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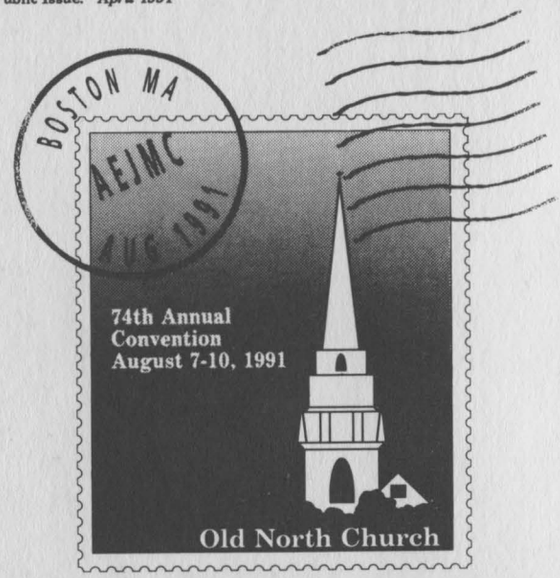

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AIDS IN THE 1980s

The Agenda-Setting Process for a Public Issue

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JAMES W. DEARING
SOONBUM CHANG

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AIDS in the 1980s: The Agenda-Setting Process for a Public Issue

Accepted for Publication October 1990

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HOW CAN A SOCIAL PROBLEM — any real-world problem — continue to be considered important in the mass media for years at a time? Critics and observers have almost universally portrayed the mass media as an institution with a short attention span: providing coverage of an issue in an ephemeral burst of attention, but with little sustained coverage of important public issues.[1]

Theoretical perspectives about how social problems become public issues mainly describe the fleeting initial mass media coverage, rather than sustained news coverage. Proponents of *natural history* models suggest that social problems, once defined as public issues through their mass media coverage, move fairly rapidly through historical stages towards resolution or demise.[2] The time span during which mass media attention is directed towards any one issue is presumably a discrete, time-bound state. The *public arenas* perspective focuses on the competition among many social problems and their proponents as each battles the other problems to gain access to very limited broadcast time and print space.[3] This perspective, like the natural history perspective, has difficulty in accounting for public issues which persist for years on the news agenda of mass media organizations. If competition among issues is so intense, then how can any one issue dominate news agendas? What factors explain the hegemony of certain issues? Both perspectives better explain why mass media attention to public issues is short-lived rather than why mass media attention may be prolonged.

The *ecologies of news* perspective,[4] although not demonstrated with cases of prolonged mass media coverage of public issues, incorporates the ideas that certain public issues will, through the interplay of journalistic and non-journalistic actors, persist in mass media coverage over relatively long periods of time. Yet while this perspective explains how conflict and negotiation between affected parties may cause issues to persist without achieving definite policy outcomes, the model does not explain why public issues may persist over long periods of time as important news topics even as policy outcomes are decided.

Although natural history models and public arena models of public issue development have been portrayed as different explanations of the same phenomena,[5] they are in fact each a partial and complementary explanation of how public issues arise and persist in society. Public issues only move through, or stall at, stages of mass media, public, and policy attention through the competitive allocation of attention on agendas. To suggest that competition models of public issue development somehow "move beyond" longitudinal or natural history models of public issue development is to draw a false distinction between what *drives change* in the level of attention to various issues (the allocation of attention through competition) and the change in *level of attention* itself (issue or cyclical stages). An agenda-setting model of issue development relies on both the idea of cyclical change in attention to issues and the idea of competition between issues as a determinant of such change. Thus in our view the concept of agenda-setting subsumes both natural history models and public arena models of public issue development.

In this monograph we document and analyze the issue of Acquired Immune Deficiency Syndrome (AIDS) in the United States during the 1980s, in order to illustrate a broadened *agenda-setting* perspective[6] to explain how a public issue can retain a priority position on the national media agenda for years at a time because of the interplay of: (1) constantly new information about the issue, which, when interpreted by journalists and editors in the context of the ongoing social problem, remakes the issue as being important in a new way, and (2) attention given to the issue on agendas other than the mass media agenda, such as the scientific agenda, the polling agenda, the public agenda, and the policy agenda.

How New Information Remakes Mass Media Issues

How do certain issues climb onto the news agenda of the major mass media? Journalists and editors are trained to recognize and value issues which are "newsworthy" by virtue of how much the issue reflects, or can be made to reflect, such newsworthiness criteria as sensation, conflict, mystery, celebrity, deviance, tragedy, and proximity.[7] Journalists and editors make subjective decisions about the degree to which a news issue reflects, or can be made to reflect, these characteristics. These decisions determine the extent of mass media coverage that an issue receives.

Issues not only receive mass media coverage because of their newsworthy characteristics. The information must also be timely. The "breaking quality" of news is its most important characteristic. The mass media's need for constantly new information partially explains why it is so unusual for a public issue to stay on the evening news and on the front page for very long. Once an issue receives media coverage, it usually remains on the news agenda for a fairly limited amount of time (often less than a month or so).

Mass media coverage of an issue over time can be better understood by contrasting this media agenda-setting process with how scientific knowledge about an issue accumulates. For example, although on a much larger scale than scientific investigations of most health-related problems in recent years, AIDS research has progressed in a process that is fairly typical in biomedical science. From the first published scientific account of a mysterious new disease on June 5, 1981,[8] scientific investigators sought to increasingly reduce the ambiguity about AIDS by gathering data to test hypotheses and by constantly reappraising accumulated knowledge. Identification of the human immunodeficiency virus (HIV), investigation of its means of transmission, and research on the development of treatment and prevention represent the creation of contiguous, precarious strands of ordered knowledge from a universe of disordered information.[9] Through the scientific processes of numerous investigators testing their hypotheses, problem-specific knowledge about AIDS was first established, refuted, and then gradually accumulated through testing subsequent hypotheses. Out of contradiction, dissent, and organized skepticism eventually comes a scientific consensus concerning a scientific issue.[10] AIDS research is an example of how theoretical contradiction and competition gradually lead to shared scientific consensus about an important scientific problem.[11]

On the scientific research agenda, new information about AIDS did not remake the issue of AIDS. New research-based information added further to the cumulative knowledge base about the disease. The attention given to a continuing biomedical problem such as AIDS does not waver much in scientific journals. Only with some sort of resolution[12] of a scientific problem (like a health epidemic) does a scientific issue drop off the scientific research agenda.

The mass media process of allocating attention to a public issue is different from scientific agenda-setting. Problem resolution is not required for a news issue to become less important on the media agenda. Instead, if there is a lack of new information about an issue, news coverage will stop. For mass media decision-makers to consider an "old" issue newsworthy again, not only is new information about the issue required, but the new information must enable writers and editors to recast the issue in a new way. When an indicator of issue importance such as the frequency of media coverage is plotted over time, the coverage usually resembles a recurring (and sometimes exponential) cycle. Each cycle, or portion of a cycle, represents a remaking of the issue. The over-time content of the media coverage of an issue represents not only new information, but also periodic changes in

Theories of mass media effects tend not to address changing mass media interpretations of public issues.

how journalists, editors, and hence viewers and readers, interpret the old issue in light of the new information. So the mass media occasionally provide their audiences with new frames of reference in order to interpret old issues.

Theories of mass media effects tend not to address changing mass media interpretations of public issues. Research on the effects of television priming,[13] for example, has not focused on the over-time processual nature of news. Audience members are assumed to be primed to think about an existing issue in one way, or to judge politicians in light of their issue positions, yet the periodic remaking of an existing issue by newspeople suggests the application of new primes. As reporters and editors make sense of new information by remaking existing issues, so mass media audience members are encouraged to think about existing issues in new ways.

Our perspective on the agenda-setting process is broader than past work on this topic. We are concerned not only with how an issue initially climbs the media agenda, but also with how an issue may, or may not, persist on the agenda for a lengthy period of years. Given this perspective, AIDS is an ideal issue of study.

Interaction of Agendas for an Issue

Especially for a major public issue such as AIDS, the issue may simultaneously become important on public agendas, media agendas, and policy agendas. The disease of AIDS itself may influence how important the issue becomes on these and other agendas. Investigators of the agenda-setting process often include in their analysis a "real-world indicator" of the importance of an issue. In the present study, we utilize the number of AIDS cases diagnosed officially by the Centers for Disease Control (CDC). Past research suggests that the real-world indicator is a very incomplete explanation of the amount of mass media coverage given to an issue. Various other factors intervene in the real-world indicator/media coverage relationship, such as the news value of the issue as perceived by newspeople, the relationship of the issue of study with other issues previously on the agenda, and so on.

While the relationship of the media agenda to the public agenda (Figure 1) has been rather well-established by past research,[14] much less scholarly attention has been devoted to how the media agenda is set.[15] The media agenda-setting process is influenced by the amount of news coverage given to an issue of study by certain influential media like *The New York Times*, by such gatekeepers as editors and news managers, and by certain spectacular news events (for example, the March 1989 oil spill by the Exxon Valdez in Alaska that influenced the environment issue in the United States). The present research seeks to determine how the media agenda-setting process for the issue of AIDS took place. A four-year period occurred after the first AIDS cases were reported in mid-

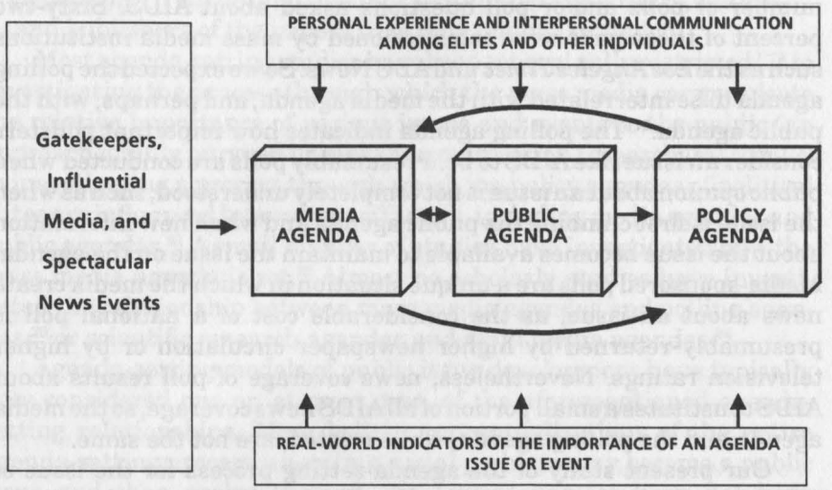

Figure 1. Three main components in the agenda-setting process: the media agenda, the public agenda, and the policy agenda.

Adapted from Everett M. Rogers and James W. Dearing, "Agenda-Setting Research: Where Has It Been, Where Is it Going?" in James A. Anderson, ed., *Communication Yearbook 11* (Newbury Park, Calif., 1988), pp. 555-594.

1981, before the issue of AIDS received major coverage by the U.S. media.

For a scientific issue like AIDS, in which research findings were reported by the mass media to the U.S. public, the scientific agenda (indexed as the number of articles about AIDS published each month in scientific journals) might be a fourth main component in the agenda-setting process (diagramed in Figure 1). The present study will create a measure of the science agenda, and analyze its role in the agenda-setting process for AIDS.

As shown in Figure 1, we expect the media agenda to influence the public agenda and the policy agenda, although the latter relationship has been less well-studied than has the media agenda/public agenda relationship. Our measure of the policy agenda for the issue of AIDS is the amount of federal funding per fiscal year for AIDS research and education. This variable is an approximate indicator of the outcomes of the policy agenda process at the national level. We index the public agenda through responses to 110 national sample polls of the U.S. adult population in which 1,084 questions regarding AIDS were asked of approximately 150,000 respondents. We obtained these public opinion data from the archives of the Roper Center for Public Opinion Research. The dates at which these polls were taken tend to cluster; for example, only six polls were carried out in 1983, none in 1984, and then 13 polls were conducted in 1985, and more in each ensuing year. A "polling agenda" seems to have been set for the issue of AIDS,[16] as indexed by the

number of polls and/or poll questions asked about AIDS. Sixty-two percent of these polls were commissioned by mass media institutions such as the *Los Angeles Times* and ABC News. So we expected the polling agenda to be interrelated with the media agenda, and perhaps, with the public agenda.[17] The polling agenda indicates how important pollsters consider an issue like AIDS to be. Presumably polls are conducted when public opinion about an issue is not completely understood, such as when the issue is first climbing the public agenda and when new information about the issue becomes available to maintain the issue on the agenda. Media-sponsored polls are a unique situation in which the media create news about an issue, as the considerable cost of a national poll is presumably returned by higher newspaper circulation or by higher television ratings. Nevertheless, news coverage of poll results about AIDS constitutes a small portion of all AIDS news coverage, so the media agenda and the polling agenda, while related, are not the same.

Our present study of the agenda-setting process for the issue of AIDS includes two elements not found in previous research: (1) the scientific agenda, and (2) the polling agenda. Our general research design also differs from most past agenda-setting research, which consists of more highly aggregated, cross-sectional data-analyses. Our general research strategy in the present investigation was to begin with an aggregated approach, and then to disaggregate (1) by looking at the agenda-setting process over time (the 91 months in our time-series of study) in order to identify eras in the media coverage of the AIDS issue, and (2) by breaking the general issue of AIDS into sub-issues (for example, the civil rights aspects of AIDS, children with AIDS, and biomedical research on AIDS). This latter disaggregation of media coverage (and correspondingly of the poll questions about AIDS) for the AIDS sub-issues allowed us to conduct a more fine-grained analysis of the agenda-setting process over time. For example, we find that one reason why AIDS stayed on the media agenda in the United States for so many years after 1985 is the fact that the AIDS sub-issues rose and fell over time, but in a fashion that maintained relatively high media coverage for the general issue of AIDS.

Toward a Broader Conception of Agenda-Setting

An agenda-setting perspective is taken in the present analysis of the media's role in the issue of AIDS. An agenda is a set of issues that are viewed at a point in time as ranked in a hierarchy of importance.[18] The mass media, it has been claimed, may have one of their strongest effects in society by putting an issue on the agenda. Scholarly research on the agenda-setting process of the mass media stems most directly from Bernard Cohen,[19] who observed that the press:

> . . . may not be successful much of the time in telling people *what to think*, but it is stunningly successful in telling its readers *what to think about*. . . .The world will look different to different people, depending . . . on the map that is drawn for them by writers, editors, and publishers of the papers they read [emphasis added].

