School of Pharmacy
South African Vaccination and Immunisation Centre
Sefako Makgatho Health Sciences University

Counter anti-vaccination myths and build the vacci(Nation)

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Declaration

No conflict of interest to declare

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Outline of presentation

- Key issues to **increase vaccination uptake**
  - **Advocacy**
  - **Social mobilisation**
  - **Communication**
- **Vaccine communication** in **practice**
  - How to build **trust**
  - Different types of **explanations** and when they should be used
  - How to **counter anti-vaccination myths**

KEY ISSUES CONCERNING ADVOCACY, SOCIAL MOBILISATION AND COMMUNICATION TO INCREASE VACCINATION UPTAKE

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Vaccination advocacy

http://timeschangin.blogspot.com/2009_03_15_archive.html

- **Influencing public opinion** to bring about **social change**
  - E.g. The Treatment Action Campaign brought about HIV/AIDS policy changes
- **Policy-related** vaccination **advocacy**
  - Public health officials & scientists
  - SA Department of Health fully supports EPI-SA
- South African **media advocacy** for vaccines
  - Influence way media reports on vaccination-related issues
  - Government officials, healthcare workers and academics

Vaccination communication

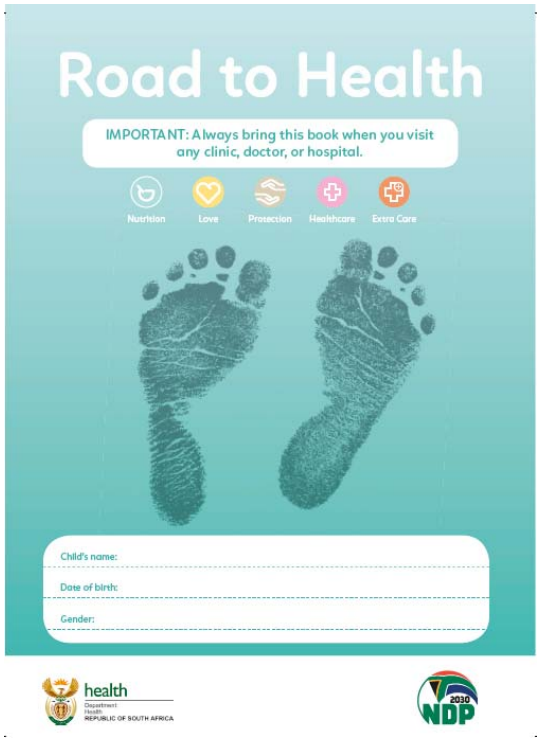
- **Exchange / sharing** of information
- Effective communication
  → **mutual understanding**
  - Stakeholder education
  - Educating clients about vaccination risks and benefits
  - Media communication
- Allocate **time for health promotion**
  - Establish knowledge
  - Respect language and culture
  - Explain verbally
  - Don’t overwhelm with too much information
  - Adapt to individual and community needs
  - Ensure understanding

http://clipartmag.com/communication-images#communication-images-26.jpg

South African National Department of Health, Expanded Programme on Immunisation (2015). Vaccinator’s Manual: “Immunisation that works”.

Vaccination communication
Essential information

- **All** side-effects that may occur
- Managing **mild** side effects at home
- **Return to the clinic** if **more serious** side effects occur
- The **date and time** of the next vaccination session
- The outstanding **doses**
- Importance of date to ensure timely **completion** of schedule
- Date and time of **next vaccination** session on **Road to Health Book (RtHB)**
- Use reference points if the caregiver is **illiterate**



South African National Department of Health, Expanded Programme on Immunisation (2015). Vaccinator's Manual: "Immunisation that works".

Vaccination communication

Risk benefit communication

http://vaccine-safety-training.org/balancing-efficacy-and-safety.html

- Vaccination risks versus disease risks
- Vaccination benefits far outweigh risks
- Serious AEFIs rare
- Serious complications of diseases common
- Anti-vaccination misinformation on credible-looking websites

Advice given by healthcare workers highly regarded

- **Be knowledgeable about the science**
- **Understand risks and benefits**
- **Communicate this information effectively**

Social mobilisation

- Social mobilisation = **high demand** for vaccination.
- Beyond understanding and accepting need → demanding vaccination as a **human right** and vaccinating their children
- All stakeholders convinced through effective advocacy and effective communication that vaccination is a **public good** that is **worth providing** and **worth receiving**

Effective vaccination **advocacy + communication** = **Social mobilisation**

Increased vaccination uptake

Importance of advocacy, social mobilisation and communication regarding vaccination

- **Politicians:** well-considered, evidence-based decisions
- **Healthcare workers:** fully understand and promote vaccination
- **Teachers / community leaders:** influence others
- **General public:** demand vaccination as a human right
- **Media:** informed, responsible decisions about publication

https://www.slideshare.net/AlAlva1/social-mobilization-73070119

VACCINE COMMUNICATION IN PRACTICE

How to build trust

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Building trust before delivering the message

- Health messages can be distressing
- **Stressed / uncomfortable** people unlikely to understand / accept
- **Confidence** and **full attention** first priority
- **Acknowledgement** of **concerns** gains attention
- Knowledgeable people judge information on merits
- **Unknowledgeable** people use peripheral cues to help them decide
  - Are you likeable?
  - Do you care about their concerns?
- Explaining **complex issues** at the outset may engender suspicion
  - Effective communication will not occur
  - Demonstrating importance of child's health to you builds trust

Rowan KE (2000). Explaining illness through the mass media: a problem-solving perspective. In: Whaley BB (ed). Explaining Illness: Research, theory, and strategies.

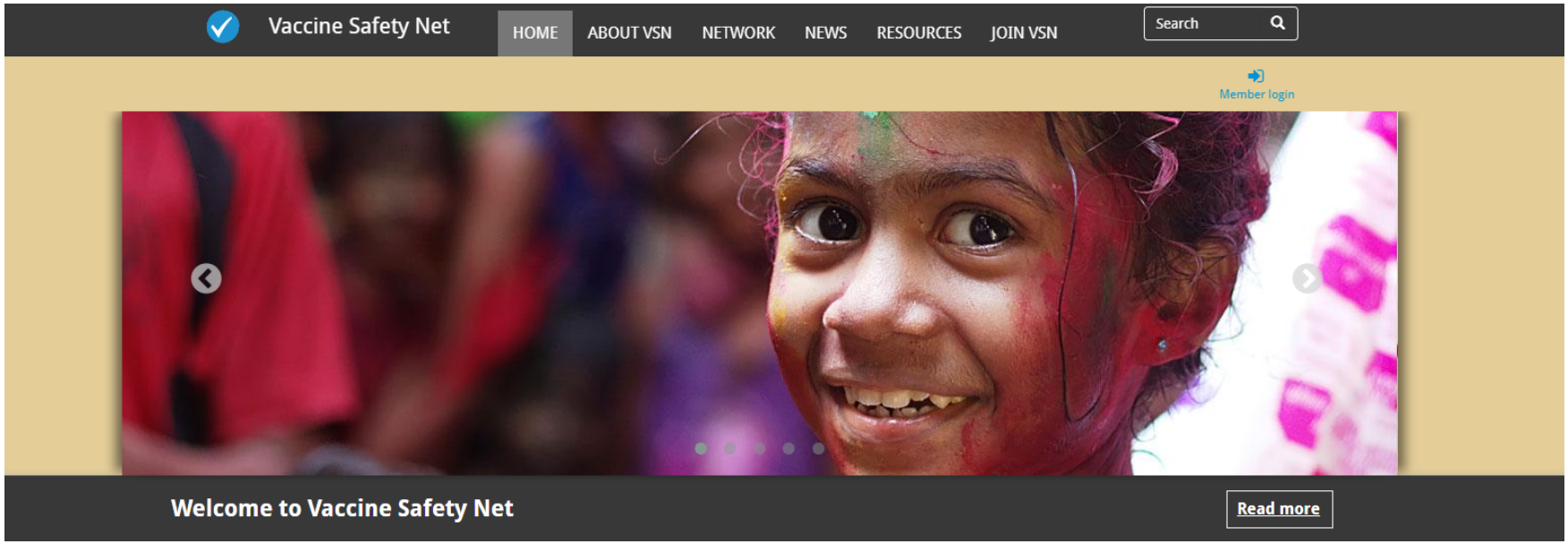
Building trust before delivering the message (2)

- Build **self-confidence**
  - Don't ridicule caregivers' sources of vaccine misinformation
  - Endorse credible books, magazines and websites that you find helpful and interesting

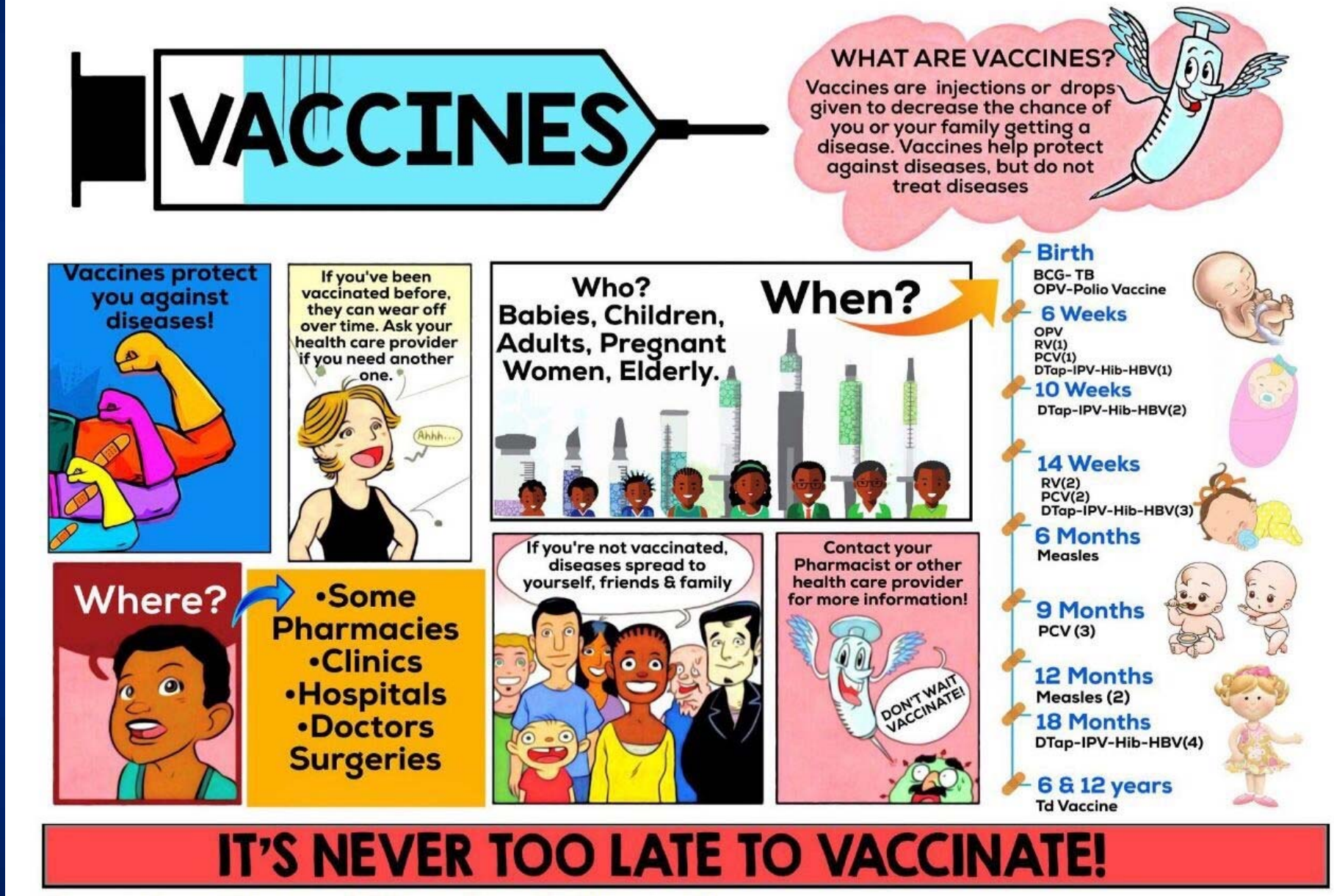
Rowan KE (2000). Explaining illness through the mass media: a problem-solving perspective. In: Whaley BB (ed). Explaining Illness: Research, theory, and strategies.

