/Medicine
 - We change our minds eg is cholesterol bad or ok?
 - Science does not speak in absolutes, anti-vaccine movement does
 - Waffling by providers
 - Leads to lack of confidence in vaccination message
- Misinformation
 - From within the medical/scientific field
 - From outside sources

Vaccine Hesitancy

Specific Concerns

- Autism
 - Just not true
- Too Many Too Soon
 - Immune system can handle up to 10,000 new exposures every day
 - Number of antigens in vaccines has greatly declined since 1960s
- Vaccines make you sick
 - Mild fever, soreness
 - Attenuated live vaccines can give a few people a mild case of the disease
 - You cannot get the flu from the inactivated flu vaccine
- Not natural
 - Neither are antibiotics, IV fluids, vitamins that come out of a bottle
 - Life expectancy in the natural world is about 35 years
 - Infant mortality rate in the natural world is 25-50%
- Not tested
 - Thoroughly tested and testing continues
- Ingredients
 - Thimerosal (out since 2001), aluminum, etc
- Just in it for the money
 - At the very best a practice will cover its costs; at worst one can lose \$5-15/vaccine given
 - World-wide conspiracy to harm children so that we can make money

AAP Guideline Statement

- *Countering Vaccine Hesitancy* Kathryn M. Edwards, MD, Jesse M. Hackell, MD, The Committee On Infectious Diseases, The Committee On Practice And Ambulatory Medicine 2016
- Reviews the data and concerns from numerous sources
- Addresses the question of dismissing families from the practice if they consistently refuse all vaccinations
 - Hot topic in Pediatrics

How to Address Vaccine Hesitancy

- Lots of studies, no consistent best way to address
 - Parents are a varied group; their concerns vary
- Overall parents trust their child's health care provider
- Strategy
 - Normalize Vaccination
 - Know the schedule
 - Check vaccine status at every visit
 - Take every chance to vaccinate (not just well child visits)
 - Standing orders
 - Followup with between visit reminders (texts, EHR reminders)
 - Elicit concerns from parents
 - Ask about and validate concerns
 - Provide information
 - Websites
 - Handouts
 - Clear, consistent recommendations

TUKHS-Pediatrics

- Goals
 - Patient-center, evidence based care
 - Collaborative decision making
- Vaccination Policy
 - “It is our goal that all children cared for at the Department of Pediatrics will be vaccinated according to the most current CDC/ACIP vaccination schedule”
 - We will provide information and continued discussions with parents about the dangers of VPDs and the benefits/risks of vaccinations
 - If, after discussion at multiple visits, a family still declines all vaccinations, the provider can request that the family be dismissed from the practice

My Experience Non-Evidence Based

- Parents are concerned
- Parents are deluged with information, both accurate and false and often cannot effectively navigate through it all
- Parents want to do what is best for their child
- After careful conversation aimed at addressing their concerns with reliable information almost all are convinced of the importance of vaccinating their child(ren) and proceed.
- Helps build a therapeutic alliance that directs health care in the future

Ideal Vaccine Program

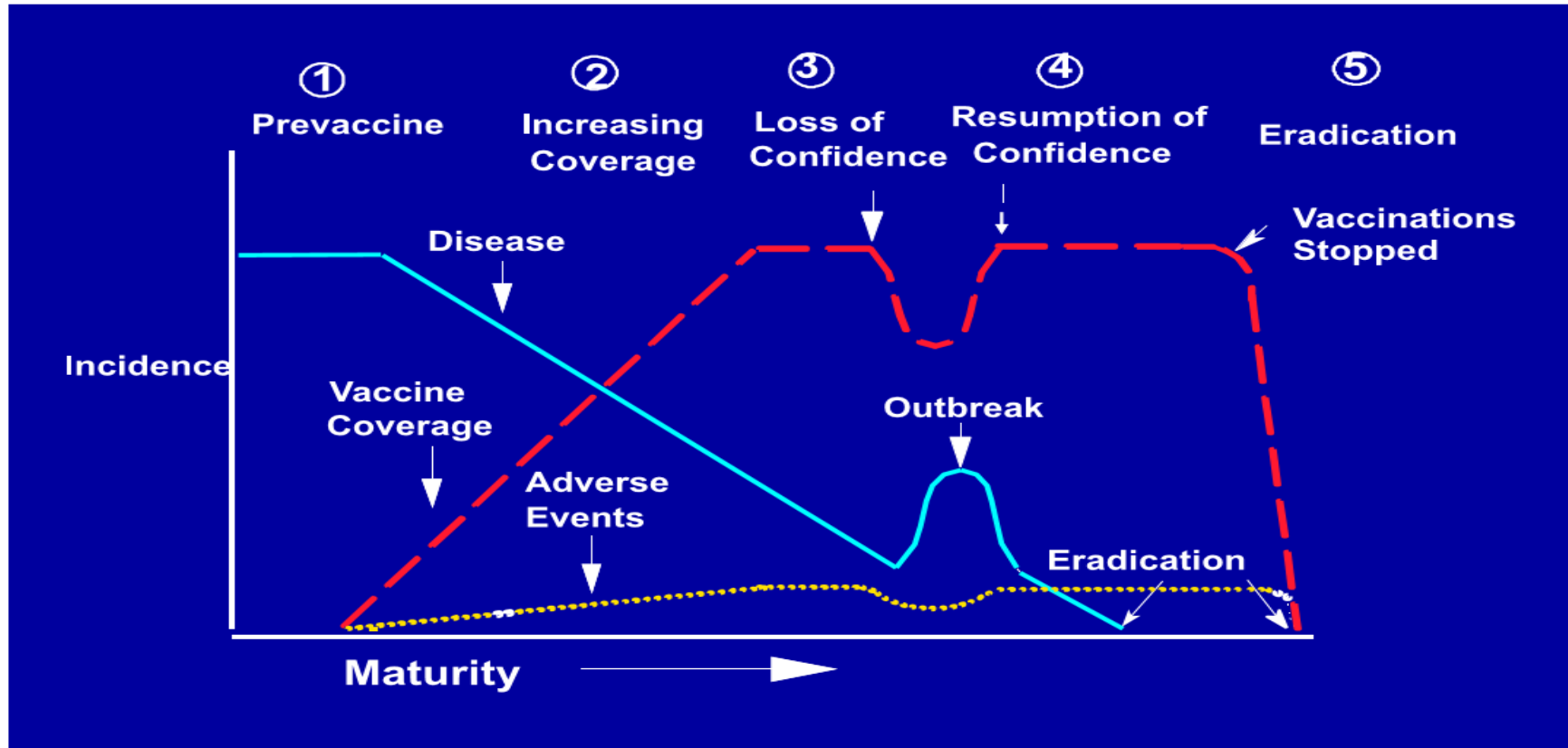


FIGURE 2

Evolution of a vaccine program. Reproduced with permission. Chen RT, Orenstein WA. Epidemiologic methods in immunization programs. *Epidemiol Rev.* 1996;18(2):102. Copyright © 1996 by the Oxford University Press.

References

- CDC
 - <https://www.cdc.gov/vaccines>
- Cochrane Data Base
 - www.cochrane.org
- WHO
 - www.who.int/immunization
- Children's Hospital of Philadelphia
 - www.chop.edu/centers-programs/vaccine-education-center
- VAERS/VICP
 - <https://vaers.hhs.gov>
 - <https://www.hrsa.gov/vaccine-compensation/index.htm>