Most agenda-setting studies have been conceptually restricted (1) to investigating the process through which the mass media communicate the relative importance of various issues and events to the public (an approach mainly pursued by mass communication researchers),[20] or (2) to investigating a process through which the policy agendas of political elites are influenced by a variety of factors, including media agendas and public agendas.[21] A small number of studies have investigated how the mass media agenda is set.[22] Almost no scholarly studies have investigated the relationship between mass media agendas and polling agendas,[23] or scientific research agendas and mass media agendas.[24]

Agenda-setting models of public issue development have typically only considered one or, at most, two, of the aforementioned agenda-setting relationships. More holistic conceptualizations of the entire agenda-setting process whereby a social problem may become a public issue and then evolve through the agenda process have not been proposed, nor investigated in empirical research. Traditional approaches to agenda-setting research, such as natural history models and public arena models, have provided only partial explanations of the total process of public issue development. A broader concept of agenda-setting which considers influences among various agendas while focusing on issue competition, the role of new information about an issue, and changing media interpretations is likely to be more useful in explaining the development of an issue through the agenda-setting process.

Perhaps agenda-setting study should be more broadly conceptualized as *agenda research*, defined as the study of how public issues gain or lose importance relative to other issues over time. This definition incorporates a dialectic which determines change in issue importance. Issues become more important on various agendas through the addition of new information and new interpretations, while becoming less important on those same agendas due to competition with other issues (Figure 2). Thus investigations of issue development and agenda-setting should ideally be conceptualized to study the interplay on different agendas of (1) how an issue arises and is sustained through new information and interpretations, and (2) how competition with other issues erodes the importance of an issue of study. With a dominant news story such as AIDS, new interpretations not only sustain attention to the overall issue, but also compete with previous interpretations of the same issue in a struggle to determine how the issue is perceived.

Media Coverage of the Issue of AIDS

The transmission of HIV in the 1980s refocused attention on problems of disseminating accurate health information and communicating risk (and non-risk) to the general public.[25] Public opinion survey results suggest that while the U.S. public became aware of the disease by the

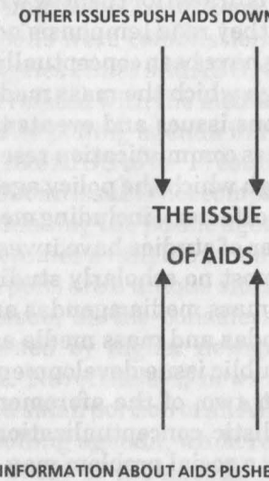

Figure 2. The nature of attention to issues is rooted in the dialectic between (1) issue competition and (2) new information about, and changing interpretations of, an existing issue.

mid-1980s, many individuals continued to be confused about certain aspects of the issue of AIDS.[26] Some observers blame scientists and other experts for providing confusing or misleading information about AIDS;[27] other analyses point to journalists' lack of thorough investigative reporting,[28] or to the euphemistic language that was utilized by the media (for example, "exchange of bodily fluids"), and to organizational barriers within mass media organizations.[29] Still other reviewers find fault with the institutions of science and government as well as journalism.[30]

In the present investigation the media agenda is measured by the number of news stories about AIDS in six of the major mass media of the United States: *The New York Times*, the *Washington Post*, the *Los Angeles Times*, and the network evening newscasts of ABC, NBC, and CBS.[31] These six media were chosen for the present analysis because they most closely approach serving as national media in the United States. New York City and Los Angeles were two of the three U.S. cities in which AIDS cases were particularly concentrated in the first years of the epidemic. The *Washington Post* was included because of its crucial role in reporting national political events, including federal government policies.

Consistency of News Coverage Across the Six Media

From June 1981 through December 1988 (91 months), the six media of study carried 6,694 news stories about AIDS. The three newspapers published 5,820 news stories, and the three television networks broadcast 874 news stories.[32] *The New York Times* outpaced the other two

papers by reporting 2,335 news stories, or about 40 percent of the total newspaper coverage. The *Los Angeles Times* reported 1,819 news stories, and the *Washington Post* 1,666. Of the three television networks, NBC broadcast 328 news stories, more than either CBS (287) or ABC (259).

The numbers of news stories about AIDS across time in each of the six media of study are highly correlated with each other. When one medium carried a relatively large number of news stories about AIDS, so did the other media. The highest correlation was .96 between the AIDS coverage of *The New York Times* and the *Washington Post*, and the lowest correlations were .73 between the number of AIDS news stories on ABC and in *The New York Times* and in the *Los Angeles Times*. Overall, each of the three newspapers' AIDS coverage is more highly correlated with that of the other newspapers' coverage than is one of the three television networks' AIDS coverage with the other networks' coverage. Correlation between the combined three newspapers and the combined three television networks is .84 (or about 70 percent of common variance). We conclude that the six mass media of study treated the issue of AIDS with a certain degree of similarity across the 91 months of our time-series.[33] For certain purposes in the analyses reported here, we combine the coverage by all six media into a total mass media coverage of AIDS. We utilize this variable to index the media agenda for the issue of AIDS on a month by month basis.

Role of The New York Times

The New York Times is often portrayed as an especially influential news source in the United States. Did *The Times* lead the other five media of study in AIDS coverage, as it has for certain other scientific issues? For example, the toxicological incident of Love Canal in 1978-1980 did not gain national attention until *The New York Times* reported this event, even after two years of extensive coverage by two local newspapers, the *Niagara Falls Gazette* and the *Buffalo News*.[34] Similarly, although the *Philadelphia Inquirer* had reported on the radon threat in Pennsylvania and New Jersey for five months, the issue of radon did not become national news until it reached the front page of *The New York Times*.[35]

We compared *The New York Times* with the *Los Angeles Times* in coverage of the issue of AIDS. From June 1981 through December 1986, *The New York Times* was outpaced by the *Los Angeles Times* for 21 months in the number of news stories regarding AIDS, while in 33 of the 54 months *The New York Times* had more stories than the *Los Angeles Times*.[36] Especially in periods of little media attention to AIDS (such as prior to April 1983, and until mid-1985), the *Los Angeles Times* published as many and sometimes more stories about AIDS, and usually in a more prominent position (such as on the front page), than did *The New York Times*. In periods of heavy media attention to AIDS (such as in late 1985

when actor Rock Hudson died), however, *The New York Times* considerably outpaced the *Los Angeles Times* in its coverage of AIDS.[37] Prior to 1987, *The New York Times*'s coverage of the issue of AIDS was rather event-oriented, and was relatively less consistent over time (than was the coverage by the other five media). After January 1987, however, *The New York Times* consistently outpaced the other five media of study in its number of AIDS news stories.

A transfer function analysis of *The New York Times* as a predictor of AIDS coverage by the other five media shows that this prestigious newspaper did not have a strong influence on the AIDS coverage by the other five media. If anything, Table 1 shows that in the first time period, June 1981 through December 1986, the other five media had a stronger influence on the AIDS coverage of *The New York Times* than vice versa. In the second time period, consisting of 1987 and 1988, the media agenda-setting influence of *The New York Times*, and of the other five media, was concomitant without either leading or lagging the other. The important statistic to note in Table 1 is the incremental R^2 column; this statistic indicates the additional variance explained in a dependent variable after the autoregressive relationship of the dependent variable

Table 1
Transfer function analysis of the causal relationships between *The New York Times* and the five other media of study.

Independent series	Beta weights	Standard error	Significance (two-tailed)	Incremental R2
I. Early time period, June 1981 through December 1986 (N=67)				
1. Other five media as the dependent series.				.05**
NY Times	1.58	.26	.000	
NY Times (-11)	.46	.18	.029	
2. *The New York Times* as the dependent series.				.11**
Others	.23	.04	.000	
Others (-1)	.21	.04	.000	
II. Later time period, January 1987 through December 1988 (N=24)				
1. Other five media as the dependent series.				.42**
NY Times	1.41	.20	.000	
NY Times (-11)	.49	.18	.013	
2. *The New York Times* as the dependent series.				.38**
Others	.45	.06	.000	
Others (-1)	.13	.06	.50	
Others (-3)	.15	.06	.025	

Note: These beta weights are unstandardized. For all of the analyses above, the Durbin-Watson statistics are slightly over 2.0.
** Indicates significance at $p < .05$.

at t-1 (the previous month in this case) is removed from the dependent variable at time t.

Based on this analysis, we believe that *The New York Times* did not play an aggressive agenda-setting role for the other five media of study until after January 1987, about six years after the U.S. mass media's first coverage of the AIDS epidemic. This role is somewhat similar to the previously-cited studies of national agenda-setting for toxic waste and radon. *The Times* starts slowly in its coverage of scientific issues as worthy of general public attention. In the case of the AIDS issue, this legitimizing role of *The New York Times* occurred relatively late (5 1/2 years into the epidemic).

Organizational and personal variables partially explain the lag in early *Times* coverage of AIDS. A former editor of *The New York Times* felt that news stories about gays were not appropriate for his newspaper. For five years into the AIDS epidemic, *The Times* refused to use the word "gay" except within quoted passages. Reporters may have felt that their news stories about a gay-related issue like AIDS would be unlikely to appear on the front page. The first front-page article in *The New York Times* about AIDS did not appear until May 25, 1983 (when 108 AIDS cases had been reported to the Centers for Disease Control, about half of them in New York City). In comparison, the first front page article about AIDS in the *Los Angeles Times* appeared in May 1982, a year earlier. Clearly, *The New York Times* did not play a dominant role in setting the U.S. media agenda for AIDS in the early years of the epidemic.

Remaking the Issue of AIDS

Figure 3 shows the monthly number of news stories about AIDS combined for our six media of study over time. Three peaks occurred in the combined media coverage: A first peak in May 1983, a second in July 1985, and a third in February 1987. These peaks delineate four eras in the media coverage of AIDS.

The JAMA Press Release

Our analysis of the major news events occurring at the three peaks of media coverage shows that the first peak occurred as a result of a press release based on an editorial in the *Journal of the American Medical Association* (*JAMA*) dated May 6, 1983. Written by Dr. Anthony Fauci, a biomedical scientist at the National Institutes of Health, the *JAMA* editorial and press release suggested that "routine household contact" might spread AIDS. The mass media gave considerable attention to this announcement. For example, our six media of study published or broadcast 39 stories about AIDS in May, 62 in June, 59 in July, and 41 in August 1983. About 26 percent of all the news stories in this four-month period dealt with how HIV is transmitted. The media attention

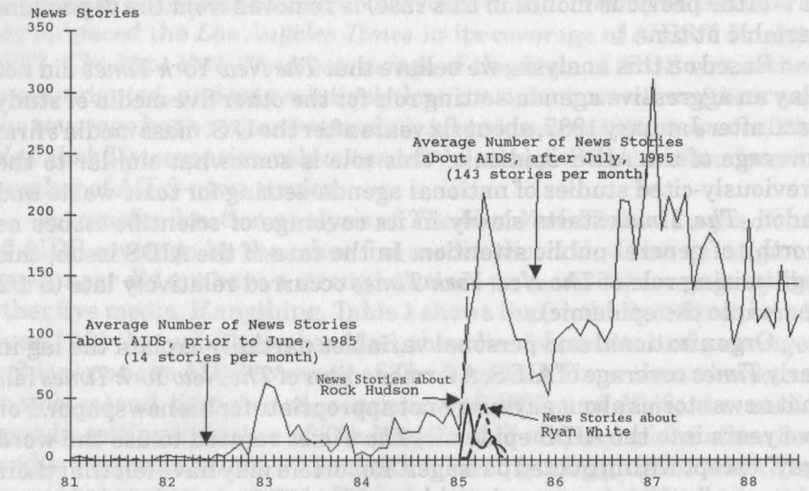

Figure 3. The impact of the Rock Hudson and Ryan White news events on the number of news stories about the issue of AIDS (from June 1981 to December 1988).

given to the *JAMA* press release was the most accorded to a single AIDS-related event since the first media reports of AIDS in June 1981. For instance, prior to *JAMA*'s announcement (from June 1981 to April 1983), the six media carried 59 news stories in total, averaging less than three news stories per month (or one news story per medium in two months).

Rock Hudson and Ryan White

The second peak in AIDS media coverage, starting in July 1985 and lasting through December of that year, was caused by two consecutive news events. One of them was movie actor Rock Hudson's hospitalization and death (see Figure 3). The first official disclosure that Hudson had AIDS was made on July 25, 1985, by the American Hospital in Paris. The six media of study carried 74 news stories about his illness over the next five months. Hudson died of AIDS on October 2, 1985, at his Beverly Hills home. During this period, the three newspapers published 24 news stories about Hudson, and the three television networks aired 50 news stories about Hudson.

In August 1985, one month after the public announcement that Rock Hudson had AIDS, another important AIDS news event occurred. A 13-year-old school boy in Indiana with AIDS, Ryan White, dominated mass media coverage (see Figure 3). A controversy centered on whether or not a child with AIDS should attend public school. The six media of study carried 117 news stories about Ryan White until an Indiana hearing officer ruled that White could return to his classes in Kokomo on November 27, 1985.

Even though the Hudson and White stories were quite different in important ways, they gave the American public a definite perception that AIDS was a matter of general concern. Hudson's familiarity to the American people, combined with the "boy next door" image of White, were enough to personalize and humanize the issue of AIDS, something that prior media reports based on the CDC statistics about the number of AIDS cases per month had not done.

The impact of these two news events upon subsequent media coverage of AIDS was enormous. For instance, prior to July 1985, our six media combined carried approximately 14 AIDS news stories per month. After July 1985, the average number of news stories produced by the six media jumped to 143 stories per month, about ten times the previous rate (see Figure 3).

Our present data-analysis generally confirms the widespread conventional wisdom by scholars and media researchers that Rock Hudson's illness and subsequent death from AIDS set the media agenda for the issue of AIDS in the United States.[40] Our review of the literature, however, failed to disclose any observer who noted the more important impact of the Ryan White news event in setting the mass media agenda for the issue of AIDS in the United States. Our content analysis of the six media of study indicates that they gave considerably more news coverage (117 news stories over a four-month period) to the Ryan White event than to Rock Hudson's illness and death (74 news stories over the same four-month period).

