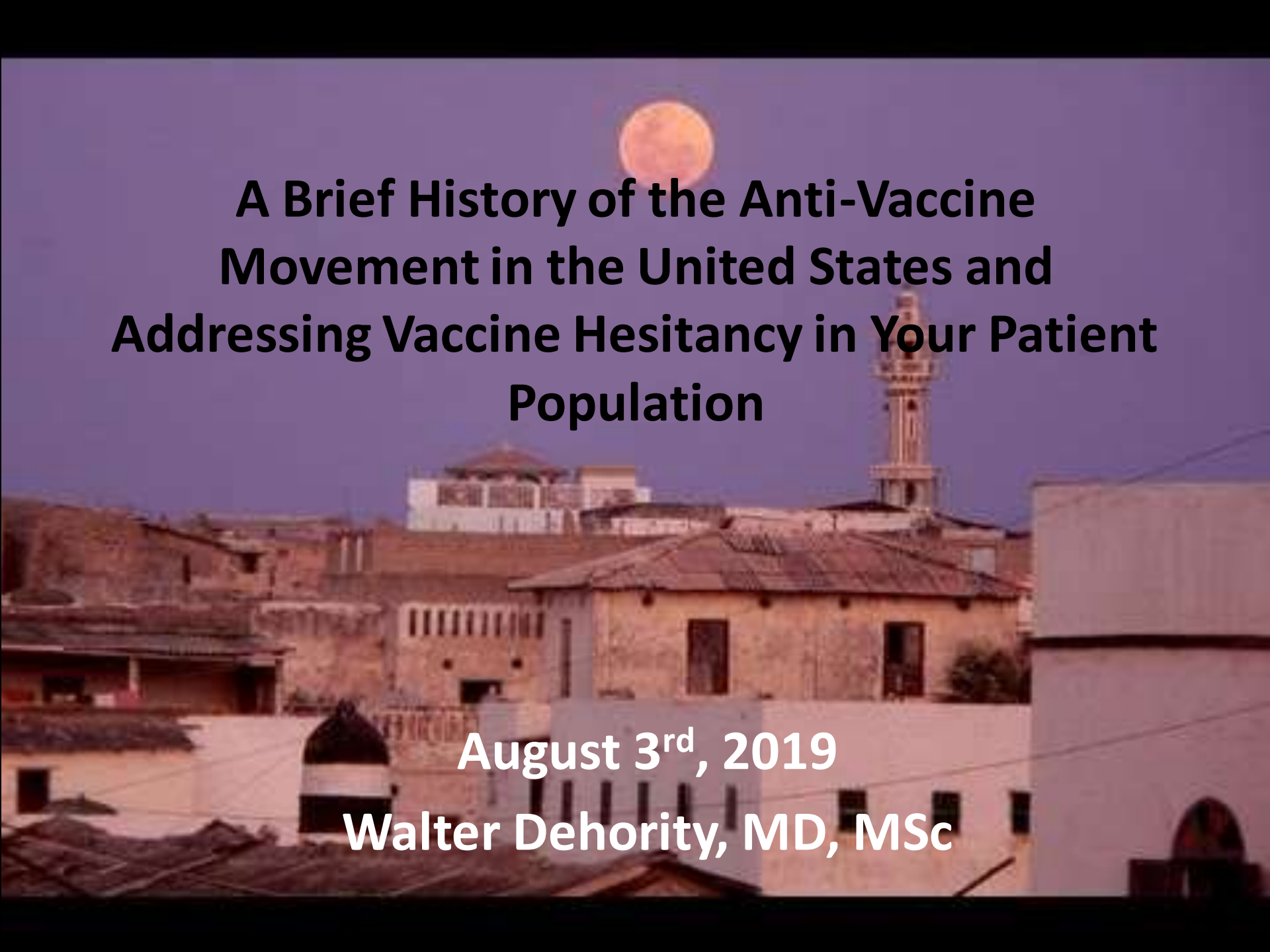


A Brief History of the Anti-Vaccine Movement in the United States and Addressing Vaccine Hesitancy in Your Patient Population

August 3rd, 2019

Walter Dehority, MD, MSc

Merca, Somalia

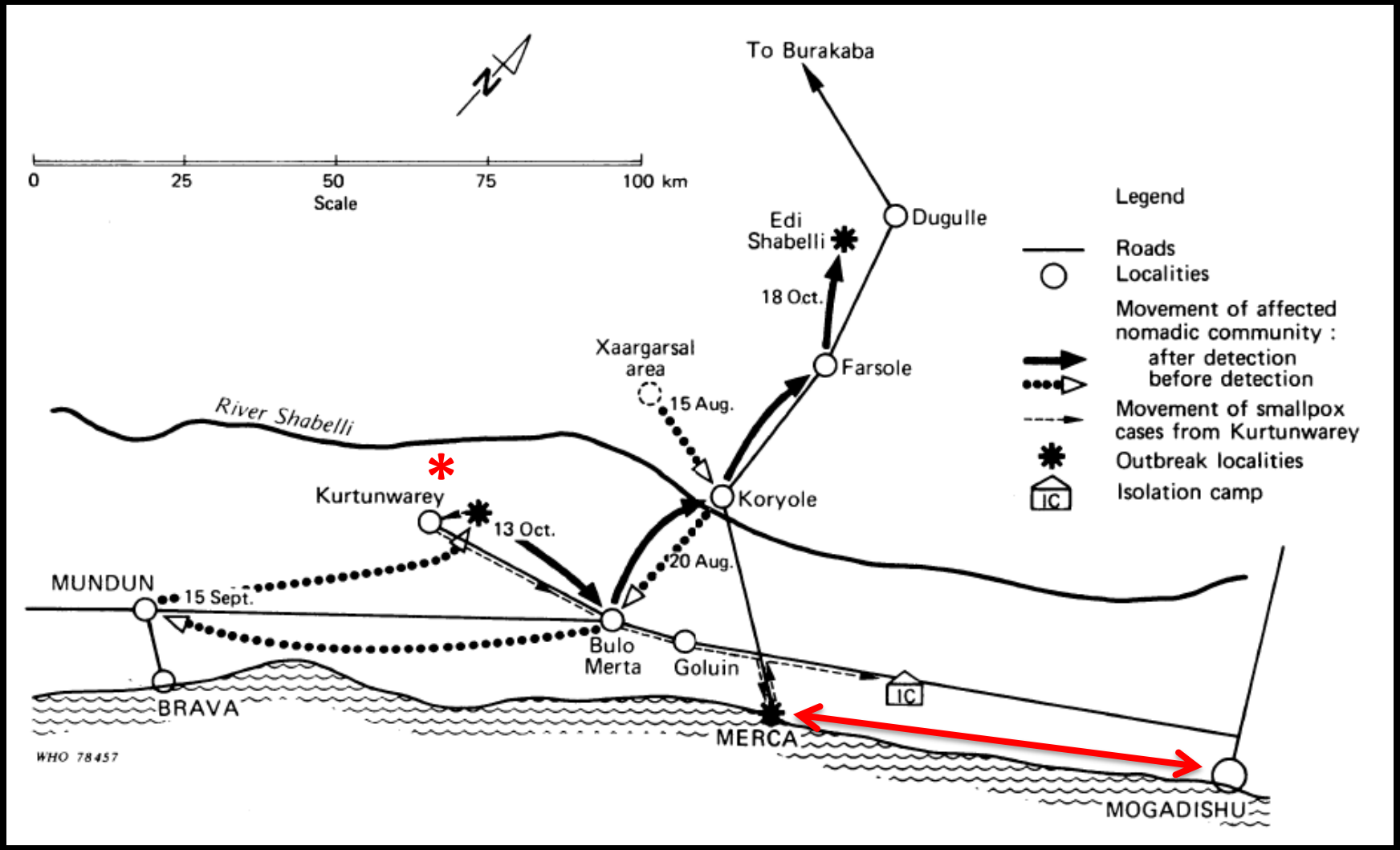
October, 1977

- The 10-year smallpox eradication effort undertaken by the WHO has been a roaring success.
- Transmission was stopped in all countries, save for 1

October, 1977

- Somalia, in North-east Africa

Merca and Outlying Communities



Bulletin of the World Health Organization. 1980;58(2):279-283

October 12, 1977
Kurtunwarey Settlement

- Ali Maalin, a 23-year-old cook at the hospital in Merca, walked out to a car containing a 6-year-old girl, Habiba Nur Ali, with severe smallpox on her way to a smallpox isolation camp as the (at the time) suspected last case of the disease
- Ali gave directions to the isolation camp through an open window, and headed back home in Merca

Bulletin of the World Health Organization. 1980;58(2):279-283

October 12, 1977
Kurtunwarey Settlment

- Unbeknownst to anyone, Ali Maalin was not immunized against smallpox

Bulletin of the World Health Organization. 1980;58(2):279-283

October 22, 1977
Merca

- He is sent home from work with a fever

Bulletin of the World Health Organization. 1980;58(2):279-283

October 25, 1977
Merca

- Admitted to the hospital in Merca
- Diagnosed with malaria initially

Bulletin of the World Health Organization. 1980;58(2):279-283

October 27, 1977
Merca

- Vesicular rash appeared
  - Diagnosed with chickenpox

Bulletin of the World Health Organization. 1980;58(2):279-283

October 31, 1977
Merca

- An epidemiologist assigned to Merca was combing through recent discharge diagnoses, noted Ali's diagnosis, and paid him a visit
- Subsequently diagnosed with smallpox and isolated

Bulletin of the World Health Organization. 1980;58(2):279-283

Last Village with Smallpox
Kuralia, Bhola (Somalia)
October, 1977

Image courtesy Centers for Disease Control and Prevention

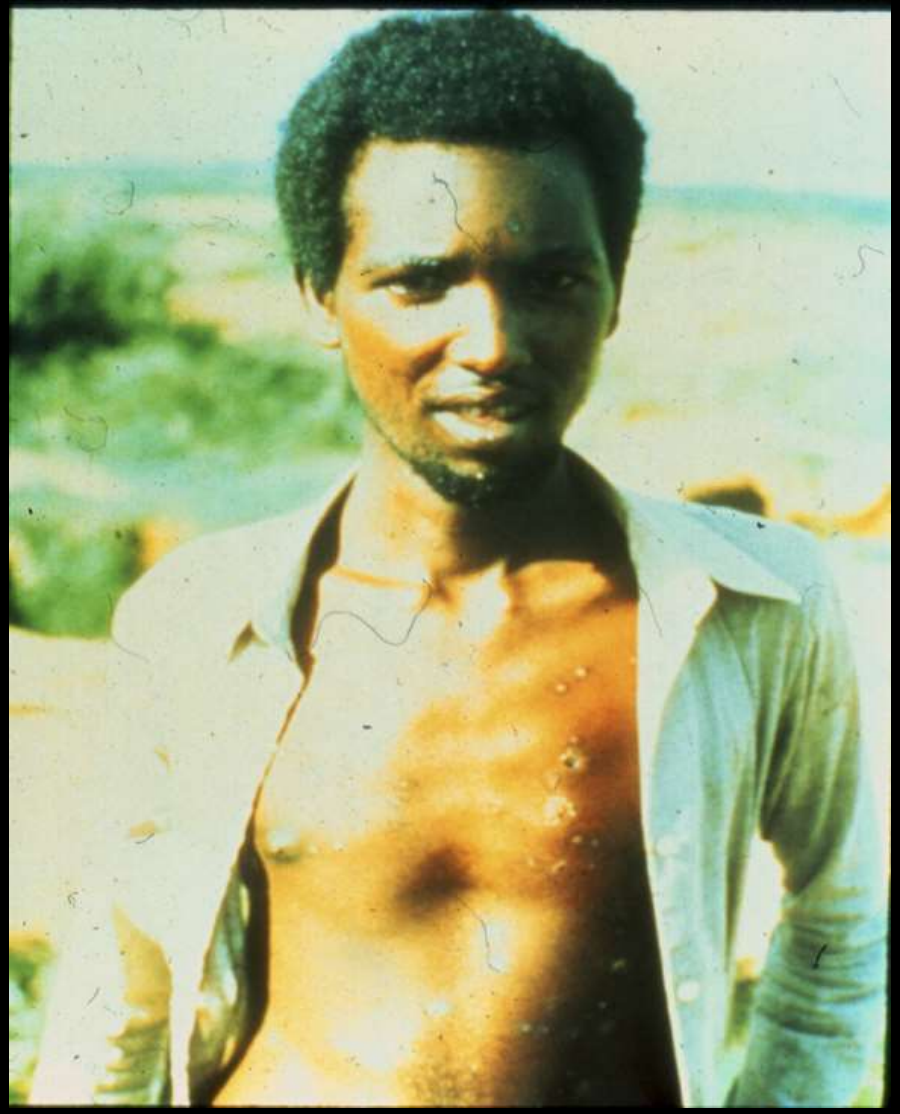
Summary of Subsequent Contact Tracing and Investigation