Website example

http://www.vaccinesafetynet.org/



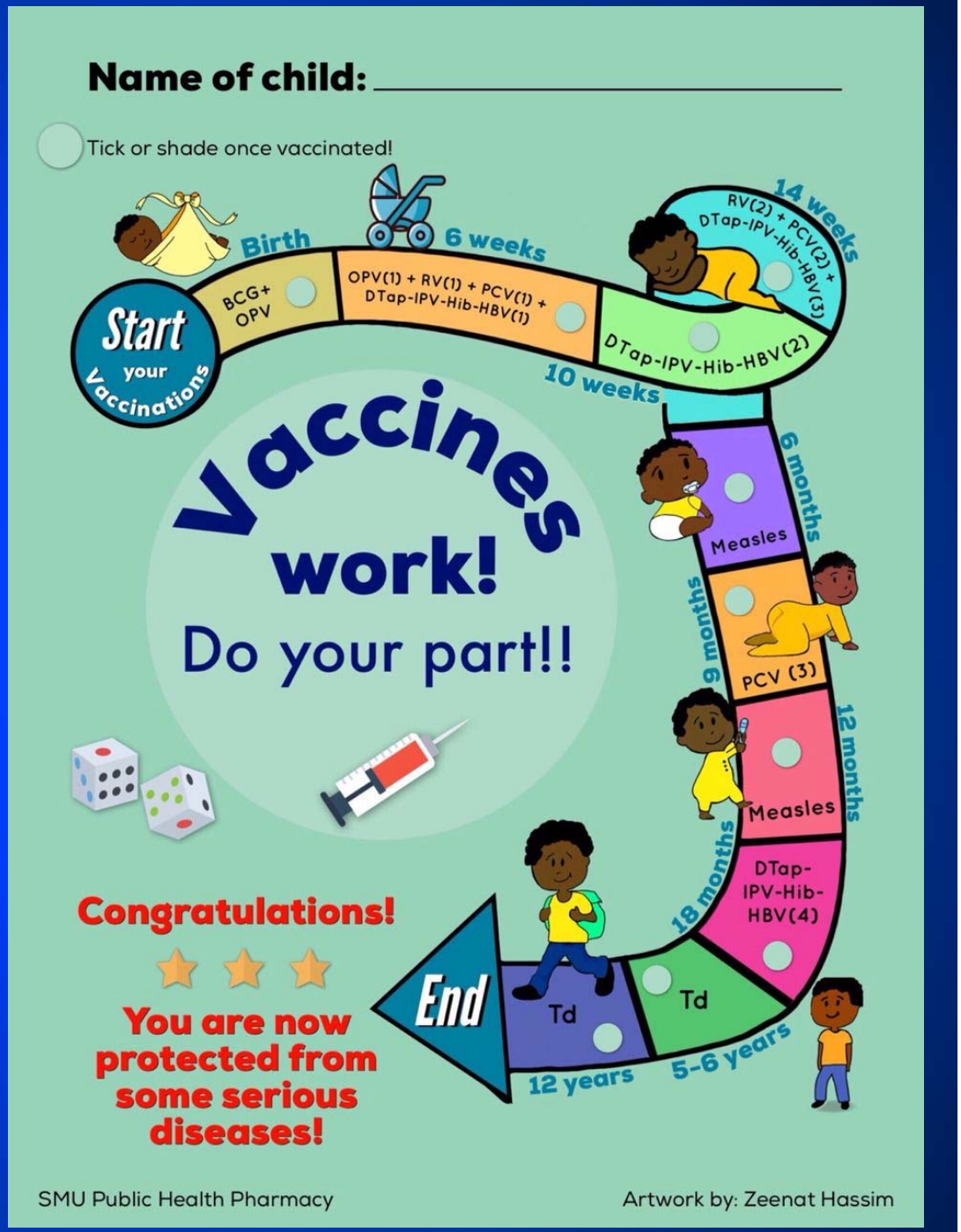
Example



Zeenat Hassim. BPharm II Student, SMU. 2017

Example

Vaccination schedule reminder: Fridge magnet



VACCINE COMMUNICATION IN PRACTICE

Different types of explanations and when they should be used

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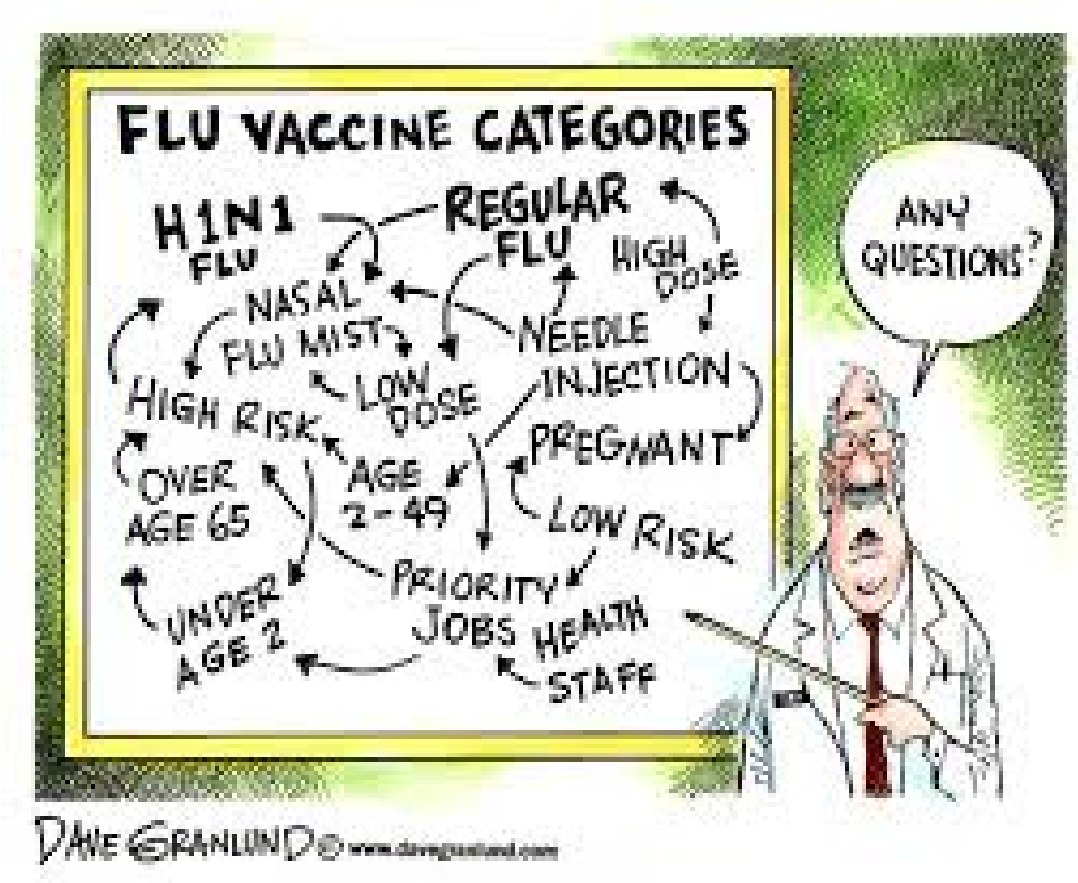
Explaining complex subject matter

- Three main **obstacles prevent understanding** complex subject matter:
  - Distinguishing **essential meanings of terms** from meanings associated by lay people with these terms
  - Visualising **complex human anatomical or physiological** phenomena or pathology
  - Understanding ideas that contradict **lay beliefs**
- Three different **types of explanations** to overcome these obstacles
  - **Elucidating** explanations
  - **Quasi-scientific** explanations
  - **Transformative** explanations

Rowan KE (2000). Explaining illness through the mass media: a problem-solving perspective. In: Whaley BB (ed). Explaining Illness: Research, theory, and strategies.

Elucidating explanations



Clarify terms - useful for:

- Introducing vaccines
- Increasing uptake
- Allaying public fears

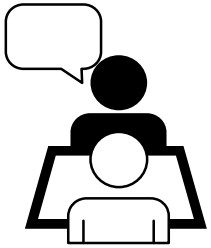
Best when there is no causal relationship:

"following" ≠ "caused by"

Rowan KE (2000). Explaining illness through the mass media: a problem-solving perspective. In: Whaley BB (ed). Explaining Illness: Research, theory, and strategies.

Elucidating explanation: Example

Example:



- Explaining what a vaccination is, and what it is not

When can this kind of explanation be used?

- When caregivers **do not have the basic knowledge** about vaccination
- When caregivers have asked if they can rather give their babies **alternative types of vaccination**
- Also suitable for
  - Parenting / baby magazine
  - Talk show slot on radio or TV
  - Website on parenting

Explanation example: What is a vaccination

- A vaccination is when a **healthy person** is given a vaccine to **prevent** them from getting a specific **disease**.
- A vaccine is **made** from the **germ** that causes the disease – it can be made of parts of the germ that **can't cause disease**, or whole killed germs, or a live germ that has been stripped of its disease-causing ability.
- The vaccine makes the person **build up resistance to the germ**, so that if the person is ever exposed to the real live germ, they are highly unlikely to get the disease that the germ causes – this is called **immunity**, which is why vaccinations are sometimes also called immunisations.
- For **example**, vaccination against **polio** starts **when babies are born**, before they have a chance to be exposed to polio germs. The polio vaccine is then also given at 6, 10 and 14 weeks, and again at 18 months, to allow the baby to build up full immunity to polio. Polio vaccination can be done by using polio drops in the mouth, or it can be given by injection.