In the case of both news events, Rock Hudson and Ryan White, the number of news stories about the event itself was only a small part of the subsequent increase in the number of news stories about AIDS (as shown in Figure 3). In other words, the impacts of the Hudson and White events were mainly in how they changed the meaning of the issue of AIDS for media newspeople, and ultimately for the American people.

During the first several years of the AIDS epidemic in the United States, the media perceived the disease mainly as a gay story and a scientific story, and generally accorded rather minor coverage to the epidemic. After AIDS was found to occur in babies and among individuals who had received transfusions of the infected blood (like hemophiliacs) in early 1983, the media began to give somewhat greater attention to the issue of AIDS. Similarly, the May 1983 *JAMA* editorial about transmission of HIV through "routine close contact"[41] implied that not only a relatively small category of homosexuals, IV (intravenous) drug-users, and hemophiliacs were at risk, but that AIDS might also cross over into the general population of the United States. Unless the American media's core constituency of middle-class individuals is perceived to be at risk, a rampant disease like AIDS does not constitute a news story with high news value.

The Rock Hudson illness and death from AIDS was particularly important in changing media newspeople's perceptions of the epidemic.

Hudson was a Hollywood star, far more famous than any of the other 10,771 individuals who had been diagnosed with AIDS by late July 1985. Hudson had played masculine roles in his movies, and most of the American public did not realize that he was gay until this fact was announced in the news stories concerning his illness with AIDS. President Ronald Reagan, a personal friend of Hudson's, telephoned him at his Paris hospital and urged him to "get well." Reagan was not to give a public speech about AIDS until May 1987, several years later, and the phone call remained one of the relatively few actions by the White House concerning AIDS. The administration saw the growing AIDS epidemic as a federal budget threat, and moved very slowly in the early years to provide funds or other support for AIDS research or prevention. During the first five years of the AIDS epidemic until mid-1987, newspeople did not ask any questions about AIDS at White House press conferences.[42]

So the Rock Hudson news event in mid-1985 served as one turning point in the rise of the AIDS issue on the U.S. media agenda because (1) it involved the White House in the issue, at least in a minimal way, and (2) it humanized AIDS by giving the epidemic an emotional meaning that had not been conveyed by the CDC's monthly statistics on the number of reported AIDS cases. In the month following disclosure of Hudson's illness, in August 1985, the Ryan White news event further humanized the epidemic, essentially launching a new AIDS sub-issue of "children with AIDS" (Figure 4) which included 361 of the 6,694 news stories (5.4 percent) carried by our six media of study over the 91 months of study.

In a similar fashion, Rock Hudson's illness essentially launched the AIDS sub-issue of "public figures with AIDS," which included 211 news

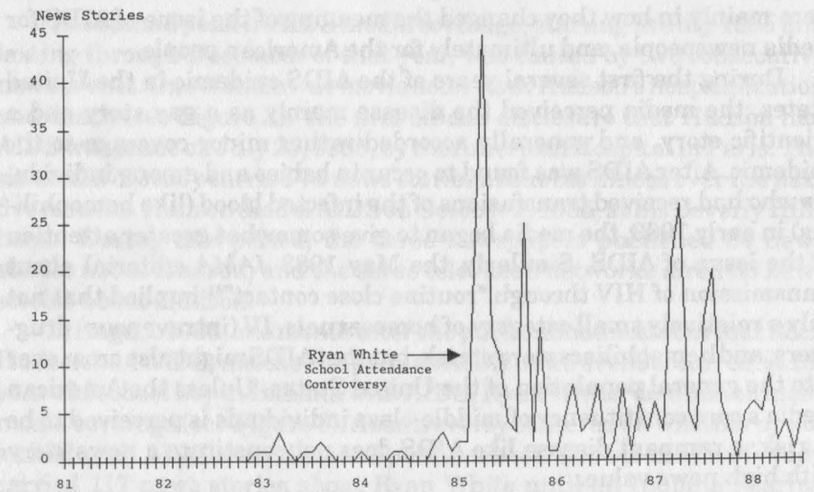

Figure 4. Number of news stories about the sub-issue category of "children with AIDS" (for six mass media combined for June 1981 to December 1988).

stories, 3.2 percent of the total news stories (Figure 5). Later in the present essay, we analyze 13 AIDS sub-issues over time.

Mandatory Testing and Privacy

The third sharp rise in the number of stories about AIDS was caused by a series of news events centered around mandatory testing for HIV and by related privacy issues. A federal health official recommended widespread blood testing on February 4, 1987, including mandatory testing for all applicants for marriage licenses, everyone who is hospitalized, and all individuals being treated for pregnancy or for a sexually-transmitted disease. This news event led to public controversies concerning civil rights and individual privacy. In addition, several other news events contributed to an increase in the level of media attention to AIDS during the period after January 1987: The assertion by insurance companies that they had the right to require insurance applicants to take an HIV test, divergent opinions about teaching AIDS education in schools, the St. Patrick's Cathedral rector's refusal to perform a Roman Catholic wedding for a person with AIDS, and debates about whether or not condom advertising should be carried by the mass media. The death from AIDS of several public figures — notably Liberace, a famous entertainer, and Stewart McKinney, a member of the U.S. House of Representatives — also helped keep the issue of AIDS in the news during 1987 and 1988.

This series of new events resulted in a major increase in media coverage of the AIDS issue. Prior to January 1987, the six media

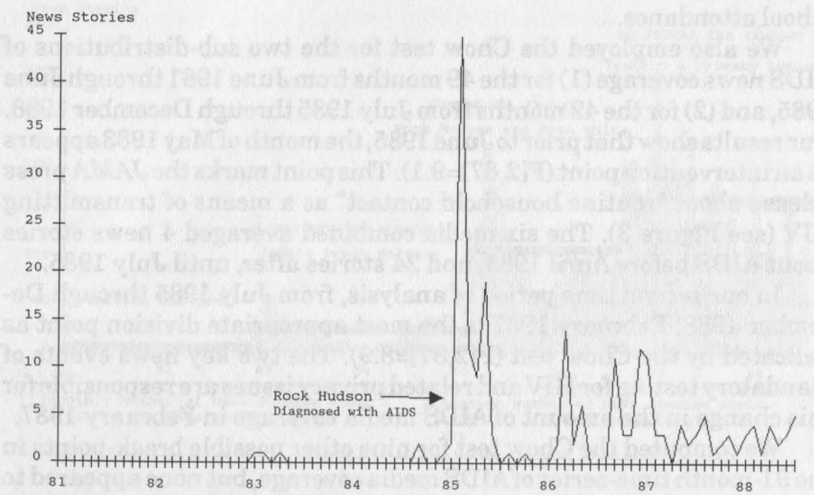

Figure 5. Number of news stories about the sub-issue category of "public figures with AIDS" (for six mass media combined for June 1981 to December 1988).

combined reported an average of 112 news stories per month. Thereafter, the six media averaged 168 AIDS news stories per month, a 50 percent increase.

The increased media coverage after January 1987 may have been partly the result of a growing sense among media professionals that they had not previously been giving adequate attention to the AIDS issue. The Associated Press annual survey of media editors concerning the top ten news stories of the year finally included the issue of AIDS in the top ten news stories in 1985, and again in 1987 AIDS reached a "top ten" position. Clearly, after mid-1985 media gatekeepers thought that AIDS was an important news issue. They increasingly told their reporters: "Go out and get me a story about AIDS."

Identifying the Four Eras

We conducted a Chow test[43] to test statistically the impact of the three peaks in media coverage on the entire distribution of media coverage of AIDS. The Chow test is a special application of the F-test which examines the statistical validity of dividing a distribution of either cross-sectional data or time-series data into two parts. Our results show that July 1985 was the optimal division point for the entire distribution of AIDS media coverage over the 91 months ($F[2,87]=21.6$). In other words, the entire distribution of media coverage is best understood as two sections, one prior to July 1985 and the other after. As mentioned earlier (see Figure 3), the average number of news stories per month about AIDS in the combined six media jumped from 14 prior to July 1985, to 143 thereafter. The major events at this time were Rock Hudson's hospitalization and death, and the controversies about Ryan White's school attendance.

We also employed the Chow test for the two sub-distributions of AIDS news coverage (1) for the 49 months from June 1981 through June 1985, and (2) for the 42 months from July 1985 through December 1988. Our results show that prior to June 1985, the month of May 1983 appears as an intervention point ($F[2,87]=9.1$). This point marks the *JAMA* press release about "routine household contact" as a means of transmitting HIV (see Figure 3). The six media combined averaged 4 news stories about AIDS before April 1983, and 24 stories after, until July 1985.

In our second time period of analysis, from July 1985 through December 1988, February 1987 is the most appropriate division point as indicated by the Chow test ($F[2,87]=8.9$). The two key news events of mandatory testing for HIV and related privacy issues are responsible for this change in the amount of AIDS media coverage in February 1987.

We computed the Chow test for nine other possible break-points in the 91-month time-series of AIDS media coverage, but none appeared to be statistically valid.

Based on these results, we divide the 91-month distribution of media coverage into four eras. Figure 6 shows these four phases of media coverage with each of their corresponding news events. Of the three division points shown in Figure 6, the point for July 1985 produced the biggest structural change in AIDS media coverage as indicated by pre-post differences in the average number of AIDS news stories per month. So July 1985 was the major turning point in media coverage of AIDS.

The four phases in AIDS media coverage identified in the present study describe different characteristics of AIDS media coverage at different time periods (Figure 6). We label the first phase, consisting of 23 months through April 1983, as the "initial stage" of media coverage. It is marked by relatively little media attention to AIDS. During this first phase, the six media of study combined carried only 59 news stories about AIDS. One of the reasons for this extremely light coverage by the mass media may have been the general absence of *The New York Times*'s usual leadership which it has exerted in setting the agenda for other scientific issues. During a six-month period in 1981 and 1982, neither *The New York Times* nor the *Los Angeles Times* published any stories regarding AIDS. Yet the epidemic was strongly concentrated in New York and Los Angeles (and in San Francisco) at this point.

During the second phase of 26 months through June 1985, media coverage of the issue of AIDS depended very heavily on scientific sources. The response of the six media to the 1983 *JAMA* press release is an example, even though it resulted in conveying an inaccurate impression about the transmission process of HIV. Another example of the media's

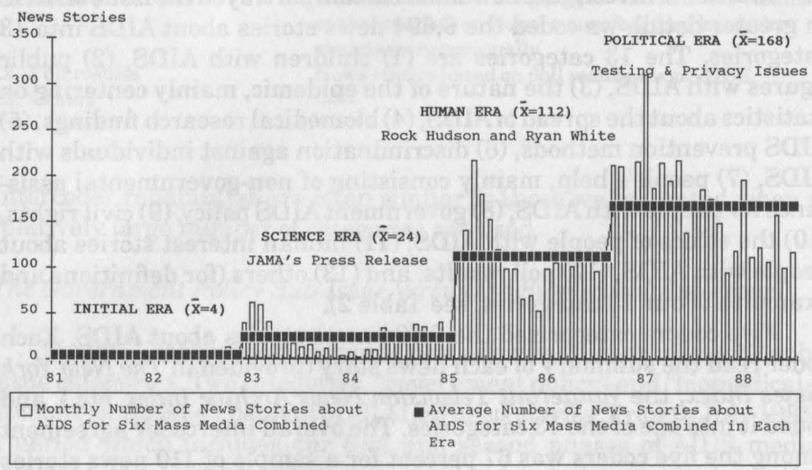

Figure 6. Four eras of media coverage for the issue of AIDS.

dependence on scientific sources occurred in 1985, when evidence of HIV transmission through heterosexual contact and via blood transfusion was found. Although the six media gave relatively less coverage to these scientific findings than they did to the *JAMA* announcement in 1983, media coverage of these scientific findings contributed to correcting the public's misunderstandings of the transmission processes for HIV (as our national poll data from surveys about AIDS generally show). During the 26 months of phase two, the "science" era, the six media conveyed a total of 606 news stories; 40 percent of these news stories were derived directly from scientific sources.

The third phase of 19 months through January 1987, labeled the "human" era, is characterized by personalizing the issue of AIDS. The Rock Hudson and Ryan White news events, as discussed previously, helped convince the U.S. public that AIDS was not just an epidemic within an isolated category of people. The impact of these two consecutive events created the major turning point for the issue of AIDS on the U.S. media agenda.

The fourth phase of 23 months, February 1987 through December 1988, is characterized as a "political" era for the issue of AIDS. A variety of public controversies emerged about certain aspects of the epidemic, especially public policy about AIDS concerning mandatory testing and individual privacy. In the fourth era, the federal government had become deeply involved in the AIDS issue, and so AIDS accordingly became a political issue.

Another Measure of AIDS Sub-Issues

In order to investigate how the six media portrayed the issue of AIDS in greater detail, we coded the 6,694 news stories about AIDS into 13 categories. The 13 categories are (1) children with AIDS, (2) public figures with AIDS, (3) the nature of the epidemic, mainly centering on statistics about the spread of AIDS, (4) biomedical research findings, (5) AIDS prevention methods, (6) discrimination against individuals with AIDS, (7) people's help, mainly consisting of non-governmental assistance for people with AIDS, (8) government AIDS policy, (9) civil rights, (10) the ethics of people with AIDS, (11) human interest stories about people with AIDS, (12) poll results, and (13) others (for definitions and examples of our 13 categories, see Table 2).

Five coders categorized the 6,694 news stories about AIDS. Each coder read the summary of each news story (provided in *The New York Times Index*, the *Vanderbilt Television News Archive Index*, etc.), and coded it into one of the 13 categories. The overall intercoder agreement among the five coders was 67 percent for a sample of 110 news stories that all five coders classified. The highest agreement between any two coders was 78 percent, while the lowest agreement was 56 percent. These agreement percentages do not include chance agreement among coders.