Month	No. visited and searched				No. of rash cases detected		
	Villages	Nomad camps	Houses	Schools	Small-pox	Chicken-pox	Others
November 1977	786	239	62 676	598	0	9	362
December 1977	1 328	341	102 898	900	0	16	454
January 1978	1 576	550	104 818	1 000	0	11	204
February 1978	1 064	240	79 843	1 053	0	11	70
March 1978	1 230	586	77 287	948	0	13	27

Bulletin of the World Health Organization. 1980;58(2):279-283

Last Case of Smallpox

Ali Maow Maalin, October, 1977



- Maow Maalin later became involved in the poliomyelitis campaign in Somalia
- Tragically, he later died of malaria while vaccinating his fellow countrymen for polio during reintroduction of the virus in 2013
- He was 59 years old

Outline

- 1.) Anatomy of an Outbreak
- 2.) A Brief History of the Anti-Vaccine Movement
- 3.) So What Do I Do About This? Talking with Vaccine Hesitant Families
- 4.) Conclusion

1.) Anatomy of an Outbreak

Association with Vaccination Status

- **Among the 110 CA patients (2014-15 outbreak)**
  - 45% unvaccinated
  - 5% undervaccinated
  - 43% with unknown vaccination status
  - 11% were too young to be vaccinated

=93% total

U.S. Measles Cases by Year, 2001-2015: This is Not a New Phenomenon!

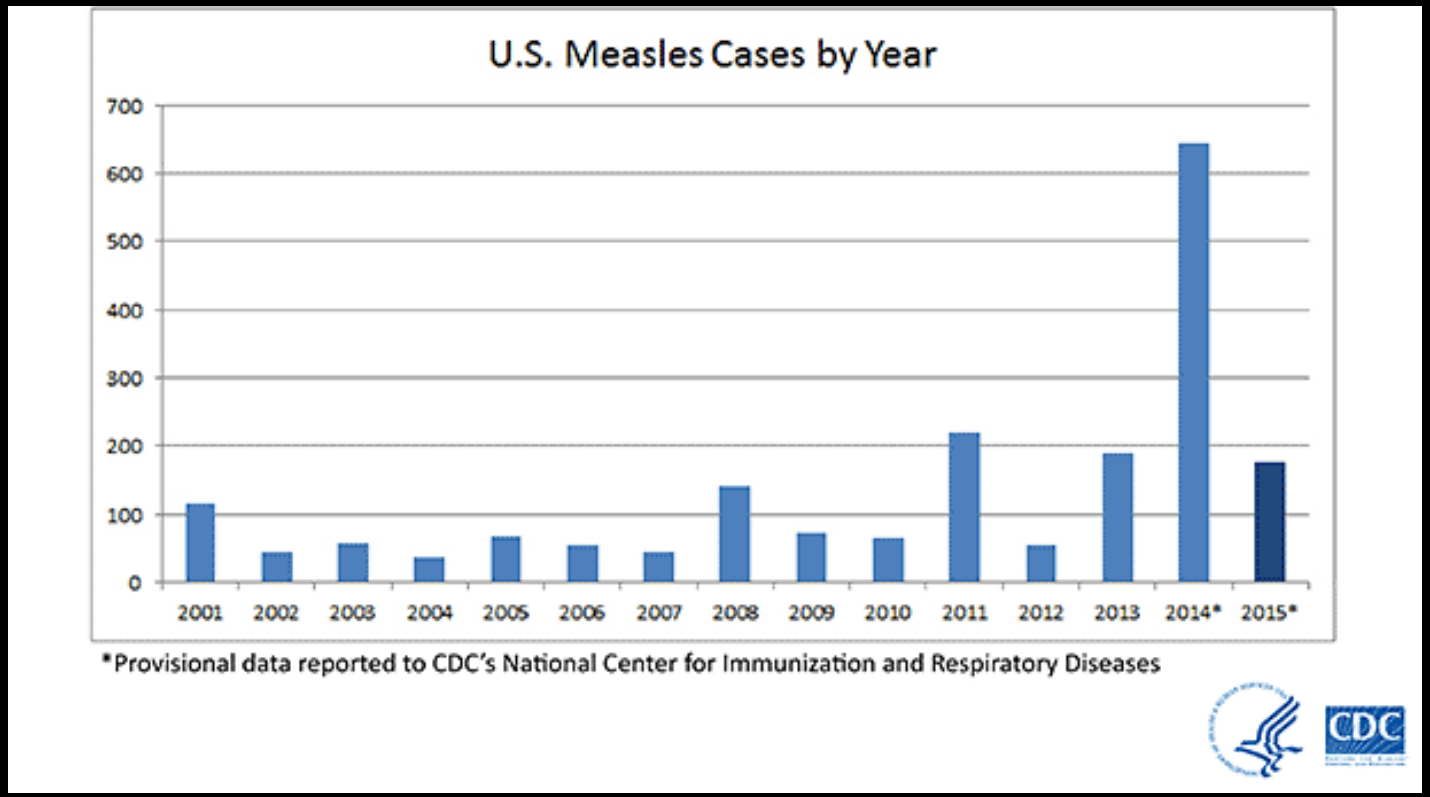


Image courtesy www.cdc.gov

Herd Immunity

Just How Contagious is Measles?

Just How Contagious is Measles?

- **July 20th, 1991**
  - The International Special Olympics began with the opening ceremonies at the Minneapolis Metrodome
    - 6,058 athletes participate
    - 55,000 spectators in attendance

Ehresmann, et al. J Infect Dis. 1995;171:679-83

Just How Contagious is Measles?

- **July 24th, 1991**
  - A 16 year old athlete from Argentina is seen at a Minnesota ER with fever, rash and conjunctivitis
  - An epidemic of measles was ongoing at that time in Argentina

Ehresmann, et al. J Infect Dis. 1995;171:679-83

Just How Contagious is Measles?

- **2 Weeks later**
  - 2 confirmed secondary cases occurred in unrelated spectators
  - Both sat in the same section of the upper deck of the stadium
  - None had any direct contact with athletes

Ehresmann, et al. J Infect Dis. 1995;171:679-83

Trump Tweeting on Twitter

Donald J. Trump ✓
@realDonaldTrump

I am being proven right about massive vaccinations—the doctors lied. Save our children & their future.

An Age Old Debate Rekindled…Why?

2.) A Brief History of the Anti-Vaccine Movement in the US

The Early Years

The Cow-Pock — or — the Wonderful Effects of the New Inoculation! — vide. the Publications of y^e Anti-Vaccine Society.

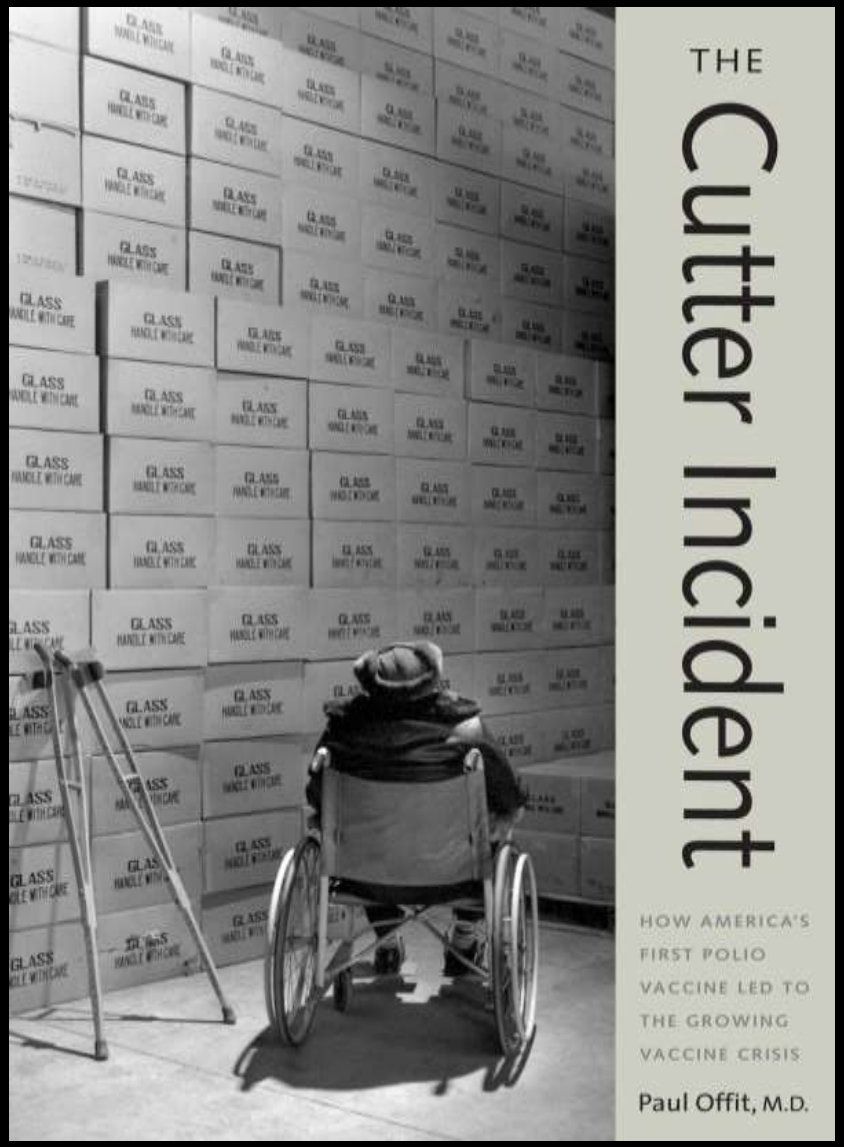
- **1798**
  - Edward Jenner publishes a paper on the smallpox vaccine
- **1879**
  - The Anti-vaccination Society of America is founded
- **1908**
  - The first National Anti-Vaccination Conference is held in Philadelphia

www.historyofvaccines.org. Accessed 3-16-15

- **1901**
  - Anti-diphtheria toxin taken from a horse was contaminated with tetanus and killed 13 children in St. Louis, MO
  - 9 children were killed from tetanus contamination of small pox vaccines in Camden, NJ

Lilienfield, DE. Perspect Biol Med. 2008. 51(2):188-98

The Cutter Incident




POLIO PIONEER
1954

- **April, 1955**
  - Licensing and production rights to the new Salk polio virus vaccine (inactivated) are granted by the United States Government to 5 pharmaceutical companies
    -Eli Lilly
    -Parke-Davis
    -Wyeth
    -Pitman-Moore
    -Cutter

Blume S, et al. Science. 2000;288(5471):1593-4
Offit PA. New Eng J Med. 2005;352(14):1411-12

Early Problems, Persistent Legacy

- **April 26th, 1955**
  - 5 children in California were reported to have become paralyzed after receiving the polio vaccine
  - Each child had been immunized with a Cutter vaccine

Offit PA. New Eng J Med. 2005;352(14):1411-12

Early Problems, Persistent Legacy

- At this time, 380,000 doses of Cutter vaccine had been distributed nationally

Offit PA. New Eng J Med. 2005;352(14):1411-12

Early Problems, Persistent Legacy

- The Communicable Diseases Center (CDC precursor) began a lengthy investigation
  - 2 pools of Cutter vaccine were found to contain live polio virus

Offit PA. New Eng J Med. 2005;352(14):1411-12

Early Problems, Persistent Legacy

- Polio developed in 40,000 children
- 51 children vaccinated with a Cutter vaccine were permanently paralyzed
  - 5 died
- 113 contacts of the children were paralyzed
  - 5 contacts died

Offit PA. New Eng J Med. 2005;352(14):1411-12

Early Problems, Persistent Legacy

- It helped gave birth to a modern vaccine phobia that persists to this day

Offit PA. New Eng J Med. 2005;352(14):1411-12

Andrew Wakefield, MMR and Autism

- **February 28th, 1998**
  - Dr. Andrew Wakefield holds a press conference a London's Royal Free hospital
  - He espoused a theory that the MMR vaccine led to autism
  - An article in the Lancet was published later that day

Image courtesy Br Med J.

