

Secrets of the MMR scare: How the case against the MMR vaccine was fixed

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*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 It was retracted on 2 February 2010.² Authored by Andrew Wakefield, John Walker-Smith, and 11 others from the Royal Free medical school, London, it reported on 12 developmentally challenged children,³ and triggered a decade long public health scare.

“Onset of behavioural symptoms was associated by the parents with measles, mumps, and rubella vaccination in eight of the 12 children,” began the paper’s “findings.” Adopting these claims as fact,⁴ its “results” section added: “In these eight children the average interval from exposure to first behavioural symptoms was 6.3 days (range 1-14).”

Mr 11, an American engineer, looked again at the paper: a five page case series of 11 boys and one girl, aged between 3 and 9 years. Nine children, it said, had diagnoses of “regressive” autism, and all but one were reported with “non-specific colitis.” The “new syndrome” brought these together, linking brain and bowel diseases. His son 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.

“From the information you provided me on our son, who I was shocked to hear had been included in their published study,” he wrote to me, after we met again in California, “the data clearly appeared to be distorted.”

He backed his concerns with medical records, including a Royal Free discharge summary.⁵ Although the family lived 5000 miles from the hospital, in February 1997 the boy (then aged 5) had been flown to London and admitted for Wakefield’s project, the undisclosed goal of which was to help sue the vaccine’s manufacturers.⁶

Wakefield’s “syndrome”

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Unknown to Mr 11, Wakefield was working on a lawsuit,⁷ for which he sought a bowel-brain “syndrome” as its centrepiece. Claiming an undisclosed £150 (€180, \$230) an hour through a Norfolk solicitor named Richard Barr, he had been confidentially⁸ put on the payroll two years before the paper was published, eventually grossing him £435 643, plus expenses.⁹

Curiously, however, Wakefield had already identified such a syndrome before the project which would reputedly discover it. “Children with enteritis/disintegrative disorder [an expression he used for bowel inflammation and regressive autism¹⁰] form part of a new syndrome,” he and Barr explained in a confidential grant application to the UK government’s Legal Aid Board¹¹ before any of the children were investigated.¹² “Nonetheless the evidence is undeniably in favour of a specific vaccine induced pathology.”

The two men also aimed to show a sudden-onset “temporal association”—strong evidence in product liability. “Dr Wakefield feels that if we can show a clear time link between the vaccination and onset of symptoms,” Barr told the legal board, “we should be able to dispose of the suggestion that it’s simply a chance encounter.”¹³

But child 11’s case must have proved a disappointment. Records show his behavioural symptoms started *too soon*. “His developmental milestones were normal until 13 months of age,” notes the discharge summary. “In the period 13-18 months he developed slow speech patterns and repetitive hand movements. Over this period his parents remarked on his slow gradual deterioration.”

That put the first symptom two months earlier than reported in the *Lancet*, and a month before the boy received the MMR vaccination. And this was not the only anomaly to catch the father’s eye. What the paper reported as a “behavioural symptom” was noted in the records as a chest infection.

“Please let me know if Andrew W has his doctor’s license revoked,” wrote Mr 11, who is convinced that many vaccines and environmental pollutants may be responsible for childhood brain disorders. “His misrepresentation of my son in his research paper is inexcusable. His motives for this I may never know.”

The father need not have worried. My investigation of the MMR issue exposed the frauds behind Wakefield’s research. Triggering the longest ever UK General Medical Council fitness to practise hearing, and forcing the *Lancet* to retract the paper, last May it led to Wakefield and Walker-Smith being struck off the medical register.^{14 15 16}

Wakefield, now 54, who called no witnesses, was branded “dishonest,” “unethical,” and “callous.”^{14 15 16} Walker-Smith, now 74, the senior clinician in the project, was found to have presided over “high risk”¹⁷ research without clinical indication or ethical approval. The developmentally challenged children of often vulnerable parents were discovered to have been treated like the doctors’ guinea pigs.¹⁸

Lawsuit test case

But Mr 11 was not the first parent with a child in the study whom I interviewed during my inquiries. That was Mrs 2: the first of the parents to approach Wakefield. She was sent to him by an anti-vaccine campaign called JABS.¹⁹ Her son had regressive autism,²⁰ longstanding problems with diarrhoea,²¹ and was the prime example of the purported

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bowel and brain syndrome—still unsubstantiated 14 years later.²² This boy would appear in countless media reports, and was one of the four “best” cases in Barr’s lawsuit.

I travelled to the family home, 80 miles northeast of London, to hear about child 2 from his mother. That was in September 2003, when the lawsuit fell apart after counsel representing 1500 families said that, on the evidence, Barr’s autism claims would fail.²³ By that time, Mrs 2 had seen her son’s medical records and expert reports written for her case at trial.

Her concerns about MMR had been noted by her general practitioner when her son was 6 years old.²⁴ But she told me the boy’s troubles began after his vaccination, which he received at 15 months.²⁵ “He’d scream all night, and he started head banging, which he’d never done before,” she explained.

“When did that begin, do you think?” I asked.

“That began after a couple of months, a few months afterward, but it was still, it was concerning me enough, I remember going back . . .”

“Sorry. I don’t want to be, like, massively pernickety, but was it a few months, or a couple of months?”

“It was more like a few months because he’d had this, kind of, you know, slide down. He wasn’t right. He wasn’t right. Before he started.”

“Not quicker than two months, but not longer than how many months? What are we talking about here?”

“From memory, about six months, I think.”

The next day, she complained to my editors. She said my methods “seemed more akin to the gutter press.” But I was perplexed by her story, since there was no case in the *Lancet* that matched her careful account.

According to the paper, child 2 had his “first behavioural symptom” two weeks, not six months, after MMR. This was derived from a Royal Free history (citing “headbanging” and “screaming” as the start²⁶) taken by Mark Berelowitz, a child psychiatrist and a coauthor of the paper.²⁷ He saw Mrs 2 during the boy’s admission, at age 8, after she had discussed her son’s story with Wakefield.²⁸

As I later discovered, each family in the project was involved in such discussions before they saw the hospital’s clinicians.²⁹ Wakefield phoned them at home, and must have at least suggestively questioned them, potentially impacting on later history taking. But I knew little of such things then, and shared my confusion with Walker-Smith, whom I met shortly after Mrs 2.

“There is no case in the paper that is consistent with the case history [Mrs 2] has given me,” I told him. “There just isn’t one.”