Table 2
Definitions of the thirteen categories of AIDS sub-issues for AIDS news stories.
(N=6,694 news stories in six media)

Category name	Definition
1. Children with AIDS	News stories about children with AIDS.
2. Public figures	News stories containing personal information about people with AIDS who are publicly recognized.
3. Epidemic	News stories reporting statistical facts about the spread of AIDS.
4. Biomedical	News stories reporting scientific findings about AIDS.
5. Prevention	News stories dealing with methods for AIDS prevention, e.g., using condoms.
6. Discrimination	News stories reporting unfair treatment of people with AIDS, e.g., health personnel's refusal to provide medical services to people with AIDS.
7. People's help	News stories reporting non-governmental activities to help people with AIDS, e.g., volunteer work, fund-raising, etc.
8. Government policy	News stories about governmental actions for AIDS, e.g., school sex education, budget allocations for AIDS, etc.
9. Civil rights	News stories regarding the privacy or civil rights issues related to AIDS, e.g., controversy over the violation of civil rights which may be caused by mandatory blood-testing for HIV infection.
10. Ethics	News stories about the immoral or irresponsible aspects of AIDS behavior, such as using the blood of people with AIDS as a threatening weapon, con demnation of AIDS as God's punishment, etc.
11. Human interest	News stories describing people with AIDS as victims so that readers or viewers may feel they know the victims more personally.
12. Poll results	News stories based on poll results about AIDS.
13. Others	——

Intercoder reliabilities are often similar to those we computed when a relatively large number of categories are used.

The Government Policy Sub-Issue Versus the Biomedical Sub-Issue

Figure 7 shows the number of news stories in each of the 13 sub-issue categories. Two categories, "government policy" and "biomedical," account for about 47 percent of all AIDS news stories. Prior to July 1985, a period which includes our first and second phases of AIDS media coverage, our six media of study carried somewhat more stories in the "biomedical" category than in the "government policy" category. The six media carried 1,136 news stories about government policy in the fourth

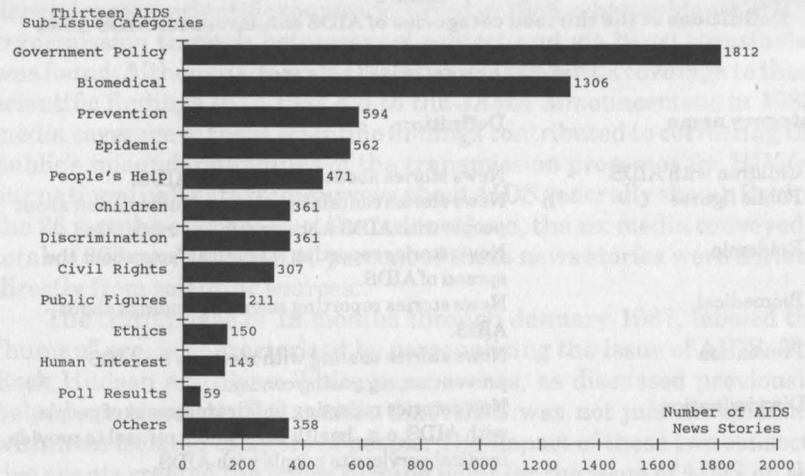

Figure 7. Number of AIDS news stories in each of 13 categories (N=6,694).

phase (February 1987 through December 1988), which is almost twice as many stories as in the "biomedical" category in the same phase. This change in rank-order of these two important AIDS sub-issues supports our previous description of the fourth phase as a political era characterized by numerous AIDS policy controversies.

The contrast between these two AIDS sub-issues over time becomes more striking when the *percentage* of all AIDS media coverage for each of these two sub-issues per month is computed, essentially standardizing the media coverage for each of the 13 sub-issues by removing the effect of the total amount of AIDS news coverage per month. A very high proportion of all AIDS news stories were about biomedical research findings in the first two or three years of the epidemic, after which this sub-issue faded in the attention that it received. After no attention to government policy until early 1983, a more-or-less consistent 30 percent of all AIDS news stories were about government policy.

Time-series analysis shows relatively substantial correlations among the number of news stories per month for each of the 13 sub-issue categories for the three television networks and the three newspapers. Nine of the 13 categories reveal a rather high degree of consensus among the two sets of media in their AIDS coverage (with an average correlation of about .60, or 36 percent of variance explained). The AIDS media coverage for the sub-issues of "public figures," "government policy," and "biomedical" have particularly high correlations. Conversely, the four categories, "discrimination," "people's helping," "poll results," and "human interest" show relatively lower correlations. Perhaps these four sub-issue categories are more event-oriented than are the other sub-issue categories. Media coverage of the 13 AIDS sub-issues is inconsistent over

time, and frequently rises and falls within short periods of time, such as in a month or two (as was illustrated in Figures 4 and 5).

The Rise and Fall of AIDS Sub-Issues

The general picture that emerges from our analysis of the 13 AIDS sub-issues over the 91 months of our time series is that as one of our sub-issues declines in its amount of media coverage, one of the other 13 sub-issues tends to rise in its degree of media attention. The net result in an aggregate sense is the ability of the overall issue of AIDS to stay on the U.S. media agenda (that is, after it got on the media agenda in July 1985). As time goes on, a new AIDS sub-issue would tend to emerge, gain increasing media coverage, and then eventually decline in the fashion that Anthony Downs[44] suggested. Through new emphasis and through new information, such as that created by biomedical research findings, an issue (once it is on the media agenda) can rise, fall, and then rise again, as new sub-issues gain and then lose media coverage.

Interaction Among the Agendas

Public Response to Media Coverage of AIDS

What are the impacts of the mass media coverage of AIDS? One impact is on public opinion, as measured by national polls. We obtained 1,084 poll questions that were asked in 110 different surveys.[45] Unfortunately for scholarly purposes, opinion polls containing questions about AIDS were not asked of the U.S. public at regular intervals during the 91 months of our time series of study. No polls about AIDS were conducted during the first two years of the epidemic. The first poll questions about AIDS were asked by the Gallup organization in June 1983. No questions about AIDS were asked in national polls for the 22 months from August 21, 1983 to June 30, 1985 (Figure 8). This same period was characterized by relatively low media coverage of AIDS.

About half of the AIDS poll questions were asked in surveys sponsored by mass media organizations (Table 3). Media organizations sponsored 68 of the 110 surveys. The cost per national sample survey of 1,500 respondents is estimated at approximately $200,000, so that the total investment represented by the 110 polls is $20 million. Presumably, media organizations expect to get a return on their considerable investment through higher television ratings and increased newspaper sales resulting from reporting news of the AIDS poll results.

Despite the periods when no poll questions were asked about AIDS (early in the epidemic), certain over-time trends in the public agenda for the issue of AIDS can be detected. The adult population of the United States became aware of AIDS relatively early, and soon learned how the virus which causes AIDS could (and could not) be transmitted. By April

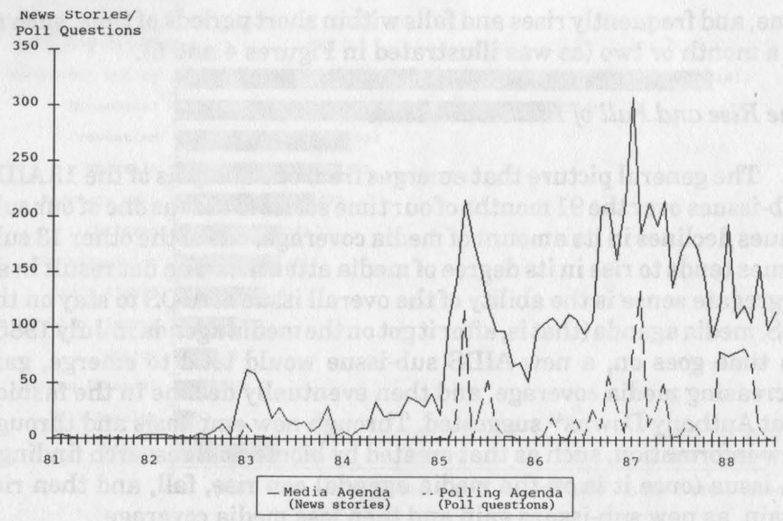

Figure 8. Number of poll questions about AIDS asked per month and the number of news stories about AIDS (for six media combined for June 1981 to December 1988).

1983, 81 percent of a national sample reported that they had heard or read about a disease called AIDS; this figure increased to 92 percent by mid-1983, then increased slowly to 98 percent by early 1986, and has remained since at this high level. Almost all of these individuals first learned about AIDS from the mass media (even though there was relatively light media coverage in the two years prior to mid-1983).

By April 1985, 84 percent said that one could become infected with HIV by receiving a blood transfusion, and by March 1987 this figure increased to 97 percent; comparable figures for HIV transmission from a sneeze decreased from 22 percent to 11 percent. So correct understanding of the means of transmission increased as this topic was increasingly covered by the mass media. When respondents were asked the most important health problem facing the United States, AIDS was at 31 percent in late 1985, rose to 33 percent in late 1986, and went to 70 percent in an April 1987 poll. The relative importance of cancer and heart disease dropped as the perceived importance of AIDS as a national health problem increased. National survey respondents increasingly thought that the U.S. government was not providing enough funding for AIDS; about two-thirds gave this response by early 1987.

Lifestyle changes were also reported as a result of AIDS: condom use, to prevent transmission of HIV, increased from 2 percent in September 1985 to 11 percent in March 1987; reported monogamous sexual relationships increased from 10 percent to 19 percent; and reported sexual abstinence increased from 2 percent to 8 percent (from September 1985 to March 1987).

Table 3
Sponsors of polls asking questions about AIDS, from June 1983 through December 1988.

	Sponsors	Number of questions about AIDS	Number of polls
1.	National Center for Health Statistics	349	5
2.	ABC News/*Washington Post*	140	5
3.	*Los Angeles Times*	99	6
4.	Gallup	98	10
5.	NBC News/*Wall Street Journal*	67	8
6.	Roper	50	9
7.	*Newsweek*	33	6
8.	CBS News/*The New York Times*	32	5
9.	*US News & World Report*/CNN	31	4
10.	*Women's World*	28	1
11.	*USA Today*/CNN	24	7
12.	Louis Harris Associates	24	1
13.	American Medical Association	14	5
14.	*Parents Magazine*	13	1
15.	*Prevention Magazine*	11	2
16.	Times-Mirror Corporation	10	3
17.	Associated Press/Media General	10	3
18.	General Social Survey	9	1
19.	ABC News	6	5
20.	*Time*	6	4
21.	*Glamour Magazine*	6	3
22.	*Family Circle*	4	1
23.	Democratic Governors' Association	3	1
24.	*Phi Delta Kappan*	2	1
25.	*Atlanta Journal-Constitution*	2	2
26.	New York City	2	1
27.	Planned Parenthood Federation of America	2	2
28.	Service Employees International Union	2	1
29.	*Money Magazine*	1	1
30.	Cable News Network (CNN)	1	1
31.	The Loran Commision	1	1
32.	NAACP Legal Defense and Education Fund	1	1
33.	Paul Loewenwarter Productions	1	1
34.	National Abortion Rights Action League	1	1
35.	World Policy Institute	1	1
	Totals	1,084	110

Our analysis of national survey results shows: (1) that public awareness of AIDS increased relatively rapidly and early (even during the first two years of the epidemic when media coverage of AIDS was still quite low), (2) that early public confusion existed about the means of transmission of the virus which causes AIDS, a confusion which later decreased (but has not disappeared), (3) that relative to other health problems in the United States, AIDS is considered by far the most important (since mid-1986), (4) that greater government spending on AIDS is favored by

a majority of the U.S. public, and (5) that certain lifestyle changes reportedly (in the polls) occurred as a result of AIDS.

We conclude that the mass media set the public agenda for AIDS (see Figure 1). Alternative communication channels about AIDS could hardly have reached so many individuals so rapidly. For instance, in 1987 only 10 percent of the U.S. public said in a national poll that they knew someone with AIDS. Interpersonal communication about AIDS was probably rather limited, particularly in the early year or two of the epidemic.

Measuring the Policy Agenda

The policy agenda was measured in the present study as the annual amount of federal funds for AIDS research, education, and testing. Although some federal funds were spent for AIDS research as early as fiscal year 1981 (through funding reallocations within the CDC), in 1983 the U.S. Congress first officially allocated federal funds under the name of "AIDS research, education, and testing." As shown in Figure 9, the U.S. Congress has approximately doubled AIDS funding each year. Federal funding for AIDS was $1.59 billion in fiscal year 1990. Since only annual data about federal funding for AIDS were available, we extrapolated the annual data into a monthly basis. We arbitrarily assumed that the federal funds for AIDS would be spent equally throughout each fiscal year, and so divided the annual funding by 12.

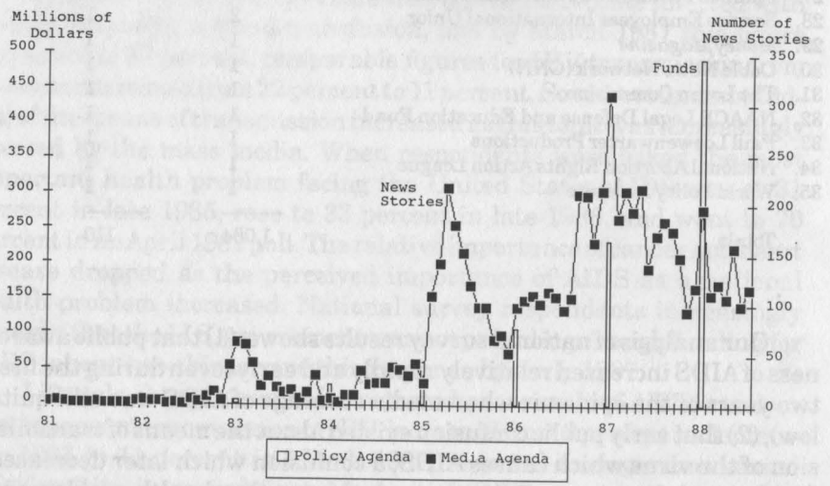

Figure 9. Federal funds for AIDS research, education, and testing per year and the number of news stories about AIDS (for six media combined for June 1981 to December 1988).

Measuring the Science Agenda

The science agenda, discussed previously, is operationalized as the number of articles about AIDS published in four leading medical and science journals: *Science*, the *Mortality & Morbidity Weekly Report* (*MMWR* — the official journal of the Centers for Disease Control), the *New England Journal of Medicine* (*NEJM*), and the *Journal of the American Medical Association* (*JAMA*). These four journals published 1,314 articles about AIDS during our time series of 91 months (an average of 15 articles per month) after June 1981, when the *MMWR* reported a "mysterious disease" (which was later named "AIDS" in July 1982) for the first time.[46] *JAMA* published 639 articles in the 91 months, while the *NEJM*, *Science*, and the *MMWR* published 378, 169, and 128 articles, respectively. Figure 10 shows the monthly distribution of the science agenda over time.