Early report

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

A J Wakefield, S H Murch, A Anthony, J Linnell, D M Casson, M Malik, M Berelowitz, A P Dhillon, M A Thomson, P Harvey, A Valentine, S E Davies, J A Walker-Smith

THE LANCET • Vol 351 • February 28, 1998

Table 2

Child	Behavioural diagnosis	Exposure identified by parents or doctor	Interval from exposure to first behavioural symptom	Features associated with exposure	Age at onset of first symptom	
					Behaviour	Bowel
1	Autism	MMR	1 week	Fever/delirium	12 months	Not known
2	Autism	MMR	2 weeks	Self injury	13 months	20 months
3	Autism	MMR	48 h	Rash and fever	14 months	Not known
4	Autism? Disintegrative disorder?	MMR	Measles vaccine at 15 months followed by slowing in development. Dramatic deterioration in behaviour immediately after MMR at 4·5 years	Repetitive behaviour, self injury, loss of self-help	4·5 years	18 months
5	Autism	None—MMR at 16 months	Self-injurious behaviour started at 18 months		4 years	
6	Autism	MMR	1 week	Rash & convulsion; gaze avoidance & self injury	15 months	18 months
7	Autism	MMR	24 h	Convulsion, gaze avoidance	21 months	2 years

THE LANCET • Vol 351 • February 28, 1998

March 1, 1998

- **British papers bursting with hyperbolic headlines**
  - ‘Ban 3-in-1 jabs’
  - ‘Alert over child jabs’

Over the next few years, >1500 articles would be written on the topic

Consequences and Fallout

BREVIA

Measles Outbreaks in a Population with Declining Vaccine Uptake

V. A. A. Jansen,[1*] N. Stollenwerk,[1] H. J. Jensen,[2] M. E. Ramsay,[3] W. J. Edmunds,[3] C. J. Rhodes[1]

Jansen, et al. Science. 2003;301:804

Wakefield Moves to the U.S. and Testifies Before Congress

Wakefield Moves to the U.S. and Testifies Before Congress

- The proceedings are covered by CNN, USA Today, the New York Times, the Washington Post, and other major media outlets
- 7 months later, '60 Minutes' runs a feature piece entitled "The MMR Vaccine"

Offit, Paul. Autism's False Prophets. Chapter 2.

More Fallout

- Shortly after the '60 Minutes' piece Japan suspends measles immunization
- The following year, more than 100,000 families refuse the MMR vaccine in the United States

Offit, Paul. Autism's False Prophets. Chapter 2.

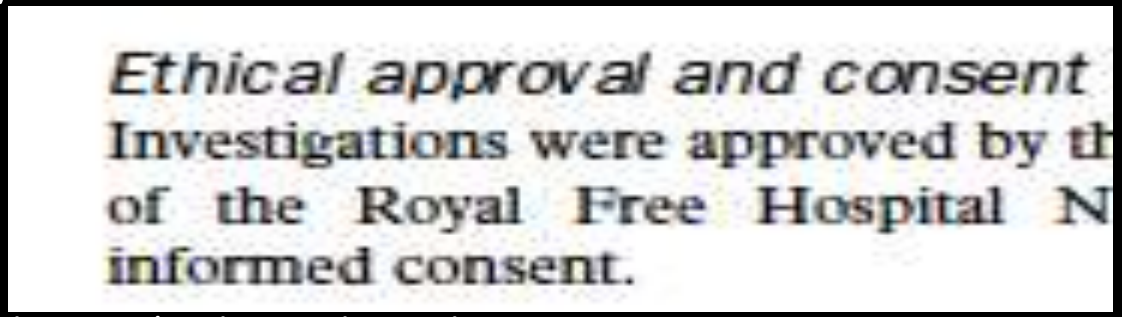
The Wheels Come Off Andrew Wakefield's Theory
February 18th, 2004

- An investigative reporter for the Sunday Times of London by the name of Brain Deer arranged for a meeting with the editor in chief of the Lancet. It was meant to be fast---the editor was a busy man
- The meeting lasted 5 hours

Offit, Paul. Autism's False Prophets. Chapter 3.

The Wheels Come Off Andrew Wakefield's Theory
February 18th, 2004

- Ethical approval from the hospital had never been obtained
- Patients had not been consented
  - General anesthesia, spinal taps, intestinal biopsies performed
  - One child sent to the ICU with a hole in the bowel following a biopsy


Ethical approval and consent
Investigations were approved by th
of the Royal Free Hospital N
informed consent.

Offit, Paul. Autism's False Prophets. Chapter 3.

The Wheels Come Off Andrew Wakefield's Theory
February 18th, 2004

- Unbeknownst to the journal, the study was funded by a personal injury lawyer named Richard Barr
- 5 of the 8 subjects enrolled were clients of Barr's in a class action lawsuit against makers of the MMR vaccine

Offit, Paul. Autism's False Prophets. Chapter 3.

The Wheels Come Off Andrew Wakefield's Theory
February 18th, 2004

- Wakefield had also filed a class action lawsuit against MMR manufacturers in 1996 with Barr, two years before the study came out
- Wakefield admitted he had been paid $800,000 by Barr to do the study and enroll the patients to '…build a case against the vaccine' for their lawsuit

Offit, Paul. Autism's False Prophets. Chapter 3.

The Wheels Come Off Andrew Wakefield's Theory
February 18th, 2004

- After the study was published, Barr received $20 million in funding from the UK lawsuit fund to help his class action lawsuit against MMR

Offit, Paul. Autism's False Prophets. Chapter 3.

The Wheels Come Off Andrew Wakefield's Theory
February 18th, 2004

- **Said Barr:**
  - 'The funding acknowledgment wasn't in the paper, but it didn't seem to be a big deal.'

Offit, Paul. Autism's False Prophets. Chapter 3.

The Wheels Come Off Andrew Wakefield's Theory
February 18th, 2004

- By September of 2005, Wakefield had been forced to resign from the Royal Free Hospital and was barred from practicing medicine in England

Offit, Paul. Autism's False Prophets. Chapter 3.

But What About His Findings?

- Disgraced though he may have been, Wakefield was still a hero to many in the anti-vaccine community
- Measles virus HAD been found in the intestines of these autistic children after receiving the MMR vaccine---hence the science spoke for itself
  - Or did it?


MMR
a jab
too far
WE SUPPORT
ANDY
WAKEFIELD
1 in 100
UK children
have AUTISM.
Why?
stifle
uncomfy
science


LISTEN TO
ANDREW
WAKEFIELD!
WE'RE
WITH

Summer, 2007

- Parents of autistic children took the Federal government to court
- By 2007, over 5,000 parents had filed lawsuits against MMR manufacturers
- Given the large volume, it was agreed it would be treated like a class action lawsuit
- If they won, the government may owe up to $2 billion, which could bankrupt the vaccine program

June 11, 2007

- Williams, Love and Powers represented Michelle Cedillo, a representative case chosen by the prosecution
- Michelle was a 12 year old girl with autism from Yuma, AZ
- The prosecution argued that her autism was caused by the MMR vaccine

Offit, Paul. Autism's False Prophets. Chapter 8.

June 11, 2007

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Opening Statements in Case on Autism and Vaccinations

By GARDINER HARRIS
Published: June 12, 2007

WASHINGTON, June 11 — Lawyers began arguments on Monday in the first of several test cases that may help decide whether the government should pay millions of dollars to parents of autistic children.

TWITTER

LINKEDIN

SIGN IN TO E-MAIL OR SAVE THIS

PRINT

Offit, Paul. Autism's False Prophets. Chapter 8.

Big Problems for the Prosecution

- Near the end of the trial, the defense called Nicholas Chadwick to the stand
- Mr. Chadwick was the laboratory technician working in Wakefield's lab while his measles study was being done
- He was responsible for running PCR assays

Offit, Paul. Autism's False Prophets. Chapter 8.

Transcript of Mr. Chadwick's Testimony

- **Question:** What results did you find from the RNA testing of the intestines?
- **Answer:** They were all negative
- **Question:** They were all negative?
- **Answer:** Yes

Offit, Paul. Autism's False Prophets. Chapter 8.

Transcript of Mr. Chadwick's Testimony

- **Question:** Did you personally test samples from autistic children in the lab?
- **Answer:** Yes, I did. Again, they were all negative.
- **Question:** Did you inform Dr. Wakefield of the negative results?
- **Answer:** Yes. Yes.

Offit, Paul. Autism's False Prophets. Chapter 8.

Transcript of Mr. Chadwick's Testimony

- **Question:** You also state in your affadavit that Dr. Wakefield was aware of all of your negative results when he submitted his paper, which was published in 1998 in the Lancet.
- **Answer:** Yes, that's correct.

Offit, Paul. Autism's False Prophets. Chapter 8.

Transcript of Mr. Chadwick's Testimony

- **Question:** Why wasn't your name on the paper I just referenced?
- **Answer:** I asked for my name to be taken off anything that related to PCR data because I wasn't comfortable…

Offit, Paul. Autism's False Prophets. Chapter 8.

The Ruling of The Court

From George L. Hastings, Jr., Special Master, in the case of Michelle Cedillo, No. 98-916V:

"The petitioners in this case have advanced a causation theory that has several parts, including contentions (1) that thimerosal-containing vaccines can cause immune dysfunction, (2) that the MMR vaccine can cause autism, and (3) that the MMR vaccine can cause chronic gastrointestinal dysfunction. However, as to each of those issues, I concluded that the evidence was overwhelmingly contrary to the petitioners' contentions. . . . Considering all of the evidence, I found that the petitioners have failed to demonstrate that thimerosal-containing vaccines can contribute to causing immune dysfunction, or that the MMR vaccine can contribute to causing either autism or gastrointestinal dysfunction. I further conclude that while Michelle Cedillo has tragically suffered from autism and other severe conditions, the petitioners have also failed to demonstrate that her vaccinations played any role at all in causing those problems."

Early report

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

A J Wakefield, S H Murch, A Anthony, J Linnell, D M Casson, M Malik, M Berelowitz, A P Dhillon, M A Thomson, P Harvey, A Valentine, S E Davies, J A Walker-Smith

Summary

Background We investigated a consecutive series of children with chronic enterocolitis and regressive developmental disorder.

Methods 12 children (mean age 6 years [range 3–10], 11 boys) were referred to a paediatric gastroenterology unit with a history of normal development followed by loss of acquired skills, including language, together with diarrhoea and abdominal pain. Children underwent gastroenterological, neurological, and developmental assessment and review of developmental records. Ileocolonoscopy and biopsy sampling, magnetic-resonance imaging (MRI), electroencephalography (EEG), and lumbar puncture were done under sedation. Barium follow-through radiography was done where possible. Biochemical, haematological, and immunological profiles were examined.

Findings Onset of behavioural symptoms was associated by the parents, with measles, mumps, and rubella vaccination in eight of the 12 children, with measles infection in one child, and otitis media in another. All 12 children had intestinal abnormalities ranging from lymphoid nodular hyperplasia to aphthoid ulceration. Histology showed patchy chronic inflammation in 11 children and reactive ileal lymphonodular hyperplasia in seven, but no granulomas. Behavioural disorders included autism (nine), disintegrative psychosis (one), and possible postviral or vaccinal encephalitis (two). There were no focal neurological abnormalities and MRI and EEG tests were normal. Abnormal laboratory results were significantly raised urinary methylmalonic acid compared with age-matched controls ($p=0.003$), low haemoglobin in four children, and a low serum IgA in four children.

Interpretation We identified associated gastrointestinal disease and developmental regression in a group of previously normal children, which was generally associated in time with possible environmental triggers.