Explanation example:
What is a vaccination NOT

- A vaccination is **not a medicine**, and the vaccines we use in infant immunisation programmes cannot be given to sick people to make them better.
- **Homeopathic** "vaccines" are **not vaccines** at all, since they don't contain any vaccine material and can't produce immunity.
- Nor can your baby be vaccinated by playing with children who have the disease at so-called **"immunisation parties".**
  - In fact your baby stands a very high chance of catching the disease at such parties.
- Although the **disease** may be **mild** in most children, it can be **very severe** in others, and can result in long-term illness and suffering for your baby, and sometimes even death.
- Vaccines are the most **effective** way to **protect** your child from dangerous diseases and the best way to keep your child **healthy**

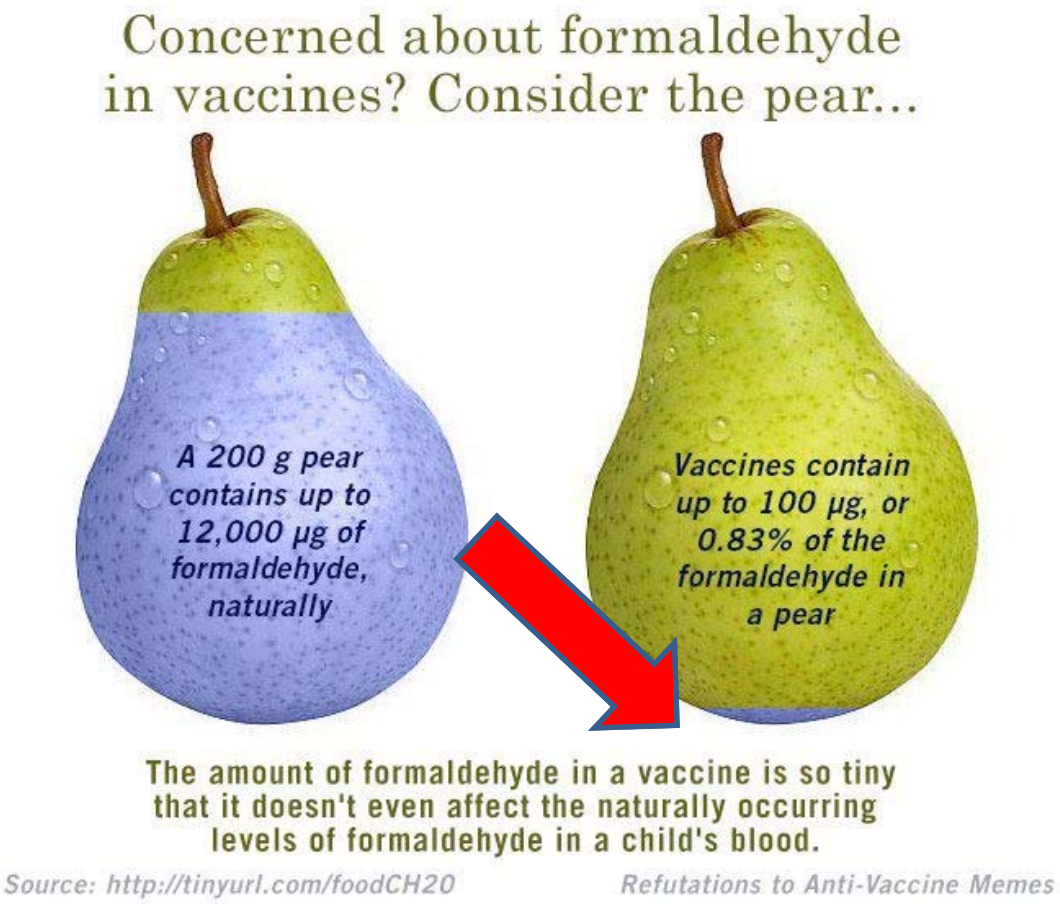
Quasi-scientific explanations

- Communication may fail because people cannot visualise information
- Quasi-scientific explanations **help visualising** complex issues
- **Simple images** in words or graphics create images in the mind
- **Headlines** show how content is organised
- **Comparisons** organise the message further
- Help to make written communication effective
  - **Headings**
  - **Sub-headings**
  - **Captions**
  - **Signalling phrases**

Rowan KE (2000). Explaining illness through the mass media: a problem-solving perspective. In: Whaley BB (ed). Explaining Illness: Research, theory, and strategies.

Quasi-scientific explanation
Example of formaldehyde

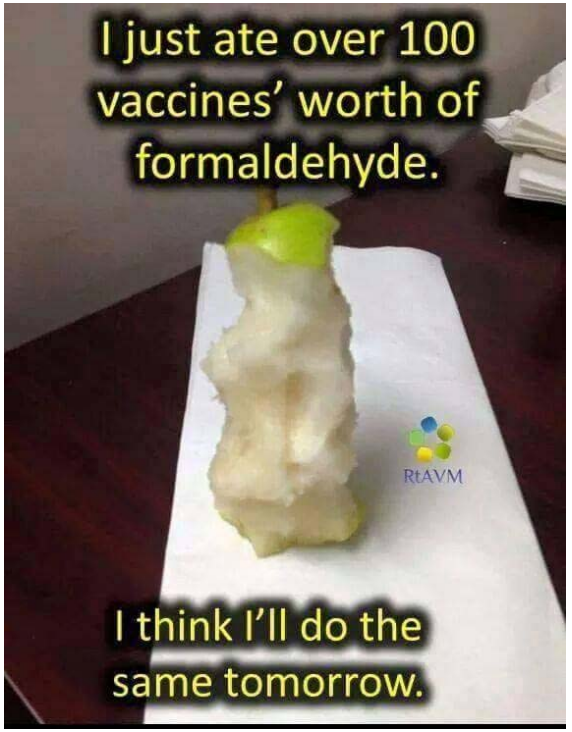
Best for explaining causal relationship



https://www.facebook.com/RtAVM/photos/-new-a-pair-of-pears-putting-into-perspective-the-amount-of-formaldehyde-in-a-va/484442114959136/

Useful for:

- Introducing vaccines
- Increasing uptake
- Allaying public fears



https://za.pinterest.com/pin/296463587949786509/

Quasi-scientific explanation

Example:

- Explaining **vaccine-associated paralytic poliomyelitis (VAPP)**, following vaccination with the oral polio vaccine.

When can this kind of explanation be used?

- Suitable for the **print media**, and could also be **depicted with graphics**.
- Should be combined with an **elucidating explanation** about polio and polio vaccines, being **"boxed"** to highlight it as the **"take-home"** message

Note:

- If there is already a lot of negative publicity, then a **transformative explanation** would be more suitable

Quasi-scientific explanation
Example: Vaccine-associated paralytic poliomyelitis

- **What does the oral polio vaccine contain?**
  - The oral polio vaccine contains live polio viruses (the germ that causes polio paralysis) that have been weakened and stripped of their ability to cause disease.
- **How does the oral polio vaccine work?**
  - The weakened polio viruses prevent polio by causing the body to make polio antibodies, which are the body's weapons to fight polio when the body is exposed to real live polio viruses in the environment.
- **Can these live oral polio vaccines cause polio?**
  - In extremely rare cases, the weakened polio virus undergoes a change (mutation) that restores its strength and ability to cause disease. When this happens, polio paralysis can develop.
- **How often does this happen?**
  - 1 case per 2.7 million doses globally
- **What is the risk of getting polio paralysis if you are exposed to the real live polio virus, and are not vaccinated?**
  - 1 in 200

Burnett RJ. Vaccination and the media. WHO Afro / NESI 5th Regional Vaccinology Course. Burgers Park Hotel, Pretoria, South Africa, 27 May-1 June 2013.
WHO (2015). Vaccine-associated paralytic polio (VAPP) and vaccine-derived poliovirus (VDPV). Fact Sheet, February 2015. http://www.who.int/immunization/diseases/poliomyelitis/endgame_objective2/oral_polio_vaccine/VAPPandcVDPVFactSheet-Feb2015.pdf.

Transformative explanations

http://www.who.int/immunization/hpv/communicate/en/

Rowan KE (2000). Explaining illness through the mass media: a problem-solving perspective. In: Whaley BB (ed). Explaining Illness: Research, theory, and strategies.

Four steps help to understand ideas that contradict lay beliefs:

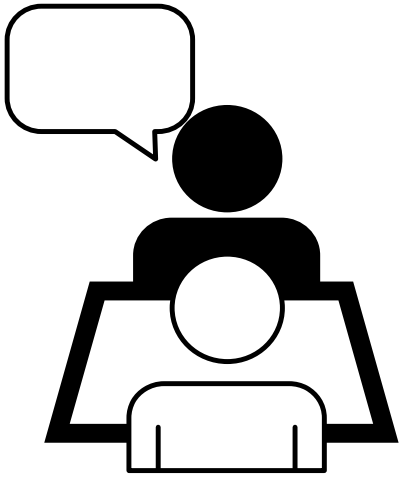
1. State lay view
2. Acknowledge plausibility of lay view
3. Create dissatisfaction with lay view
4. State scientifically endorsed view; show why this is better

Best for countering anti-vaccination messages

Transformative explanation
Use of examples

Example:

- Explanation that there is no link between vaccines and autism



When can this kind of explanation be used?

- When a **caregiver is reluctant** to accept
  - MMR vaccine
  - Vaccines that contain additives
  - Multivalent vaccines
- It is also **suitable** for
  - Parenting / baby magazine
  - Talk show slot on radio or TV
  - Website on parenting

Transformative explanation
Example: Step 1 and Step 2

Step 1: State the lay theory

- **Despite** the fact that **Dr Wakefield has been found guilty** of falsifying his results in the original report that linked vaccination to autism, many people still believe that **vaccines cause autism**.
- Some say that this is because of the **viruses** in the vaccine, others say that vaccine **preservatives** are to blame, while others say it is because children are getting **too many vaccines at once**.

Step 2: Acknowledge the plausibility of the lay view

- It is **not only lay people** who hold this view
- A few **scientists** support it, and have come up with **causal pathways** to support their claims that are **biologically plausible** to **themselves** at least, and which are convincing to many well educated members of the public.

Burnett et al. 2012. Addressing public questioning and concerns about vaccination in South Africa: A guide for healthcare workers. Vaccine, 30 Suppl 3:C72-8.

Transformative explanation
Example: Step 3

Step 3: Show how the lay view does not hold up to scrutiny

- However, these claims are discredited for several reasons. First, Wakefield had **not designed** his **study** in a way that **could show cause** – it lacked both a statistically powerful sample size and a comparison group.
- The findings were on **only 8 of 12 autistic children**, all 8 having received MMR (falsified at the time of publication as "before developing autism"; we now know it was "after" in some cases). At the time MMR coverage in Britain was 92%, thus most children aged between 1 to 2 years would have received MMR.
- As it happens, **autism** is usually **diagnosed** at this **age**, so it is not surprising that these children were diagnosed at around the same age as MMR vaccination.

Burnett et al. 2012. Addressing public questioning and concerns about vaccination in South Africa: A guide for healthcare workers. Vaccine, 30 Suppl 3:C72-8.

Transformative explanation
Example: Step 3 (cont)

- Second, **preservatives** have **never** been used in MMR – it is a **live vaccine**, and preservatives are used only in killed vaccines.
- Third, **babies** are **exposed** to **numerous organisms** every day, and suffer many viral infections each year, which they clear.
  - Besides, babies who are vaccinated respond just as well to infections that are not vaccine-preventable, as babies who are not vaccinated.
  - When vaccinated with multivalent vaccines (i.e. vaccines that act against a number of organisms), babies respond with antibody titres just as high as when vaccinated with the individual vaccines separately.

Burnett et al. 2012. Addressing public questioning and concerns about vaccination in South Africa: A guide for healthcare workers. Vaccine, 30 Suppl 3:C72-8.

Transformative explanation
Example: Step 4

Step 4: State the scientifically endorsed view and show how this explains the phenomenon better than the lay view

- Most compellingly, since Wakefield's original report in 1998, **over 1 million children** have been studied using statistically powerful epidemiological study designs
- **No link between vaccination and autism** has been found in any of these studies.
- Studies **to show cause** (i.e. to rule out coincidence) must always consist **of at least 2 groups**
  - Those vaccinated and those not vaccinated
  - Further sub-divided into those with autism and those without autism in each group for comparison by statistical analysis.

