

# A Perspective on the Significance of Pandemic Influenza

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**Abstract:** The identification in February 1976 of a new strain of influenza virus led to the enactment of unprecedented federal legislation to minimize the impact of a potential outbreak of pandemic influenza in the fall and winter of 1976–1977. This legislative program does not, however, represent a commitment of federal resources to deal with the more general, long-standing problem of epidemic influenza. This paper presents a series of estimates of the impact and economic consequences of influenza. By including periods of interpandemic as well as pandemic disease, the estimates offer a broadened perspective of the magnitude of the influenza problem. The estimates show that

while the proportions of pandemic influenza can be singularly impressive, the cumulative effects of inter-pandemic outbreaks are generally of greater consequence. The paper discusses the implications of these estimates and the 1976 legislation for the support and implementation of federal policy on the use of influenza vaccine. While the commitment of resources in support of public policy cannot alone guarantee successful implementation, it must be considered an essential prerequisite for dealing with both inter-pandemic and pandemic influenza. (*Am. J. Public Health* 67:1063–1070, 1977).

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## Introduction

The identification in February 1976 of a new strain of influenza virus led to the enactment of federal legislation to minimize the impact of a potential outbreak of pandemic influenza in the fall and winter of 1976–1977. The legislation was specifically tailored to cope with the unusual circumstances attending the early detection of a major antigenic variant of the type A influenza virus. Recovered during an outbreak of respiratory disease among trainees at Fort Dix, New Jersey, the virus, known as A/New Jersey/76 (Hsw1N1), is antigenically akin to influenza viruses known to infect swine.<sup>1</sup> Moreover, its antigenic properties bear a striking resemblance to those of the virus thought to be responsible for the catastrophic “Spanish influenza” pandemic of 1918–1919 which killed more than half a million persons in the United States and more than twenty million worldwide.<sup>2, 3</sup>

The legislative program was unprecedented in one respect and unparalleled in another. For the first time, the federal government enacted legislation and allocated resources for the specific purpose of dealing with the effects of epidem-

ic influenza in advance of the appearance of widespread disease. Although the federal government has, in the past, appropriated funds for programs to control communicable diseases through immunization, it has never before allocated as much to a single disease control program, nor has it ever sought to reach so large a target population in so short a period of time.

The authorizing legislation was supported by an emergency appropriation of \$135 million which among other things, enabled the government to purchase and distribute influenza vaccine and assist the states in making it available to the public.<sup>4, 5</sup> The rationale for the program and its evolution have been discussed at greater length elsewhere.<sup>6–8</sup> Whatever else it may be, the recent legislation was not a commitment of federal resources to the support of influenza immunization programs in the future. The legislative authorization of the swine influenza immunization program expires on August 1, 1977.

Yet, the long-standing problems associated with the control of influenza in general will persist and remain in need of attention beyond the expiration of the instant legislation. Future assessment of these problems and alternative approaches through which they might be addressed could, conceivably, benefit from data which document the performance of the program and the epidemiologic and economic impact of the disease in 1976–1977. But consideration of the pandemic aspects of the disease alone will not adequately reveal the full extent of the influenza problem. The antigenic and epidemiologic characteristics of the influenza virus vary unpredictably from year to year as do the extent and impact of the disease. Examination of experience with the disease which encompasses pandemic as well as interpandemic peri-

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ods is fundamental to a balanced understanding of the problem and to the formulation of a responsible approach to the control of influenza.

This paper presents a series of estimates of the impact and economic consequences of epidemic influenza. Recognizing the protean nature of the disease, estimates are presented for three epidemic episodes which approximate the experience recorded during the decade 1961–1970. By including periods of interpandemic as well as pandemic disease, these estimates offer a broadened perspective on the magnitude of the influenza problem and a backdrop against which to assess the experience of 1976–1977.

## Methods

Estimates of the economic consequences of epidemic influenza were derived through a two-stage process. The first stage entailed estimation of the epidemiologic dimensions of the disease. The second stage involved the application of a series of cost measures to yield estimates of the economic consequences of the disease in epidemic form.