“Well that could be true,” the former professor of paediatric gastroenterology replied, disarmingly. He knew the case well, having admitted the boy for the project and written reports for Barr, who paid him £23 000.³⁰

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“Well, so either what she is telling me is not accurate, or the paper’s not accurate.”

“Well I can’t really comment,” he said. “You really touch on an area which I don’t think should be debated like this. And I think these parents are wrong to discuss such details, where you could be put in a position of having a lot of medical details and then try to match it with this, because it is a confidential matter.”

It was not merely medically confidential, it was also legally protected: a double screen against public scrutiny. But responding to my first MMR reports, in the *Sunday Times* in February 2004,³¹ the GMC decided to investigate the cases and requisitioned the children’s records.³²

The regulator’s main focus was whether the research was ethical. Mine was whether it was true. So as a five member disciplinary panel³³ trawled through the records, with five Queen’s counsel³⁴ and three defendant doctors,³⁵ I compared them with what was published in the journal.³⁶

Multiple discrepancies

The paper gave the impression that the authors had been scrupulous in documenting the patients’ cases. “Children underwent gastroenterological, neurological, and developmental assessment and review of developmental records,” it explained, specifying that *Diagnostic and Statistical Manual of Mental Disorders IV*³⁷ criteria were used for neuropsychiatric diagnoses. “Developmental histories included a review of prospective developmental records from parents, health visitors, and general practitioners.”

But, when the details were dissected before the GMC panel, multiple discrepancies emerged. A syndrome necessarily requires at least some consistency, but, as the records were laid out, Wakefield’s crumbled.

First to crack was “regressive autism,” the bedrock of his allegations.^{38 39} “Bear in mind that we are dealing with regressive autism in these children, not of classical autism where the child is not right from the beginning,” he later explained, for example, to a United States congressional committee.⁴⁰

But only one—child 2—clearly had regressive autism.⁴¹ Three of nine so described clearly did not. None of these three even had autism diagnoses, either at admission or on discharge from the Royal Free.

The paper did not reveal that two of this trio were brothers, living 60 miles south of the hospital. Both had histories of fits and bowel problems⁴² recorded before their MMR vaccinations.^{43 44} The elder, child 6, aged 4 years at admission, had Asperger’s syndrome,⁴⁵ which is distinct from autism under DSM-IV, is not regressive,⁴⁶ and was confirmed on discharge.⁴⁷ His brother, child 7, was admitted at nearly 3 years of age without a diagnosis,⁴⁸ and a post-discharge letter from senior paediatric registrar and *Lancet* coauthor David Casson⁴⁹ summarised: “He is not thought to have features of autism.”⁵⁰

The third in the trio, child 12, was enrolled on the advice of the brothers’ mother—reported in media to be a JABS activist, and who had herself “only relatively recently”⁵¹ blamed the vaccine. Child 12 was aged 6 at admission and had previously been assessed for possible Asperger’s syndrome at Guy’s Hospital, London, by a renowned

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developmental paediatrician.^{52 53} She diagnosed “an impairment in respect of language”—an opinion left undisturbed by Berelowitz.^{54 55}

Mrs 12 was a GMC witness at its mammoth hearing, which between July 2007 and May 2010 ran for 217 days. She explained that the brothers’ mother had made her suspicious of MMR and had given her Barr’s and Wakefield’s names.⁵⁶ Mrs 12 then approached them and filed a statement for legal aid before her son was referred.⁵⁷

“It was like a jigsaw puzzle—it suddenly seemed to fit into place,” she told the panel, describing how she concluded, four years after the boy was vaccinated, that MMR was to blame for his problems. “I had this perfectly normal child who, as I could see, for no apparent reason started to not be normal.”

The 12 children were admitted between July 1996 and February 1997, and others had connections not revealed in the paper, almost as striking as the trio’s. The parents of child 9 and child 10 were contacts of Mrs 2, who ran a group that campaigned against MMR.⁵⁸ And child 4 and child 8 were admitted—without outpatient appointments⁵⁹—for ileocolonoscopy and other invasive procedures, from one Tyneside general practice, 280 miles from the Royal Free, after advice from anti-MMR campaigners.⁶⁰

Pre-existing problems

Both child 4 and child 8 were among the eight whose parents were reported to have blamed the vaccine. But although the paper specified that all 12 children were “previously normal,”⁶¹ both had developmental delays, and also facial dysmorphisms, noted before MMR vaccination.

In the case of child 4, who received the vaccine at age 4 years, Wakefield played down problems, suggesting that early issues had resolved. “Child four was kept under review for the first year of life because of wide bridging of the nose,” he reported in the paper. “He was discharged from follow-up as developmentally normal at age 1 year.”

But medical records, presented by the GMC, give a different picture for this child. Reports from his pre-MMR years were peppered with “concerns over his head and appearance,”⁶² “recurrent” diarrhoea,⁶³ “developmental delay,”⁶⁴ “general delay,” and restricted vocabulary.⁶⁵ And although before his referral to Wakefield his mother had inquired about vaccine damage compensation,⁶⁶ his files include a report of a “very small deletion within the fragile X gene,”⁶⁷ and a note of the mother’s view that her concerns about his development had begun when he was 18 months old.⁶⁸

“In general, his mother thinks he developed normally initially and subsequently his problems worsened, and he lost some of his milestones, but he subsequently improved on a restrictive exclusion diet,” wrote his general practitioner, William Tapsfield, referring the boy, then aged 9, after a phone conversation with Wakefield. “The professionals who have known [child 4] since birth don’t entirely agree with this, however, and there is a suggestion that some of his problems may have started before vaccination.”⁶⁹

Similarly with child 8, who was also described in the *Lancet* as having overcome problems recorded before vaccination. “The only girl . . . was noted to be a slow developer compared with her older sister,” the paper said. “She was subsequently found to have coarctation of the aorta. After surgical repair of the aorta at the age of 14 months, she progressed rapidly, and learnt to talk. Speech was lost later.”