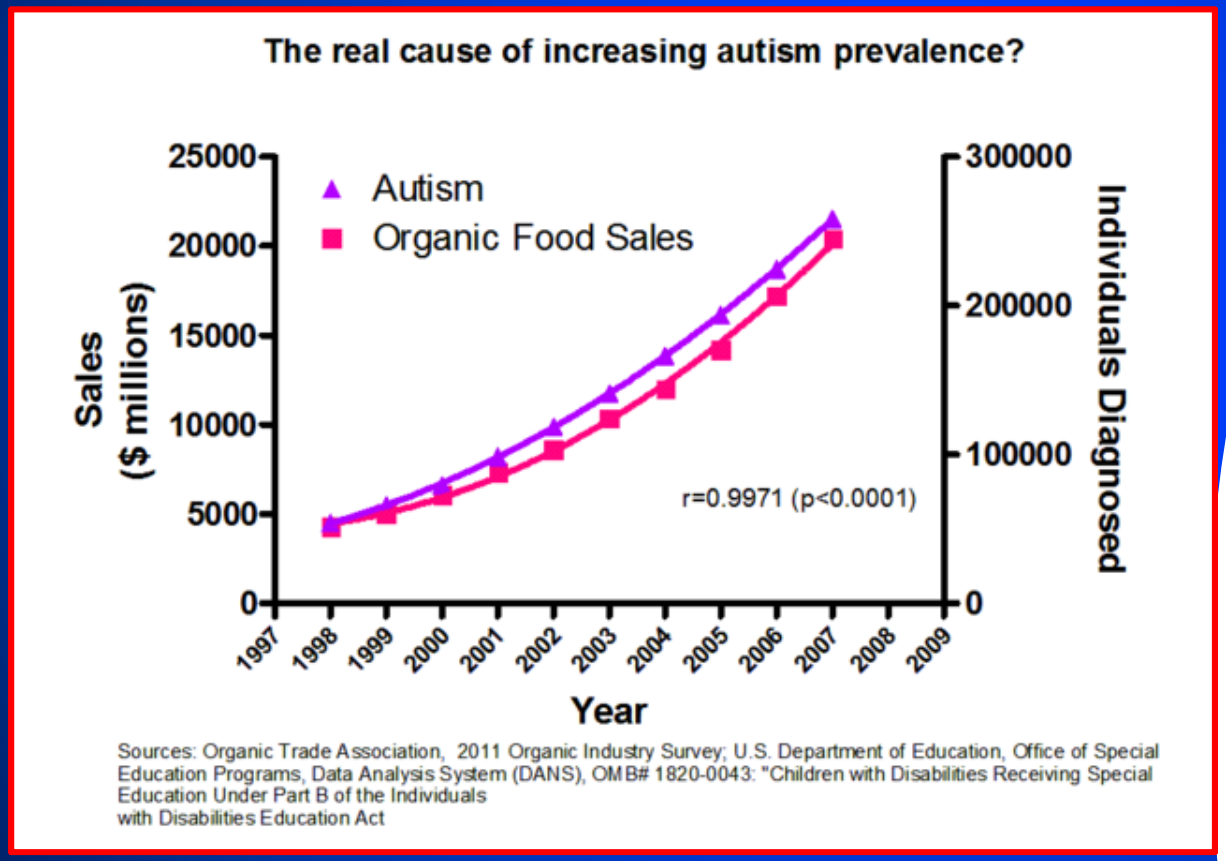
Burnett et al. 2012. Addressing public questioning and concerns about vaccination in South Africa: A guide for healthcare workers. Vaccine, 30 Suppl 3:C72-8.

Transformative explanation
Example: Step 4 (cont)

- Furthermore, these studies have to have **statistically powerful sample sizes** in order to be representative of the target population.
- Let us look at a simple **example**
  - If you study only one group (children with autism) and you find that all of them have brown eyes, you cannot conclude that there is a link between brown eyes and autism
  - Unless you study a group of children without autism, and you can show that most of the children who don't have autism have blue or green eyes, and very few have brown eyes.
- And even if you do find this to be true, if you have only studied 10 or twenty children with autism, your finding may be purely due to chance, since such a **small sample** cannot represent all children with autism.

Burnett et al. 2012. Addressing public questioning and concerns about vaccination in South Africa: A guide for healthcare workers. Vaccine, 30 Suppl 3:C72-8.

The "real" cause of autism: Organic food



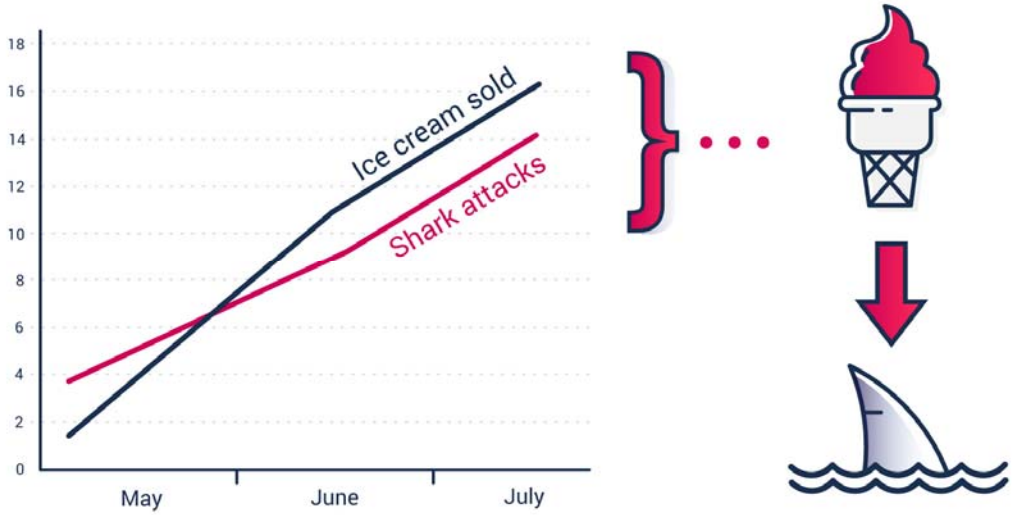
Source: https://io9.gizmodo.com/on-correlation-causation-and-the-real-cause-of-a

Distinction between correlation and causation

How susceptible are you to …

- logical fallacies?
- cognitive biases?
- extracting what you believe is meaningful?

Inappropriate statistical analysis



Spurious "shark attacks and ice cream sales association"

Positive correlation between the rise in shark attacks and increased ice cream sales

Does eating ice cream cause shark attacks?
OR Do shark attacks cause more ice creams to be eaten?

- Linear regression analysis (**correlation**) used instead of measures of **association**
  - because only **one group** has been investigated and **comparison** between groups is thus **not possible**

VACCINE COMMUNICATION IN PRACTICE

How to counter anti-vaccination myths

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Cowpox vaccine

"Unnatural" and "ungodly"

Vaccinated - would grow body parts of cows

"Anti-vaccination movement"

https://en.wikipedia.org/wiki/File:The_cow_pock.jpg

1967:

2.7 million deaths

20%-40% case fatality

100% permanent facial scarring

1980:

Global eradication of smallpox

Thanks to the smallpox vaccine!

https://en.wikipedia.org/wiki/Smallpox

Countering anti-vaccination myths

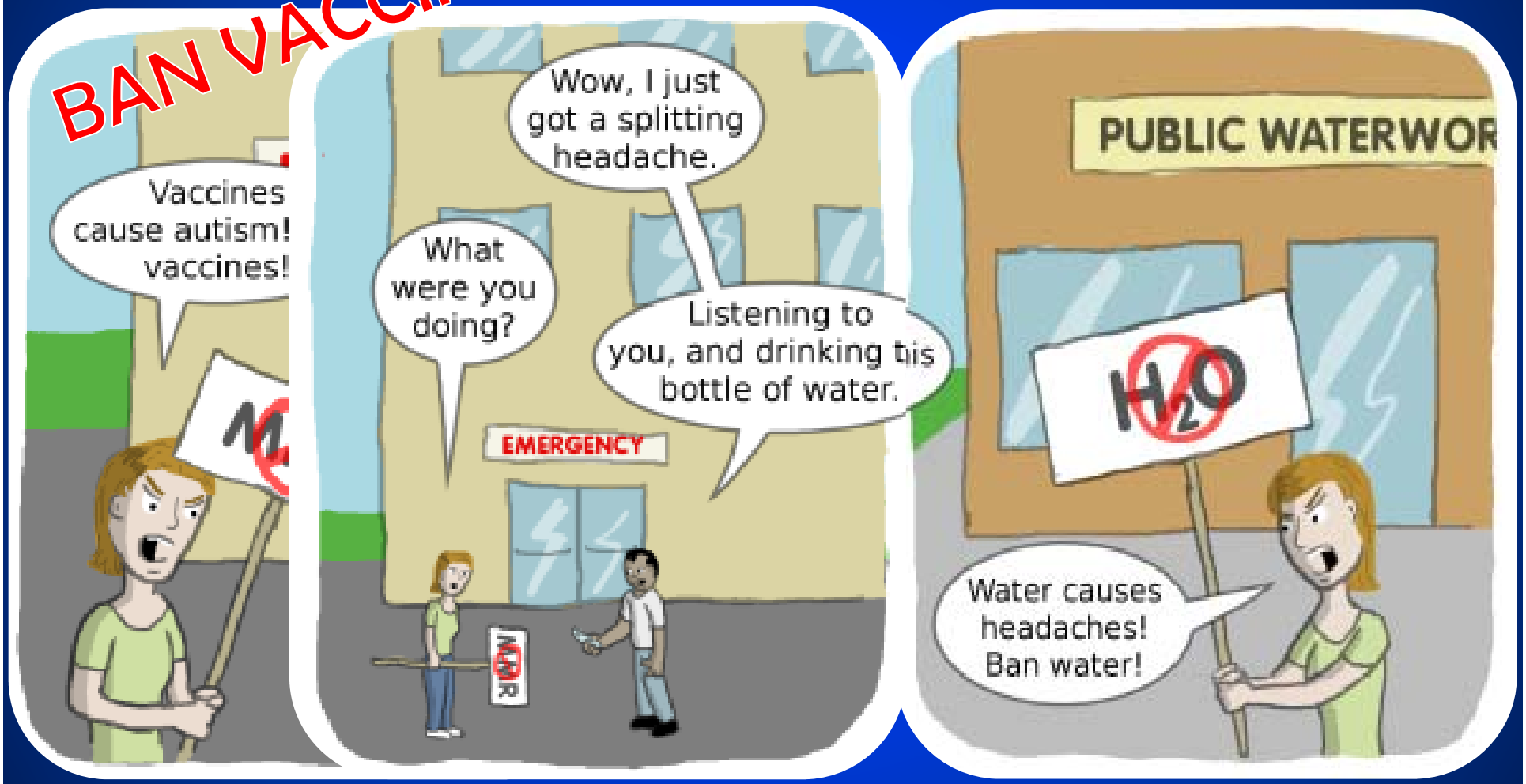
- **Misguided quest** to **help** other parents
- **Financial** interests
- Parents exposed to misinformation and are **concerned**:
  - **"Vaccine hesitancy"**
  - They are not anti-vaccination
  - Deserve empathy and understanding
- Need effective communication leading to acceptance of vaccination

https://www.youtube.com/watch?v=7Wp4eZr0d7g

MYTH

“Vaccines are not safe or harmful”

MYTH: Vaccines cause autism!



https://www.cansa.org.za/files/2017/04/Fact-Sheet-Position-Statement-Vaccines-Vaccination-April-2017.pdf

Water causes headaches! BAN WATER!

How to protect yourself from getting autism?