### Estimating the Dimensions of Epidemic Influenza

Estimates of the dimensions of epidemic influenza are presented under three headings: 1) mortality; 2) morbidity and disability; and 3) resource consumption.

**Mortality** The most widely used index of the presence and severity of epidemic influenza is "excess pneumonia-influenza mortality," the number of deaths attributable to influenza and pneumonia in excess of normal seasonal expectancies.<sup>9</sup> Studies of epidemic influenza have revealed, however, that the lethal impact of the disease is far more extensive than a cursory examination of excess pneumonia-influenza mortality alone would seem to indicate.<sup>10, 11</sup> These studies have shown that excess pneumonia-influenza mortality observed during epidemics of influenza is accompanied by mortality attributable to such other causes as chronic cardiovascular and bronchopulmonary conditions. Thus, one knowledgeable observer concluded that "influenza and pneumonia are far more destructive in epidemics than is indicated by deaths due to these causes."<sup>11</sup>

Since the late 1930s, excess mortality from influenza and pneumonia has consistently accounted for less than 50 per cent of total excess mortality associated with epidemic influenza.<sup>8, 12</sup> Although excess pneumonia-influenza mortality may be the more sensitive indicator, total excess mortality provides a better measure of the total impact of an epidemic.<sup>13</sup> Estimates of excess mortality presented in this study are based on data collected by the Center for Disease Control and the National Center for Health Statistics.

**Morbidity and Disability** Because of the characteristics of the disease, determination of the extent of influenza morbidity and associated disability is necessarily imprecise. Influenza presents no pathognomonic signs, and over the years the terms "flu" and "influenza" have been widely used to characterize a variety of common colds and other ailments that are similar to, and often clinically indistinguishable from, genuine influenza. The estimates presented here were

developed from data collected by the National Health Survey which conducts weekly interviews in a continuous sampling of households.<sup>14</sup>

Because National Health Survey data are based on responses to household interviews, and in view of the difficulty in making a definitive diagnosis of influenza in the absence of laboratory confirmation, it was assumed that a significant amount of influenza-like illness is reported to the Survey as influenza. It is also known that influenza occurs in the United States on a yearly basis, though not always in epidemic proportions. In light of the foregoing, it was necessary to attempt to eliminate the effect of what might be called "endemic" levels of influenza, as well as other influenza-like illnesses from estimates of the morbidity and disability associated with an influenza epidemic. This was accomplished by identifying a reference year, essentially free of epidemic influenza, for which a baseline level of "endemic" influenza and influenza-like illness could be determined. The relevant indices of influenza and influenza-like illness were applied to a standard population and subtracted from indices similarly developed for the epidemic years for which estimates have been prepared. The net result is a set of estimates of the "excess" morbidity and disability associated with epidemic influenza which complement more readily available data on excess mortality.

The period July 1966–June 1967 was selected as the reference year. Data published by the Center for Disease Control indicate that although influenza was present in half the states, it failed to attain noteworthy epidemic proportions.<sup>15</sup>

**Resource Consumption** The appearance of influenza in epidemic form is generally accompanied by an increase in the use of health care resources and services. For purposes of this study these include ambulatory and inpatient physicians' services, hospital utilization, and prescription drugs.

Morbidity data included in the National Health Survey include only those acute conditions which required medical attention and/or resulted in restricted activity. It was assumed that each medically attended case resulted in one physician service. This may yield an underestimate of the actual volume of ambulatory services as it is likely that some individuals, particularly those with complications not requiring hospitalization, required more than one physician contact. The assumption of one service per medically attended case was accepted in the absence of any more definitive data.

It was assumed that three per cent of the medically attended cases required hospitalization, and that the average length of stay was nine days.<sup>16, 17</sup> In addition, it was assumed that each hospitalized person received a diagnostic evaluation upon admission, and one physician visit per day for each of the subsequent eight days of the average stay. No accounting was made for the influenza-related utilization of other inpatient facilities such as extended care facilities, or for physician services rendered to persons confined to such institutions.