Lancet 1998; **351:** 637–41
See Commentary page

Inflammatory Bowel Disease Study Group, University Departments of Medicine and Histopathology (A J Wakefield FRCS, A Anthony MB, J Linnell PhD, A P Dhillon MRCPath, S E Davies MRCPath) **and the University Departments of Paediatric Gastroenterology** (S H Murch MB, D M Casson MRCP, M Malik MRCP, M A Thomson FRCP, J A Walker-Smith FRCP,), **Child and Adolescent Psychiatry** (M Berelowitz FRCPsych), **Neurology** (P Harvey FRCP), **and Radiology** (A Valentine FRCR), **Royal Free Hospital and School of Medicine, London NW3 2QG, UK**

Correspondence to: Dr A J Wakefield

Introduction

We saw several children who, after a period of apparent normality, lost acquired skills, including communication. They all had gastrointestinal symptoms, including abdominal pain, diarrhoea, and bloating and, in some cases, food intolerance. We describe the clinical findings, and gastrointestinal features of these children.

Patients and methods

12 children, consecutively referred to the department of paediatric gastroenterology with a history of a pervasive developmental disorder with loss of acquired skills and intestinal symptoms (diarrhoea, abdominal pain, bloating and food intolerance), were investigated. All children were admitted to the ward for 1 week, accompanied by their parents.

Clinical investigations

We took histories including details of immunisations and exposure to infectious diseases, and assessed the children. In 11 cases the history was obtained by the senior clinician (JW-S). Neurological and psychiatric assessments were done by consultant staff (PH, MB) with HMS-4 criteria.[1] Developmental history included a review of prospective developmental records from parents, health visitors, and general practitioners. Four children did not undergo psychiatric assessment in hospital; all had been assessed professionally elsewhere, so these assessments were used as the basis for their behavioural diagnosis.

After bowel preparation, ileocolonoscopy was performed by SHM or MAT under sedation with midazolam and pethidine. Paired frozen and formalin-fixed mucosal biopsy samples were taken from the terminal ileum; ascending, transverse, descending, and sigmoid colons, and from the rectum. The procedure was recorded by video or still images, and were compared with images of the previous seven consecutive paediatric colonoscopies (four normal colonoscopies and three on children with ulcerative colitis), in which the physician reported normal appearances in the terminal ileum. Barium follow-through radiography was possible in some cases.

Also under sedation, cerebral magnetic-resonance imaging (MRI), electroencephalography (EEG) including visual, brain stem auditory, and sensory evoked potentials (where compliance made these possible), and lumbar puncture were done.

Laboratory investigations

Thyroid function, serum long-chain fatty acids, and cerebrospinal-fluid lactate were measured to exclude known causes of childhood neurodegenerative disease. Urinary methylmalonic acid was measured in random urine samples from eight of the 12 children and 14 age-matched and sex-matched normal controls, by a modification of a technique described previously.[2] Chromatograms were scanned digitally on computer, to analyse the methylmalonic-acid zones from cases and controls. Urinary methylmalonic-acid concentrations in patients and controls were compared by a two-sample t test. Urinary creatinine was estimated by routine spectrophotometric assay.

Children were screened for antiendomyseal antibodies and boys were screened for fragile-X if this had not been done

A prolonged Legacy?

“Falsehood flies and the truth comes limping after, so that when men come to be undeceived, it is too late; the jest is over and the tale has had its’ effect.”

Jonathan Swift, November 1710

Parental Vaccine Safety Survey

Statement	% that strongly agree or agree with statement
Some vaccines cause autism in healthy children	25%
I am concerned about serious adverse effects of vaccines	54%

Table adapted from Freed, et al. Pediatrics. 2010;125(4):654-662

July, 2016 Data

Statement	% that strongly agree or agree with statement
Concerned that vaccines cause autism	???
Concerned that vaccines cause autism Vaccines have dangerous effects other than autism	???

Hough-Telford, et al. Pediatrics. 2016;138(3):e20162127

July, 2016 Data

Statement	% that strongly agree or agree with statement
Concerned that vaccines cause autism	54%
Concerned that vaccines cause autism Vaccines have dangerous effects other than autism	57%

Hough-Telford, et al. Pediatrics. 2016;138(3):e20162127

The Story of Thimerosal

- **1900-1930**
  - Multi-dose vaccine vials used---cheap
- **1928**
  - 4 deaths after a Typhoid vaccine from bacterial contamination
- **1940**
  - Mercury added to vaccines as a preservative to prevent bacterial infections from vaccines

- The mercury form was known as thimerosal
- Very effective---no more infections
- Studies showed that adults receiving 2 million µg were fine (10,000 x the amount in vaccines)

AUTISM
It's no mystery.

IT'S MERCURY.

www.nationalautism.org

If you caused

A 6,000% INCREASE IN AUTISM

wouldn't you try to cover it up, too?

MERCURY POISONING AND AUTISM

It isn't a coincidence.

SYMPTOMS OF AUTISM IN CHILDREN

Loss of Speech
Social Withdrawal
Reduced Eye Contact
Repetitive Behaviors
Hand-flapping, Toe-walking
Temper Tantrums
Sleep Disturbances
Seizures

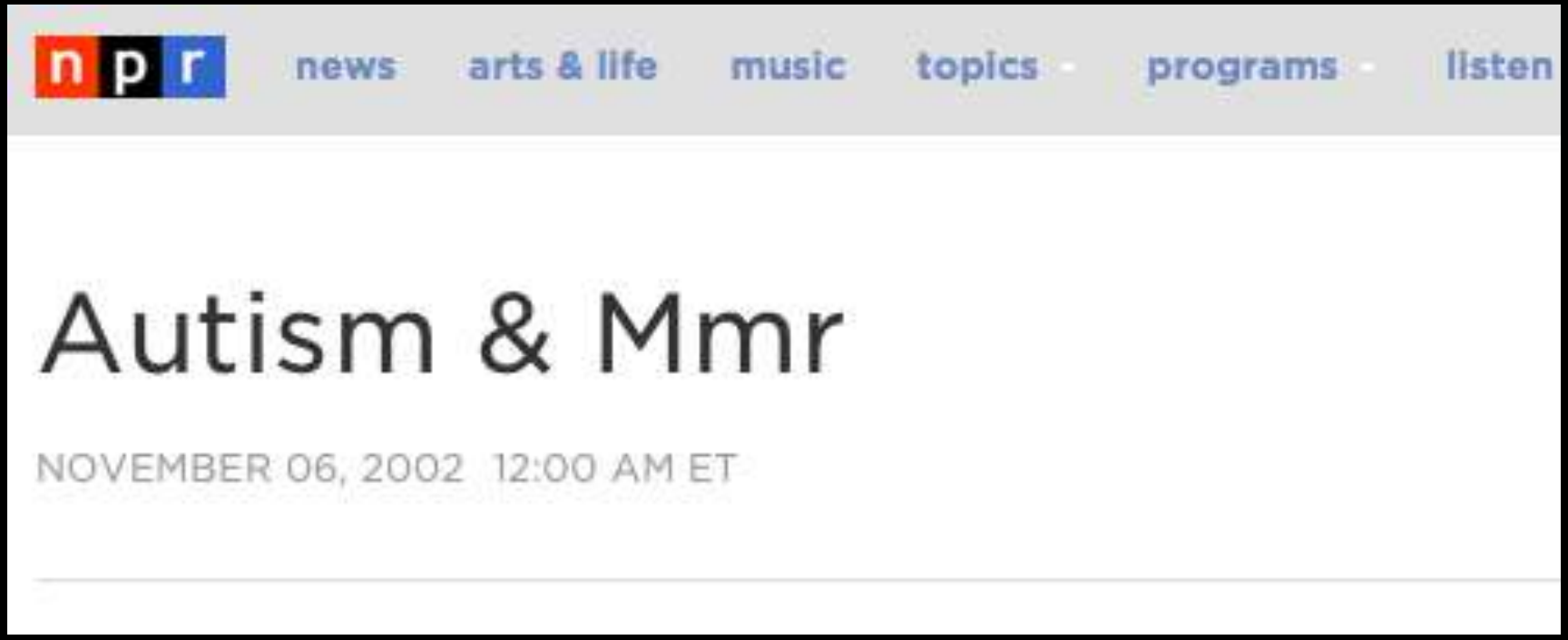
SYMPTOMS OF MERCURY POISONING IN CHILDREN

Loss of Speech
Social Withdrawal
Reduced Eye Contact
Repetitive Behaviors
Hand-flapping, Toe-walking
Temper Tantrums
Sleep Disturbances
Seizures

- Concern of mercury was occurring around the same time Andrew Wakefield published his Lancet paper
- They were not advocating the same theory, but led to ‘group think’ against the MMR vaccine that persists to this day

Picked up by Dan Rather...

Then NPR...


npr
news
arts & life
music
topics
programs
listen
Autism & Mmr
NOVEMBER 06, 2002 12:00 AM ET

Then the NY Times...

The New York Times Magazine

WORLD | U.S. | N.Y. / REGION | BUSINESS | TECHNOLOGY | SCIENCE | HEALTH | SPORTS | OPI

The Not-So-Crackpot Autism Theory

By Arthur Allen
Published: November 10, 2002

Correction Appended

Neal Halsey's life was dedicated to promoting vaccination. In June 1999, the Johns Hopkins pediatrician and scholar had completed a decade of service on the influential committees that decide which inoculations will be jabbed into the arms and thighs and buttocks of eight million American children each year. At the urging of Halsey

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The Provocative *New York Times* Bestseller

EVIDENCE OF HARM

MERCURY IN VACCINES AND THE AUTISM EPIDEMIC: A MEDICAL CONTROVERSY

DAVID KIRBY

Politicians Weigh In

"…it (autism) increased 4,000%. And at the same time we changed the requirements for the normal vaccine dosage…you've got to ask yourself, isn't there a connection between these two things? I don't care how many respected institutions are on the other side."

---Senator Joe Liberman, May 31, 2005

"Imus in the Morning Show"

Quote courtesy of www.newsweek.com and 'Autisms False Prophets', chapter 5

Politicians Weigh In

"…it's the thimerosal that caused this (autism). And yet, we still have mercury in vaccinations around the country. Its absurd. I don't get it. We ought to stop."

---Senator John Kerry, March 20, 2006

"Imus in the Morning Show"

Quote courtesy of www.newsweek.com and 'Autisms False Prophets', chapter 5

Safety of Thimerosal-Containing Vaccines: A Two-Phased Study of Computerized Health Maintenance Organization Databases

Thomas Verstraeten, MD*‡; Robert L. Davis, MD, MPH§; Frank DeStefano, MD, MPH‡; Tracy A. Lieu, MD, MPH‖; Philip H. Rhodes, PhD‡; Steven B. Black, MD¶; Henry Shinefield, MD¶; and Robert T. Chen, MD‡; for the Vaccine Safety Datalink Team

No association found

PEDIATRICS Vol. 112 No. 5 November 2003 1039

More Data Comes In

Thimerosal Exposure in Infants and Developmental Disorders: A Retrospective Cohort Study in the United Kingdom Does Not Support a Causal Association

Nick Andrews, MSc*; Elizabeth Miller, MBBS, FRCPath, FFPHM‡; Andrew Grant, PhD*; Julia Stowe, BA§; Velda Osborne, BSc‖; and Brent Taylor, PhD, MBCHB§

Autism and Thimerosal-Containing Vaccines

Lack of Consistent Evidence for an Association

Paul Stehr-Green, DrPH, MPH, Peet Tull, Michael Stellfeld, MD, Preben-Bo Mortenson, DrMedSC, Diane Simpson, MD, PhD

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Featured Research *from universities, journals, and other organizatio*

Measles Mumps Rubella And Mercury-based Immunizations Cleared As Causes Of Autism

Date: July 5, 2006
Source: McGill University

Share This

584 PEDIATRICS Vol. 114 No. 3 September 2004

Am J Prev Med 2003;25(2)

