

AIDS Meds: A Victim of Their Own Success (Part 1)



By Josh Bloom — July 7, 2016

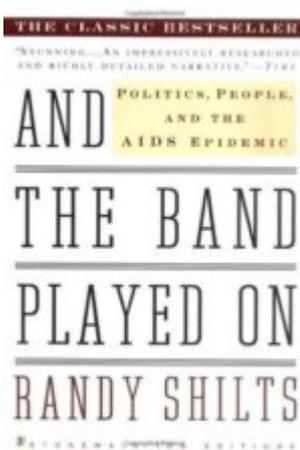


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Goodreads.com

For those of us who witnessed the horrors of the early days of AIDS, the images are impossible to forget. Not only did everyone who contracted HIV (which didn't even have a name at the beginning) die, but they did so in the most gruesome of ways.

Randy Shilts, a former San Francisco Chronicle reporter who wrote "And the Band Played On" (St. Martin's Press, New York, 1987), paints this picture in horrifying detail. Not only was Shilts a gifted writer, but he was also dead in the middle of the west coast epidemic **(1)**, and would later succumb to the disease in 1994 — the year before the first effective AIDS drugs would become available.



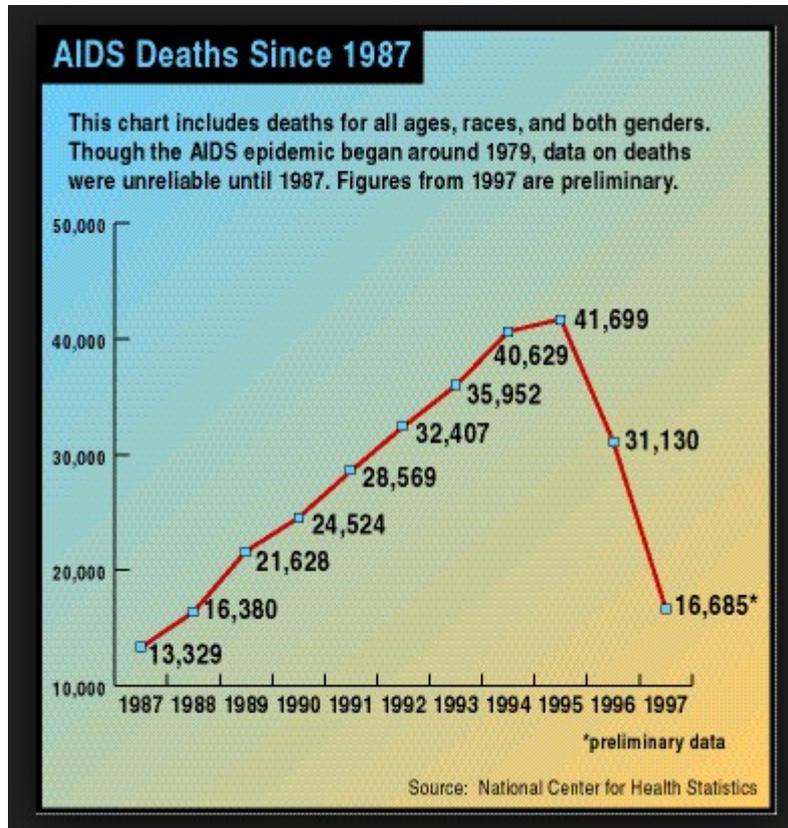
Randy Shilts (1951-1994) Image: Wikipedia

The destruction of the immune systems of HIV-positive people left them vulnerable to a host of opportunistic infections — microbes that are present in our bodies, but rarely cause harm in people with a health immune systems. It was the opportunistic infections **(2)** that did the killing, not HIV itself.

It is impossible to read his book and forget Shilts' horrific description of a young man who contracted esophageal candidiasis (thrush) — a yeast infection of the mouth and throat— and died

sitting in a chair because the mass grew so large that it blocked his airway when he tried to lie down.

After 14 years of unprecedented research, Roche's saquinavir — the first of the HAART **(3)** drugs was approved **(4)**. Many others would follow. In 1995, for the first time ever, the death rate in the U.S. from AIDS began to fall.