Finally, it was assumed that an epidemic of influenza is also accompanied by an increase in the consumption of prescription drugs. This study, therefore, incorporates the assumption that each medically attended case resulted in the

filling of one prescription. This most likely understates the actual utilization of pharmaceuticals. Many cases of influenza receive no formal medical attention, but it is quite likely that these unattended cases were accompanied by the consumption of non-prescription drugs unaccounted for in this analysis.

### Estimating the Costs of Epidemic Influenza

Estimation of the economic consequences of epidemic influenza was based on the method employed by Rice.<sup>18, 19</sup> Direct costs which reflect expenditures associated with the utilization of health care resources and services, are estimated at 1968–1969 prices for physicians' services, hospital utilization, and prescription drugs. Direct costs alone, however, "do not measure the full economic costs imposed on the Nation by illness, disability, and premature death since they do not include the loss of output to the economy."<sup>18</sup> In this analysis, indirect costs reflect the estimated value of productivity temporarily or permanently foregone due, respectively, to morbidity or mortality attributable to the presence of epidemic influenza.

*Direct Costs* With respect to ambulatory physicians' services, the cost per visit is the average price of an office visit to an internist or general practitioner as reported by the Bureau of Labor Statistics. This value reflects the average prices in ten large cities used in the formulation of the Consumer Price Index. The average price of such a visit for December 1968 was estimated to be \$6.80.<sup>20, 21</sup>

Estimates of the costs of physicians' services rendered to persons hospitalized as a result of influenza are based on the relative value scales of the California Medical Association's Commission on Professional Fees.<sup>22</sup> According to that schedule, the value of the diagnostic evaluation performed on admission is three times that of the office visit, and the follow-up visit is assigned the same value as the office visit. Accordingly the cost of the diagnostic evaluation was estimated to be \$20.40, and that of the follow-up inpatient visit \$6.80.

Cost estimates of hospitalization arising from epidemic influenza were based on the average daily rate of \$64.67 for care in short-term community hospitals during December 1968.<sup>21, 23</sup>

The cost of pharmaceutical products prescribed for the medically attended cases was based on the average retail price of prescription drugs developed from drug industry data sources.<sup>24</sup> The average value for 1968 was \$3.36.

*Indirect Costs (Morbidity)* Ideally, the most appropriate way to measure the value or productivity foregone due to influenza-related absenteeism in the labor force would be through the determination of the daily marginal product of each worker absent as a result of the disease. This figure would then be multiplied by the number of days lost by each worker and summed across the working population. Obviously this course was not feasible, and an estimate of average daily earnings was employed as a surrogate for the marginal product. Estimates of average daily earnings for 1969 were developed in a manner consistent with the methods employed by Rice.<sup>18, 19</sup> The estimates presented here are in

summary form and take account of age specific earning and morbidity variations in the employed population.

*Indirect Costs (Mortality)* The development of the economic costs associated with productivity permanently lost due to influenza-related excess mortality also followed the guidelines used by Rice.<sup>18, 19</sup> Cost estimates were expressed as the discounted present value of future earnings lost.

The selection of a discount rate has an important bearing on the magnitude of the present value of future earnings. The lower the rate, the higher the present value for equivalent income streams and vice versa. The selection of a discount rate is also a topic of controversy, and has been considered extensively elsewhere.<sup>25, 26</sup> For purposes of this study, discount rates of four and eight per cent have been used in estimating the costs of excess mortality.

As is the case for the estimated costs of morbidity, the mortality estimates presented in summary form below reflect age-specific differences in mortality rates and present value of future earnings. As contrasted with the morbidity estimates, the mortality estimates do reflect the value of housewives' services permanently lost as a result of epidemic influenza. The value of the latter was approximated by the mean annual earnings of domestic workers.<sup>18, 19</sup> Recent data suggest that this approach understates the value of such services.<sup>27</sup>

### Results

Estimates of the dimensions and economic consequences of epidemic influenza are presented on the basis of the experience of three years: 1962–1963; 1965–1966; and 1968–1969. They are referred to below as Models 63, 66, and 69 respectively. The findings summarized here have been discussed more extensively elsewhere.<sup>19</sup> The relevant indices of epidemic impact for the three epidemic years and 1966–1967, the non-epidemic reference year (Model 67), were applied in the manner described to a standard population (mid-year 1968–1969), and the economic consequences were estimated using 1968–1969 values. The net result is a set of comparable estimates of what the consequences of three epidemic configurations might have been had they materialized in a given population in a particular year.

