



## Medical Milestone of the 20<sup>th</sup> Century

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11 June 2014

### Just William

Some of us, now at a 'certain age' may remember reading the exploits of a precocious English schoolboy called **William Brown**<sup>[1]</sup>. When asked what he wanted to be when he grew up William replied "Well, electricity, the telephone and bulls-eyes have all been invented. Everything's been invented – so I don't want to be an inventor."

### Was William right?



### Are we getting healthier?

At the beginning of the 20<sup>th</sup> century life expectancy at birth in the UK was 45 years and a large number of deaths occurred in childhood. Today however the average life expectancy for a child born in the UK is over 74 years. A man who has reached the age of 70 can expect to live to age 81 while a woman age 70 can expect to live to at least 84.<sup>[2]</sup>

**Woman Libbers' Rejoice** One unusual anomaly is a man will generally live longer if he is married while a woman will live longer if she is not married. Advances in medical science in the past 100 years, some of which are listed below, have extended our life expectancy.

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### Medical Milestones in the 20<sup>th</sup> Century

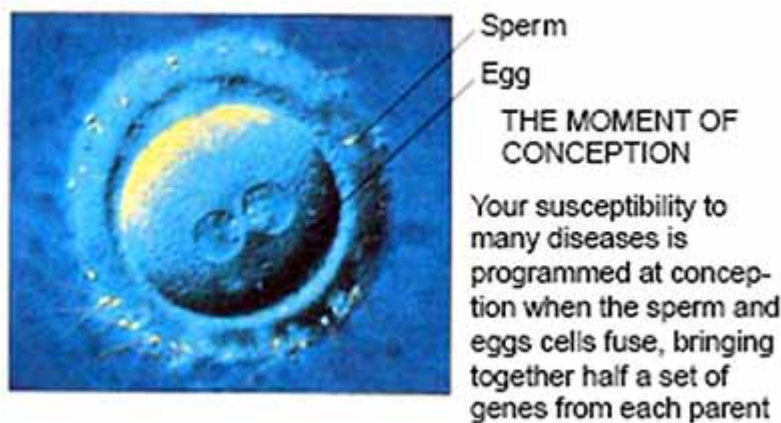
1900	1904	Some food preservatives found to be harmful to health
	1906	Free milk & meals provided for schoolchildren in UK
1910	1912	Vitamins discovered
1920	1921	First Marie Stopes clinic offering free contraceptives opens in London
	1922	Vitamin D deficiency is found to cause rickets
	1923	First immunisations for diphtheria given
	1925	First published article to report lead additives to petrol are public health risk
	1926	Vaccine for peruses (whooping cough) introduced
	1927	Vaccines against tuberculosis & tetanus become available
	1928	First smear test to detect early cervical cancer
	1928	Penicillin discovered
1930	1935	Alcoholics Anonymous founded in USA
1940	1941	Penicillin first used (for treating blood poisoning)
	1946	Link made between smoking & lung cancer
	1948	The National Health Service formed in UK
		Radiation first used to treat cancer
1950	1951	Oral contraceptive pill introduced
	1955	Polio immunisation by injection begins in UK
	1956	Clean Air Act passed after 4,000 die in 1952 London smog

1960	1960's	Smoking identified as a major risk factor in heart disease & lung cancer
	1962	Oral polio vaccine developed
	1964	<b>Measles immunisation begins across UK</b>
	1967	Physical exercise found to reduce risk of cardiovascular disease
		Smallpox eradication program launched
		<b>First heart transplant</b>
	1969	Rubella immunisation begins in UK
1970	1970	Seat belts in cars made compulsory in Victoria, Australia
	1975	Diets high in animal fats & low in fiber linked to several forms of cancer
	1977	<b>Last case of smallpox</b>
1980	1981	Safe-sex guidelines introduced in response to AIDS epidemic
		First heart / lung transplant
	1983	<b>All UK cars legally required to have seatbelts</b>
	1984	Passive smoking found to cause lung disease
1990	1960's	Human genome project maps genes that predispose people to certain diseases
	1994	Immunisation eradicates polio from Western hemisphere
	1995	<b>OEDC ban on leaded petrol blocked by Canada &amp; Australia</b>
	1999	Vaccine against meningococcal meningitis introduced in UK
2000	2000	Unleaded petrol introduced in Indonesia

### Just Genes?

Health is partly determined by your genes as well as being linked to your environment and lifestyle. A person's genetic inheritance may result in a disease or disorder developing later in life such as diabetes mellitus.

Life expectancy has risen dramatically in the past 100 years due to improvements in nutrition, sanitation and health care.



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### Prevention & Protection

A better understanding of the mechanism of disease resulted in the discovery that lifestyle factors such as smoking and a high-fat diet contribute to major illnesses. This has led to an emphasis on healthy living to reduce the chance of disease, safety legislation and immunisation to protect the population.