Information for Parents and Caregivers +

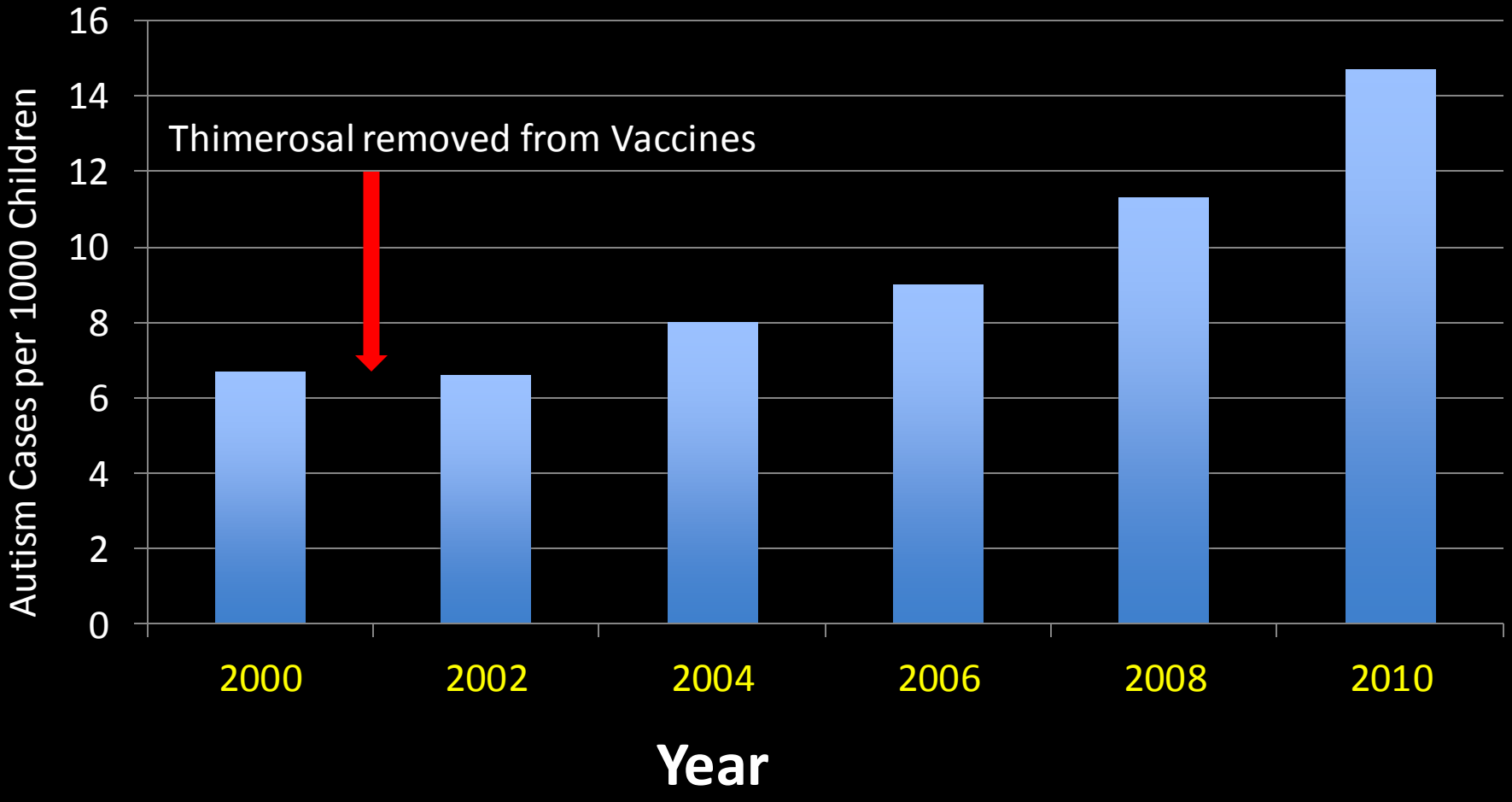
Research +

Is thimerosal still used in vaccines for children?

No. Thimerosal hasn't been used in vaccines for children since 2001.

www.cdc.gov/vaccinesafety/concerns/thimerosal/faqs.html#4A

Prevalence of Autism by Year, 2000-2010



Emily Willingham Contributor
I write about the science they're selling you.
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PHARMA & HEALTHCARE 2/22/2014 @ 3:40PM | 98,065 views

Is The CDC Hiding Data About Mercury, Vaccines, And Autism?

You know the rule. The answer is, "No." But the assertion has gone viral on social media thanks to the zombie-like resurrection of a long-told, oft-debunked story that the US Centers for Disease Control (CDC) is hiding its own data linking autism and mercury in vaccines. If you see such assertions in your timelines and newsfeeds (sample headline: "CDC Caught Hiding Data Showing Mercury in Vaccines Linked to Autism"), send the disseminators here. Why? Read on.

Image courtesy of www.rollingstone.com

Did CDC Conspire to Hide Vaccine Risk?

'Simpsonwood Conspiracy' Claims Debunked; Concerns Remain

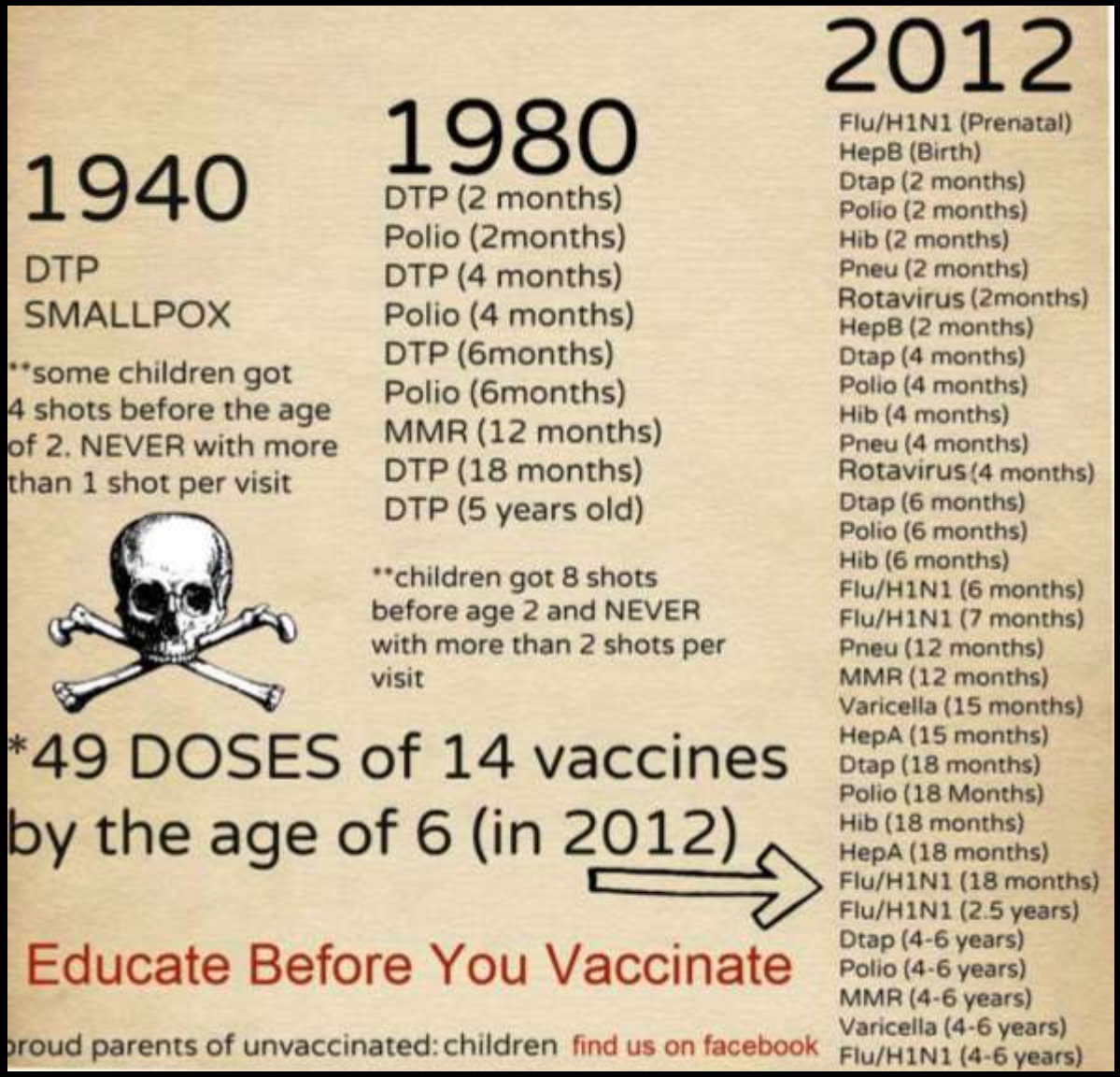
By Daniel J. DeNoon

WebMD Health News

Reviewed by Laura J. Martin, MD

WebMD News Archive

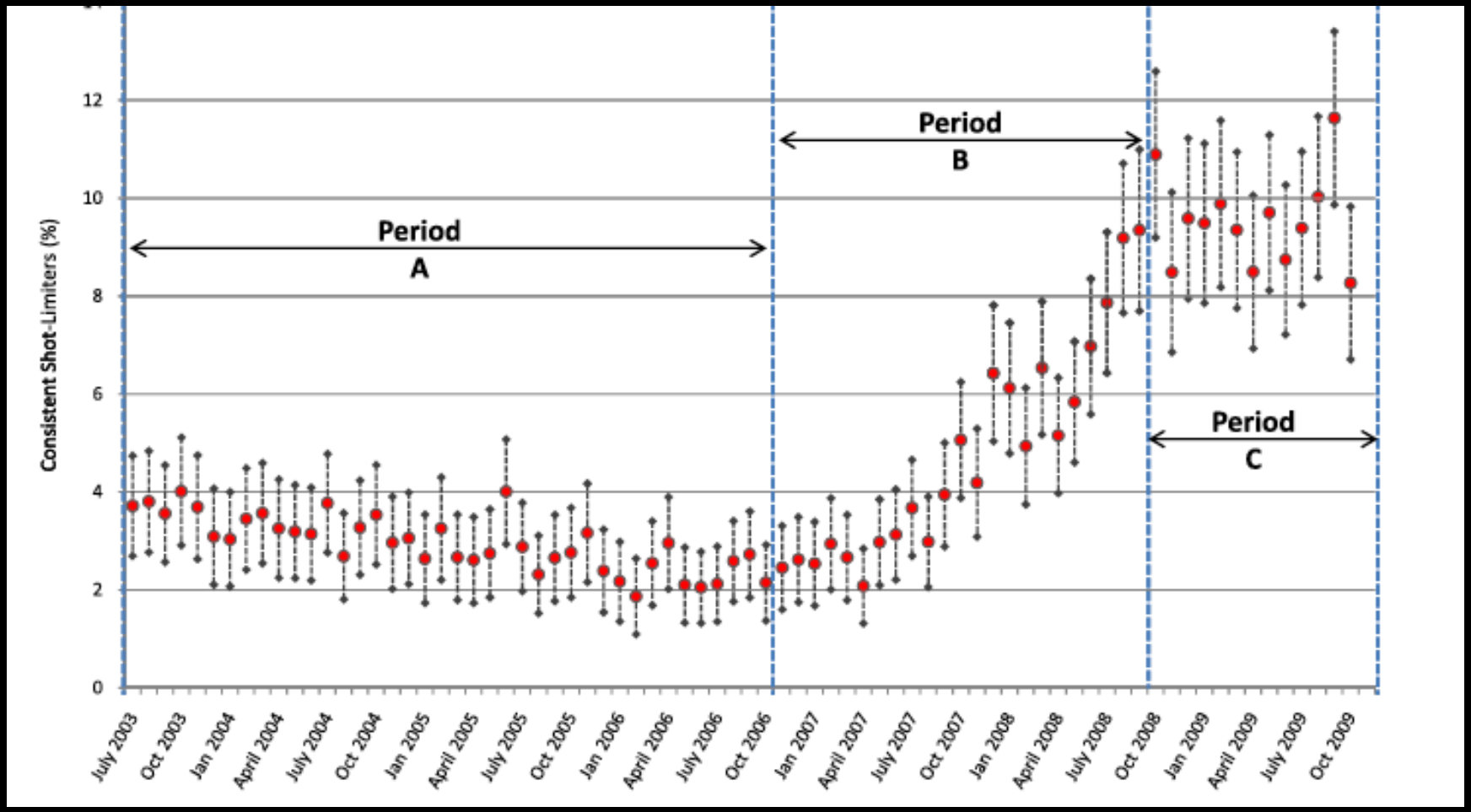
‘Antigen Overload’ and ‘Overwhelming the Immune System’