The estimates presented here portray epidemic influenza as a recurrent problem capable of repeatedly attaining multi-billion dollar proportions. However, they must also be recognized as incomplete approximations which represent an attempt at conveying a sense of magnitude rather than precise measurement. A number of sources of distortion have been identified in preceding sections. Additionally, still other aspects of the impact or economic consequences of epidemic influenza have been omitted from the estimates because they do not readily lend themselves to quantification, or because it is difficult to estimate their economic value. For example, the disruptive effect of epidemic influenza on the orderly conduct of community life is not

**TABLE 1—Indices of Influenza Incidence and Associated Disability by Category and Epidemic Model**

Category	Model 63	Model 66	Model 69
Cases of influenza (000)	27 140	21 748	51 155
Incidence (per 100 persons)	13.8	11.1	26.0
Days of restricted activity (000)	156 172	108 004	317 347
Days of restricted activity per case	5.8	5.0	6.2
Days of bed disability (000)	97 060	63 917	193 875
Days of bed disability per case	3.6	2.9	3.8
Days lost from work (000)	31 750	20 608	66 210
Days lost from work per case	3.4	3.2	3.2
Days lost from school (000)	15 221	17 719	34 833
Days lost from school per case	4.7	2.8	3.2

entirely amenable to quantification or expression in economic terms. Such items as days lost from school are relatively readily quantified, but in these estimates they reflect losses only for school children 6–16 years of age, and it is difficult, if not impossible, to assign any economic value to such losses.

#### The Dimensions of Epidemic Influenza

Aggregate estimates of the incidence of epidemic influenza and associated disability in each of the three models are displayed in Table 1. Table 2 reflects the extent and characteristics of excess mortality in each instance. Table 3 summarizes the estimated utilization of health services and resources in each of the three epidemic configurations. Examination of the data in these tables reveals a marked variability in epidemic impact as well as an absence of consistency between the levels of morbidity and excess mortality. For example, the epidemic characterized by the highest incidence (Model 69) was by no means the most lethal (Model 63). This would suggest that excess mortality by itself is inadequate as an indicator of the magnitude or severity of an epidemic of influenza.

#### The Economic Consequences of Epidemic Influenza

The direct costs of epidemic influenza which grow out of the utilization of health care resources and services are summarized in Table 4. The direct costs picture is heavily dominated by the costs arising from the utilization of hospital services. The significance of this component is magnified when the costs of inpatient physicians' services are added to it.

Though substantial in their own right, direct costs are dwarfed by indirect costs in the overall epidemic cost structure. Direct costs as a proportion of total costs vary from model to model, but are consistently less than a quarter of total epidemic costs (Table 5). Indirect costs, uniformly in excess of 75 per cent of total costs, reflect the value of temporarily and permanently foregone productivity stemming from industrial absenteeism (morbidity) and excess mortality, respectively. Table 5 presents summary estimates of these indirect costs and, by incorporating direct costs as well, makes it possible to examine the overall cost structure for each epidemic model. It can be seen that excess mortality accounts for over half the indirect costs in two of the three models (63 and 66), for over half of total costs in one model

**TABLE 2—Indices of Excess Mortality Associated with Epidemic Influenza by Category and Epidemic Model**

Category	Model 63	Model 66	Model 69
Total excess mortality	48 901	20 621	27 495
Mortality rate (per 100,000 population)	24.9	10.5	14.0
Case fatality rate (per 100,000 cases)	180.2	94.8	53.7
Percent total excess mortality due to pneumonia-influenza	21.0	24.0	36.6
Percent total excess mortality due to all other causes	79.0	76.0	63.4
Percent total excess mortality in persons aged 65+	73.9	65.5	58.3

