Autism & the MMR Vaccine: The Doctor Who Cried Wolf

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Overview

• What are / is
  – Measles, Mumps & Rubella?
  – MMR Vaccine?
  – Autism?

• Who is Andrew Wakefield?

• What is the controversy?
  – Effects?

• What role is played by
  – Parents/Patients?
  – Academic journals?
Introduction

• The MMR Vaccine is routinely used on young children (1 + 1.5 yrs)
• It contains a mercury-based preservative
• Some people are suspicious of its use and links to neurological disorders
• Rates of usage have decreased recently, leading to increases in certain conditions (Mumps, Measles and Rubella)
What is MMR?

- **Measles**
  - An infection caused by a virus
    - 95%+ used to catch it before 18.
    - 75%+ in an infected household will catch it

- **Mumps**
  - Swelling of the parotid (salivary) gland

- **Rubella**
  - Complications (in pregnancy)
    - Spontaneous abortion

http://en.wikipedia.org/wiki/Rubella
What is MMR Vaccine?

• Measles-Mumps-Rubella (MMR) Vaccine
• For kids
  – Very common
  – Decreased usage since 1990s
  – Increase in MMR outbreaks, too.
• “Herd Immunity”
  – When 95% are vaccinated (Times London)

http://en.wikipedia.org/wiki/Vaccination
http://en.wikipedia.org/wiki/Syringe
Mercury in Vaccines

• Thimerosal used since 1930s to preserve bio & drug products
  – Prevent bacterial contamination
• 50% mercury by weight
  – ~25 micrograms per 0.5 ml dose
• Recommended for reduction (NEJM)
• Blamed by many for increased rates of autism

Sources:
http://content.nejm.org/cgi/content/full/357/13/1278
Autism

• Neurodevelopmental disorder
  – Impaired social interaction & communication
  – Compulsive behaviours
  – Self-injury
  – Savant (Kim Peek - Rain Main movie)

• Wide “Spectrum” (Range of Symptoms)
  – e.g. Asperger’s (Bit-torrent!)

• Likely causes
  – Genetics
  – Environmental

• Prevalence
  – 1 per 200 (Autism Society of Canada)
  – Increase since the 1980s
    • Due to diagnostics?
    • Due to other factors?

Kim Peek (“Rain Man”)  
http://en.wikipedia.org/wiki/Kim_Peek
Who is Andrew Wakefield?

• British researcher
  – Former Surgeon
• Born in 1957
• Medical School (UK) – 1981
• U of Toronto (Fellowship) – 1980s
  – Small Intestine Transplants
• Surgeon in the UK – 1990s
  – Asked to look at Autism & bowel problems
  – Rosemary Kessick (“Allergy Induced Autism” group)
• Advocates link b/w Autism & Vaccines (present)

Sources:
BBC: http://news.bbc.co.uk/2/hi/3513365.stm
Online Interview (Dr. Mercola) http://www.youtube.com/watch
Wakefield’s 1998 Paper

- 12 Children with intestine inflammation
- Symptom: “Loss of acquired skills”
- 8 kids: “[Symptoms onset] associated, by the parents, with [MMR] vaccination”
  - 5 kids: “early adverse reaction to immunisation”
- “We did not prove an association between [MMR Vaccine] and the syndrome described.”
- Addendum: 39/40 further patients “with the syndrome.”
The Reaction

• Use of MMR dropped rapidly
  – 80% from 92%
  – Herd immun. gone

• Measles rate increased (UK)
  – 56 in 1998
  – 1348 in 2010

Source:
• Times of London
  • http://www.timesonline.co.uk/tol/life_and_style/health/article5683671.ece
  • http://briandeer.com/
Media Coverage

Vaccines & Autism

NBC “Today Show” (Aug. 2009)
http://www.youtube.com/watch?v=HIP7w_Yoq_U&feature=related
Media Coverage

NBC “Countdown” (Feb 2, 2010)
http://www.youtube.com/watch?v=bjGx1mH7FFY&feature=related
RETRACTED: Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children

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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.
Unethical Research

• Wakefield lied (Times of London, 2004 - 2010)
  – Hospital records contradict the 1998 study
  – Wakefield manipulated patient data
  – Few of the 12 had bowel problems
    • Records changed after pathologists’ reports
  – Did not receive ethics approval
    • But said he had

• Some families also tied to legal action against vaccine makers during research

• Funding of Wakefield by lawyers (since ‘96) not revealed in article

• Patent information not revealed in article

Sources:
  • Times of London
    • http://www.timesonline.co.uk/tol/life_and_style/health/article5683671.ece
  • NBC Countdown (Feb 2, 2010)
    • http://www.youtube.com/watch?v=bjGx1mH7FFY&feature=related
Conclusions

• Unethical research
  – Conflicts of interest (legal & financial)

• Poor oversight & verification
  – Blind peer review
  – Inaccessible patient data

• Vulnerable & confused parents
  – Try to do the “right thing”

• How do we fix this?
Class Topics for Discussion
“On Liberty”

• Can someone choose to harm themselves?
  – Should they choose not to have MMR?
  – What if it hurts others?