Time-Series Analysis of the Agenda-Setting Process for AIDS

We sought to determine the causes and effects of the components in the agenda-setting process for AIDS. In addition to the media, polling, policy, and science agendas already described, we include in our time-series analysis the number of AIDS cases as a "real-world indicator" of the epidemic (Table 4). We obtained the monthly number of reported AIDS cases in the United States from the CDC for the 91-month period from June 1981 to December 1988. Figure 11 shows the monthly number

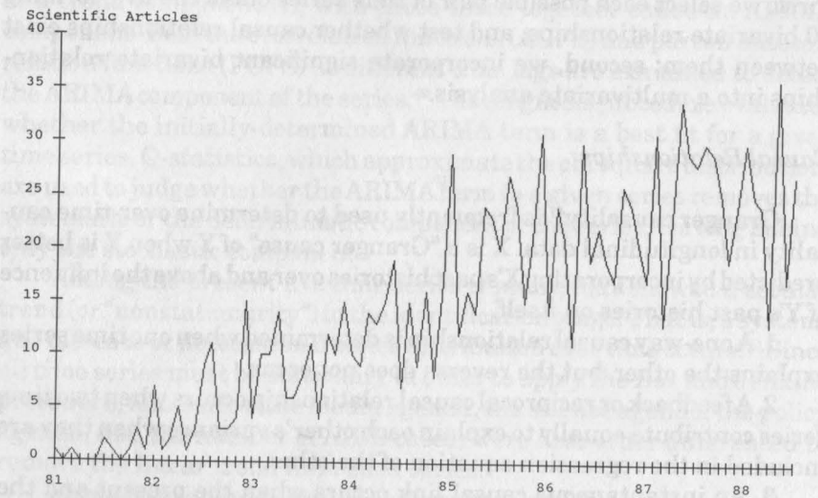

Figure 10. Number of scientific articles about AIDS published in four medical and science journals per month for 91 months (from June 1981 to December 1988).

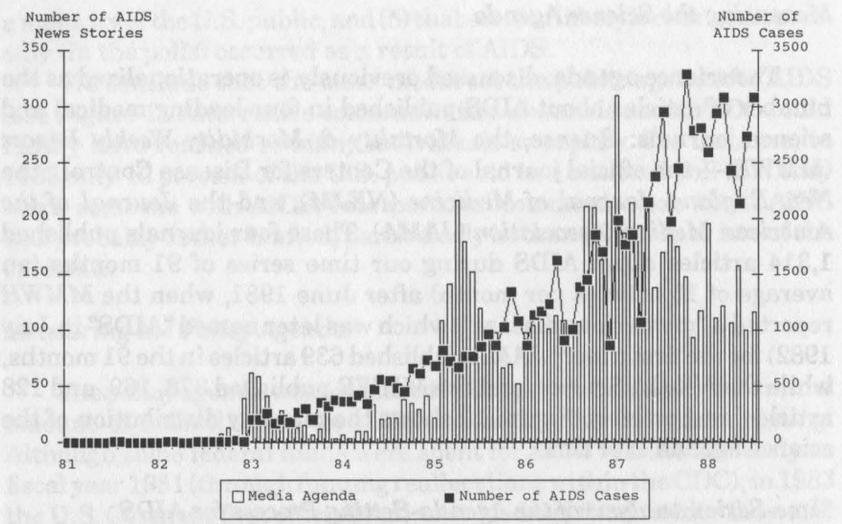

Figure 11. The number of AIDS cases per month and the number of AIDS news stories in six media of study for 91 months (from June 1981 to December 1988).

of AIDS cases in the United States, and the number of AIDS news stories. By observation, one can see that the real-life indicator is far from a complete explanation of media coverage (about 53 percent of the variance in these two variables occurs together).

Here, we assess the over-time causal relationships among our five time series without a priori assumptions. We take a two-step approach: First, we select each possible pair of time series out of the five, forming 10 bivariate relationships, and test whether causal relationships exist between them; second, we incorporate significant bivariate relationships into a multivariate analysis.

Causal Relationships

Granger causality[47] is frequently used to determine over-time causality in longitudinal data. X is a "Granger cause" of Y when Y is better predicted by incorporating X's past histories over and above the influence of Y's past histories on itself.

1. A one-way causal relationship is determined when one time series explains the other, but the reverse does not occur.

2. A feedback or reciprocal causal relationship occurs when two time series contribute equally to explain each other's variance when they are included in the regression equation of the other.

3. An instantaneous causal link occurs when the present and the past history of one time series contribute to increase the other variable's total variance explained.

Table 4
Zero-order correlations among the media agenda, the science agenda, the polling agenda, the policy agenda regarding the issue of AIDS, and the number of AIDS cases, from June 1981 through December 1988. (N=91 months)

Variables	Media agenda	Science agenda	Polling agenda	Policy agenda	Number of AIDS cases
1. Media agenda	—	.72*	.60*	.59*	.73*
2. Science agenda		—	.41*	.66*	.77*
3. Polling agenda			—	.32*	.49*
4. Policy agenda				—	.88*
5. No. of AIDS cases					—

* Significant at $p < .05$.

4. Finally, the absence of Granger causality is assessed when neither of two series increase the other's variance by including their past histories for the other.

In order to test for the existence of Granger causality between any two time series, we first determine the contribution of each time series' past histories upon itself. Box and Jenkins[48] developed an identification-estimation-diagnosis procedure to assess the patterns of past histories of a given time series, and thus to sort out the stochastic component ("white noise" or "random disturbance") of the series. The identification procedure involves initially determining whether a time series has an autoregressive component (AR), or a moving average component (MA), or a trend component (I), with these three together called an ARIMA component. Both autocorrelation functions (ACFS) and partial autocorrelation functions (PCFS) at different time lags are examined to detect the ARIMA component of the series.[49] The diagnosis procedure evaluates whether the initially-determined ARIMA term is a best fit for a given time series. Q-statistics, which approximate the chi square distribution, are used to judge whether the ARIMA term in a given series removes the systematic or the deterministic component of the series, leaving behind only the stochastic component.

Among the present five time series of study, four showed a secular trend (or "nonstationarity") in the identification stage. That is, a systematic increase or decrease in a series distribution over time occurs.[50] Since all time series must be stationary in order to apply the Box and Jenkins procedure, four series (the media agenda, the science agenda, the policy agenda, and the number of AIDS cases) were first-order differenced to remove the linear trend from each series.[51]

Through the identification, estimation, and diagnosis procedure, the ARIMA components of each time series were determined. Table 5 shows the ARIMA term for each series and the total amount of variance

Table 5
Univariate ARIMA coefficients and variance explained (R^2) for each time series.

	Time series	ARIMA term	Coefficients**	R^2
1.	Media agenda*	(1, 1, 0)	AR (4) = .32*** (.12)	.096
2.	Science agenda*	(0,1,1)	MA (1) = -1.0*** (.12)	.577
3.	Polling agenda	(1,0,1)	AR (1) = .40*** (.11) MA (3) = .36*** (.13)	.277
4.	Policy agenda*	(1,1,0)	AR (12) = 2.1*** (.03)	.984
5.	No. of AIDS cases*	(2,1,1)	AR (4) = .26*** (.10) AR (7) = -.48*** (.10) MA (1) = -.70*** (.13)	.469

* These series are first-order differenced.
** AR is autoregressive; MA is a moving average. The number in parentheses following each AR or MA is the time lag in months. The number in the parentheses below each AR or MA term is the standard error of each coefficient of the ARIMA term.
*** Indicates the coefficient is significant at $p < .05$.

(R^2) explained by its ARIMA component on itself. Different series have different ARIMA components. For instance, the media agenda, after being first-order differenced, showed a statistically significant autoregressive component, AR(4). Since the autoregressive component indicates a direct relationship between adjacent observations in the time series, presence of the AR(4) component in the media agenda can be interpreted as showing that an observation at time *k* is directly dependent on the observation of itself four months prior. In other words, there is a four-month cyclical pattern in the media agenda. The R^2 of the media agenda of about 10 percent indicates the amount of variance explained by this four-month cyclical pattern on itself. The remainder of the variance, 90 percent, remains as "white noise" or error variance caused by factors external to the media agenda.

The science agenda, which is also first-order differenced, showed a statistically significant moving average term, MA(1). Its presence indicates the persistence of random shock from one observation to the next in the science agenda series. The presence of MA(1) in the science agenda means that the random disturbance that altered the science agenda in a particular month influences the same process one month later. This influence of prior random disturbance on itself explains about 58 percent of the variance in the science agenda.

The polling agenda, which was not differenced since no secular trend was observed, had both autoregressive and moving average terms, AR(1) and MA(3), respectively. Each observation in the polling agenda is directly dependent on the observation one month prior, and is also influenced by the random shock three months prior. These mixed influences of the AR(1) and MA(3) jointly explain about 28 percent of the variance in the polling agenda.

The policy agenda, after being first-order differenced, showed a 12-month regularity, which is an artifact caused by our division of the federal funds for AIDS research, education, and testing by 12 months in order to convert the annual data into monthly units. Thus, the presence of AR(12) is artificially created. The AR(12) component explains 98.5 percent of the variance in the policy agenda which leaves less than 2 percent of variance explained by external causes.

The number of AIDS cases was also first-order differenced, and showed two autoregressive terms, AR(4) and AR(7), and one moving average term, MA(1). There are two oscillating cycles in the increasing number of AIDS cases at every four and seven months, respectively. In addition, random shock of the previous month influences the observation the next month. Both autoregressive and moving average terms explain 47 percent of the variation in the number of AIDS cases over time.

The first step in testing Granger causality is to adequately define the ARIMA components of each time series. The second step involves adding past histories of the independent series to the dependent series, which results in constructing transfer function models. At this stage, a decision must be made as to which lagged coefficients of the predictor series should be included in explaining the dependent series. This decision is made by examining the correllogram between the two time series, which estimates the contemporaneous and lagged correlations between two series when we specify the range of lags to be included.[52] The lagged coefficients with statistically significant correlations in the correllogram are used to test its contribution to explaining the dependent series over time. Table 6 shows which lagged coefficients in each time series were selected to explain the other series of study.

By relating one or more independent series to the dependent series, we can construct transfer function models of the dependent series. Transfer function analyses produce transfer function coefficients (phi), which represent the dynamic, cyclical relationships between the series. The transfer function coefficients reveal the statistical significance of each predictor's contribution and its direction in affecting the dependent series. Transfer function analyses also provide R^2, the total variance in the dependent series explained by the independent series and by the dependent series' past histories (the ARIMA component) on itself. By subtracting the R^2 of the transfer function models from the R^2 of the univariate ARIMA models, estimates can be made of the incremental

Table 6
Transfer function coefficients, total variance explained (R^2), and incremental variance due to the predictors of the independent series.

Dependent series	Independent series	Transfer function coefficient	Standard error of coefficient	Total R^2	Incremental R^2
1. Media agenda	Science agenda	$.76_{t-8}$	.57	.264	.168*
		1.26_{t-13}**	.58		
		1.29_{t-17}	.61		
Science agenda	Media agenda	$-.03_{t-3}$	.02	.616	.039
		$.07_{t-4}$*	.02		
		$.02_{t-5}$	.02		
2. Media agenda	Polling agenda	$.35_{t-4}$*	.15	.201	.105*
		$.41_{t-17}$*	.19		
Polling agenda	Media agenda	$.26_{t-1}$*	.07	.508	.231*
		$-.22_{t-3}$*	.08		
		$.15_{t-4}$	.08		
		$-.22_{t-10}$*	.08		
		$.27_{t-11}$*	.08		
3. Media agenda	No. of AIDS cases	$-.05_{t-1}$*	.01	.377	.281*
		$.03_{t-10}$**	.01		
		$-.04_{t-13}$	.01		
No. of AIDS cases	Media agenda	1.59_{t-1}*	.73	.413	.017
		-2.06_{t-3}*	.75		
		$.84_{t-9}$	.56		
4. Media agenda	Policy agenda	-6.12_{t-9}*	2.9	.153	.057
		10.90_{t-20}	5.8		
Policy agenda	Media agenda	$.01_{t-13}$	.01	.989	.005
		$.01_{t-16}$	.01		
5. Science agenda	Polling agenda	$.03_{t-11}$*	.03	.595	.018
		$-.06_{t-12}$	.03		
Polling agenda	Science agenda	1.39_{t-3}**	.47	.420	.143*
		1.02_{t-14}	.45		
6. Science agenda	No. of AIDS cases	$-.01_{t-6}$	.01	.594	.017
		$.01_{t-13}$*	.00		
No. of AIDS cases	Science agenda	8.87_{t-5}*	3.7	.578	.001
		-3.35_{t-7}*	4.5		
		11.83_{t-8}	4.3		
7. Science agenda	Policy agenda	$-.06_{t-6}$	.31	.591	.014
		$-.28_{t-9}$	.45		
		$.37_{t-11}$	.41		
Policy agenda	Science agenda	$.01_{t-1}$	.01	.985	.001
		$.01_{t-2}$	.01		
		$.01_{t-4}$	.01		
8. Polling agenda	No. of AIDS cases	$.01_{t-3}$	.00	.344	.067
		$.02_{t-6}$	.01		
		$.02_{t-9}$*	.00		
No. of AIDS cases	Polling agenda	-1.64_{t-2}	1.1	.525	.055
		4.4_{t-5}*	1.3		
		-1.88_{t-15}	1.4		
9. Polling agenda	Policy agenda	3.95_{t-7}	2.0	.452	.175*
		7.84_{t-9}*	2.2		
		4.26_{t-10}*	2.1		
Policy Agenda	Polling Agenda	$.00_{t-4}$	.00	.991	.007
		$.01_{t-13}$	.01		
10. No. of AIDS cases	Policy agenda	6.61_{t-1}	11.0	.521	.051
		11.02_{t-2}	12.4		
		28.45_{t-7}	23.9		
Policy agenda	No. of AIDS cases	-6.49_{t-1}	8.3	.985	.010
		$.01_{t-4}$	.01		
		7.38_{t-7}	9.4		
		1.26_{t-10}	1.1		

* Significant at $p < .05$.
** Significant at $p < .01$.

variance solely due to the independent series over and above the dependent series' influence on itself. The F-test determines the statistical significance of the incremental variance due to the predictor series. An examination of transfer function coefficients tests the individual predictor's contribution to the dependent series. The F-test for the incremental variance jointly tests the statistical significance of all the included predictors of the independent series in the transfer function analyses. Table 6 shows the results of 20 transfer function analyses for each pair of series.