- Up to 23% of parents in national surveys question the number of shots their children receive
- 25% are concerned that vaccines may weaken or overload the immune system
- Many are concerned about too much ‘foreign material’ being injected into their children given the increasing number of vaccines used

Offit PA, et al. Pediatrics. 2002;109(1):124-132

Frequency of Alternative Vaccinations Schedules Over Time: Oregon, 2003-2009



Robison SG, et al. Pediatrics. 2012;130(1):32-41

Prevalence of Alternative Immunization Schedules

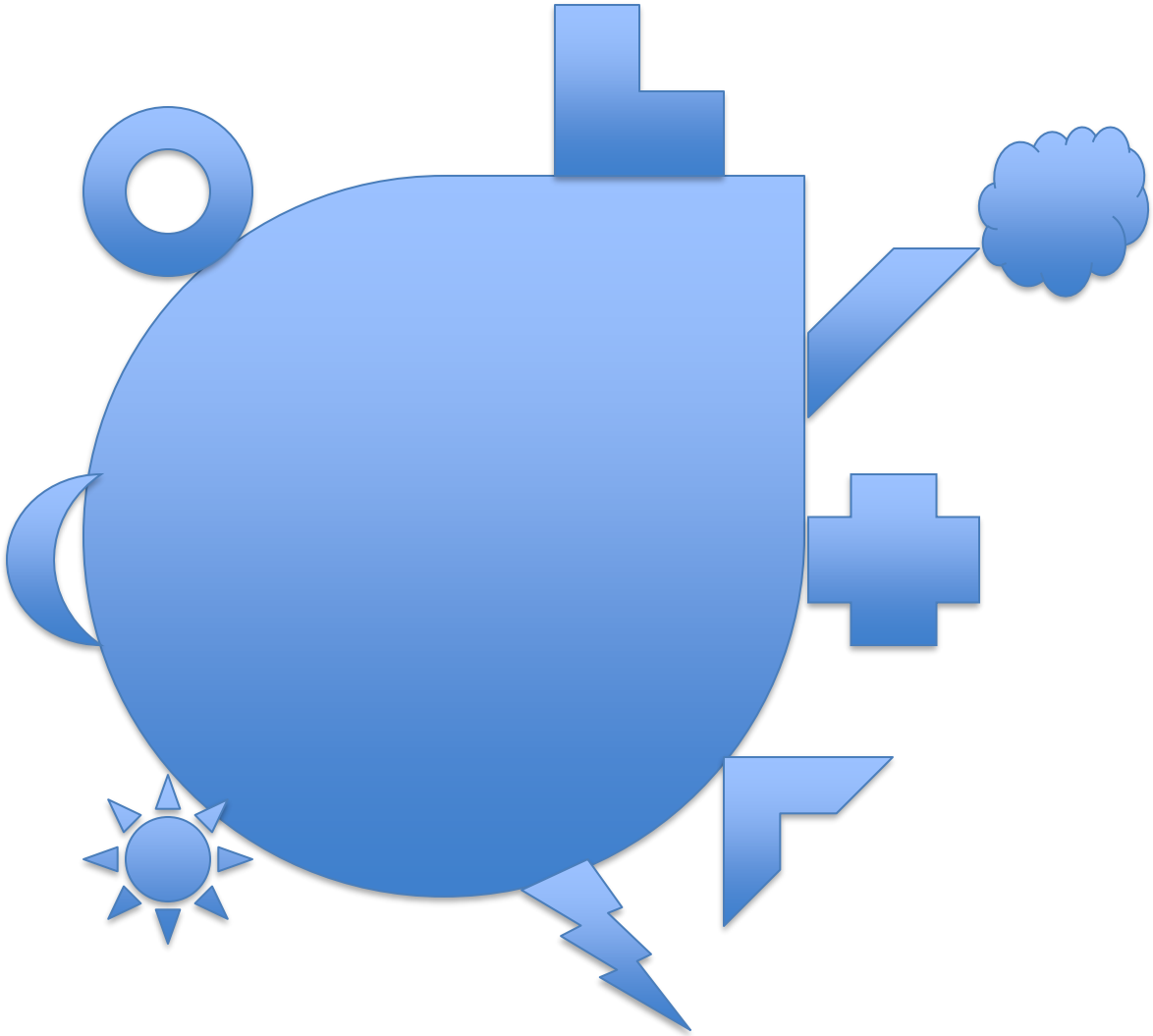
- 93% of nationally-surveyed Pediatricians report at least one request per month to 'space out' vaccines in children <2 years
- 21% more this happens in >10% of families they see

Kempe A, et al. Pediatrics. 2015;135(4):666-680

Increasing Numbers of Vaccines, 1900-2015

Year	# Vaccines	# Possible Injections by Age 2
1900	1	1
1960	5	8
1980	7	5
2000	11	20
2015	14	27

Offit PA, et al. Pediatrics. 2002;109(1):124-132
ACIP 2015 Immunization Schedule



Vaccine components, circa 1980

Vaccine components, circa 2000

Declining Number of Injected Antigens/Components in Vaccines, 1900-2015

Year	# Vaccines	# Possible Injections by Age 2	# Immunogenic Proteins/Sugars Injected
1900	1	1	200
1960	5	8	3,217
1980	7	5	3,041
2000	11	20	134

96% fewer antigens injected then in 1980 despite a 4-fold Increase in the # of vaccines

Offit PA, et al. Pediatrics. 2002;109(1):124-132

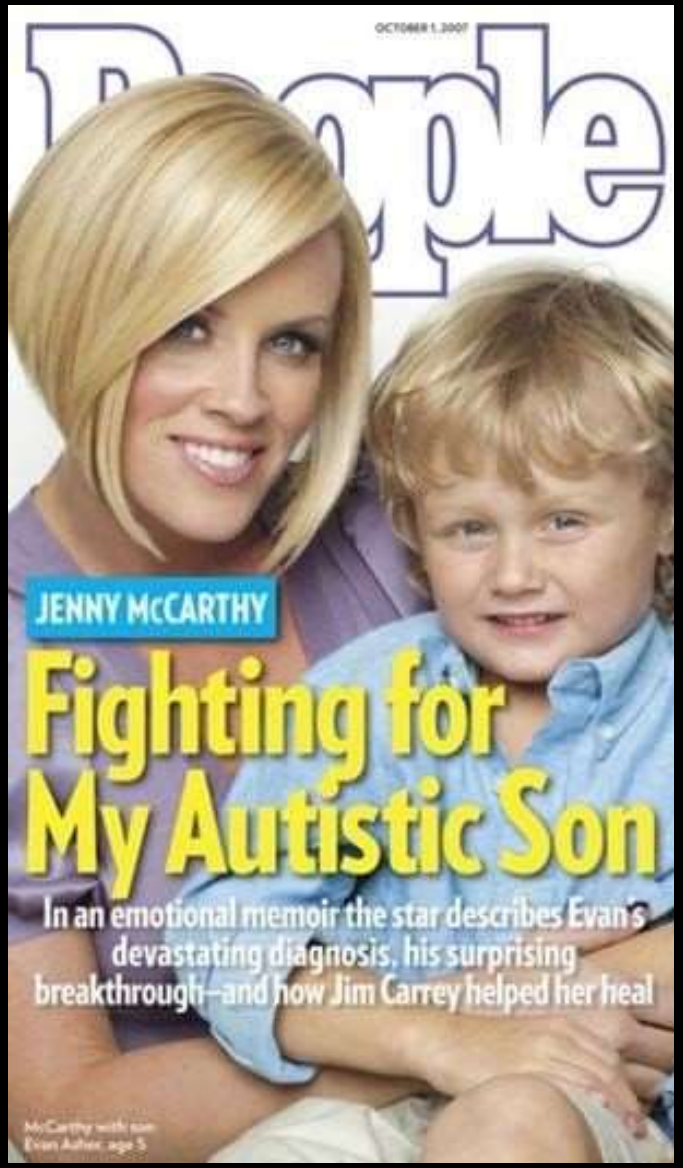
Take a Guess!

- In theory, children may be able to create up to 10^{11} different combinations of antibodies
- By calculating the estimated ability of the immune system to respond to antigens (e.g. concentration of antigen, number of B-cells per ml of blood, number of epitopes per vaccine, etc) a child should be able to respond to how many vaccines at one time?

Offit PA, et al. Pediatrics. 2002;109(1):124-132

10,000 vaccines at any one time

The Modern Cause Celebré



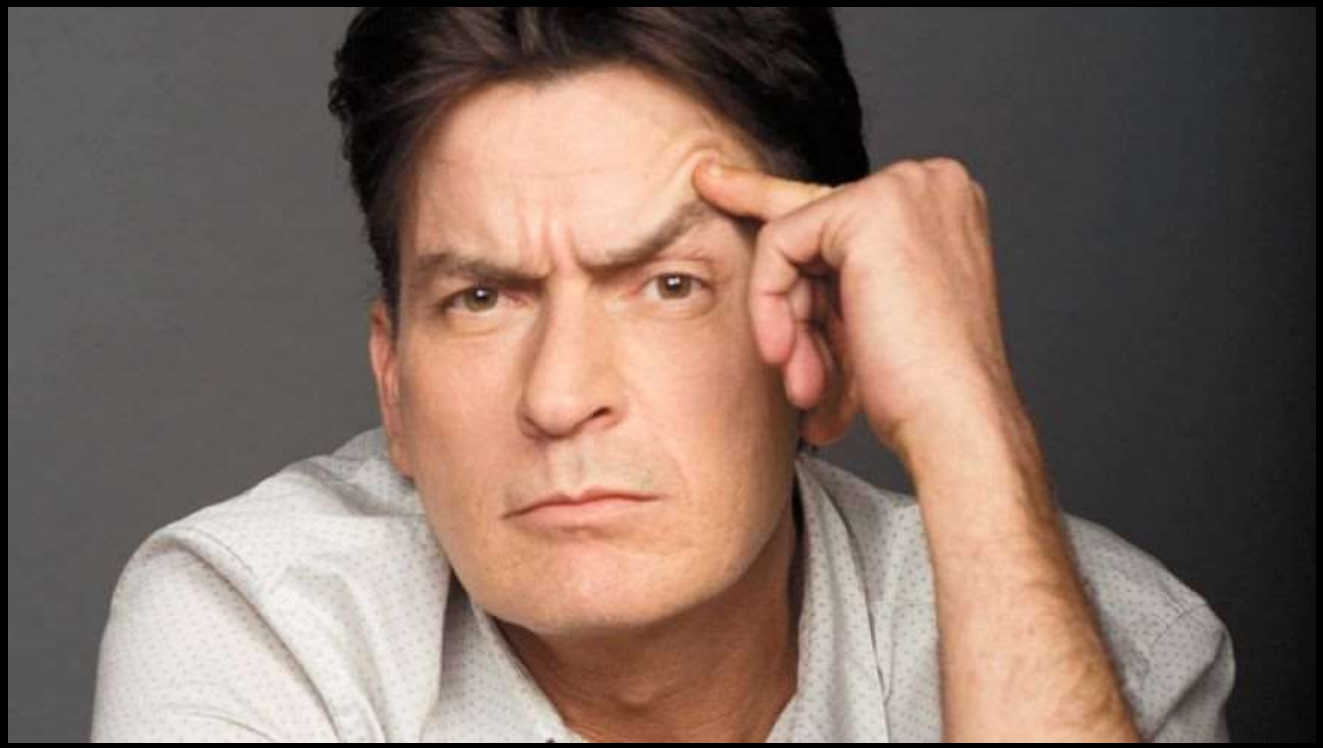
Sources of Trusted Information Re: Vaccines

Group	Medical Provider	Celebrities	Family/Friends	Parents of Children Allegedly Harmed by Vax
Parents	76%	26%	15%	73%

Freed GL, et al. Pediatrics. 2011;127(S1):S107-112

Charlie Sheen
2008

Has stated that vaccines are ‘poison’ and did not consent to allowing his daughters to receive the MMR vaccine



Bill Maher
2009

“Why would you let them be the ones to stick a disease into your arm? I would never get a swine flu vaccine or any vaccine. I don’t trust the government, especially with my health.”