Do not vaccinate … so

https://me.me/i/cant-get-autism-if-you-die-from-polio-none-13174593

1998 - Andrew Wakefield revived anti-vaccination movement

Lancet: Claimed association between measles mumps rubella (MMR) vaccine and developing autism

There was no scientific basis for the claim

Medical license revoked by Britain's General Medical Council

EARLY REPORT

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

RETRACTED

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 associ... by the parents, with measles, mumps, and rub... vaccination in eight of the 12 children, with measl... infection in one child, and otitis media in a... All 12 children had intestinal abnormalities ranging from lymphoid nodular hyperplasia to ...oid ul...ation. Histology showed patchy chronic infla... in 11 children and reactive ileal lymphoi... erplasia in seven, but no granulomas. Be...oural disor... included autism (nine), disintegrativ... sis (one), a... possible postviral or vaccinal encephalitis ...o). There were no focal neurological ab...malities and ...T and EEG tests were normal. Abno...al laboratory results ...re significantly raised urinary ...ethylma... acid compared with age-matched control... ...03), lo... haemoglobin in four children, ...low ... IgA in ... children.

Inter...tation ...e iden... associated gastrointestinal di...se and ...evelopmental regression in a group of previ... ...mal chi...n, which was generally associated in time ... possible environmental triggers.

Lancet 199...**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 ... of apparent normality, lost acquired skills, includ... com...ication. They all had gastrointestinal ...mptoms, ...luding abdominal pain, diarrhoea, and ...ating and, in ...some cases, food intolerance. We ...scribe ... clinical f...ings, and gastrointestinal feature... of these chi...en.

Patients and meth...s

12 children, cons...cutively ...ed to ... department of paediatric gastr...erology ... a hi...y of a pervasive developmental ...der with loss ...ed skills and intestinal symptoms ...rrhoea, abdominal ...in, bloating and food intolerance), were inv...gated. All children were admitted to the ward for ...week, accomp...d by their parents.

Clinical investigations

... took histor... including details of immunisations and e...sure to infect...s diseases, and assessed the children. In 11 ca...e histor... was obtained by the senior clinician (JW-S). Neur... ...d psychiatric assessments were done by consultant staff (PH, MB) with HMS-4 criteria.[5] Developmental ... included a review of prospective developmental records from p...ents, 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.[6] 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

Wakefield et al. 1998
Lack of scientific validity

	Autism positive	Autism negative
MMR received	8	No data
MMR NOT received	4	No data

- Tiny sample size: Only **12 children with autism studied**
  - 8 of whom it was claimed **developed autism** shortly after receiving MMR = later found to be a **false claim**
- **No comparison** group
- The **temporal sequence** was found to be **reversed** in most cases (i.e. autism signs and symptoms preceded MMR)
- The **causal mechanism** was **not biologically plausible**

FACTS AGAINST MYTH:
"Vaccines are not safe or harmful"

HOW THE CASE AGAINST THE MMR VACCINE WAS FIXED

In the first part of a special *BMJ* series, **Brian Deer** exposes the bogus data behind claims that launched a worldwide scare over the measles, mumps, and rubella vaccine, and reveals how the appearance of a link with autism was manufactured at a London medical school

When I broke the news to the father of child 11, at first he did not believe me. "Wakefield told us my son was the 13th child they saw," he said, gazing for the first time at the now infamous research paper which linked a purported new syndrome with the measles, mumps, and rubella (MMR) vaccine.[1] "There's only 12 in this."

That paper was published in the *Lancet* on 28 February 1998. It was retracted on 2 February 2010.[2] Authored by Andrew Wakefield, John Walker-Smith and 11 others from the Royal Free Hospital and School of Medicine, London, it reported on 12 developmentally challenged children, and triggered a decade long public health scare.

"Onset of behavioural symptoms was associated by the parents with measles, mumps, and brain and bowel diseases. Child 11 was the penultimate case.

Running his finger across the paper's tables, over coffee in London, Mr 11 seemed reassured by his anonymised son's age and other details. But then he pointed at table 2—headed "neuropsychiatric diagnosis"—and for a second time objected.

"That's not true."

Child 11 was among the eight whose parents apparently blamed MMR. The interval between his vaccination and the first "behavioural symptom" was reported as 1 week. This symptom was said to have appeared at age 15 months. But his father, whom I had tracked down, said this was wrong.

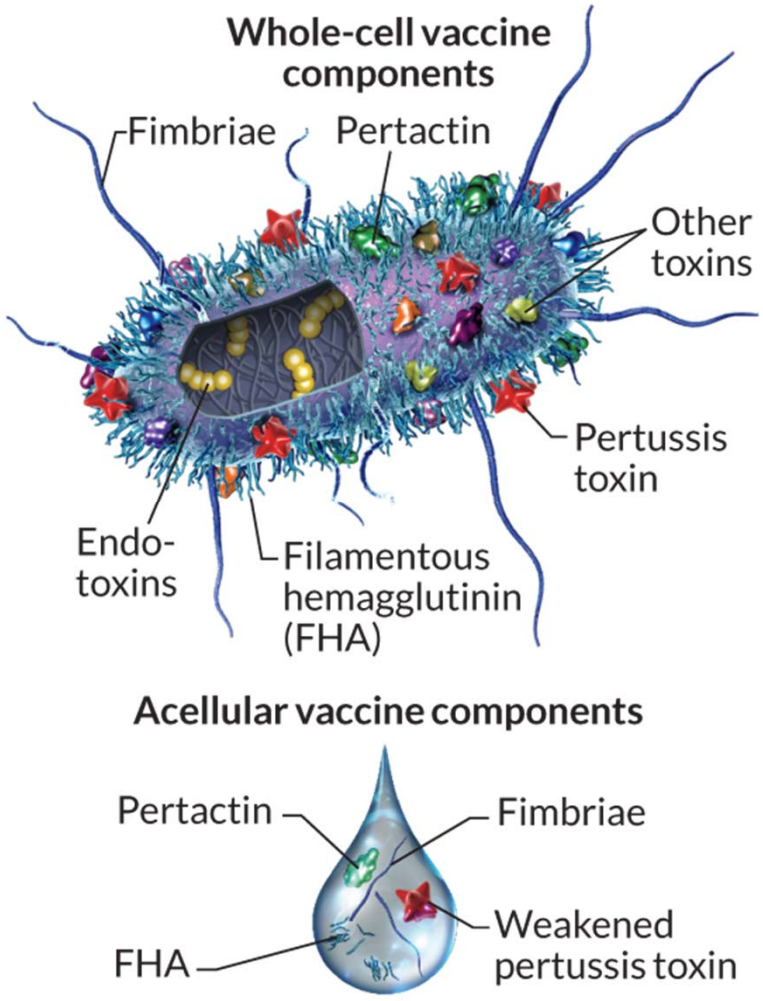
"The regulator's main focus was whether the research was ethical. Mine was whether it was true"

closed £150 (€180; $230) an hour through a Norfolk solicitor named Richard Barr, he had been confidentially put on the payroll for two years before the paper was published, eventually grossing him £435 643, plus expenses.[4]

Curiously, however, Wakefield had already identified such a syndrome before the project that would reputedly discover it. "Children with enteritis/disintegrative disorder [an expression he used for bowel inflammation and regressive autism[5] form part of a new syndrome," he and Barr explained in a confidential grant application to the UK government's Legal Aid Board,[6] before any of the children were investigated. "Nonetheless the evidence is undeni-

Deer B. BMJ. 2011 Jan 5;342:c5347. http://www.medicine.mcgill.ca/epidemiology/hanley/c609/Material/BMJpartI.pdf

FACTS AGAINST MYTH:
Example of vaccine safety being a priority



- **Whole cell pertussis vaccine**
  - Killed vaccine associated with high fever.
  - Highly effective for many years
- **Acellular pertussis vaccine**
  - Contains only the proteins which elicit the immune response
  - Not as effective as whole cell pertussis vaccine

https://lookfordiagnosis.com/mesh_info.php?term=Vaccines%2C+Acellular&lang=1

WHO (2015). Pertussis vaccines: WHO position paper. Weekly epidemiological record; 35(90): 433–460.

FACTS AGAINST MYTH: Information needed to prove that a vaccine has caused an adverse event

- Experimental studies to test the safety and efficacy of vaccines – typically involve **two groups** of children

	Experienced adverse event / developed disease	No adverse event / no disease
Vaccinated	Total vaccinated with the outcome	Total vaccinated without the outcome
Not vaccinated	Total not vaccinated with the outcome	Total not vaccinated without the outcome

- Over 60 000 children included in the latest rotavirus vaccine trials
  - Still not large enough to detect a very rare adverse event
  - 1 in a million children
- **Post-marketing surveillance** to detect very rare adverse events
  - Possible **rare adverse events** flagged and fully investigated
  - **Observational studies** - children who have been vaccinated / not vaccinated in normal course of their lives - not under trial conditions.

Untrue and dangerous claims about vaccines

1 in 4 of Donald Trump's tweets contains fake news

Vaccine debate – which side are you on?

Andrew Wakefield
anti-vaccination
activist

Scared of the flu shot?

MYTH:

Flu shots can give you the flu

FACT:

You already caught the virus but was not showing symptoms when vaccinated

MYTH: Vaccines are not safe

If someone has to wear a hazmat suit to handle vaccines in in a laboratory, it should not be injected!

FACT:

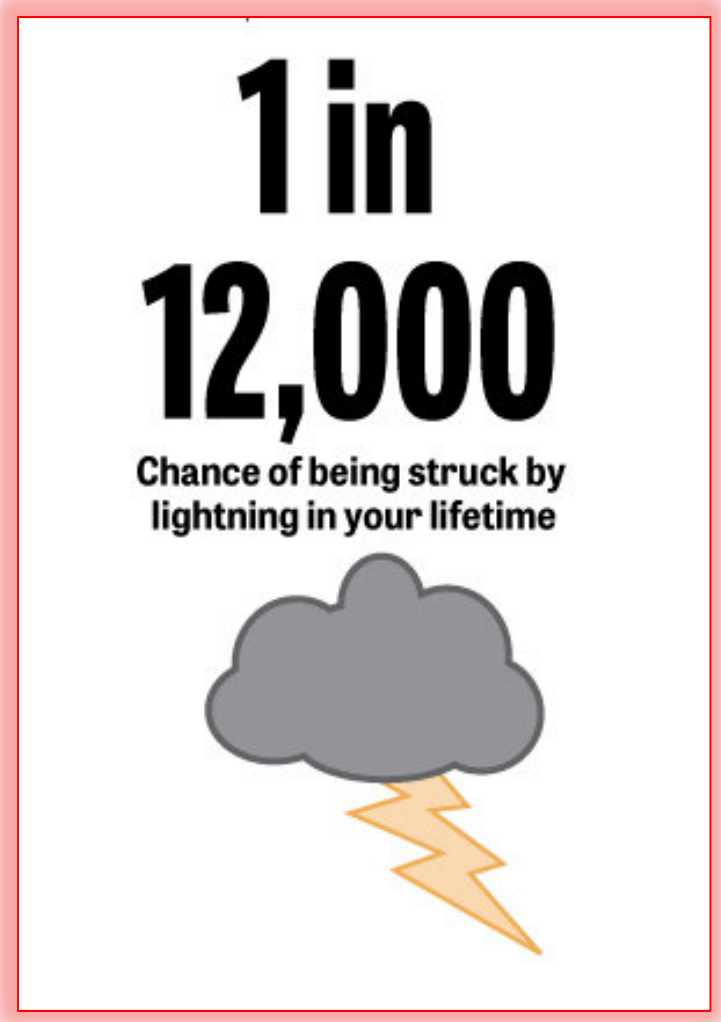
Independent assessment of each individual lot of a licensed vaccine batch before release onto the market

Retesting in case of adverse events

School of Pharmacy

Vaccines ARE safe

Serious adverse events following immunisation are extremely rare



https://globalvax.wordpress.com/2015/04/06/10-important-reasons-to-be-vaccinated/