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But Wakefield was not a paediatrician. He was a former trainee gastrointestinal surgeon with a non-clinical medical school contract.⁷⁰ And his interpretation differed from that of local consultants (including a developmental paediatrician and a geneticist) who had actually looked after the girl. Her doctors put the coarctation side by side with the delay and dysmorphism,⁷¹ and noted of her vocabulary that, before MMR at 18 months, she vocalised only ⁷² “two or three words.” ⁷³

“[Child 8’s] mother has been to see me and said you need a referral letter from me in order to accept [child 8] into your investigation programme,” the general practitioner, Diana Jelley, wrote to Wakefield at referral, when the girl was aged 3 and a half years. “I would simply re-iterate . . . that both the hospital and members of the primary care team involved with [child 8] had significant concerns about her development some months before she had her MMR.”⁷⁴

The girl’s general practice notes also provide insight into the background to the 12 children’s referrals. After person(s) unknown told Mrs 8 that her daughter may have inflammatory bowel disease, Jelley wrote: “Mum taking her to Dr Wakefield, Royal Free Hospital for CT scans/gut biopsies ?Crohn’s—will need ref letter—Dr W to phone me. Funded through legal aid.”⁷⁵

The child was “pale”

The remaining five children served Wakefield’s claims no better. There was still no convincing MMR syndrome. Child 1, aged 3 years when he was referred to London, lived 100 miles from the Royal Free, and had an older brother who was diagnosed as autistic.⁷⁶ Child 1’s recorded story began when he was aged 9 months, with a “new patient” note by general practitioner Andrea Barrow.⁷⁷ One of the mother’s concerns was that he could not hear properly—which might sound like a hallmark presentation of classical autism, the emergence of which is often insidious. Indeed, a Royal Free history, by neurologist and coauthor Peter Harvey, noted “normal milestones” until “18 months or so.”⁷⁸

Child 1 was vaccinated at 12 months of age, however. ⁷⁹ Thus neither 9 nor 18 months helped Wakefield’s case. But in the *Lancet*, the “first behavioural symptom” was reported “1 week” after the injection, holding the evidence for the lawsuit on track.

Step 1 to achieve this: two and a half years after the child was vaccinated, Walker-Smith took an outpatient history. Although the mother apparently had no worries following her son’s vaccination,⁸⁰ the professor elicited that the boy was “pale” 7-10 days after the shot. He also elicited that the child “possibly” had a fever, and “may” have been delirious, as well as pale.⁸¹

“It’s difficult to associate a clear historical link with the MMR and the answer to autism,” Walker-Smith wrote to the general practitioner,⁸² with a similar letter to Wakefield, “although [Mrs 1] does believe that [child 1] had an illness 7-10 days after MMR when he was pale, ?fever, ?delirious, but wasn’t actually seen by a doctor.”

Step 2: for the *Lancet*, Wakefield dropped the question marks, turning Walker-Smith’s queries into assertions. And, although Royal Free admission⁸³ and discharge⁸⁴ records refer to “classical” autism, step 3, the former surgeon reported “delirium” as the first “behavioural symptom” of *regressive* autism, with, step 4, a “time to onset” of 7 days.

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So here—behind the paper—is how Wakefield evidenced his “syndrome” for the lawsuit, and built his platform to launch the vaccine scare.

“It is significant that this syndrome only appeared with the introduction of the polyvalent MMR vaccine in 1988 rather than with the monovalent measles vaccine introduced in 1968,” he claimed in one of a string of patents he filed for businesses to be spun from the research.⁸⁵ “This indicates that MMR is responsible for this condition rather than just the measles virus.”

Three of the four remaining children were seen in outpatients on the same day—in November 1996. None of their families were reported in the paper as blaming the vaccine. Child 5, from Berkshire, aged 7 at admission, had received MMR at 16 months.⁸⁶ The paper reported concerns at 18 months, but the medical records noted fits⁸⁷ and parental worries⁸⁸ at 11 months. Child 9, aged 6, from Jersey, also had MMR at 16 months.⁸⁹ His mother dated problems from 18-20 months.⁹⁰ Child 10, aged 4, from south Wales, contracted a viral infection, which was suspected by parents and doctors to have caused his disorder, four months after his vaccination.⁹¹

“Behavioural changes included repetitive behaviour, disinterest in play or head banging,” said a question and answer statement issued by the medical school, concerning the *Lancet* 12, on the day of the paper’s publication.

Another discrepancy to emerge during the GMC hearing concerned the number of families who blamed MMR. The paper said that eight (1, 2, 3, 4, 6, 7, 8, and 11) linked developmental issues with the vaccine. But the total in the records was actually 11. The parents of child 5,⁹² 9,⁹³ and 12⁹⁴ were also noted at the hospital as blaming the vaccine, but their stated beliefs were omitted from the journal.

Case selection

The frequency of these beliefs should not have surprised Wakefield, retained as he was to support a lawsuit. In the month that Barr engaged him—two years before the paper was published—the lawyer touted the doctor in a confidential newsletter to his MMR clients and contacts. “He has deeply depressing views about the effect of vaccines on the nation’s children,” Barr said.⁹⁵ “He is also anxious to arrange for tests to be carried out on any children . . . who are showing symptoms of possible Crohn’s disease. The following are signs to look for. If your child has suffered from all or any of these symptoms could you please contact us, and it may be appropriate to put you in touch with Dr Wakefield.”

The listed symptoms included pain, weight loss, fever, and mouth ulcers. Clients and contacts were quickly referred.⁹⁶ Thus, an association between autism, digestive issues, and worries about MMR—the evidence that launched the vaccine scare—was bound to be found by the Royal Free’s clinicians because this was how the children were selected.⁹⁷

Moreover, through the omission from the paper of some parents’ beliefs that the vaccine was to blame, the time link for the lawsuit sharpened. With concerns logged from 11 of 12 families, the maximum time given to the onset of alleged symptoms was a (forensically unhelpful) four months. But, in a version of the paper circulated at the Royal Free six months before publication, reported concerns fell to nine of 12 families but with a still unhelpful maximum of 56 days.⁹⁸ Finally, Wakefield settled on 8 of 12 families, with a maximum interval to alleged symptoms of 14 days.

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Between the latter two versions, revisions also slashed the mean time to alleged symptoms—from 14 to 6.3 days. “In these children the mean interval from exposure to the MMR vaccine to the development of the first behavioural symptom was six days, indicating a strong temporal association,” he emphasised in a patent for, among other things, his own prophylactic measles vaccine,⁹⁹ eight months before the *Lancet* paper.

This leaves child 3. He was 6½ and lived on Merseyside: 200 miles from the hospital. He received MMR at 14 months,¹⁰⁰ with the first concerns recorded in the general practitioner’s notes 15 months after that.¹⁰¹ His mother—who 4 years later contacted Wakefield on the advice of JABS¹⁰²—told me that her son had become aggressive towards a brother, and records say that his vocabulary had not developed.¹⁰³

“We both felt that the MMR needle had made [child 3] go the way he is today,” the parents wrote to a local paediatric neurologist, Lewis Rosenbloom, 18 months before their son’s referral to London.¹⁰⁴ They told him they wanted “justice” from the vaccine’s manufacturer, and that they had been turned down for legal aid.¹⁰⁵ “Although it is said that the MMR has never been proven to make children to be autistic, we believe that the injection has made [child 3] to be mentally delayed, which in turn may have triggered off the autism.”