**TABLE 3—Consumption of selected health care resources due to epidemic influenza, by category and epidemic model**

Category	Model 63	Model 66	Model 69
Cases of influenza (000)	27 140	21 748	51 155
Percent of cases medically attended	51.3	44.9	41.7
Physicians services not related to hospitalization (000)	13 923	9 765	21 332
Physicians services related to hospitalization (000)	3 759	2 637	5 760
Diagnostic evaluations (000)	418	293	640
Routine follow-up visits (000)	3 341	2 344	5 120
Hospital admissions (000)	418	293	640
Hospitals days (000)	3 759	2 637	5 760
Prescriptions issued (000)	13 923	9 765	21 332

(63), and for a majority of neither in the third (69). The latter is largely due to the fact that while model 69 had the highest overall incidence of the three it also had the lowest case fatality rate. Not surprisingly, the variability in the dimensions of epidemic influenza is also reflected in estimates of its economic consequences.

*Discussion*

For well over a decade before 1976, the Public Health Service has advocated the selective use of influenza vaccine. Rather than the control of morbidity in the general population, the policy objective has been the reduction or minimization of excess mortality among the elderly and those with certain chronic debilitating conditions, a group considered to be at high risk with respect to influenza. The strategy called for the routine annual immunization of high-risk persons regardless of the prospects for epidemic activity in any given year. The policy was based on three assumptions:

- The most important consequence of epidemic influenza is excess mortality;
- Influenza vaccines have attained some measure of success in controlling the incidence of disease during epidemic periods leading to the presumption that they

would effect a reduction of mortality in high-risk persons; and

- The specific characteristics of influenza epidemics cannot be predicted from year to year with sufficient accuracy “to permit confident planning of control measures on a year-to-year basis.”<sup>28</sup>

Detailed analyses have shown that the underlying assumptions are reasonable and acceptable and that the policy is justifiable on economic as well as epidemiologic grounds. Disaggregated estimates of the impact and economic consequences of epidemic influenza reveal that the high-risk population (approximately 22.8 per cent of the total population) incurs a disproportionate share (50 per cent or more) of the total costs associated with the disease. A cost-benefit analysis has indicated that, notwithstanding vaccine efficacy and epidemic attack rates, the net benefits likely to accrue to society as a result of routine annual influenza immunization in the high-risk population greatly exceed those forthcoming from the use of the vaccine in the nonhigh-risk, general population.<sup>19</sup>

The decision in 1976 to deviate from existing policy “was based on the prospect that the new swine influenza will persist and cause extensive disease” and, because it was believed that the new strain had appeared early enough to allow adequate lead time to develop and produce vaccines specific to the need.<sup>2</sup>

**TABLE 4—Summary of Direct Costs of Epidemic Influenza by Cost Category and Epidemic Model at 1968-1969 Values**

Cost Category	Model 63 Cost (000)	Model 66 Cost (000)	Model 69 Cost (000)
	\$	\$	\$
Total direct cost	415 798	291 663	637 104
Physicians services	125 922	88 318	192 930
Non-hospitalization related	94 676	66 402	145 058
Hospitalization	31 246	21 916	47 872
Hospital services	243 095	170 535	372 499
Prescription drugs	46 781	32 810	71 675

**TABLE 5—Distribution of the Costs of Epidemic Influenza, by Epidemic Model and Cost Category, at 1968–1969 Values**

Cost category	Model 63		Model 66		Model 69	
	Cost (000)	Percent	Cost (000)	Percent	Cost (000)	Percent
	\$	%	\$	%	\$	%
Direct cost	415 798	13.2	291 663	17.3	637 104	16.4
Indirect cost	2 732 514	86.8	1 389 686	82.7	3 242 926	83.6
Morbidity	904 710	28.7	505 225	30.1	1 955 135	50.4
Mortality	1 827 804	58.1	884 461	52.6	1 287 791	33.2
Total cost (4% discount rate)	3 148 312	100.0	1 681 349	100.0	3 880 030	100.0
Total cost (8% discount rate)		\$2 675 561		\$1 439 697		\$3 530 945