However as people now live longer, the major causes of ill health and death have changed. In the developed world infectious disease and under nourishment have been superseded by heart disease, cancer, stroke and smoking-related lung disease. A high fat diet and sedentary lifestyle contribute to many of these disorders.

Poor vision, deafness, arthritis and loss of memory tend to develop with increasing age. Although people enjoy more years of good health than before, elderly people can still expect a period of on average 10 years of mental and physical illness.

## The greatest medical milestone of the 20<sup>th</sup> century- discovered by accident

**Our vote for the greatest medical milestone goes to the discovery of penicillin.** This became the building block for developing many other antibiotics used today.

In 1928 Sir Alexander Fleming (*or as he was known then, just plain Alex*) had been growing flu culture in Petri dishes in his laboratory at St Mary's Hospital, London. He left this culture growing while he was on holidays for 3 weeks. The culture in one of the Petri dishes somehow became contaminated with spores of a strange mould, *Penicillin notatum*. This mould thrives at low temperature and fortunately the room was unheated during Fleming's absence. The weather turned warmer curtailing the growth of the mould, but stimulating the growth of the heat loving bacteria – except that is, in the regions where the mould had grown.<sup>[3]</sup>

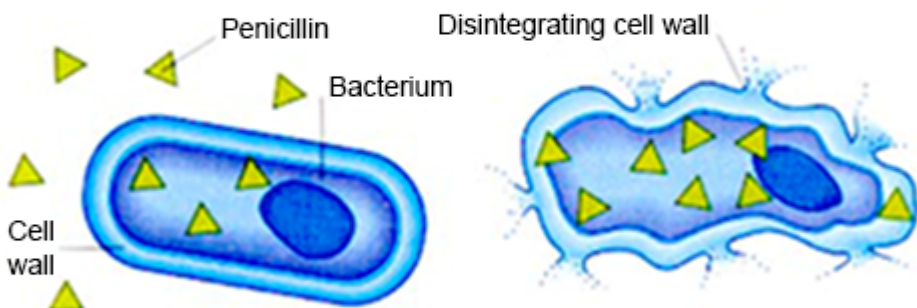
Upon his return, Fleming discovered that in the areas surrounding the mould growth, the bacteria had all been killed. **He correctly concluded the mould had produced an anti-bacterial substance.**

It was 13 years before Fleming's discovery made an impact. The first attempts to apply his "miracle drug" again highlight the role of chance.

Scientists Howard Florey and Ernst Chain developed methods to purify the anti-bacterial substance accidentally discovered by Fleming. They then had to test the drug. Standard procedure would have been to deliberately infect guinea pigs with a virulent bacterium and administer the drug to see if it had any effect.

### HOW PENICILLINS WORK

Penicillin antibiotics are used to treat many bacterial infections. Penicillins are bactericidal, which means that they actually destroy the bacteria causing infection. Most other types of antibiotic work by altering chemical activity in the bacteria, thereby preventing them from reproducing. The immune system is then able to overcome the remaining infection.



**1** Bacteria are single cell organisms that have protective cell walls. The penicillin enters the bacterium, beginning the process that will destroy it.

**2** The drug interferes with the chemicals needed by the bacterium to form its cell walls. This causes the cell walls to disintegrate, and the bacterium dies.

### Of Mice and Men

Once again luck stepped in. The researchers decided to use mice as well as guinea pigs. We now know that penicillin is fatal to guinea pigs even in minute doses and such experiments would have been a dismal failure, in all likelihood curtailing further development of the drug.

Florey himself admitted "*Mice were tried in the initial toxicity tests. What a lucky chance that was. If we had used guinea pigs exclusively, we would have said that penicillin was toxic, and we probably should not have proceeded to try to overcome the difficulties.*" It is only by luck that that mice and humans happen to respond similarly to this drug.

### Bed Pan Technology

Penicillin kills bacteria by preventing the formation of cell walls that bacteria need to survive. Initial methods of producing penicillin involved the use of tins, trays and bottles proved inadequate. After many tests, Florey's team discovered that ordinary bed pans, borrowed from Radcliff Infirmary, were the most efficient containers for growing penicillin.

**The first man was treated with penicillin in 1941.** He was treated for blood poisoning. *Widespread use of penicillin to treat infected wounds during World War II meant by mid 1940's penicillin became widely available for use as medicine.*

Hard driving Aussie scientist Howard Florey failed to interest British pharmaceutical companies in producing penicillin. He then flew to USA and with the help of *Pearl Harbor*, was able to convince the American government to 'encourage' pharmaceutical companies to speed up the production of penicillin to treat war wounds.

It now plays a major role in treating illnesses such as pneumonia, rheumatic fever and scarlet fever.