I visited this family twice. Their affected son was now a teenager and a challenge both to himself and to others. His mother said his diagnosis was originally “severe learning difficulties with autistic tendencies” but that she had fought to get it changed to autism.¹⁰⁶

As for a connection with MMR, there was only suspicion. I do not think his family was sure, one way or the other.¹⁰⁷ When I asked why they took him to the Royal Free, his father replied: “We were just vulnerable, we were looking for answers.”

What was unquestionably true was that child 3 had serious bowel trouble: intractable, lifelong, constipation.¹⁰⁸ This was the most consistent feature among the 12 children’s symptoms and signs¹⁰⁹ but, being the opposite of an expected finding in inflammatory bowel disease,^{110 111} it was nowhere mentioned in the paper. This young man’s was so severe that he was dosed at his special school, his mother said, with up to five packets of laxative a day.

“You always knew when his stomach was hard,” she told me, in terms echoed over the years by many parents involved with Wakefield. “He would start headbutting, kicking, breaking anything in the house. Then he would go to the toilet and release it.”

For the Royal Free team, however, when reporting on these patients, such motility issues¹¹² were sidelined in the hunt for Wakefield’s syndrome. In almost all the children, they noted commonly swollen glands in the terminal ileum, and what was reported as “non-specific colitis.”^{113 114} In fact, as I revealed in the *BMJ* last April,¹¹⁵ the hospital’s pathology service found the children’s colons to be largely normal, but a medical school “review” changed the results.

In this evolution of the gut pathology noted in the records to what was published in the paper, child 3’s case is a prime example. After ileocolonoscopy (which, GMC prosecution and defence experts agreed, was not clinically indicated¹¹⁶), the hospital’s pathologists found all colonic samples to be “within normal histological limits”.¹¹⁷ But three months after the boy was discharged, Walker-Smith recalled the records and changed the diagnosis to “indeterminate ileocolitis”.¹¹⁸

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“I think, sadly, this was the first child who was referred, and the long term help we were able to give in terms of dealing with constipation was not there,” he told the GMC panel. “However, we had excluded Crohn’s disease and we had done our best to try and help this child, but in the end we did not.”

So that is the *Lancet* 12: the foundation of the vaccine scare. No case was free of misreporting or alteration. Taken together, NHS records cannot be reconciled with what was published, to such devastating effect, in the journal (table 4).

Comparison of three features of the 12 children in the *Lancet* paper with features apparent in the NHS records, including those from the Royal Free hospital

Child no	Regressive autism		Non-specific colitis		First symptoms days after MMR		All three features	
	Lancet	Records*	Lancet	Records†	Lancet	Records‡	Lancet	Records
1	Yes	?	Yes	Yes	Yes	No	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No	Yes	No
3	Yes	?	Yes	No	Yes	?	Yes	No
4	Yes	?	Yes	No	Yes	No	Yes	No
5	Yes	?	Yes	No	No	No	No	No
6	Yes	No	Yes	Yes	Yes	?	Yes	No
7	Yes	No	No	No	Yes	No	No	No
8	No	No	Yes	No	Yes	No	No	No
9	No	No	Yes	No	No	No	No	No
10	No	No	Yes	No	No	No	No	No
11	Yes	?	Yes	No	Yes	No	Yes	No
12	Yes	No	Yes	No	No	No	No	No
Total	9/12	?6/12	11/12	3/12	8/12	?2/12	6/12	0/12

Comparison of three features of the 12 children in the *Lancet* paper with features apparent in the NHS records, including those from the Royal Free hospital

Wakefield, however, denies wrongdoing, in any respect whatsoever.¹¹⁹ He says he never claimed that the children had regressive autism, nor that he said they were previously normal. He never misreported or changed any findings in the study, and never patented a measles vaccine. None of the children were Barr’s clients before referral to the hospital, and he never received huge payments from the lawyer. There were no conflicts of interest. He is the victim of a conspiracy.^{120 121} He never linked autism with MMR.

“Mr Deer’s implications of fraud against me are claims that a trained physician and researcher of good standing had suddenly decided he was going to fake data for his own enrichment,” he said in a now abandoned complaint against me to the UK Press Complaints Commission. “The other authors generated and ‘prepared’ all the data that was

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reported in the *Lancet*. I merely put their completed data in tables and narrative form for the purpose of submission for publication.”

But, despite signing up to claim credit for a paper in the *Lancet*, his co-authors Walker-Smith and Murch did not even know which case was which. Walker-Smith said he had “trusted” Wakefield.¹²² “When I signed that paper, I signed with good intent,” he told the GMC panel. Denying any wrongdoing, he argued that the published report was not even about MMR, but merely described a new “clinico-pathological entity”. He said that the admissions to the Royal Free were “entirely related to gastroenterological illness” and how the children were sourced was “irrelevant” and “immaterial.” His lawyers said that he was appealing against the panel’s decision and on these grounds they had advised him not to respond to my questions.

The journal, meanwhile, took 12 years to retract the paper, by which time its mischief had been exported. As parents’ confidence slowly returned in Britain, the scare took off around the world, unleashing fear, guilt, and infectious diseases—and fuelling suspicion of vaccines in general. In addition to measles outbreaks, other infections are resurgent, with Mr 11’s home state of California last summer seeing 10 babies dead from whooping cough, in the worst outbreak since 1958.¹²³

Wakefield, nevertheless, now apparently self-employed and professionally ruined, remains championed by a sad rump of disciples. “Dr Wakefield is a hero,” is how one mother caught their mood in a recent *Dateline NBC TV* investigation, featuring the story of the doctor and me.¹²⁴ “I don’t know where we would be without him.”