In spite of the unusual early warning, the decision to proceed with the program was based on incomplete and imperfect information. No one was in a position to predict with any certainty whether swine influenza, indeed any influenza, would strike in the fall and winter of 1976–1977 or how extensive or severe any such outbreak might be. An analysis of the decision conducted after the fact reported a divergence of opinion among knowledgeable influenza watchers on the likelihood of an epidemic; the estimates of the experts ranging from a low probability of .02 to a high of .50. The same analysis estimated that if an epidemic did occur, it could strike 26.6 per cent of the population (56.5 million persons) and result in a rate of excess mortality of 23.5 per 100,000 population (50,000 excess deaths). Those age 65 and over who normally bear the majority of the burden of total excess mortality would, according to these estimates, sustain less than 40 per cent of the total in 1976–1977. Overall, the economic consequences of the projected epidemic could exceed \$7 billion. In their examination of the decision, the analysts concluded that “a policy of vaccinating the general adult population instead of just the high-risk population would be warranted.”<sup>29</sup> This determination was contingent upon “high vaccine efficacy, low vaccine administrative costs, and high acceptance rates, plus the assumption that one is dealing with a potentially pandemic strain of the influenza virus.”<sup>29</sup>

Although the action taken in 1976 contrasted sharply with long-standing Public Health Service policy on the use of influenza vaccine, the two sets of responses are neither inconsistent nor contradictory. Each is an appropriate and justifiable response to different manifestations of a single complex problem.

The estimates presented earlier in this paper offer an opportunity to examine more closely the relative impacts and economic consequences of pandemic and interpandemic influenza. Except in the most general terms, it is not possible to describe a “typical” influenza epidemic. A review of data which describe the incidence of influenza and associated disability and excess mortality for fiscal years 1961–1970 reveal similarities which permit the experience of the decade to be grouped under the four epidemic models developed above.<sup>14, 30, 31</sup> Models 63 and 69 were unique in the decade and can be taken as representative of only those individual

years. Model 66, an epidemic of more moderate proportions relative to Models 63 and 69, also approximates the experience of 1962, 1965, 1968, and 1970. Model 67, the “non-epidemic” reference year is also reflective of the experience of 1961 and 1964. Thus, in a decade, epidemic influenza struck seven times; Models 63 and 69 each occurred once, while outbreaks resembling Model 66 appeared five times.

Model 69 reflects the decade’s single experience with a major antigenic variant of type A influenza; 1968–1969 was the year of the Hong Kong pandemic. The extent of morbidity and disability in that year far surpassed that recorded in any other year of the ten under consideration. However, the excess mortality in Model 69 was lower than might have been expected and can be seen to have been second in the decade to Model 63.<sup>32</sup> From the standpoint of the economic consequences of the disease, Model 69 was the costliest single episode in the interval. Largely because of its high rate of excess mortality, Model 63, although less extensive, was (with respect to cost) a not-too-distant second. In contrast to the other two, the dimensions and consequences of Model 66 were somewhat more modest. Its significance is heightened, however, inasmuch as an epidemic of similar dimensions occurred in five out of the ten years.

The proportions of an outbreak of pandemic influenza can be singularly impressive, but the cumulative effects of interpandemic outbreaks are generally of greater consequence. The foregoing is not meant to demean the importance of pandemic influenza or to detract from the significance of the legislation enacted in 1976. Its purpose is to promote a more complete understanding of the true extent of the problem posed by influenza.

Although it has been widely promulgated and generally endorsed, there is nothing to suggest that the long-standing federal policy on the use of influenza vaccine has materially affected the level of excess mortality. It may well be, however, that the apparent failure to realize the stated objective is more closely related to the degree to which the policy has been implemented than to the choice of an inappropriate policy option.

Indeed, the evidence points to a breakdown in policy implementation. In general, the total supply of influenza vaccine available in any given year has been inadequate to meet the needs of the high-risk population, even if its use had been

restricted entirely to that group. Furthermore, the vaccine has not been utilized in a manner consistent with the policy's stated objective and strategy. In each of the six fiscal years ending in 1974, no more than 11 per cent of the total population received influenza vaccine. As much as 50 per cent of the vaccine used in each of those years was diverted to the non high-risk population, while less than a quarter of those at high risk received any protection.<sup>33</sup>

Federal policy on the use of influenza vaccine has definite implications for the supply of vaccine as well as the manner in which that supply should be allocated. Yet, the federal stance on influenza vaccine utilization has never been accompanied by a commitment of resources to support implementation. There have been no signals generated at the federal level capable of assuring the necessary supply response on the part of the vaccine manufacturers or channelling influenza vaccine to the high-risk population.