Bivariate Analysis of the Agenda-Setting Process for AIDS

Half of the ten bivariate relationships among the five time-series are mutually independent of each other in terms of Granger causality. The

five independent relationships are: (1) the media agenda-policy agenda, (2) the science agenda-number of AIDS cases, (3) the science agenda-policy agenda, (4) the polling agenda-number of AIDS cases, and (5) the policy agenda-number of AIDS cases. These relationships are not characterized by statistical significance of the transfer function coefficients. The incremental variance of the one time series upon the other was less than 5 percent, and was not statistically significant.

Unlike previous research on policy agenda-setting, this study found no evidence that the AIDS media agenda set the AIDS policy agenda (that is, federal funding) over time. The AIDS media agenda explains only 0.5 percent of the variance in the policy agenda over and above the influence of the AIDS policy agenda on itself. The AIDS policy agenda explained the AIDS media agenda better (5.7 percent of variance), although this increase in variance explained is not statistically significant. The number of AIDS cases (a real-world indicator of the epidemic), had almost no impact on the four AIDS agendas, except for the media agenda. The number of AIDS cases, even though it keeps increasing over our 91 months of study, did not predict the science agenda, policy agenda, or the polling agenda. So the growing number of AIDS cases in the United States was a separate process unrelated to the four agendas. Several past studies have found similarly that a real-world indicator plays little or no role in the agenda-setting process. For example, the drug issue rose to an important position on the U.S. national agenda during the 1980s, while the real-world indicators (the number of drug-related deaths) did not increase.[53]

Four relationships showed one-way causality over our 91-month time series. These four relationships are media agenda-science agenda, media agenda-number of AIDS cases, polling agenda-science agenda, and polling agenda-policy agenda, when the former series in each pair was treated as the dependent series (see Table 6).

In the media agenda-science agenda relationship, the science agenda explains an additional 16.8 percent of the variance in the media agenda, over and above the influence of the media agenda itself. The science agenda lagged 13 and 17 months had an effect on the media agenda. The reverse relationship, in which the media agenda predicted the science agenda, explained only 3.9 percent of variance in the science agenda over time.

In the media agenda-number of AIDS cases series, the number of AIDS cases explains 28 percent of the variance in the media agenda over time, which is statistically significant. However, unlike the media agenda-science agenda relationship, the parameters of the predictors of the number of AIDS cases were negative overall, that is, -.05 at t-3, .03 at t-10, and -.04 at t-13, which indicates a lag in the media coverage behind the growing number of AIDS cases over time (see Figure 11).

In the polling agenda-science agenda relationship, the science agenda positively influences the polling agenda in both the short term

and the long term. Two predictors (at t-3 and at t-14) have a positive causal relationship with the polling agenda, jointly explaining an additional 14.3 percent of the variance in the polling agenda.

The policy agenda also explains the polling agenda. The policy agenda explained 17.5 percent of additional variance in the polling agenda over time. The direction of this influence is positive at three different time-lags: t-7, t-9, and t-10.

A reciprocal relationship exists between the media agenda and the polling agenda. The polling agenda explains an additional 10.5 percent of variance in the media agenda with all positive parameters at two

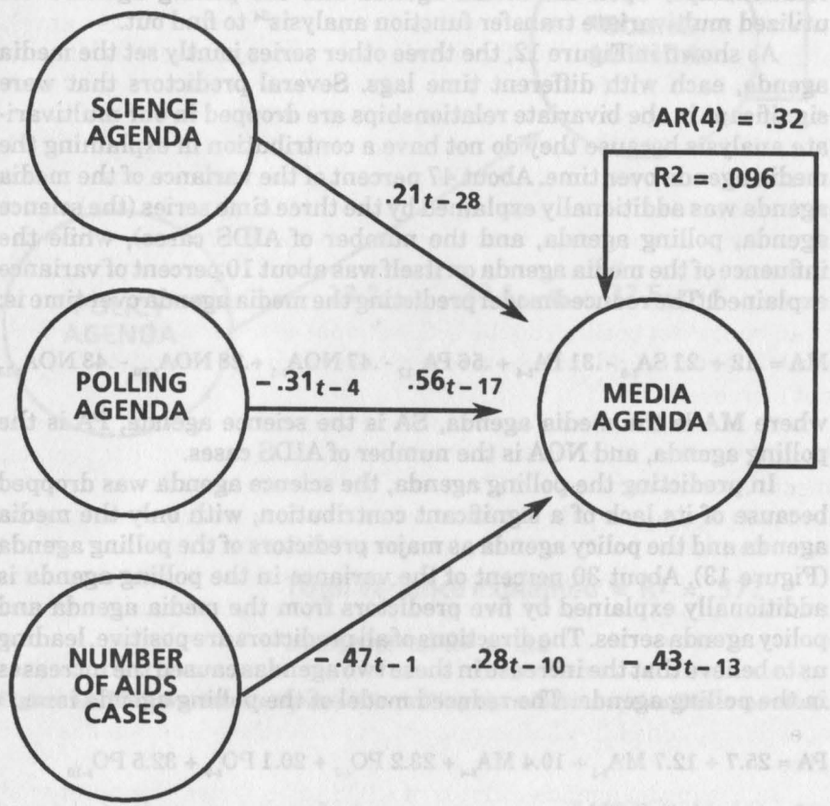

Figure 12. Multivariate analysis of the media agenda time series (N=91 months).

different time-lags: t-4 and t-17. The media agenda explains an additional 23 percent of variance in the polling agenda with both negative and positive parameters: positive at t-1 and t-11 and negative at t-3 and t-10. This mixed pattern of causality reflects a dynamic process of causality between the two series, without a unidirectional causal path.

Multivariate Analysis of the Agenda-Setting Process for AIDS

The five significant bivariate relationships just discussed have two common dependent series: the media agenda and the polling agenda. What is the joint effect of the significant predictors (in the bivariate relationships) upon the media agenda and the polling agenda? We utilized multivariate transfer function analysis[54] to find out.

As shown in Figure 12, the three other series jointly set the media agenda, each with different time lags. Several predictors that were significant in the bivariate relationships are dropped in our multivariate analysis because they do not have a contribution in explaining the media agenda over time. About 47 percent of the variance of the media agenda was additionally explained by the three time series (the science agenda, polling agenda, and the number of AIDS cases), while the influence of the media agenda on itself was about 10 percent of variance explained. The reduced model predicting the media agenda over time is:

$$MA = .12 + .21\,SA_{t-8} - .31\,PA_{t-4} + .56\,PA_{t-17} - .47\,NOA_{t-1} + .28\,NOA_{t-10} - .43\,NOA_{t-13}$$

where MA is the media agenda, SA is the science agenda, PA is the polling agenda, and NOA is the number of AIDS cases.

In predicting the polling agenda, the science agenda was dropped because of its lack of a significant contribution, with only the media agenda and the policy agenda as major predictors of the polling agenda (Figure 13). About 30 percent of the variance in the polling agenda is additionally explained by five predictors from the media agenda and policy agenda series. The directions of all predictors are positive, leading us to believe that the increase in these two agendas caused the increases in the polling agenda. The reduced model of the polling agenda is:

$$PA = 25.7 + 12.7\,MA_{t-1} + 10.4\,MA_{t-4} + 23.2\,PO_{t-7} + 20.1\,PO_{t-9} + 32.5\,PO_{t-10}$$

where PA is the polling agenda, MA is the media agenda, and PO is the policy agenda.

Time-Series Analysis for Each of the Four Eras

The results just described (both the bivariate and multivariate time-series analyses) covered the entire period of our present research — that is, the 91 months from June 1981 through December 1988. As we showed

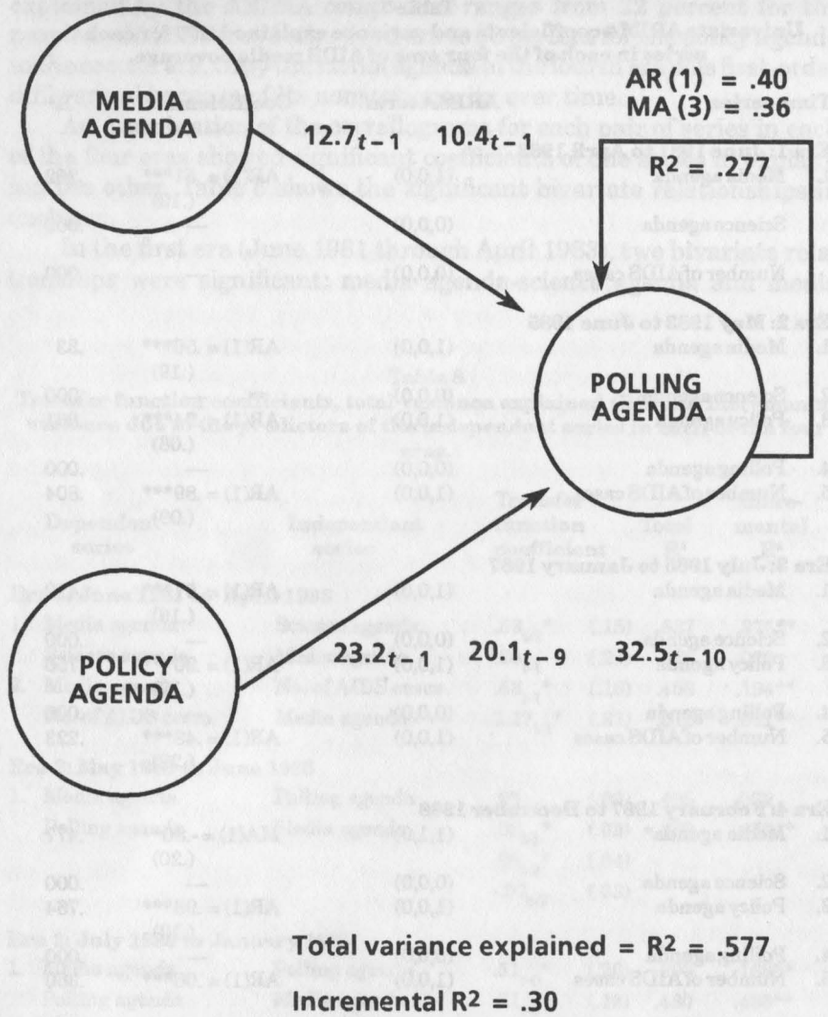

Figure 13. Multivariate analysis of the polling agenda time series (N=91 months).

previously, three major peaks in news coverage of AIDS divided the 91-month series into four eras. We now investigate whether different causal patterns may have occurred in each of the four eras. We employed the same analytical procedures for each era as we did for the total period of 91 months — identifying ARIMA components for each series, estimating cross-correlations between two series in each era, and conducting a transfer function analysis to test Granger causality between pairs of series.

Table 7
Univariate ARIMA coefficients and variance explained (R^2) for each time series in each of the four eras of AIDS media coverage.

Time series	ARIMA term	Coefficients**	R^2
Era 1: June 1981 to April 1983			
1. Media agenda	(1,0,0)	AR(1) = .51*** (.19)	.262
Science agenda	(0,0,0)	—	.000
Number of AIDS cases	(0,0,0)	—	.000
Era 2: May 1983 to June 1985			
1. Media agenda	(1,0,0)	AR(1) = .56*** (.19)	.33
2. Science agenda	(0,0,0)	—	.000
3. Policy agenda	(1,0,0)	AR(1) = .94*** (.08)	.861
4. Polling agenda	(0,0,0)	—	.000
5. Number of AIDS cases	(1,0,0)	AR(1) = .89*** (.09)	.804
Era 3: July 1985 to January 1987			
1. Media agenda	(1,0,0)	AR(1) = .57*** (.16)	.422
2. Science agenda	(0,0,0)	—	.000
3. Policy agenda	(1,0,0)	AR(1) = .90*** (.12)	.756
4. Polling agenda	(0,0,0)	—	.000
5. Number of AIDS cases	(1,0,0)	AR(1) = .48*** (.22)	.223
Era 4: February 1987 to December 1988			
1. Media agenda*	(1,1,0)	MA(1) = -.80*** (.20)	.477
2. Science agenda	(0,0,0)	—	.000
3. Policy agenda	(1,0,0)	AR(1) = .98*** (.12)	.764
4. Polling agenda	(0,0,0)	—	.000
5. Number of AIDS cases	(1,0,0)	AR(1) = .06***	.360

* This series is first-order differenced.
** AR is autoregressive; MA is a moving average. The number in parentheses following each AR or MA term is the time lag in months.
*** Indicates the coefficient is significant at $p < .05$.

Table 7 shows the ARIMA components for each series in each era. All time series have simpler ARIMA components than for the entire 91-month period. Most ARIMA components in the four eras have an AR(1) term, which indicates that each observation in the time series is dependent on the observations one month prior. Both the science agenda and polling agenda consistently have "white noise" throughout the four eras: an R^2 of .00 indicates the existence of pure "white noise." The variance

explained by the ARIMA component ranges from 22 percent for the number of AIDS cases in the third era to 86 percent for the policy agenda in the second era. Only the media agenda in the fourth era was first-order differenced because of its nonstationarity over time.

An examination of the correllograms for each pair of series in each of the four eras showed significant coefficients of one series in explaining the other. Table 8 shows the significant bivariate relationships in each era.

In the first era (June 1981 through April 1983), two bivariate relationships were significant: media agenda-science agenda and media

Table 8
Transfer function coefficients, total variance explained (R^2), and incremental variance due to the predictors of the independent series in each of the four eras.