How the link was fixed

The *Lancet* paper was a case series of 12 child patients; it reported a proposed “new syndrome” of enterocolitis and regressive autism and associated this with MMR as an “apparent precipitating event.” But in fact:

- Three of nine children reported with regressive autism did not have autism diagnosed at all. Only one child clearly had regressive autism
- Despite the paper claiming that all 12 children were “previously normal,” five had documented pre-existing developmental concerns
- Some children were reported to have experienced first behavioural symptoms within days of MMR, but the records documented these as starting some months after vaccination
- In nine cases, unremarkable colonic histopathology results—noting no or minimal fluctuations in inflammatory cell populations—were changed after a medical school “research review” to “non-specific colitis”
- The parents of eight children were reported as blaming MMR, but 11 families made this allegation at the hospital. The exclusion of three allegations—all giving times to onset of problems in months—helped to create the appearance of a 14 day temporal link
- Patients were recruited through anti-MMR campaigners, and the study was commissioned and funded for planned litigation

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Footnotes

- Funding: Brian Deer's investigation was funded by the *Sunday Times* of London and the Channel 4 television network. Reports by Deer in the *BMJ* were commissioned and paid for by the journal. No other funding was received, apart from legal costs paid to Deer by the Medical Protection Society on behalf of Andrew Wakefield.
- Competing interests: The author has completed the unified competing interest form at www.icmje.org/coi_disclosure.pdf (available on request from him) and declares no support from any organisation for the submitted work; no financial relationships with any organisation that might have an interest in the submitted work in the previous three years; BD's investigation led to the GMC proceedings referred to in this report, including the charges. He made many submissions of information but was not a party or witness in the case, nor involved in its conduct.
- Provenance and peer review: Commissioned; externally peer reviewed.

References

1. Wakefield AJ, Murch SH, Anthony A, Linnell, Casson DM, Malik M, et al. Ileal lymphoid nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children. *Lancet* 1998;351:637-41 [retracted].
2. Editors of the *Lancet*. Retraction: ileal lymphoid nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children. *Lancet* 2010;375:445.
3. One child, child 5, was admitted without any developmental diagnosis, but was in treatment for epilepsy.
4. Although the paper makes clear that the research did not prove an association between MMR and the purported syndrome, it describes its table 2 as summarising "the apparent precipitating events; onset of behavioural features; and age of onset of both behaviour and bowel symptoms."
5. David Casson. Discharge summary. 21 May 1997.
6. Although Wakefield and the *Lancet* would later claim that the Legal Aid Board commissioned a quite separate "viral" study, the work specified in the documents submitted to the Legal Aid Board, seeking funding, on 6 June 1996, included clinical examination, ileocolonoscopy, histology, immunohistochemistry and molecular analysis for measles virus, neuropsychiatric studies, MRI brain scan, lumbar puncture, EEG and evoked potentials, B12 studies, modified Schilling test, and various blood and urine tests. The document includes costings, such as £1750 for colonoscopy with four night's stay, £1000 for MRI scans, and £1400 for medical reports. Molecular, immunohistochemical, and electron microscopic analysis of tissues was priced at £500 per child. Named investigators for the legal project who would also be authors of the *Lancet* paper were Andrew Wakefield, John Walker-Smith, Simon Murch, David Casson, Amar Dhillon, John Linnell, Mark Berelowitz, and Peter Harvey. The document states: "The objective is to seek evidence which will be acceptable in a court of law of the causative connection between either the mumps, measles and rubella vaccine or the measles/rubella vaccine and certain conditions which have been reported with considerable frequency by families of children who are seeking compensation. It is hoped that using the testing protocol attached it will be possible to establish the causal link between the administration of the vaccines and the conditions outlined in this proposed protocol and costing proposal." The board commissioned the project under an "authority to do contract work," naming Wakefield, issued on 22 August 1996. The technical specification is materially identical to a protocol submitted for approval by the Royal Free's ethics committee, and the work to be performed is materially identical to the study submitted by Wakefield to the *Lancet*, with data sliced into two paired papers, which were peer reviewed together. One was published on 28 February 1998, and the other was rejected by the journal.
7. MMR and MR Vaccine Litigation Sayers and others v Smithkline Beecham plc and others - [2007] All ER (D) 30 (Jun).
8. Although some of his professional colleagues have admitted awareness of a relationship between Wakefield and the lawyer, his co-authors have denied any knowledge that he was contractually employed and funded by Barr. For example, in an email dated 27 February 2004, Walker-Smith wrote: "No financial details of Andy's work was ever discussed with me by anyone and I was totally unaware of the grant of £55,000 that had been paid to him in an NHS Trust Fund, until Deer told me to my astonishment in December 2003." Also in February 2004, John O'Leary, a Wakefield research collaborator and business partner,

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issued a statement to Deer, through lawyers: "We were not made aware, nor were we aware, of any liaison between Dr Wakefield and Mr Richard Barr of Alexander Harris Solicitors that apparently existed since 1996. In addition, we had never been informed that the LSC [the Legal Services Commission, successor to the Legal Aid Board] had funded Dr Wakefield."

9. Deer B. MMR doctor given legal aid thousands. Sunday Times 2006 December 31.

www.timesonline.co.uk/tol/news/uk/article1265373.ece/.

10. Wakefield A. Introduction to the rationale, aims and potential therapeutic implications of the investigation of children with Disintegrative disorder (regressive autism; Heller's disease and intestinal symptomatology." (Document issued by Wakefield and mailed to doctors and parents who approached the Royal Free, dated 3 February 1997.)

11. Barr R, Wakefield A. Proposed protocol and costing proposals for testing a selected number of MR and MMR vaccinated children (and attached specification). Submitted to the Legal Aid Board 6 June 1996. [GMC fitness to practise panel hearing in the case of Wakefield, Walker-Smith and Murch. Day 11.]

12. Child 1 attended an outpatient appointment on 19 June 1996, and was admitted on 21 July 1996.

13. Barr R. Letter to the Legal Aid Board. 22 November 1996. Day 11.

14. General Medical Council. Dr Andrew Wakefield: determinations on serious professional misconduct and sanctions. 24 May 2010. Wakefield: www.gmc-uk.org/Wakefield_SPM_and_SANCTION.pdf_32595267.pdf.

15. General Medical Council. Professor John Walker-Smith: determinations on serious professional misconduct and sanctions, 24 May 2010. www.gmc-uk.org/Professor_Walker_Smith_SPM.pdf_32595970.pdf.

16. General Medical Council. Fitness to practise panel. Findings of fact. 28 January 2010. www.gmc-uk.org/static/documents/content/Wakefield__Smith_Murch.pdf.

17. British Paediatric Association. Guidelines for the ethical conduct of medical research involving children. Bull Med Ethics 1992;80:13-20.

[Medline]

18. Panel findings of fact. Ten children (1, 2, 3, 5, 6, 7, 8, 9, 10, 12) were found to have been subjected to invasive investigations for research purposes without ethical approval. In seven cases (1,2,3,5,8,9,12) this was found to be contrary to the child's clinical interests. Eight children (1, 2, 3, 4, 5, 8, 9, 12) were caused to undergo colonoscopies which were not clinically indicated. Seven children (1, 2, 3, 5, 8, 9, 12) were caused to undergo barium meals and follow throughs which were not clinically indicated. Three children (3, 9, 12) were caused to undergo lumbar punctures which were not clinically indicated.