Donald Trump
2012 (and 2015, 2016 and…)

"…there might be something to the idea that they are linked to autism. I think that when you add all of these vaccinations together and then two months later the baby is so different…I've known cases."

Rob Schneider
2014

“The efficacy of these shots have not been proven. And the toxicity of these things---we’re having more and more side effects. We’re having more and more autism. You can’t make people do procedures they don’t want…It’s against the Nuremberg Laws.”

Robert Kennedy, Jr.
April 2015

"They get the shot, that night they have a fever of 103 deg, they go to sleep, and 3 months later their brain is gone. This is a holocaust, what this is doing to our Country."

Watch Robert De Niro Talk Pulling Anti-Vaccine Film From Tribeca

"I think the movie is something that people should see," festival co-founder told 'Today.' "I want to know the truth. I'm not anti-vaccine, but I want safe vaccines"

Robert De Niro defended controversial anti-vaccine documentary 'Vaxxed' during an emotional interview with 'Today.'

Courtesy www.rollingstone.com. Accessed 10-24-16

Age of Autism
Daily Web Newspaper of the Autism Epidemic

Vaxxed At Cannes

MAY 22, 2017, *UK TIMES:* Anti-vaccine film Vaxxed will be given Cannes screening

By Oliver Moody, Science Correspondent

THE TIMES

Anti-vaccine film Vaxxed will be given Cannes screening

Oliver Moody,
Science Correspondent

May 23 2017, 12:01am,
The Times

Andrew Wakefield in Britain to promote the film. He was struck off in 2010 for producing fraudulent research
RUTH ACASTER

A documentary in which the disgraced former doctor Andrew Wakefield alleges that a link between vaccines and autism has been covered up by the US government is to be shown at the Cannes film

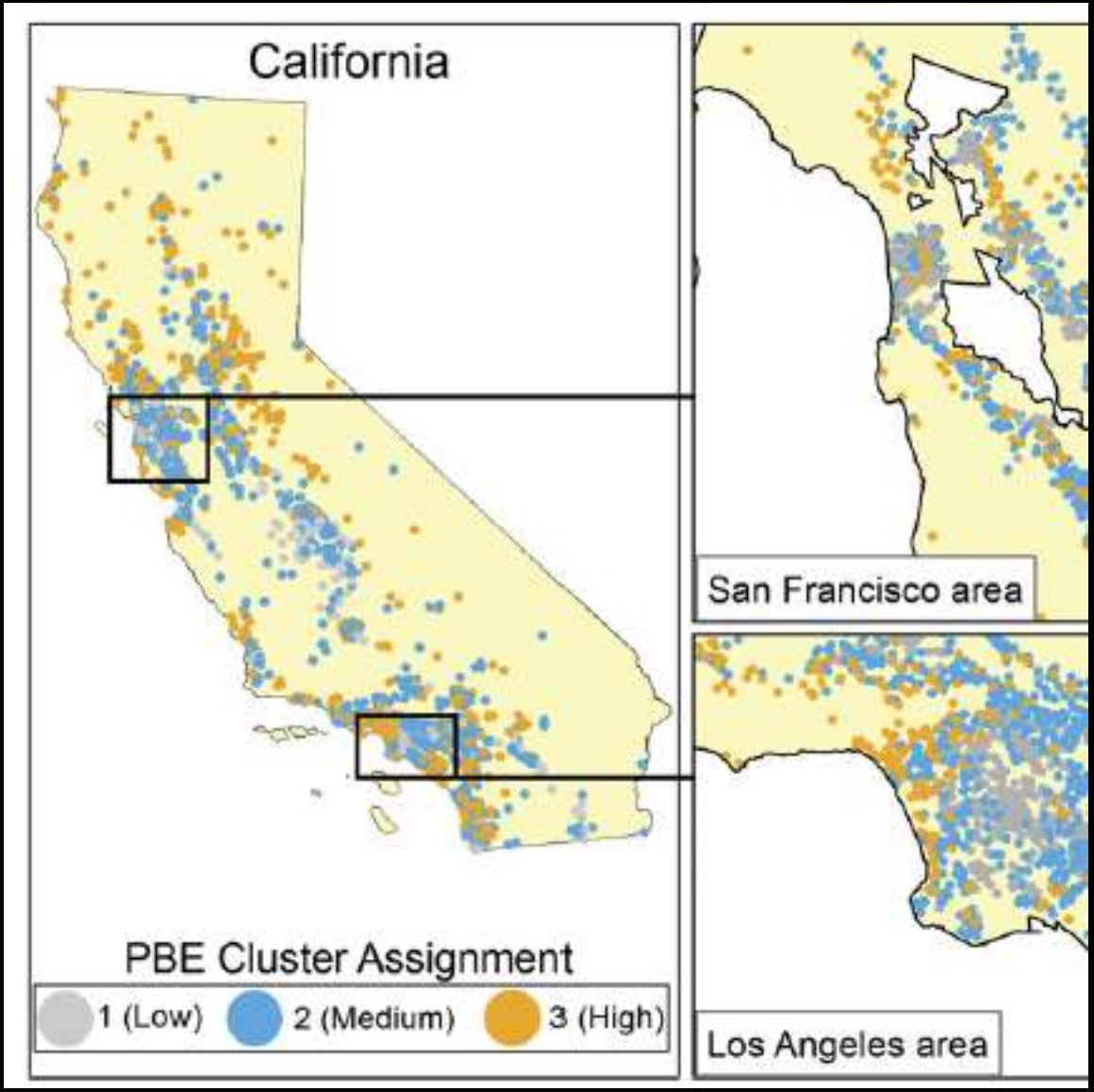
3.) So What Do I Do About This? Taking to Vaccine Hesitant Families

Current Epidemiology of Vaccine Hesitancy

- **Vaccine hesitant parents more likely to be:**
  - White
  - Married
  - >30 years old
  - College educated
  - Household income >$75,000
  - ≥4 children

Siddiqui M, et al. Hum Vacc Immunother. 2013;9(12):2643-2648
Smith PJ, et al. Pediatrics. 2004;114:187-195

Location and Clustering of PBE's: California, 2001-2014



Carrel M, et al. Pediatrics. 2015;136(1):80-91

Rationale for Vaccine Hesitancy: Vaccinated vs. Unvaccinated Families

Group	Vaccine Aren't Safe	Vaccines Don't Work	Won't Get Sick	Don't Trust the Government
Vaccinated	15%	17%	15%	23%
Unvaccinated	61%	54%	58%	40%

Salmon DA, et al. Arch Pediatr Adolesc Med. 2005;159:470476

Strategies for Engagement

- **Key Points**
  - The psychology of vaccine hesitancy is complicated and variable (one size may not fit all)
  - Poorly studied

Strategies for Engagement

- **Systematic review of published studies assessing strategies for addressing vaccine hesitancy**
  - 33,023 potential articles identified
  - 1,208 articles fit inclusion criteria
  - Only 181 evaluated the proposed intervention(s)
    - Did vaccine uptake change?
    - Did attitudes/beliefs change?

Jarrett C, et al. Vaccine. 2015;33:4180-4190

Strategies for Engagement

- **Least effective interventions (<10% increase in vaccine uptake)**
  - Passive advertising (posters, websites, billboards)
  - Extended clinic hours
  - Incentives for vaccination
  - Reminder-recall strategies

Jarrett C, et al. Vaccine. 2015;33:4180-4190

Strategies for Engagement

- **Most effective interventions (>25% increase in vaccine uptake)**
  - Aimed to increase knowledge (e.g. dialogue-based interventions)
  - Mandated vaccinations (? Increase mistrust, does not address underlying problem, not used in countries with higher vaccination rates)
  - Engaged religious or other influential community leaders

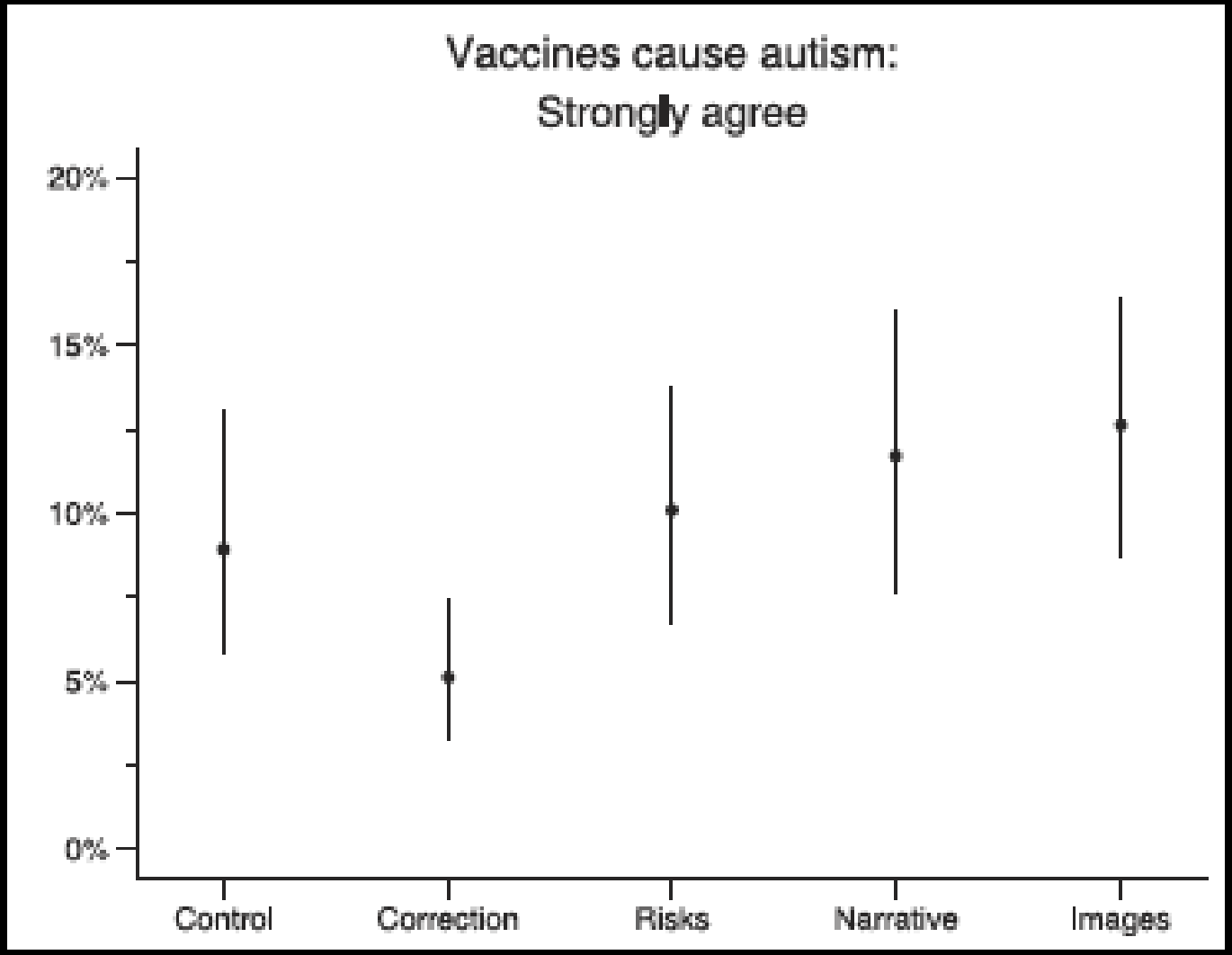
Jarrett C, et al. Vaccine. 2015;33:4180-4190

Strategies for Engagement

- **1759 parents provided with 1 of 4 narrative scripts:**
  - Information describing the lack of association with the MMR vaccine and autism
  - Discussion of the dangers of vaccine preventable diseases
  - Images of children infected with vaccine preventable diseases
  - A dramatic narrative of a child who almost died from measles
  - A control group discussing bird feeding