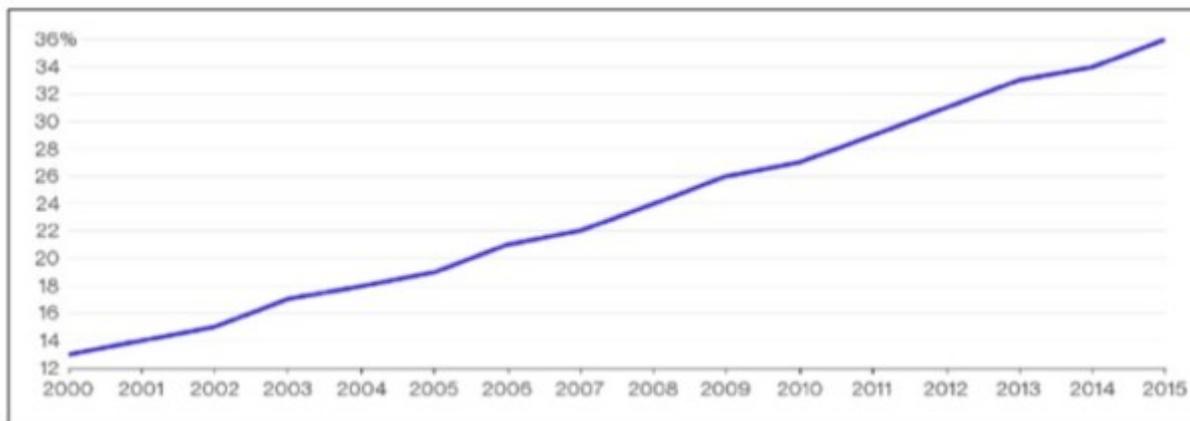
AIDS deaths by year in the US. Source: National Center for Health Statistics

In what is arguably the most successful campaign in the history of medicinal chemistry, drugs kept getting better and better, as well as much easier to take:



HIV daily medication. ca. 1997 (left), 2004 (right). Source: Gilead Sciences

There are now [approximately 20 approved HIV medicines](#) [1] that are available **(5)** as well as 14 others that are combinations of two or more of the 20. And the results speak for themselves:



Percentage of HIV-positive people aged 50 and older in North America, and Western and Central Europe by year. Source: UNAIDS

The obvious progress in the graph above is, in fact, a double-edged sword. Life-spans are obviously increasing, but this is because of chronic treatment with drugs, mostly Truvada. But, as HIV+ people take Truvada for many years, its toxicity becomes problematic. Fortunately, drug companies continued to develop ART drugs that worked by different mechanism, which makes it possible for patients to switch therapies when necessary.

Next: Part 2 — Attacking HIV with new drugs that operate in different ways. How will this change the treatment paradigm?

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Notes:

- (1) The East Coast epidemic took hold in New York's Greenwich Village and the gay section of Fire Island, off of Long Island. Gaetan Dugas (aka "Patient Zero"), a flight attendant for Air Canada, is thought to be significantly responsible for the rapid geographical spread of the infection.
 - (2) The other predominant opportunistic infections at that time were cytomegalovirus (CMV, a herpes virus), Kaposi's Sarcoma, Pneumocystis pneumonia, and toxoplasmosis. All of these could be fatal.
 - (3) Highly Active Anti-Retroviral Therapy, also called ART — Antiretroviral Therapy.
 - (4) Lamivudine (Epivir, 3TC), which is still used today as a component of certain combination therapies, was approved just before saquinavir. However, like the first approved (and ineffective) AIDS drug, AZT, it also belongs to the drug class called reverse transcriptase (RT) inhibitors. The original "cocktail therapies" required at least two different drugs that acted against the virus by different mechanisms. Saquinavir, a protease inhibitor, was the first drug to make this possible. This is one reason that a number of scientists consider it to be [the most worthwhile drug since 1990](#) [2].
 - (5) This is an approximation, which depends on how "different drug" is defined. Some of the 20 are simply time-released versions of existing drugs. Most are entirely different entities.
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Links

[1] <https://aidsinfo.nih.gov/education-materials/fact-sheets/21/58/fda-approved-hiv-medicines>

[2]

http://blogs.sciencemag.org/pipeline/archives/2011/01/31/whats_the_most_worthwhile_new_drug_since_1990