19. Interviewed by Brian Deer, both Mrs 2 and the organiser of JABS confirmed this.

20. (a) Neil Thomas. Evidence to the panel. Day 107. (b) Michael Rutter. Evidence to the panel. Day 35.

21. (a) Richard Cartmel. Evidence to the panel. Day 14. (b) Royal Free history taken: 2 September 1996. Day 40.

22. Buie T, Campbell DB, Fuchs GJ, Furata GT, Levy J, Vandewater J, et al. Evaluation, diagnosis, and treatment of gastrointestinal disorders in individuals with ASDs: a consensus report. Pediatrics 2010;125(suppl 1): s1-18.

23. Lord Justice May. Judgment in the court of appeal, London. R on the application of "H" v the Legal Services Commission. 28 February 2006.

24. Richard Cartmel. GP record. 2 November 1994. Day 14. "Nil obvious re MMR story."

25. Child 2 was born on 29 July 1988 (mother's interview with Deer; register of births), and vaccinated with MMR on 8 November 1989 (GP records. Day 14)

26. (a) David Casson. Discharge summary. 16 September 1996. Day 24. "Mum notes a normal developmental progress. Mum does recount that at 13 months of age he had his MMR immunisation and two weeks following this had started with head banging behaviour and screaming throughout the night. Subsequently seemed generally sickly but nevertheless the main changes appeared to have stemmed from the age of 20 months when he started losing words and became hyperactive and stopped recognising people and responding normally." The summary, like the Lancet paper, gives a wrong age (13 months) for child 2's vaccination, taken from the mother by Mark Berelowitz. (b) Peter Harvey. Neurology report. 9 September 1996. Day 107. "Head banging after MMR inoculation followed by progressive intellectual damage."

27. Berelowitz told the panel that the "core part" of the job to which he was appointed in 1993 was to head the paediatric liaison service, which helped children and families deal with psychological complications of severe physical illness. Day 12.

28. Panel findings of fact. Page 13.

29. Andrew Wakefield. Evidence to the panel. Day 59. "Firstly, as with all other potential referrals, the parents had made contact with me and had described their child's problems as they perceived them..." In some cases, he sent them documents setting out his theories and plans. Day 59. Although an academic researcher with no clinical duties, Wakefield was anxious to talk with parents before referral. For example, he wrote to family of child 4. Day 51. "Thank you very much for your letter regarding your son. I would be very grateful if you could phone me or my secretary with your telephone number so that we can discuss this directly." He wrote to the parents of child 12. Day 42. "It will be necessary for me to discuss the nature of the referral with your GP and I would be grateful if you could let me have his/her name, telephone number. Also could you please let me have your telephone number so that I can speak to you directly on the subject."

30. Deer B. Revealed: Undisclosed payments to Andrew Wakefield at the heart of vaccine alarm.

<http://briandeer.com/wakefield/legal-aid.htm>

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31. Deer B. Revealed: MMR research scandal. Sunday Times 2004; Feb 22.
www.timesonline.co.uk/tol/life_and_style/health/article1027636.ece.
32. The GMC panel examined records for all of the Lancet children except child 11. It also examined the records of an additional patient, child JS, a Barr client who was denied by his paediatrician enrolment into the study, despite repeated requests from Wakefield and Walker-Smith. This boy was later admitted as a private patient and became a lead claimant, alongside child 2, in the lawsuit.
33. Sylvia Dean, lay member; Wendy Golding, lay member; Surendra Kumar, GP (chair); Parimala Moodley, psychiatrist; Stephen Webster, geriatrician.
34. Kieran Coonan QC for Wakefield. Stephen Miller QC for Walker-Smith. Adrian Hopkins QC for Simon Murch. Sally Smith QC appeared for the GMC. The independent legal assessor, advising the panel, was Nigel Seed QC.
35. The third defendant was Simon Murch, at the time of these events consultant paediatric gastroenterologist at the Royal Free, and now professor of medicine at Warwick University. On 28 January 2010, Day 197, he was found to have misled the Royal Free's ethics committee, acted contrary to the clinical interests of children, and failed in his duties as a responsible consultant. On 24 May 2010, Day 217, the panel noted that Murch's involvement with the project was "subsidiary to and more limited" than Wakefield's and Walker-Smith's, that he had shown insight into his conduct, and had "demonstrated errors of judgment but had acted in good faith". He was acquitted of serious professional misconduct.
36. Deer B. MMR doctor fixed data on autism. Sunday Times 2009 Feb 8.
www.timesonline.co.uk/tol/life_and_style/health/article5683671.ece.
37. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4th ed. 1994.
38. Andrew Wakefield. Evidence to the panel. (a) Day 49. "Q: What did you understand that phrase to mean, 'pilot study'? A: This refers specifically and exclusively to the Legal Aid Board pilot study. That is, the investigation of five children with Crohn's disease and five children with regressive autism and gastrointestinal symptoms." (b) Day 52. "Q: The second aspect concerns the second box down, which is noted 'Diagnosis' and you see what you have written there: 'Regressive autism + ? inflammatory bowel disease'. Again, what did you intend to convey by using that expression on this document? A: Based upon my understanding at the time, that was the likely diagnosis in this child."
39. Mr Justice Bell. Judgment in the high court, London. Paul Sayers & Ors v SmithKline Beecham & Ors. 19 December 2001. "The mechanisms all take their point of departure from the demonstrated persistence of measles virus in the body of children with regressive autism."
40. Andrew Wakefield. Evidence to the House of Representatives committee on government reform. 25-6 April 2001.
41. Michael Rutter. Evidence to the panel. Day 37. Day 39.
42. Dr N. GP records. Day 6.
43. Dr N. GP note. 18 March 1993. Day 6. The record says child 6 received MMR on 15 June 1993.
44. John Trounce. Report. June 1995. Day 6. Child 7 received MMR on 24 November 1995.
45. John Walker-Smith. Letter to Andrew Wakefield. 4 October 1996. Day 41.
46. Filipek PA. Autistic Spectrum Disorders. In Swaiman KF, Ashwal S. Pediatric neurology: principles and practice. 3rd ed. Mosby, 1999.
47. Panel findings of fact. Page 25.
48. Panel findings of fact. Page 93.
49. Repeated, multiple comparisons between Casson's documentation shows an exceptional degree of concordance with clinical records generated by consultants.
50. David Casson. Letter to Sian Bennett. May 1997. Day 102.
51. John Walker-Smith. Outpatient history, taken from the mother. 2 October 1996. Day 41. "He had behaviour changes within a week, although the mother has only relatively recently associated the change of behaviour with MMR."
52. Andrew Wakefield. Letter to Mrs 12. 19 July 1996. Day 28. "Thank you for your letter regarding your son. We have recently taken a profound interest in this subject, particularly in view of the link between bowel problems and Asperger's Syndrome. I would greatly appreciate if you would mind calling me at the Royal Free before 3rd August and in addition I would like you to seek a referral from your GP to Professor John Walker-Smith, Professor of Paediatric Gastroenterology at the Royal Free Hospital, for investigation."
53. Gillian Baird, at the Newcomen Centre, Guy's hospital. September 1996. Day 36.
54. Panel findings of fact. Page 34.
55. Michael Rutter, an expert witness for the GMC, said that there was "no evidence that I could identify" in the child's records indicating any significant regressive element in his disorder. Day 36.
56. Mrs 12. Evidence to the panel. Day 28.
57. Richard Barr. Letter to Mrs 12. 14 August 1996. Day 28.
58. Mrs 2 ran Allergy-induced Autism, a since-disbanded national group.
59. Panel findings of fact. Page 22 (child 4); page 37 (child 8).
60. An academic pharmacist in Sunderland, England, and JABS.