Dependent series	Independent series	Transfer function coefficient		Total R^2	Incremental R^2
Era 1: June 1981 to April 1983					
1. Media agenda	Science agenda	$.83_{t-2}$*	(.15)	.637	.375**
Science agenda	Media agenda	$.26_{t-1}$	(.21)	.076	.076
2. Media agenda	No. of AIDS cases	$.53_{t-1}$*	(.18)	.456	.194**
No. of AIDS cases	Media agenda	1.17_{t-1}*	(.37)	.611	.611**
Era 2: May 1983 to June 1985					
1. Media agenda	Polling agenda	$.96_{t-1}$	(.99)	.405	.072
Polling agenda	Media agenda	$.08_{t-1}$*	(.03)	.459	.459**
		$.06_{t-2}$*	(.04)		
		$-.07_{t-3}$	(.03)		
Era 3: July 1985 to January 1987					
1. Media agenda	Polling agenda	$.51_{t-0}$*	(.20)	.590	.168**
Polling agenda	Media agenda	$.51_{t-0}$*	(.13)	.480	.480**
Era 4: February 1987 to December 1988					
1. Media agenda	Policy agenda	-3.40_{t-1}	(2.30)	.486	.090
Policy agenda	Media agenda	$.05_{t-3}$*	(.02)	.828	.064**
		$.01_{t-16}$	(.01)		
2. Science agenda	Policy agenda	$.64_{t-1}$*	(.25)	.302	.302
		$-.80_{t-2}$*	(.33)		
		$-.28_{t-3}$	(.29)		
Policy agenda	Science agenda	$.28_{t-1}$*	(.09)	.838	.074**

Note : The number in parentheses next to each transfer function coefficient is the standard error of each coefficient.
* Significant at $p < .05$.
** Significant at $p < .01$.

agenda-number of AIDS cases (in both cases, the media agenda was treated as the dependent series). The science agenda explained 37.5 percent of the additional variance in the media agenda. Observations two months prior caused a positive impact upon the media agenda.

In the media agenda-number of AIDS cases relationship, both series significantly explained each other. The one-month lagged values of the number of AIDS cases explained 19.4 percent additional variance in the media agenda, while the media agenda explained 61 percent of the variance in the number of AIDS cases at one-month and two-month lags. This relationship is reciprocal. It might seem illogical that the media agenda could cause the number of AIDS cases. However, it must be remembered that our measure of the number of AIDS cases is actually the number of cases reported by local health authorities to the CDC. In the first era, AIDS was a new, unknown disease. At first, it did not even have an agreed-upon name, nor were all of its symptoms known. Under these conditions, it is not so illogical that increased media coverage of the AIDS issue could lead to a greater number of reported AIDS cases. Perhaps the situation during the first era of AIDS media coverage was somewhat similar to the case of wife abuse in the United States in the 1970s and of child abuse in the 1980s; with greater media coverage of these issues, the number of reported cases also increased sharply, although the actual number of cases might not have increased. Thus, in the first era, the media agenda was set by the science agenda (one month prior) and, less so, by the number of AIDS cases (one month prior).

In the second era, the only significant bivariate relationship involves the polling agenda and the media agenda when the polling agenda series was treated as the dependent series. The media agenda shows a positive causal link to the polling agenda with two different time-lags — one month and two months prior. The media agenda explains an additional 45.9 percent of the variance in the polling agenda. A reversed causal relationship is not likely. The polling agenda explains only 7 percent of the variance in the media agenda. Thus, in the second era, the media agenda set the polling agenda in a positive way.

In the third era, the causal link between the media agenda and the polling agenda was closer than in the second era. Both agendas showed a reciprocal relationship rather than the unidirectional causal link in the second era (see Table 8). The media agenda explained 48 percent of the polling agenda with no time lags (that is, within a month). The influence of the polling agenda on the media agenda is also significant: the polling agenda explained an additional 17 percent of the variance in the media agenda. This feedback relationship between the media agenda and the polling agenda during the third era could occur when media organizations sponsored polls about AIDS and then created news stories of the poll results. Ten different media organizations sponsored 12 surveys in the third era of AIDS coverage, and these surveys contained 211 questions about AIDS (40 percent of the total poll questions in the national surveys sponsored by media organizations).

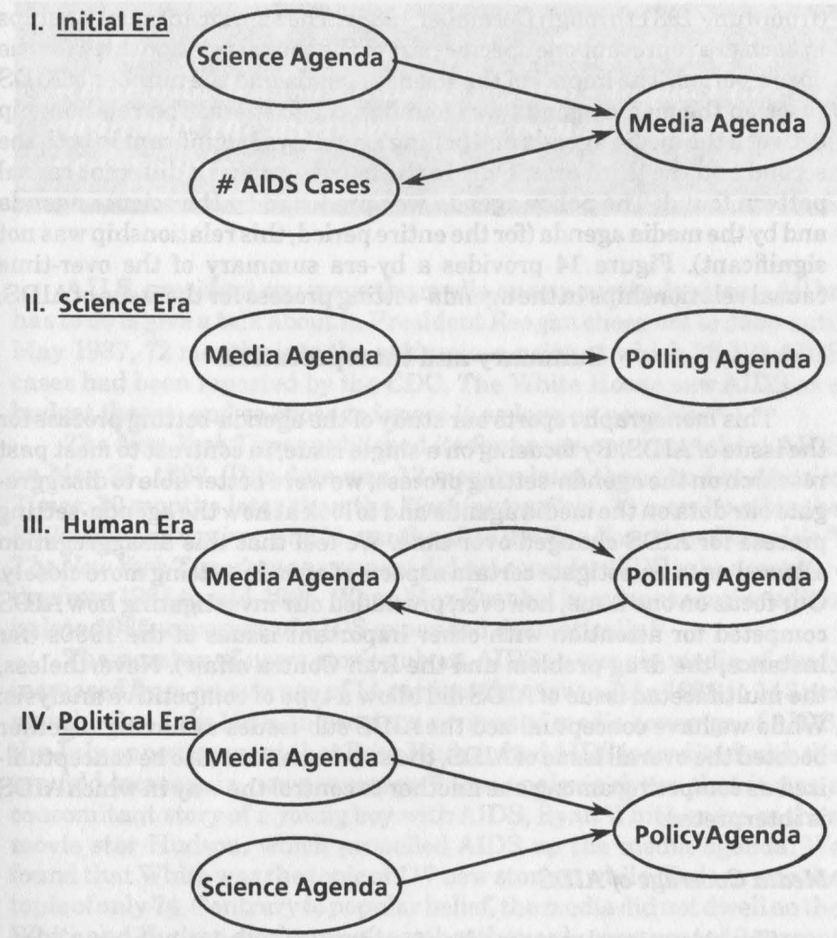

Figure 14. A general, by-era model of over-time causal relationships among the media agenda, the science agenda, the polling agenda, and the policy agenda regarding the issue of AIDS and the number of AIDS cases.

In the fourth era, two bivariate relationships are significant: (1) the policy agenda and the media agenda, and (2) the policy agenda and the science agenda. In both relationships the policy agenda was the dependent series. Both are unidirectional causal relationships. The science agenda shows a positive causal link to the policy agenda with a one-month lag, explaining an additional 7.4 percent of the variance in the policy agenda. The media agenda has a positive causal relationship with the policy agenda with a three-month lag, and additionally explained 6.4 percent of the variance in the policy agenda. Thus, in the fourth era, the media and the science agenda series set the policy agenda.

How do the causal relationships found in the four eras compare to the previous results that we obtained for the entire 91-month period

(from June 1981 through December 1988)? The significant relationships in each era represent one specific part of the causal relationships for the entire period. The impact of the science agenda and the number of AIDS cases on the media agenda was found in the first era. The relationship between the media agenda and polling agenda was significant in both the second and the third eras. Only in the fourth era was a different causal pattern found: The policy agenda was predicted by the science agenda and by the media agenda (for the entire period, this relationship was not significant). Figure 14 provides a by-era summary of the over-time causal relationships in the agenda-setting process for the issue of AIDS.

Summary and Interpretation

This monograph reports our study of the agenda-setting process for the issue of AIDS. By focusing on a single issue, in contrast to most past research on the agenda-setting process, we were better able to disaggregate our data on the media agenda and to look at how the agenda-setting process for AIDS changed over time. We feel that this disaggregation allowed us to investigate certain aspects of agenda-setting more closely. Our focus on one issue, however, precluded our investigating how AIDS competed for attention with other important issues of the 1980s (for instance, the drug problem and the Iran-Contra affair). Nevertheless, the multifaceted issue of AIDS did allow a type of competitive analysis: While we have conceptualized the AIDS sub-issues as having together boosted the overall issue of AIDS, the sub-issues can also be conceptualized as competing among one another to control the way in which AIDS is interpreted.

Media Coverage of AIDS

The six national mass media of study were found to be highly correlated in their coverage of AIDS over 91 months. In the earliest years of coverage, AIDS stories were often direct rewrites of medical journal articles. Scientists were prime news sources. Information in the mass media reports was at times contradictory, which accurately reflected the early state of divergent scientific investigation of the mysterious new disease. When reported in the mass media, however, such contradictions created confusion among the general public.

For the first 48 months of the AIDS epidemic, a point at which 9,944 individuals had AIDS (according to CDC statistics), the issue of AIDS was not very high on the mass media agenda. Respondents to the Associated Press annual survey of editors and publishers did not rate the AIDS issue as a top-ten news story until 1985. One reason why U.S. national mass media were slow to respond to the AIDS issue was the lack of involvement by two traditional agenda-setting sources: The White House and *The New York Times.*

The personification of the AIDS disease by White and Hudson had its primary impact in changing the meaning of the issue for media newspeople . . . .

A U.S. president can move the media on any particular issue. All he has to do is give a talk about it. President Reagan chose not to do so until May 1987, 72 months into the epidemic, a point at which 35,121 AIDS cases had been reported by the CDC. The White House saw AIDS as a budget threat, and so chose to ignore it as long as possible.[55]

The New York Times published its first page-one story about AIDS on May 25, 1983. This date was 12 months later than the *Los Angeles Times*, 10 months later than the *Washington Post*, 11 months after the *Philadelphia Inquirer*, and 11 months after the *San Francisco Chronicle*.[56] *The New York Times*'s management did not consider AIDS to be newsworthy from 1981 to mid-1985. When Max Frankel became executive editor in late 1985, coverage of AIDS expanded dramatically.[57]

The number of news stories about AIDS in our six media of study increased from an average of 14 per month prior to July 1985 to 143 per month after July 1985. In previous reviews of media coverage of AIDS, the July announcement that Rock Hudson had AIDS is credited with the ten-fold increase in news coverage.[58] Our analysis shows that it was a concomitant story of a young boy with AIDS, Ryan White, more so than movie star Hudson, which propelled AIDS up the media agenda. We found that White was the topic of 117 new stories, while Hudson was the topic of only 74. Contrary to popular belief, the media did not dwell on the White and Hudson disclosures (together they only represented 3 percent of our 6,694 news stories of study). The personification of the AIDS disease by White and Hudson had its primary impact in changing the meaning of the issue for media newspeople, who then responded with more attention to AIDS. This importance of personification in propelling an issue up the media agenda can be better appreciated by considering the AIDS news stories which broke earlier and did not push AIDS up the media agenda:

- The virus which causes AIDS is found in the blood supply, a news event announced in December 1982.
- The CDC announcement in January 1983 that heterosexual contact is a means of HIV transmission.
- Announcement of the identification of the virus (HIV) which causes AIDS in March 1984.
- Announcement of the blood test for HIV antibodies in January 1985.

None of these important scientific findings led to major news coverage, and thus they did not set the media agenda for the issue of AIDS.[59]

After the mass media agenda was set in mid-1985, U.S. media accorded very heavy attention to AIDS, and then continued to do so. But even before July 1985, the rather limited AIDS coverage by the U.S. media had created a sharp increase in public awareness of AIDS (this occurred in 1983 and 1984), and had begun to correct the widespread public misperceptions about methods of HIV transmission. National sample polls consistently show that Americans report that they obtained most of their information about AIDS from the mass media, especially television, newspapers, and news magazines.

The mass media create public awareness of an issue but may not provide public knowledge of that issue: "It maximizes public awareness and public ignorance at the same time. To be excited about an issue but fail to think it through makes for the worst kind of citizen. A state of moral frenzy is not public judgment."[60]

Remaking the Issue of AIDS

We identified four distinct eras in the media coverage of AIDS: an initial era, a science era, a human era, and a political era (see Figure 6). After the beginning of the human era in AIDS news coverage (in July 1985), the monthly numbers of news articles about AIDS remained fairly consistent.

How did the issue of AIDS, once it rose on the U.S. mass media agenda in mid-1985, maintain such a prominent position in the face of pressure for attention from other important issues and their proponents? Why didn't the AIDS issue follow the usual rise-and-fall sequence of most other issues on the media agenda? Did the issue of AIDS overcome the usual pattern of rather short-term attention that characterized other issues (as was presented in Figure 2)?

Through a disaggregation of the themes which news stories about AIDS addressed, we conclude that the enormity of the AIDS issue obscured a typical rise-and-fall attention pattern. Our analysis of 13 AIDS sub-issues suggests that new information about AIDS was regularly becoming available and being interpreted in new ways, so that as any particular AIDS sub-issue faded on the agenda, another AIDS sub-issue rose to take its place. Thus new information and new interpretations about the general issue of AIDS served to keep AIDS on the media agenda over a period of years.

Interaction Among Agendas

We began the present analysis of the agenda-setting process with an abstracted diagram (see Figure 1) based on past theory and research. It showed an expected relationship of (1) real-world indicators, (2) the media agenda, (3) the public agenda, and (4) the policy agenda. To this

relationship we added the science agenda and the polling agenda, and subtracted the public agenda (which available polls did not measure adequately on a month by month basis). To what extent did the present investigation of the issue of AIDS support this set of expected relationships?

We triangulated quantitative methods to analyze interaction among our five full time series (number of AIDS cases, the science agenda, the media agenda, the polling agenda, and the policy agenda), and among the five time series for each of the four eras in media coverage of AIDS. The significant relationships in each era represent one specific part of the causal relationships for the entire period. The full time-series results differ from the results for the fourth era time-series analysis, suggesting the all-inclusive time-series analyses can obscure interesting time-dependent relationships.

Our full time-series analyses indicate that the real-world indicator of the severity of AIDS had very little impact on the other four agendas. This finding is in keeping with previous research showing wide discrepancies between real-world circumstances and mass media coverage. The full time-series analyses also indicate that the media agenda for the issue of AIDS did not set the policy agenda for AIDS. Other investigations, using very different methods, reported a strong media impact on federal spending.[61]

Two dependent variables emerged: The media agenda and the polling agenda. The media agenda was affected by the science agenda, and to a less reliable extent by the polling agenda and the real-world indicator of the number of AIDS cases (see Figure 12). The effects on the polling agenda, with the directions of all predictors being positive, are more clear-cut. It was affected by both the media agenda and the policy agenda.