### World War II and Penicillin

While penicillin had been discovered pre-war by Sir Alexander Fleming, it took the war to force companies to develop a way of making the highly effective medicine on an industrial scale. Credit for this goes to Howard Florey and Ernst Chain and many soldiers wounded in combat had both men and their team to thank. For this research and achievement, *Florey, Chain, and Fleming shared the Nobel Prize for Physiology or Medicine in 1945.*

By the end of the war, such was the research into penicillin that several strains were developed. *Also the 1945 version of penicillin was some 20 times more potent than the 1939 version.* The mass production of penicillin was always of great importance to the Allies yet it was also a difficult thing to achieve.



Wounded WW2 servicemen at Aid Stations

Penicillin was used en masse after **D-Day** on wounded men and it was found to be especially effective against *gangrene*. Despite the changes in warfare, one problem that barely changed was the time lapse between when a man was wounded and when he could be operated on by a surgeon. *In the British Army, the average time lapse was acknowledged to be 14 hours.* Prior to the use of penicillin, such a period of time allowed a wound to fester. With the use of a penicillin dressing, the chance of a wound getting infected was vastly reduced and survival chances greatly increased.

### Penicillin Allergy

Between 1% and 10% of people who take penicillin experience an allergic reaction. This reaction may range from *hives* to a life-threatening form of shock known as *anaphylactic shock*. If you are unsure if you are allergic and penicillins are required, your doctor can perform a skin test. If positive, other forms of antibiotics are usually available. However more than half the patients who have a past history of allergic reaction may lose their sensitivity in five to ten years.<sup>[4]</sup>

## Nobel Prize

Sir Alexander Fleming (*Scot*), Ernst Boris Chain (*German*) and Sir Howard Walter Florey (*Australian*) were collectively awarded the **1945 Nobel Prize in Physiology or Medicine**.



**Sir Alexander Fleming**



**Ernst Boris Chain**



**Sir Howard Walter Florey**

## Conclusion

The medical milestones of the 20<sup>th</sup> century will certainly be eclipsed by ones yet to be made in the 21<sup>st</sup> century. Scientific medical milestones will continue to contribute in extending both our age and quality of life.

**However, we conclude that the discovery of *Penicillin* was the Most Important Medical Milestone of the 20th century.**

Finally we respectfully suggest young **William Brown** was wrong – although we note, coincidentally, the first **William** story ever published was titled "Rice Mould Pudding", featured in *Home Magazine* in 1919

## Reference:

1. 'Just William' by Richmal Crompton, published 38 books from 1922 to 1970 & sold over 6 million copies
2. British Medical Association, Complete Family Health Guide, Dorling Kindersley, London, 2000, p.17
3. Medical Discoveries: Lessons from the past, Andy Breslin, AV Magazine Nov-Dec 1995
4. Medical Questions & Answers, Stefania Siedlecky, AM MB BS MSc (London), Readers Digest, Surry Hills NSW, p.78

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## Richmal Crompton



Richmal Crompton ~ from young girl to age 56 in 1946 ~ home: Oakley Rd Bromley Common

**Richmal Crompton Lamburn** (15-Nov-1890 ~ 11-Jan-1969) was initially trained as a schoolmistress, but later became a popular English writer, best known for her **Just William** series of books, humorous short stories, and to a lesser extent adult fiction books.

Richmal Crompton Lamburn was the second child of the Rev. Edward John Sewell Lamburn, a Classics master at Bury Grammar School his wife Clara (née Crompton).

Richmal Crompton attended St Elphin's boarding school for the daughters of the clergy, originally based in Warrington, Lancashire. She later moved with the school to a new location Darley Dale, near Matlock, Derbyshire in 1904. In order to further her chosen career as a schoolteacher, she won a scholarship to the University of London. Crompton graduated in 1914 with a BA honors degree in Classics (II class). She took part in the Woman's Suffrage Movement (*the right for women to vote and stand for electoral office*).

In 1914, she returned to St Elphin's as a Classics mistress and later, at age 27, moved to Bromley High School in southeast London where she began her writing in earnest. She was an excellent and committed teacher at both schools.

Having contracted *poliomyelitis* in 1923, she was left without the use of her right leg. She gave up her teaching career and began to write full-time. Later in her forties, she suffered from *breast cancer* and had a mastectomy.

She never married and had no children although she was aunt and great-aunt to other members of her family. Her **William** stories and her other literature were extremely successful and, three years after she retired from teaching, Crompton was able to afford to have a house built in Bromley Common (The Glebe), for herself and her mother, Clara.

*According to the actor John Teed, whose family lived next door to Crompton, the model for William was Crompton's nephew Tommy.*

In spite of her disabilities, during the Second World War she volunteered for the Fire Service. She died in 1969 at her home in Chislehurst, London Borough of Bromley.

The first collection, entitled **Just William**, was published in 1922. She wrote 38 other **William** books throughout her life. The last, **William the Lawless**, was published posthumously in 1970.

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## That's Life



When asked what he wanted to be when he grew up, William (age 11) replied;

*“Well, electricity, the telephone and bulls-eyes have all been invented.  
Everything's been invented – so I don't want to be an inventor.”*

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