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61. "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." This claim was retracted by 10 of the 13 authors in March 2004. (Murch SH, Anthony A, Casson DH, Malik M, Berelowitz M, Dhillon AP, et al. Retraction of an interpretation. *Lancet*2004;363:750.)
[CrossRef][Medline][Web of Science]
62. Dr Steel. Letter to Dr Sendall. 19 May 1988. Day 6 and Day 36.
63. William Tapsell. GP records. Day 6.
64. Dr Jackson. Letter to health visitor. 1988. Day 6.
65. ENT surgeon. Day 36. "At the age of two years and one month he apparently has a few single words only. He does not seem able to communicate his needs to his mother... Obviously I am more concerned about his increasingly apparent general delay. Mum was asking about this and although initially denying any problem, is obviously concealing quite deep seated worries about him being 'backward'."
66. Government vaccine damage payments unit. Request for information. 18 September 1995. Day 36.
67. Consultant geneticist letter. Day 6. "We are not sure whether this deletion is significant at all and certainly there is a very high possibility that it has nothing to do with [child 4's] autism."
68. Consultant to consultant letter. Day 6.
69. William Tapsfield. Referral letter to Wakefield. 1 July 1996. Day 41.
70. Panel findings of fact. Page 4.
71. Wheldon Houlsby. Letter to Neela Shabde. 17 February 1995. Day 29. "I was asked to see [Child 8] last year when there was concern about her development generally. When I saw her in clinic at the age of 10½ months I discovered that she had a coarctation, and referred her to the paediatric cardiologists. This was repaired surgically, and she is now well from this point of view. However concern about her development persists."
72. For reference, according to Medline Plus, from the US National Library of Medicine and the National Institutes of Health, the typical 18 month old "Can say 10 or more words when asked". According to the Early Identification of Developmental Delay and Disability project, funded by the state of California, at age 15 months, a child typically "uses 4-6 words", and at 16-18 months "uses 7-20 words".
73. Michael Rutter. Evidence to the panel. Day 37. "It is the kind of account that one often gets with an autism spectrum disorder. The fact that the child had only two to three words would make one uncertain as to whether this is a true bill or not, in that that is a very small amount of language to lose, but this is the kind of thing that one often sees so that the picture that comes out of all of these records is of a developmental problem that began early, involves language, involves some autistic-like features, quite a lot of hyperactivity, so that there does not seem much doubt that there was some sort of pervasive developmental disorder that could be regarded as falling on the autism spectrum at an earlier point."
74. Diana Jelley. Referral letter to Wakefield. 3 October 1996. Day 29.
75. Diana Jelley. Note of a telephone call from Mrs 8. 30 September 1996. Day 29.
76. Andrea Barrow. Referral letter to Walker-Smith. 17 May 1996. Day 5.
77. Andrea Barrow. GP record. 4 November 1993. Day 5.
78. Hospital record. 23 October 1996. Day 36.
79. Child 1 was born on 14 January 1993 and received MMR on 19 January 1994.
80. Anthea Barrow. Referral letter. 17 May 1996. "Mr & Mrs 1's most recent concern is that the MMR vaccination given to their son may be responsible for the autism." Day 5.
81. John Walker-Smith. Letter to Wakefield. 21 June 1996. Day 36.
82. John Walker-Smith. Letter Andrea Barrow. 21 June 1996. Day 77. Day 102.
83. David Casson. Child 1 admission clerking note. 21 July 1996. Day 24.
84. David Casson. Child 1 discharge summary. 9 August 1996. Day 24.
85. Patent Office. Pharmaceutical composition for regressive behavioural disease. UK patent GB 2 325 856 A. Priority date 6 June 1997. Publication date 9 December 1998.
86. Child 5 was born on 10 December 1988 and received MMR on 10 April 1990.
87. Geoffrey Shillam. GP records. 24 November 1989. Day 11.
88. Dr Williams. Letter to Dr Wilkinson. January 1992. Day 11. Day 36. "At one year he had convulsions which led to a further hospital admission but these appear to have been due to a high fever. From then on his parents noticed a difference in his development and feel that these febrile epileptic seizures continue to the present day... At 10 months of age he was saying mummy and daddy but then became very miserable and appeared to lose ground in his development after he had been in hospital."
89. Child 9 was born on 11 June 1990 and received MMR in October 1991.
90. Mohsin Malik. Discharge summary. 14 January 1997. Reported in the first statement of Clifford Spratt. Day 23.
91. Trevor Hopkins. GP records. Day 5.
92. (a) Peter Harvey. Neurology record. 5 December 1996. Day 64. "No doubt about relationship with MMR at onset. No doubt of normal earlier development... Parents have no doubt about the relationship with MMR." (b) David Casson. Discharge

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summary. 6 December 1996. Day 24. "His parents feel that the onset of his neurodevelopmental symptoms stems from the period two months after having had the MMR vaccination which he received on the 10 April 1990. A few months subsequent to this he started losing his skills."