The manufacturers are well acquainted with the problematic nature of the influenza viruses and the limitations inherent in contemporary inactivated influenza vaccines. Their decisions with respect to production levels are undoubtedly influenced by these considerations, as well as by projections of the demand for the vaccine and the desire to minimize unused supplies and the potential financial losses they imply. Public-sector involvement in policy implementation in the civilian population has historically been confined to articulating or endorsing a policy which has carried with it little more than the weight of expertise and reason and the power of persuasion.\*

In 1976 the likelihood of successful policy implementation was heightened by the presence of the wherewithal to implement that policy. The federal government appropriated resources to assure an adequate supply of vaccine, to support its purchase and distribution, and to assist the states in delivering it to the public. As a consequence, the supply of vaccine exceeded that which has generally been available in other years by a factor of seven or more. It was also expected that most of the vaccine would be administered, free of charge, through publicly sponsored programs established in accordance with the enabling legislation. The availability of an adequate supply of vaccine and the means to channel it to the public are the direct results of the decision to commit public resources, particularly from federal sources, to the support of public policy. While the commitments made could not, by themselves, guarantee successful policy implementation, they must be regarded as essential prerequisites. In other years, similar commitments, on any scale, have not been forthcoming, and the implementation of federal policy on the use of influenza vaccine has been a failure.

The importance of federal support to the success of ongoing immunization programs has not gone unnoticed in the context of other diseases. With respect to measles, for example, the reported incidence of disease has been found to be "quite sensitive to the magnitude of the federal control

effort."<sup>34</sup> However, federal programs "specifically designed to establish a federal leadership role in the control of communicable disease, and to signal to the states that the federal government was serious about working with them in attaining control" have never heretofore been extended to influenza.<sup>35</sup>

The extraordinary circumstances which prevailed in early 1976 and the threat of pandemic disease precipitated the federal decision to initiate a one-time, publicly supported program of mass influenza immunization. It is clear, however, that pandemic influenza is only part of a more extensive problem that must be dealt with on a continuing basis. It is equally apparent that a responsible approach to the problem requires attention to the implementation of federal vaccine utilization policy in the face of interpandemic as well as pandemic influenza. Without the allocation of resources during interpandemic periods, however, the proper implementation of an established policy calling for routine annual immunization of high-risk persons will continue to face severe obstacles, and the opportunity to make the best use of available influenza vaccines will continue to be foregone.

#### ACKNOWLEDGMENTS

Portions of this paper are based on research supported by P.H.S. Training Grant 5 TO 1 CH 00008 and conducted while the author was a doctoral candidate at the Harvard School of Public Health, Boston, MA.

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\*There are limited exceptions to this. Most notably, the State of California has, in recent years, enacted legislation which supports a modest program to provide influenza vaccine to high-risk persons.

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### Dr. Feldman to Deliver Memorial Lecture

The Eighth Annual Thomas Francis, Jr. Memorial Lecture will be given at the University of Michigan, School of Public Health, in Ann Arbor on Monday, November 21, 1977 at 4 PM by Dr. Harry A. Feldman, Professor and Chairman, Department of Preventive Medicine, State University of New York, Upstate Medical Center, Syracuse. The title of the lecture will be "The Meningococcus: An Enigma Wrapped in Sugar."

Each year the Francis Lecturer is selected by a committee composed of the five most recent past presidents of the American Epidemiological Society. The Chairman of this year's selection committee is Dr. William S. Jordan, Jr., Director of the Microbiology and Infectious Diseases Program at the National Institute of Allergy and Infectious Diseases, Bethesda, Maryland. The lectureship is supported by an endowment fund developed from contributions made by colleagues and friends of the late Thomas Francis, Jr.