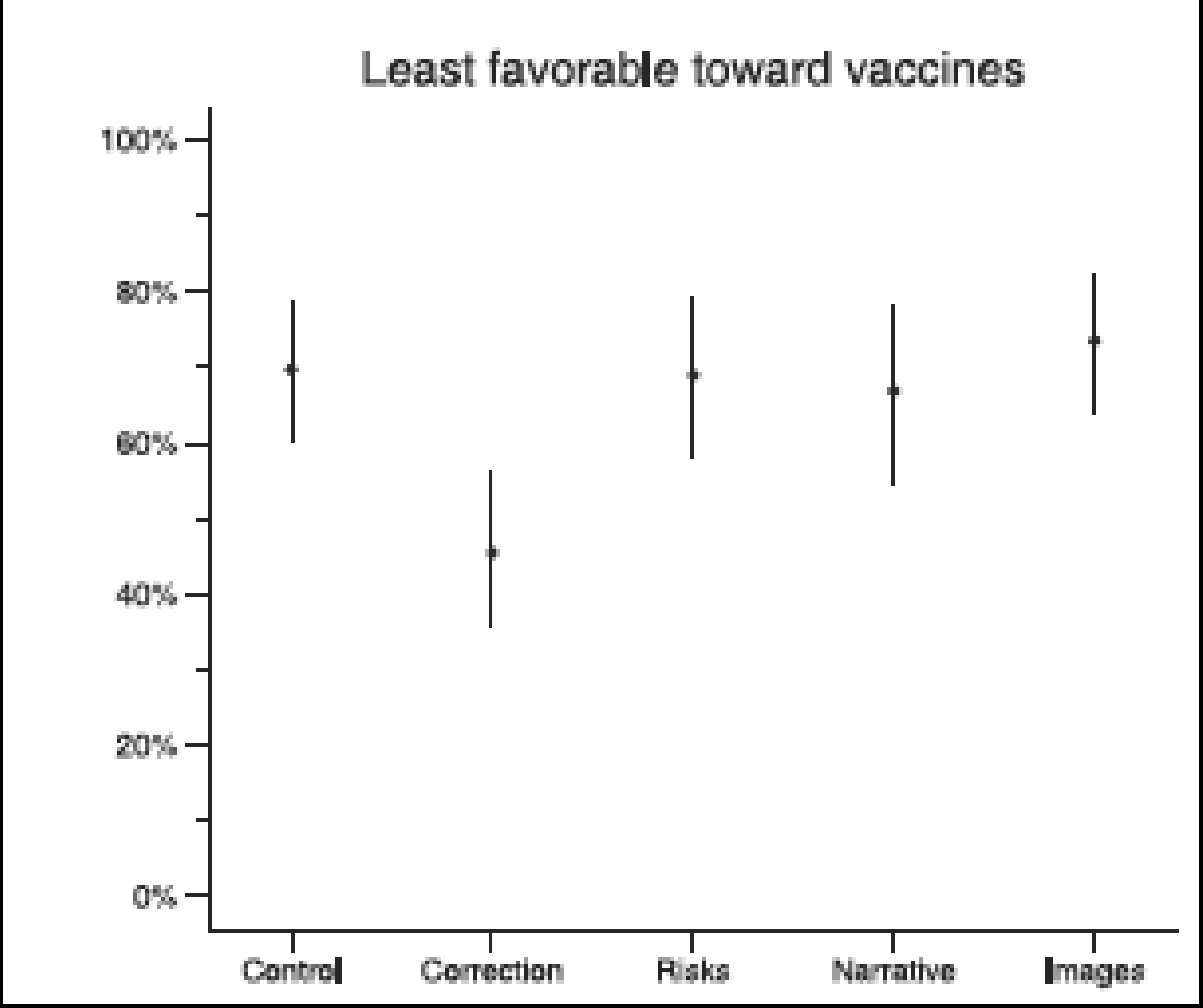
Dube, et al. Vaccine. 2015;33:4191-4203

Likelihood of Families Beliefs Changing After Interventions



Dube, et al. Vaccine. 2015;33:4191-4203

How Likely Families Are to Consent to an MMR After an Intervention



Dube, et al. Vaccine. 2015;33:4191-4203

Strategies for Engagement

- **Authors concluded:**
  - Findings similar to studies of ‘fixed-thinking’ in politics and other vaccine studies
  - ‘The 5%’ may not budge in their thought process

Dube, et al. Vaccine. 2015;33:4191-4203

Strategies for Engagement

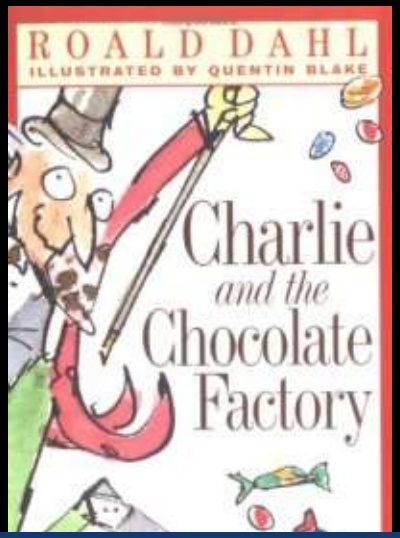
- **So What to Do?**
  - Patience
  - Address any obvious misunderstandings
  - Provide evidence where evidence may help
  - Dialogue
  - Uncover the rationale for their hesitancy
  - Avoid ‘cheap fixes’
  - No ‘silver-bullet’, ‘one-size fits all’ approach
  - You will never convince everyone

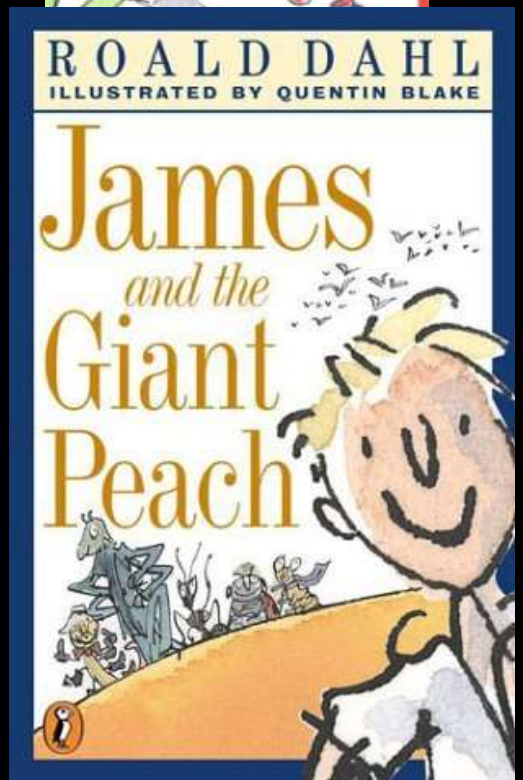
The ‘4 C’ Model

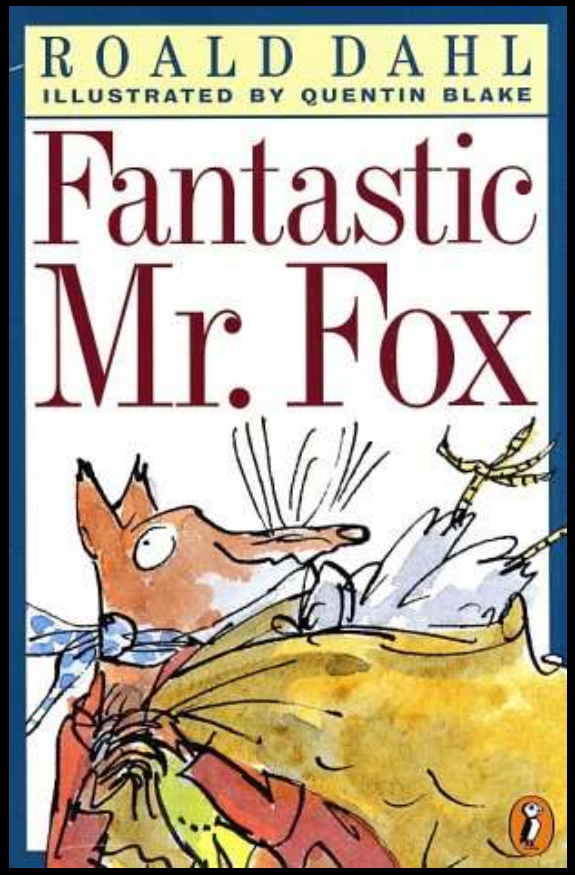
Group	Worldview/Factors Affecting Vaccination	Engagement Approach
Complacency	Not at risk for diseases/not needed	Not opposed to vax---increase perception of risk
Convenience	Money, transportation, accessibility issues	Often open to vax---remove barriers; reminders/texting
Confidence	**Distrust in vax or the medical system**	**Hardest to deal with---firmly entrenched fears**
Calculation	Assess the pros and cons: Often those who take advantage of herd immunity	Not opposed to vax---discuss risks of contracting disease

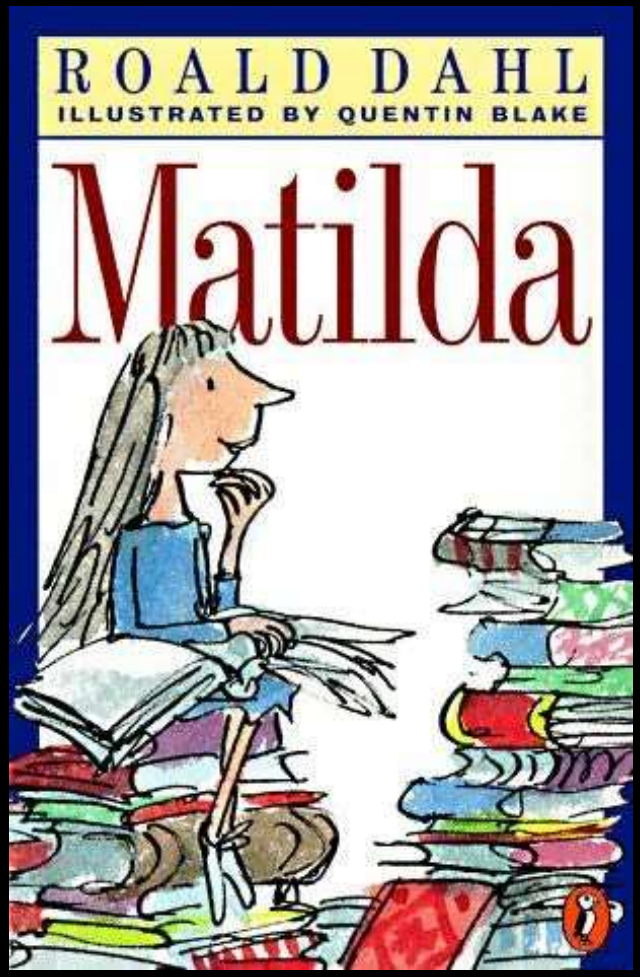
Adapted from Betsch, et al. Policy Insights from the Behavioral and Brain Sciences. 2015;2(1):61-73

4.) Conclusion
The Death of Olivia Dahl









The Death of Olivia Dahl
November, 1962

Olivia, my eldest daughter, caught measles when she was 7 years old. As the illness took its usual course I can remember reading to her often in bed and not feeling particularly alarmed about it. Then one morning, when she was well on the road to recovery, I was sitting on her bed showing her how to fashion little animals out of pipe cleaners, and when it came to her turn to make one herself, I noticed that her fingers and her mind were not working together, and she couldn't do anything.

The Death of Olivia Dahl
November, 1962

“Are you feeling alright?” I asked her.

“I feel all sleepy” she said.

The Death of Olivia Dahl
November, 1962

In an hour, she was unconscious.

In twelve hours she was dead.

The Death of Olivia Dahl
November, 1962

There is today something that parents can do to make sure that this sort of tragedy does not happen to a child of theirs. They can insist that their child is immunized against measles. I was unable to do that for Olivia in 1962 because in those days a reliable measles vaccine had not been discovered.

The Death of Olivia Dahl
November, 1962

It is not yet generally accepted that measles can be a dangerous illness.

Believe me, it is.