Images: http://en.wikipedia.org/wiki/John_Stuart_Mill,
Can The Public Judge Risk?

• How many know of friends in car accidents?
  – How many of you don’t drive because of that?

• What is the difference between
  – Statistical evidence
  – Anecdotal evidence
  – Correlation
  – Causation
Academic Journal Responsibility?

- British Medical Journal vs. The Lancet
  - How do they handle conflicts of interest?
  - How much did Lancet editors know of the conflict of interest (e.g. patent application) before 1998 paper?
Media Responsibility?

• Scaring people sells “copy”
  – Controversies are good for business
  – Are journalists in a conflict of interest?

• What is “balanced” reporting?
  – If 99% of the experts believe A and 1% believe B
    • Do you give both sides equal coverage?

• What is “educated” reporting?
  – Should you report on something you don’t know about?

• What is “educating” reporting?
  – Does the media have a responsibility to educate the population?
  – Or to entertain?
Parents’ Roles & Responsibilities

• Parents of autistic children
  – Looking for causes
  – Feel they caused the autism via vaccine
    • “Now we knew it was our fault.” (Rochelle Poulter)
    • Similar to earlier claims of “refrigerator mothers”
      – Autism could be caused by cold emotions.

• Herd decisions?
  – Force vaccinations on everyone?

• Individual decisions?
  – Let everyone choose for themselves?
  – Put others at risk?
Patient Confidentiality

• Gives patients privacy
• Problem in Academia
  – Prevents verification during peer-review
  – Reviewers can’t see if results are true
    • No easy way to verify
    • Sometimes data is made up
    • Scientific Fraud is hard to determine
Extra slides
“On Liberty”

• Can someone choose to harm themselves?
  – Should they choose not to have MMR?
  – What if it hurts others?
Can The Public Judge Risk?

• What is the difference between
  – Statistical
  – Anecdotal
Selected References

- Wakefield’s original 1998 paper
- Wakefield’s 1997 patent application
  - [http://briandeer.com/wakefield/vaccine-patent.htm](http://briandeer.com/wakefield/vaccine-patent.htm)
Further Reading

• Brian Deer’s investigation (2004-2010)
  – http://briandeer.com/mmr-lancet.htm
  – http://www.timesonline.co.uk/tol/life_and_style/health/article5683671.ece

• Wikidoc:
  – http://wikidoc.org/index.php/MMR_vaccine_controversy

• Wikipedia:
  – http://en.wikipedia.org/wiki/Andrew_Wakefield

• NY Times:
Further Viewing

• Rain Main movie (Autism example)
  – http://www.youtube.com/watch?v=k2T45r5G3kA

• Wakefield interview with Dr. Mercola
  – http://www.youtube.com/watch?v=oIsFW5phHas

• Ben Goldacre’s take on Wakefield
  – http://www.youtube.com/watch?v=jfheO9H8CD4

• Compulsory MMR vaccination debate
  – http://www.youtube.com/watch?v=cb80A6SRfXc&feature=fvw

• NBC Dateline 2009
Timeline of Wakefield’s Autism + Vaccine Work

- 1995 Wakefield’s Chron’s disease paper
  - Attempts link b/w MMR and Chron’s disease (briandeer.com)
- 1997 Patent application
  - “treatment of an MMR virus mediated disease”
- 1998 Wakefield et al.’s Autism paper published
  - Attempts link b/w Autism & MMR Vaccination
- 1999 Thimerosal (mercury preservative) reduced in US market (NEJM)
- 2001: Thimerosal - neurodevelopmental link is “biologically plausible” (IOM / FDA)
- 2004
  - Brian Deer (Sunday Times, UK) investigates
  - IOM rejects causal Thimerosal-Neuro link
  - British Medical Council Inquiry begins
  - 10/13 co-authors renounce paper
- 2005: Mumps Outbreak in UK
- 2006: Mumps Outbreak in US Midwest
- 2007: BMC hearing starts
- 2010:
  - BMC rules against Wakefield
  - BMJ demands retraction from Lancet
  - Lancet retracts paper
- Wakefield and supporters continue to push their agenda

Sources:
- Brian Deer’s website: http://briandeer.com/mmr/uptake-stats.htm
- NEJM article on Thimerosal: http://content.nejm.org/cgi/content/full/357/13/1278
Media Coverage

London Tonight (March 2009)

http://www.youtube.com/watch?v=jfheO9H8CD4
Anti-MMR Vaccine
Autism: Rain Man (Movie)

http://www.youtube.com/watch?v=x65Q2O2_hPA
Questions about the Anti-MMR Video

• Does proof need to be direct?
  – The lawyer stated that the link could be indirect (circumstantial).
  – Was the announcer correct to state “…proving that the MMR vaccine did, in fact, cause their son to have severe and permanent brain damage…”?

• This is about seizure reaction, not autism

• Could there be other sources?