MYTH

“Vaccines are ineffective”

MYTH: Vaccines are ineffective

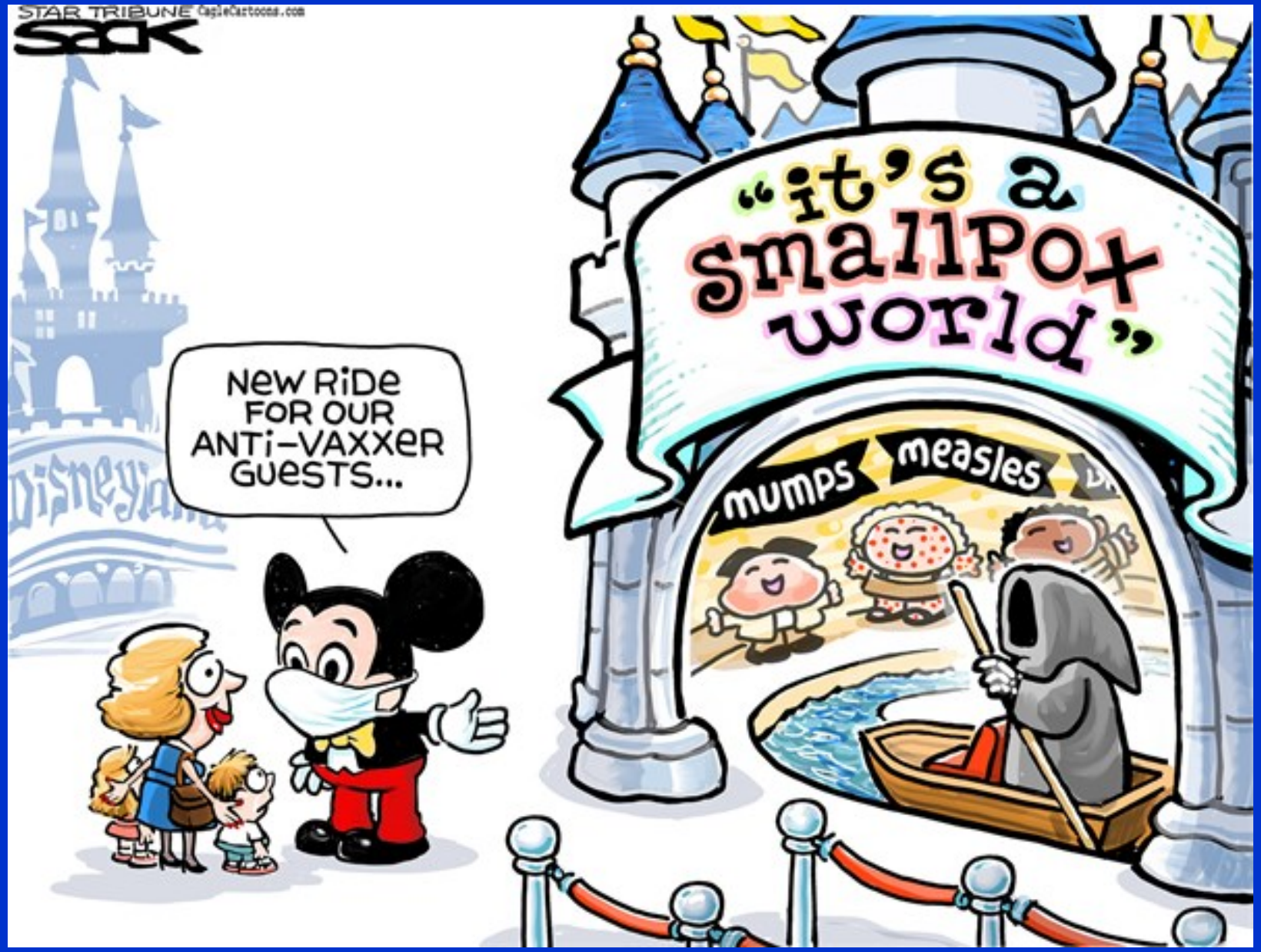
Why would my unvaccinated kids be a threat to your vaccinated kids?

... if you are so sure that vaccines work?

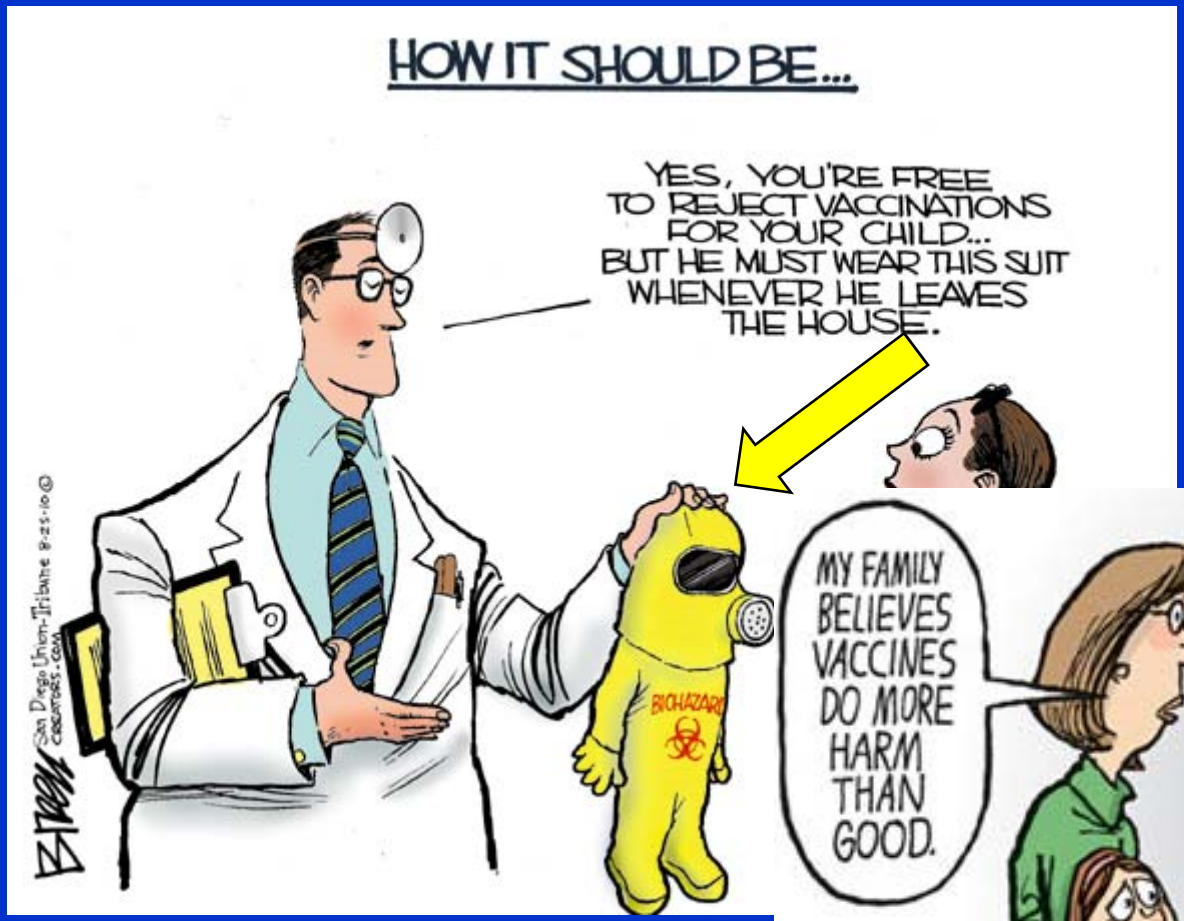
No vaccine is 100% effective (85%-95%)

Personal Body Guard

Parents choosing NOT TO VACCINATE their children



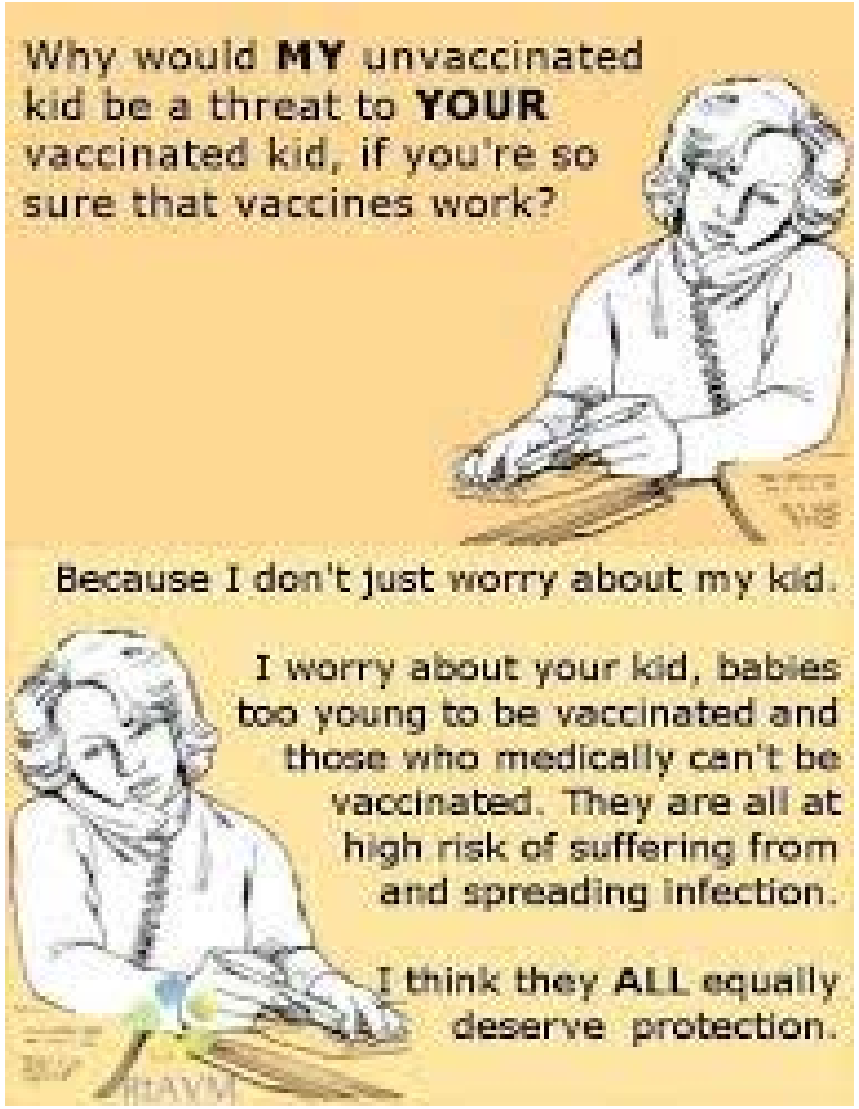
Parents choosing NOT TO VACCINATE their children



Supply child with personal protective wear

Vaccinate mother with common sense

FACTS AGAINST MYTH:
"Vaccines are ineffective"



https://vaxplanations.wordpress.com/tag/herd-immunity/

- When **vaccination coverage is high** the majority of people who get the disease may have been vaccinated
- **Perception** that vaccines are ineffective
- **No vaccine is 100% effective**; most are 85–95% effective

Burnett et al. 2012. Addressing public questioning and concerns about vaccination in South Africa: A guide for healthcare workers. Vaccine, 30 Suppl 3:C72-8.