93. Mohsin Malik. Discharge letter. 14 January 1997. Reported in the first statement of Clifford Spratt. Day 23. Spratt said: "The letter also informed me that [child 9]'s mother linked his mental regression at age 18-20 months to MMR which he was given at 16 months of age."

94. Andrew Wakefield. Royal Free form, ordering tests. Day 61. Day 36. "Autistic spectrum disorder and bowel disorder after MMR". Note also: (a) Legal aid certificate to sue the vaccine's manufacturer issued 9 October 1996, prior to a first outpatient clinic dated 18 October. (b) Mary Stuart. GP record. 25 July 1996. "Call from Dr Wakefield. Needs colonoscopy B12 absorption tests. History of measles vaccination reaction." Day 7. Day 64. (c) Mrs 12. Evidence to the panel. Day 28.

95. Dawbarns. Newsletter. February 1996. Day 37. Day 58.

96. The first referral letter for any child in the Lancet series—child 3—was dated 19 February 1996.

97. Andrew Wakefield. Evidence to the panel. Day 66. "Q: What I am suggesting to you and what I now want to ask you is where you make it clear that the children had come to the Royal Free in the first place, at least in the majority of cases, in the letters that we have looked at, because their parents, or in some cases their doctor through their parents, thought that MMR might have caused the damage? A: That is implicit to anyone reading this paper. When we talk in the discussion about a possibility of a referral, selection bias, in a self-referred group, the group is self-referred because of the symptoms manifest by the children, including the history of a possible exposure to a vaccine or an infection that has led to the problem, and then seeking help from a specific unit. That is explicitly what self-referral means. Inherent in that is, to the reader, those elements of the history of the patient that have caused them to come to that unit. To anyone reading this, we would have considered that to be self-evident. Self-referral on the basis of one or more of the symptoms of gastrointestinal problems, developmental regression and an association with environmental exposure... Q: I asked you why you did not make it clear, as we have seen from the letters that we looked at yesterday, that, at least in the vast majority of cases, these children came in the first place because their parents thought that MMR had caused that condition. You immediately to go a line where you talk about self-referral, but that particular reference does not include the very point that I am asking about, and you say is implicit, namely the association with MMR. How does any reader, whether a scientist, doctor or otherwise, read that into what you say there? A: The patients, children, are self-referred based on their symptoms and their history. That contains the three key elements of an environmental exposure, gastrointestinal problems and developmental regression. That self-referral encapsulates those three elements. That is, I would have thought, evident to any reader."

98. Deer B. It's all change as MMR paper reveals key differences from published Lancet study.

<http://briandeer.com/mmr/lancet-versions.htm>

99. Patent Office. Filing receipt. 6 June 1997, published at Deer B. Revealed: the first Wakefield MMR patent describes "safer measles vaccine". <http://briandeer.com/wakefield/vaccine-patent.htm>

100. Child 3 was born on 1 January 1990 and received MMR on 1 March 1991.

101. Ajjegowda Shantha. Evidence to the panel. Day 5. "Q: I think the first record of any parental concern in relation to development was when child 3 was 2½ in June 1992... A: Yes."

102. John Walker-Smith. Letter to Ajjegowda Shantha. 4 April 1996. Day 5.

103. Lewis Rosenbloom. Letter to Dr Oppenheim. "The mother's main concerns are [child 3's] lack of speech." GP records. Day 5.

104. Mr and Mrs 3. Letter to Lewis Rosenbloom. August 1994. Day 36.

105. The family reapplied through Barr, and were granted legal aid.

106. Child 3's development was plainly delayed from at least a very early point. A consultant letter, written in December 1992, when the boy was almost 3 years old, summarised the history. "He walked at 13 months of age and used 2-3 words of speech until he was 18 months when this left him. He now has lots of unintelligible babble and appears to understand at one word level." Day 36.

107. Although, in addition to making a legal claim, they also made a claim to the government's vaccine damage payments unit, prior to referral. Day 36.

108. (a) Ajjegowda Shantha. GP records and evidence to the panel. Day 5. (b) John Walker-Smith. Evidence to the panel. Day 91.

109. Murch S, Thomson M, Walker-Smith J. Author's reply [letter]. *Lancet* 1998;351:908.

110. Squires RH and Colletti RB, Indications for pediatric gastrointestinal endoscopy: A medical position statement of the North American Society for Pediatric Gastroenterology and Nutrition. *Journal of Pediatric Gastroenterology and Nutrition* 1996; 23: 107-110.

111. Ian Booth. Evidence to the panel. Day 41. "Looking for inflammatory bowel disease would be a most unusual way of approaching a patient with severe, long-standing constipation."

112. Afzal N, Murch S, Thirrupathy K, Berger L, Fagbemi A, Heuschkel R. Constipation with acquired megarectum in children with autism. *Pediatrics* 2003;112:939-42

[Abstract/FREE Full text]

113. Deer B. Wakefield MMR-autism sign was recognized for years: as benign finding in children.

<http://briandeer.com/wakefield/ileal-hyperplasia.htm>

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114. Turunen S, Karttonen TJ, Kokkonen J. Lymphoid nodular hyperplasia and cow's milk hypersensitivity in children with chronic constipation. *Journal of Pediatrics* 2004;145:606-11.
[CrossRef][Medline][Web of Science]
115. Deer B. Wakefield's "autistic enterocolitis" under the microscope. *BMJ* 2010;340:838-41.
116. Panel findings of fact. Page 70.
117. Histology report for child 3. Printed 13 September 1996.
118. Walker-Smith J. Letter to Ajjegowda Shantha, with revised discharge summary. 31 December 1996. Day 5.
119. Wakefield A. Complaint to the Press Complaints Commission. March 2009 (suspended by the PCC on 10 February 2010 on grounds of non-pursuit by the complainant). <http://briandeer.com/solved/wakefield-complaint.pdf>
120. Deer B. Vaccine victim: Andrew Wakefield invents a bizarre conspiracy [video]. <http://briandeer.com/solved/tall-story.htm>
121. Profile: Andrew Wakefield , the man at the centre of the MMR scare. *Times* 2010 May 24.
<http://www.timesonline.co.uk/tol/news/uk/article7135099.ece>
122. Walker-Smith J. Evidence to the panel. Day 97. "We all rely on trust. I trusted Dr Wakefield."
123. California Department of Public Health. Pertussis report. 15 December 2010.
www.cdph.ca.gov/programs/immunize/Documents/PertussisReport2010-12-15.pdf.
124. NBC News. A dose of controversy. Dateline NBC, with Matt Lauer. 30 August 2009, repeated and updated 30 May 2010.