When interaction among the time-series data is analyzed by the four shorter eras, interesting differences emerge which better support the model we derived from Figure 1. During the initial era, the science agenda and the real-world indicator of severity affected the media agenda. The relationship between the science agenda and the media agenda may be explained by the fact that many of these stories were rewrites of science and medical journal press releases. During the science era, when scientific information about disease transmission began to dominate news content, the media agenda affected the polling agenda. That is, pollsters asked questions in response to media coverage about AIDS. During the human era, the media agenda and the polling agenda influenced each other. This feedback relationship suggests that media organizations sponsored polls that asked questions about AIDS and then created news stories (often several-part series) based on the poll results. Both science era and human era results concur with the results from a previous investigation of media impact on the polling agenda.[62]

During the political era of mass media coverage of AIDS, our results

indicate that both the science agenda and the media agenda influenced the policy agenda. The finding that the media agenda influenced the policy agenda during the fourth era is in contradiction of the results from our full (91-month) time-series analysis. This latter evidence of the media agenda influencing the policy agenda in the fourth era supports the idea that with some issues, there is a time-ordered, linear agenda-setting function from the mass media to policy decision-makers.

The present investigation has a number of shortcomings, the foremost being the lack of a quantifiable and consistent over-time measure of the public agenda. This problem is endemic to analyses based on archival data. Yet especially when enriched by qualitative data and through methodological and analytical triangulation, such problems can be mitigated through the exploration of other opportunities. For example, in the present investigation, quantifiable and consistent over-time measures of the science agenda and of the policy agenda were included, which conceptually extended the agenda-setting model in important ways.

Our study argues for the research strategy of disaggregation of the agenda-setting process so that its more specific mechanisms can be better understood. We also feel that it was valuable to study the agenda-setting process over time, rather than just cross-sectionally. Finally, there are certain advantages of investigating a single issue, rather than a set of issues that are on the agenda at the same time. We have illustrated a different way of studying agenda-setting than that mainly utilized in the several hundred past studies of this topic. Needed are yet other research designs, so that the rich details of this important process can be more completely understood.

NOTES

1. Daniel Yankelovich, "How the Public Learns the Public's Business," *Kettering Review* 9 (Winter 1985):8-18.

2. Anthony Downs, "Up and Down with Ecology: The Issue-Attention Cycle," *Public Interest* 28 (1972): 38-50; Herbert Blumer, "Social Problems as Collective Behavior," *Social Problems* 18 (1971): 298-306.

3. Stephen Hilgartner and Charles L. Bosk, "The Rise and Fall of Social Problems: A Public Arenas Model," *American Journal of Sociology* 94, no. 1 (1988): 53-78.

4. Harvey L. Molotch, David L. Protess, and Margaret T. Gordon, "The Media-Policy Connection: Ecologies of News," in David Paletz, ed., *Political Communication: Theories, Cases and Assessments* (Norwood, N. J.: Ablex, 1987), pp. 26-48.

5. Hilgartner and Bosk, "The Rise and Fall of Social Problems: A Public Arenas Model."

6. Everett M. Rogers and James W. Dearing, "Agenda-Setting Research: Where Has It Been, Where Is It Going?" in James A. Anderson, ed., *Communication Yearbook 11* (Newbury Park, Calif.: Sage, 1988), pp. 555-594 .

7. Pamela J. Shoemaker with Elizabeth Kay Mayfield, "Building a Theory of News Content: A Synthesis of Current Approaches," *Journalism Monographs* 103 (June 1987), p. 4.

8. Centers for Disease Control, "Pheunocystis Pneumonia: Los Angeles," *Morbidity and Mortality Weekly Report* 30 (1981): 250.

9. Bruno Latour and Steve Woolgar, *Laboratory Life: The Social Construction of Scientific Facts* (Newbury Park, Calif.: Sage, 1979).

10. W. L. Lawrence, *Modern Science and Human Values* (New York: Oxford University Press, 1986); J. Bronowski, *Science and Human Values* (New York: Harper & Row, 1956); J. Ronald Milavsky, "AIDS and the Media" (Paper presented at the American Psychological Association, Atlanta, 1988); Robert K. Merton, *Social Theory and Social Structure* (New York: Free Press, 1968).

11. Henry Small and Edwin Greenlee, "A Co-Citation Study of AIDS Research," *Communication Research* 16 (1989): 642-666; William Booth, "No Longer Ignored, AIDS Funds Just Keep Growing," *Science* 242 (1988): 858-859.

12. Resolution, in this sense, is not limited to resolution of the underlying social problems. Resolution may occur in other ways. For example, if the U.S. president drastically reduces federal grants for AIDS research, the issue of AIDS may drop off the scientific research agenda for lack of money.

13. Shanto Iyengar and Donald R. Kinder, *News That Matters* (University of Chicago Press, 1987).

14. Rogers and Dearing, "Agenda-Setting Research: Where Has It Been, Where Is It Going?"

15. Tsan-Kuo Chang, "The Impact of Presidential Statements on Press Editorials Regarding U.S. China Policy, 1950-1984," *Communication Research* 16, no. 4 (1989): 486-509.

16. James W. Dearing, "Setting the Polling Agenda for the Issue of AIDS," *Public Opinion Quarterly* 53 (1989): 309-329.

17. A distinction must be made here between (1) the public agenda, which is measured by the responses to the 110 national polls, and (2) the polling agenda, which is measured by the number of such polls and/or poll questions about AIDS. They are clearly two different variables (Dearing, "Setting the Polling Agenda for the Issue of AIDS.")

18. Rogers and Dearing, "Agenda-Setting Research: Where Has It Been, Where Is It Going?"

19. Bernard C. Cohen, *The Press and Foreign Policy* (Princeton, N.J.: Princeton University Press, 1963), p. 3.

20. Maxwell E. McCombs and Donald L. Shaw, "The Agenda-Setting Function of Mass Media," *Public Opinion Quarterly* 36 (1972):176-184.

21. Cohen, *The Press and Foreign Policy*; Martin Linsky, *Impact: How the Press Affects Federal Policy-Making* (New York: W.W. Norton, 1988).

22. Terrence H. Qualter, *Opinion Control in the Democracies* (New York: St. Martin's, 1985).

23. Dearing, "Setting the Polling Agenda for the Issue of AIDS."

24. William A. Check, "Beyond the Political Model of Reporting: Nonspecific Symptoms in Media Communication about AIDS," *Review of Infectious Diseases* 9, no. 5 (1987): 987-1000.

25. Alonzo Plough and Sheldon Krimsky, "The Emergence of Risk Communication Studies: Social and Political Context," *Science, Technology, and Human Values* 12, nos. 3-4 (1987): 4-10.

26. As indicated by the responses of U.S. adults to over 500 survey questions about AIDS that were archived in the Roper Center for Public Opinion Research. See Eleanor Singer, Theresa F. Rogers, and Mary Corcoran, "The Polls: A Report; AIDS," *Public Opinion Quarterly*, 51 (1977): 580-595; Eleanor Singer and Theresa F. Rogers, "Public Opinion and AIDS," *AIDS and Public Policy Journal*, 1 (1987): 8-13.

27. Andrew Scott, "AIDS and the Experts," *New Scientist*, March 5, 1950, pp.50-52.

28. Edward M. Brecher, "Straight Sex, AIDS, and the Mixed-Up Press," *Columbia Journalism Review* , March/April, 1988, pp. 46, 48-50.

29. Ron Dorfman, "AIDS Coverage: A Mirror of Society," *The Quill* November 16, 1987, pp. 16-18; James Kinsella, "Covering the Plague Years: Four Approaches to the AIDS Beat," *New England Journal of Public Policy* 4 (1988):465-474; James Kinsella, *Covering the Plague: AIDS and the American Media* (New Brunswick, N.J.: Rutgers University Press, 1990); Randy Shilts, *And the Band Played On: Politics, People, and the AIDS Epidemic* (New York, St. Martin's Press, 1987); Staci D. Kramer, "The Media and AIDS," *Editor & Publisher*, March 12, 1988, pp. 10-11, 43.

30. William A. Check, "Beyond the Political Model of Reporting: Nonspecific Symptoms in Media Communication about AIDS."

31. We included in our analysis only the three U.S. television networks' evening television broadcasts, which are indexed in the Vanderbilt Television News Archive.

32. Obviously, we are not implying here that a television news story is equivalent in an absolute sense to a newspaper news story.

33. Similar evidence that coverage of an issue by various media rises and falls in concert was reported by McCombs and Shaw, "The Agenda-Setting Function of Mass Media," and by Lucig H. Danielian and Stephen D. Reese, "A Closer Look at Intermedia Influences on Agenda-Setting: The Cocaine Issue of 1986," in Pamela J. Shoemaker (ed.), *Communication Campaigns about Drugs: Government, Media, and the Public* (New Jersey: Lawrence Erlbaum Associates, 1989), pp. 47-65.

34. Penelope Ploughman, "The Creation of Newsworthy Events: An Analysis of Newspaper Coverage of the Man-Made Disaster at Love Canal" (Ph.D. diss., State University of New York at Buffalo, 1984).

35. Allen Mazur, "Putting Radon on the Public Risk Agenda," *Science, Technology, and Human Values*, 12, nos. 3-4 (1987): 86-93.

36. *The New York Times* and the *Los Angeles Times* tied in their amount of news coverage of AIDS in 13 of the 67 months from June 1981 through December 1986.

37. For the entire period of 67 months through December 1986, *The New York Times* published 863 news stories about AIDS, while the *Los Angeles Times* published 838.

38. Although we do not present our analysis of the AIDS coverage by the *San Francisco Chronicle* here, this newspaper surpassed both the early coverage by the *Los Angeles Times* and the later coverage by *The New York Times*.

39. Anthony S. Fauci, "The Acquired Immune Deficiency Syndrome," *Journal of the American Medical Association* 249 (1983): 2375.

40. For example, Shilts, *And the Band Played On*; William A. Check, "Beyond the Political Model of Reporting: Non-Specific Symptoms in Media Communication about AIDS"; David P. Fan and Gregory McAvoy, "Predictions of Public Opinion on the Spread of AIDS: Introduction of New Computer Methodologies," *Journal of Sex Research* 26 (1989): 159-187; J. Ronald Milavsky, "AIDS and the Media." An alternative explanation might be that the number of AIDS news stories created by Hudson's illness constituted a "critical mass" in public attention to the AIDS issue, after which the number of AIDS news stories per month escalated; see W. Russell Newman, "The Threshold of Public Attention," *Public Opinion Quarterly* 54, no. 2 (1990): 159-176.

41. Fauci, "The Acquired Immune Deficiency Syndrome."

42. David Shaw, "Coverage of AIDS Story: A Slow Start," *Los Angeles Times*, December 20, 1987, pp. 36-39; David Shaw, "Hudson Brought AIDS Coverage Out of the Closet," *Los Angeles Times*, December 21, 1987, pp. 20-31.

43. For details on computation of the Chow test, see Gregory C. Chow, "Tests of Equality between Sets of Coefficients in Two Linear Regressions," *Econometrica* 28, no. 3 (1960): 591-605; Henry Cassidy, *Using Econometrics: A Beginner's Guide* (New York: Prentice Hall, 1981), pp. 246-248.

44. Anthony Downs, "Up and Down with Ecology: The Issue-Attention Cycle."

45. In April 1989, when we obtained the 1,084 poll questions about AIDS from the Roper Center, there may have been more questions about AIDS which were asked prior to December 1988, which were not then filed at the Roper Center.

46. The 1,314 scientific articles about AIDS include "research news and reports" (77 percent), "original contributions" (19 percent), and "editorials" (4 percent).

47. C.W.J. Granger, "Testing for Causality: A Personal Viewpoint," *Journal of Economics Dynamics and Control* 2 (1980): 329-352.

48. G.E.P. Box and G.M. Jenkins, *Time-Series Analysis: Forecasting and Control*, 2nd ed. (San Francisco: Holden-Day, 1976).

49. Thomas B. Cook and Donald T. Campbell, *Quasi-Experimentation: Design and Analysis Issues for Field Settings* (Boston: Houghton-Mifflin, 1979) provide more information about how to read autocorrelations in order to detect the ARIMA components of a time-series.

50. Nonstationarity is determined when autocorrelations die out slowly and partial correlations show a large spike in the distribution at t-1 which is close to 1.0.

51. First-order differencing subtracts the first observation from the second. Differencing or detrending does not affect any deterministic parameters: it only affects the manner in which time series are represented in a model.

52. See Thomas B. Cook, Leonard Dintzer, and Melvin M. Mark, "The Causal Analysis of Concomitant Time-Series," in Leonard Bickman (ed.), *Applied Social Psychology Annual*, vol. 1 (Newbury Park, Calif.: Sage, 1980), pp. 93-135, for more details about the different techniques to create a correllogram. In our study we employed the Haugh-Box procedure to estimate cross-correlations between two series. The Haugh-Box procedure pre-whitens both series with their own ARIMA terms, and cross-correlates residuals of two time series. In this respect, the Haugh-Box procedure is called independent pre-whitening.

53. Lucig H. Danielian and Stephen D. Reese, "A Closer Look at Intermedia Influence on Agenda-Setting: The Cocaine Issue of 1986."

54. John T. Cuddington, "Simultaneous-Equations Test of the Natural Rate and Other Classical Hypotheses," *Journal of Political Economy* 88 (1980): 539-549.

55. Charles Perrow and Mauro F. Guillen, *The AIDS Disaster: The Failure of Organizations in New York and the Nation* (New Haven, Conn.: Yale University Press, 1990), p. 51.

56. Shaw, "Coverage of AIDS Story: A Slow Start"; Shaw, "Hudson Brought AIDS Coverage out of the Closet."

57. Evidence for this point is provided by James Kinsella, *Covering the Plague: AIDS and the American Media*.

58. Shilts, *And the Band Played On: Politics, People, and the AIDS Epidemic*; Shaw, "Coverage of AIDS Story: A Slow Start"; Shaw, "Hudson Brought AIDS Coverage out of the Closet."

59. Check, "Beyond the Political Model of Reporting: Nonspecific Symptoms in Media Communications About AIDS."

60. Daniel Yankelovich, "How the Public Learns the Public's Business."

61. Martin Linsky, *Impact: How the Press Affects Federal Policy-Making* (New York: W.W. Norton, 1986).

62. Dearing, "Setting the Polling Agenda for the Issue of AIDS."

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