FACTS AGAINST MYTH:
CDC example of vaccine effectiveness

- Of 1000 children never exposed to natural measles, 995 vaccinated
- All 1000 exposed to measles
- All **5 unvaccinated** children **(100%)** get measles
- **7 of the 995 vaccinated** children **(0.7%)** get measles
- Thus **58.3% (7/12)** of measles cases were vaccinated!
- But the vaccine was **99.3% (988/995) effective**

Information provided by anti-vaxxers to show the measles vaccine is not effective	Measles cases (n=12)	% of total cases
Previously vaccinated against measles	7	58.3%
Previously not vaccinated against measles	5	41.7%

Burnett et al. 2012. Addressing public questioning and concerns about vaccination in South Africa: A guide for healthcare workers. Vaccine, 30 Suppl 3:C72-8.

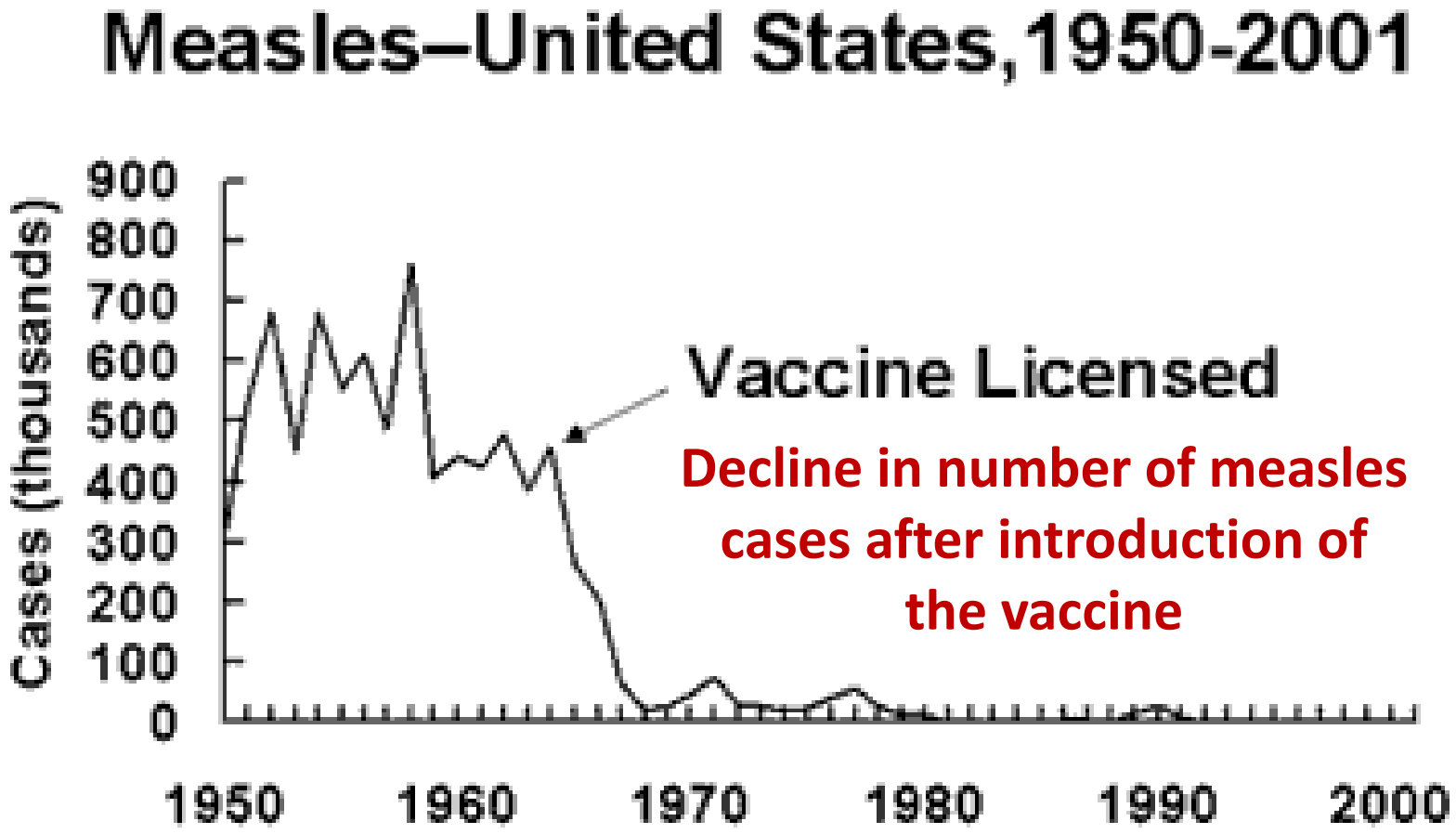
FACTS AGAINST MYTH: Vaccine efficacy testing must be ethically conducted

- Efficacy is measured by testing for antibodies, and comparing the levels of antibodies between vaccinated and unvaccinated children
- It would be **unethical to expose** the children to the causative organism as part of the experiment
- The anti-vaccination lobby claim that because scientists do not do this, they have no proof of efficacy

MYTH

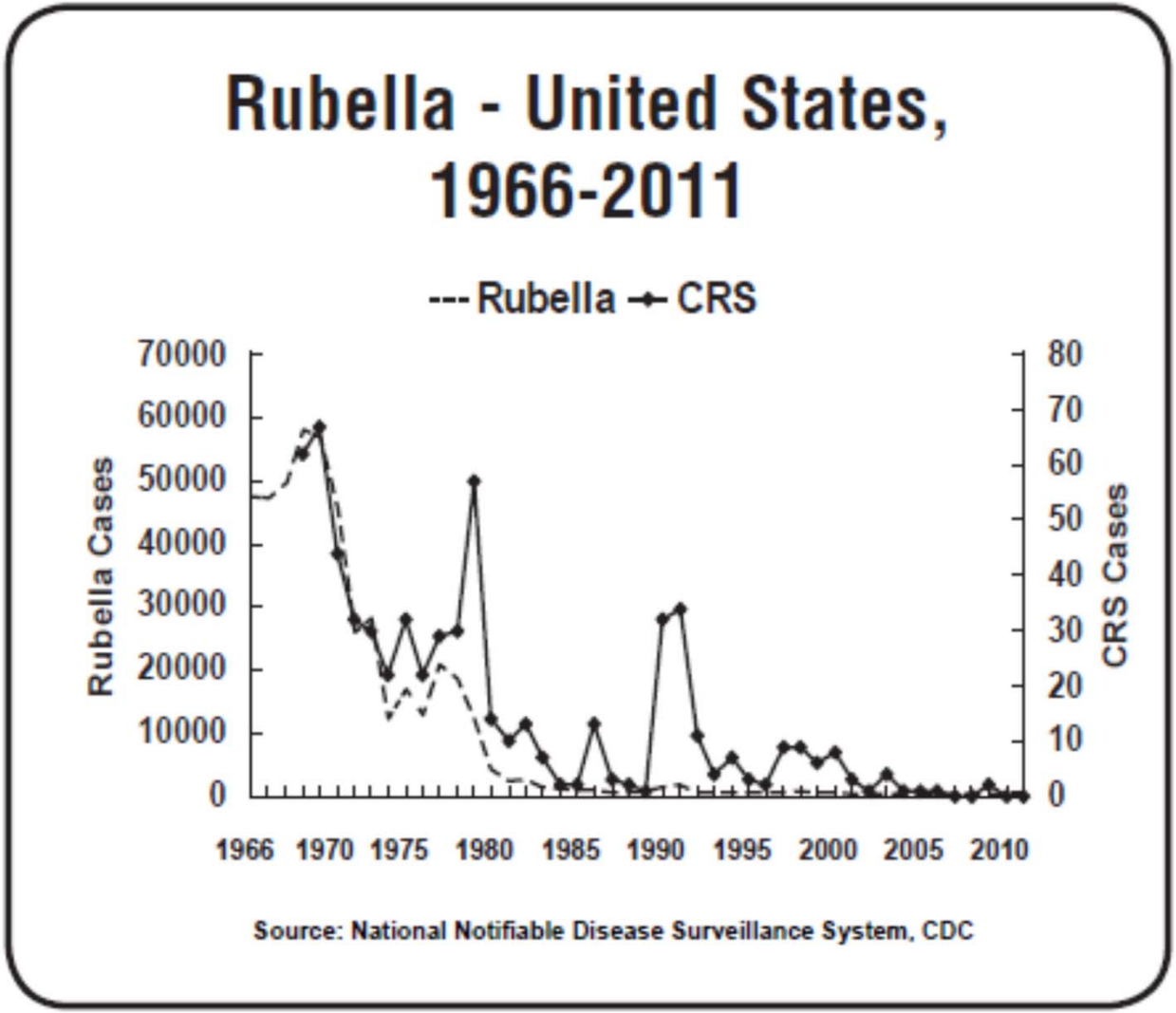
“Vaccines are not responsible for the decline in infectious diseases”

FACTS AGAINST MYTH: "Vaccines are not responsible for the decline in infectious diseases"



http://www.cdc.gov/vaccines/vac-gen/6mishome.htm

FACTS AGAINST MYTH: "Vaccines are not responsible for the decline in infectious diseases"



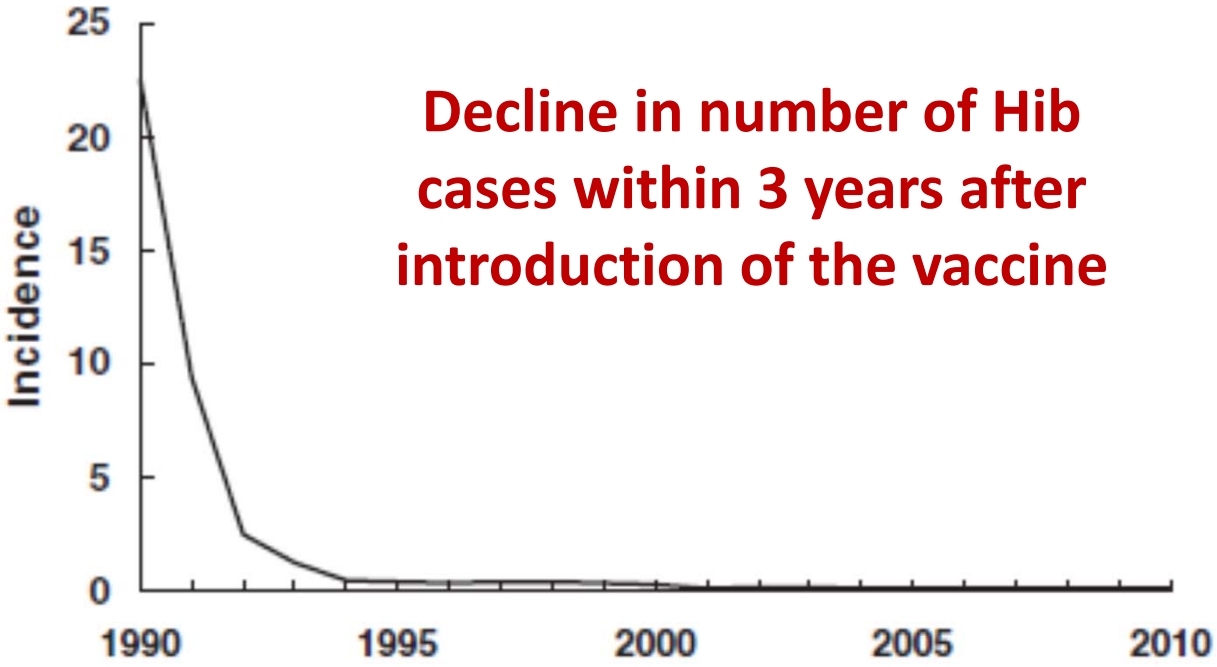
CRS = Congenital rubella syndrome

Decline in number of rubella cases after introduction of the vaccine

http://www.cdc.gov/vaccines/vac-gen/6mishome.htm

FACTS AGAINST MYTH: "Vaccines are not responsible for the decline in infectious diseases"

Incidence* of Invasive Hib Disease, 1990-2010



Decline in number of Hib cases within 3 years after introduction of the vaccine

*Rate per 100,000 children <5 years of age

http://www.cdc.gov/vaccines/vac-gen/6mishome.htm

FACTS AGAINST MYTH: "Vaccines are not responsible for the decline in infectious diseases"

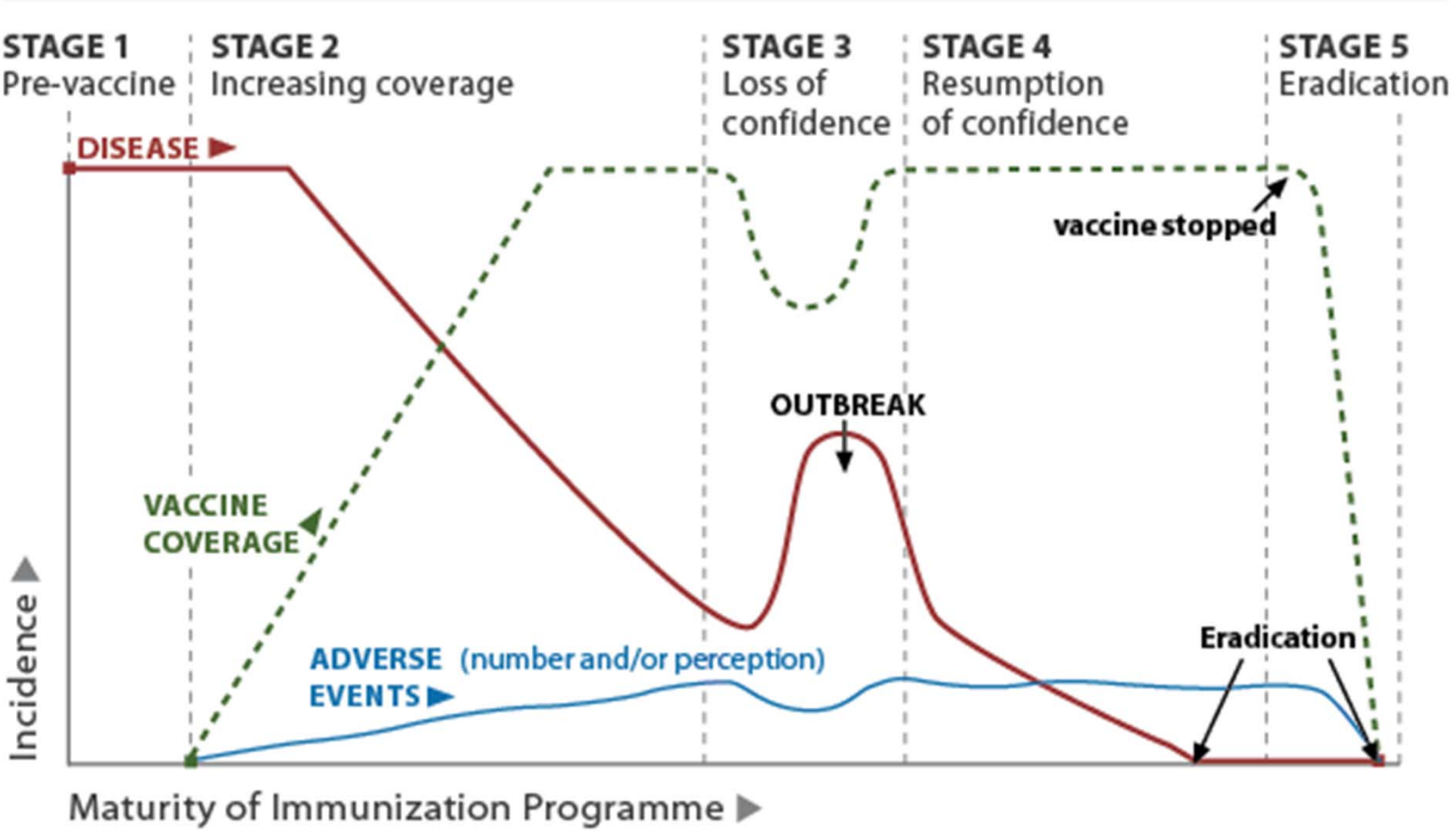


Diagram adapted from Chen RT et al. The Vaccine Adverse Event Reporting System (VAERS). A passive surveillance system in the US intended to collect reports of reactions to vaccines. Under the aegis of the US Centers for Disease Control and Prevention and the US Food and Drug Administration. (VAERS). Vaccine, 1994: 12(6):542–550.

MYTH

“Vaccination is profit driven”

FACTS AGAINST MYTH:
"Vaccination is profit driven"

For every $1 spent on a vaccine in the US...

DTaP saves
$27

MMR saves
$26

Perinatal Hepatitis B saves
$14.70

Inactivated Polio (IPV) saves
$5.45

Varicella saves
$2.73

ECBT
every child by two

...with routine vaccination the US saves $13.5 billion in direct costs and $68.8 billion in societal costs.

Information from Economic Evaluation of the Routine Childhood Immunization Program in the United States, 2009, Presented at Pediatric Academic Societies' Annual Meeting, Boston, Massachusetts, Apr 28-May 1, 2012, Fangjun Zhou, PhD

Image courtesy of Vichaya Kiatying-Angsulee/FreeDigitalPhotos.net

Who profits from vaccination?

The expenses to TREAT a vaccine-preventable disease are much higher than providing the vaccination

https://vaxplanations.wordpress.com/tag/herd-immunity/

Who profits from vaccination? (2)

- **EPI-SA vaccines** are provided **free of charge** in the public sector
- **Private sector clinics** in South Africa generally provide the **vaccine at cost**, and charge only a **small administration fee**
- Vaccination clearly does NOT provide huge profits for South African healthcare workers

Do scientists profit from vaccination?

- **Independent scientists** who develop and test vaccines are sometimes accused of being in “the pockets” of the vaccine industry
  - E.g. Paul Offit, the inventor of the rotavirus vaccine
- Independent scientists who obtain funding, produce validated findings of vaccine safety and efficacy in numerous studies
- **Universities** do not have funds for their scientists to develop and test vaccines
  - When funding is obtained, they remain employees of their university, not the funder

Do governments profit from vaccination?

- Most countries - independent national technical advisory bodies
  - Guide national policymakers and programme managers on immunisation policies and programmes
- South Africa: **National Advisory Group on Immunisation (NAGI)**
  - Independence of NAGI is unquestionable
- All vaccines in EPI-SA – selected based on scientific evidence

health
Department:
Health
REPUBLIC OF SOUTH AFRICA

The anti-vaccination lobby profits from discrediting vaccines

RESEARCH

Burnett et al (2015). SAMJ 105(11):922-6

A profile of anti-vaccination lobbying on the South African internet, 2011 - 2013

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[2] *Department of Public Health, Sefako Makgatho Health Sciences University, Pretoria, South Africa*
[3] *Department of Epidemiology and Social Medicine, University of Antwerp, Belgium*

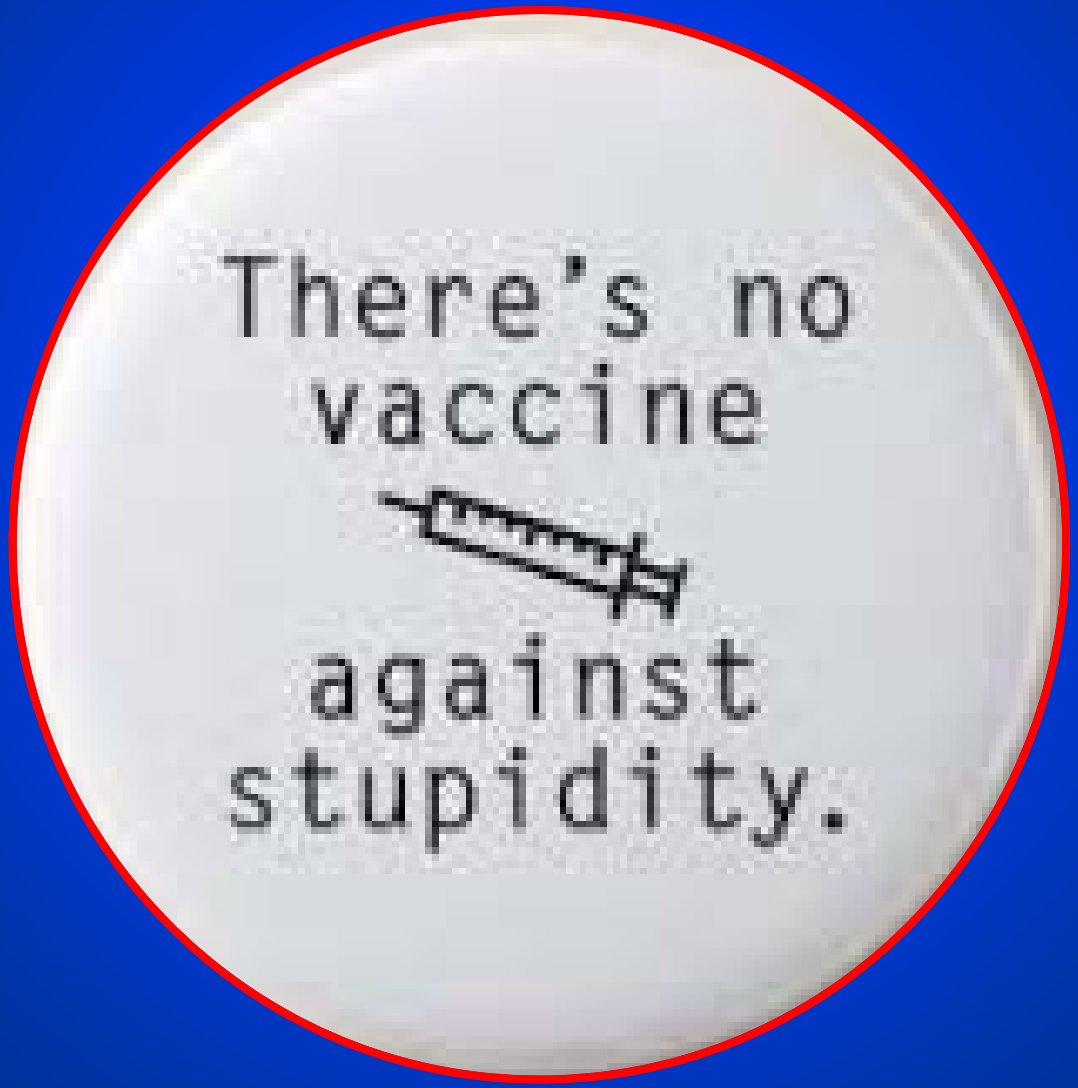
- **Sponsors** of websites and blogs **discrediting vaccines** often have a profit motive
- These organisations **sell products** that claim to be “natural alternatives” to vaccination
- In 2009 this industry was worth USD 60 billion

Brookes G. Economic Impact Assessment of the European Union (EU)’s Nutrition & Health Claims Regulation on the EU food supplement sector and market. 2010. https://www.pgeconomics.co.uk/pdf/Impact-Assessment-health-claims.pdf

- In 2013 the global vaccine market was worth only USD 24 billion

World Health Organization. Prequalification to make high-quality, safe and affordable vaccines. 2013. http://www.who.int/features/2013/vaccine_prequalification/en/

For the record …



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Thank you

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