A study in 1956 reflects the wide variation in the legislative, organizational, fiscal, and operational aspects of local air pollution control activities, a situation to be expected at this time in view of variations in severity of air pollution and in degrees of public support given to its palliation.

Administration of Air Pollution Control in the United States

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BIOLOGICAL effects of polluted air and techniques of controlling atmospheric contaminants have been studied frequently and reported regularly. Few investigations have been made, however, of the administration of air pollution control programs. Yet administration provides the machinery necessary for transforming technical knowledge into positive action to enhance the urban atmosphere.

This paper analyzes information obtained in a survey of administrative characteristics of local air pollution control agencies in the spring of 1956. Since the study deals with practice, the data do not necessarily reflect ideal situations. Furthermore, air pollution problems vary with the peculiarities of the individual community, and the extent of the control program will vary according to the local needs. Keeping in mind these two considerations, administrators of air sanitation activities may find the data instructive.

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From various sources, a list of 144 pollution control agencies was prepared, and a questionnaire was sent to each. Ninety-three agencies (65 percent) responded, 82 of which claimed active programs. The population served by the agencies ranged from 10,000 to 8,000,000. All of the communities with populations of 1,000,000 and over replied; however, below 50,000 population, there was only a 37.5 percent response.

Background Data

The questionnaire asked, among other things, for data on the industrial and commercial nature of the community and on the quantity of various fuels consumed. It was anticipated that such information might be indicative of the need for various types of control. Response was disappointing. The number reporting was so small that the data were not considered worthy of presentation. This suggests that communities do not have information that would be of value in determining the type of program needed in the community. It should be recognized, however, that under severe conditions organoleptic responses of individuals are sufficient to motivate control of air pollution.

To provide needed background, the agencies were asked to enumerate the major sources of air pollution in the area. Their answers, tabu-

lated below, reflect local opinion concerning the most serious sources in that area. They do not necessarily provide an all-inclusive list of sources of air pollution. If an industrial operation did not exist in a community, it obviously would not be a problem.

Source	*Number times reported*
Open burning (refuse, scrap, industrial wastes)	18
Metal smelting and refining	14
Gasoline and diesel motive equipment (autos, trucks, locomotives)	12
Chemical industries (not specified)	9
Lumber, furniture, and so forth	9
Industrial (not specified)	8
Incinerators (domestic, apartment, commercial)	8
Oil refining	5
Railroad locomotives (coal burning)	5
Sulfur and sulfuric acid	4
Asphalt plants	4
Meat packing and rendering plants	4
Paint manufacturing	4
Fertilizer plants	3
Textiles	3
Laundries	3
Aggregates	3
Cement manufacturing	3
Farm products processing	3
Apartments, hotels, schools, substandard dwellings	3
Paper and pulp	2
Paint spray booths	2
Other (ammonia, rubber, lithographing, pollen, gas plant, food processing, milling, roofing, burning natural gas)	9

Open burning was the most frequently cited major source of air pollution. This is a deplorable situation since sanitary methods of refuse disposal which obviate any need for burning in the open are readily available and economically feasible for all communities.

Laws regulating air pollution and standards for compliance are usually adopted locally. Communities of 1,000,000 or more population frequently use board regulations to establish standards. Most of the communities in this study had laws controlling smoke, fly ash, odors, toxic gases, and nuisances, with no apparent trend due to population size. This finding indicates a tendency for communities to recognize air pollution problems through legislation, but not necessarily through support of program budget.

Administrative Status

There were no independent air pollution control agencies in the smallest population groups, but more than 50 percent in the largest group were independent (table 1). This is logical. In small areas, the workload may not be heavy enough to justify full-time employees, and administrative overhead costs of an independent agency may be prohibitive. In large areas, an independent agency may be justified on the ground that it lends greater emphasis to the air sanitation program. However, the fact that, even in the large population groups, independent status is not universal indicates that there may be advantages to conducting the activities as part of a larger administrative structure if administrative costs can be reduced without sacrificing emphasis.

Table 1. Administrative status of air pollution control, by population group, air pollution control survey, 1956

Population group	Number reporting	Independent	Building department	Health department	Safety department	Other	Split
Under 50,000	11	0	5	3	1	2	0
50,000–99,000	11	2	2	3	2	2	0
100,000–199,000	18	3	5	4	3	2	[1] 1
200,000–499,000	18	4	4	6	1	3	0
500,000–999,000	15	2	2	4	3	2	[2] 2
1,000,000 and over	9	5	1	3	0	0	0
Total	82	16	19	23	10	11	3
Percent	100	19. 5	23. 2	28. 0	12. 2	13. 4	3. 7

[1] Split between health and building.
[2] 1 split between health and safety and 1 between health and public works.

Table 2. Number of full-time professional and technical employees per 100,000 population served, according to range of per capita expenditures, air pollution control survey, 1956

Per capita expenditure	Number agencies in range	Number full-time professional and technical [1] employees per 100,000 population served			
		Minimum	Maximum	Median	Average
$0.000–$0.049	5	0. 13	0. 88	0. 23	0. 36
$0.050–$0.099	17	. 51	1. 75	1. 00	1. 03
$0.100–$0.149	11	1. 08	2. 44	1. 82	1. 77
$0.150–$0.199	3	2. 16	2. 67	2. 50	2. 44
$0.200–$0.299	1	3. 17	3. 17	3. 17	3. 17
$0.300 and over	2	3. 33	4. 18	3. 76	3. 76
All reporting [2]	39	. 13	4. 18	1. 38	1. 46

[1] Includes inspectors.
[2] Characteristics of this group are: range, $0.020 to $0.529; median, $0.091; average, $0.109.

The health department seems to have a slight edge over any other department as the agency responsible for air sanitation. Possibly this is due to development of air pollution control as an expansion of interest in industrial hygiene and inplant exposures to toxic substances. Also, this arrangement permits combining the chemical laboratories serving industrial hygiene and air pollution control. Certainly there is great need for coordination between industrial and air sanitation, and also between these and stream sanitation, to prevent the activities of one from causing changes that create problems for the others.

In the three instances where responsibility for air sanitation was shared by two departments, the health department was concerned primarily with odors and gases and another department was responsible for smoke abatement. This would appear to be an unsatisfactory arrangement. It does not readily permit a unified approach. In addition, there are the usual possibilities of costly duplication of effort and facilities or confusion resulting in no action on problems assumed by one agency to be within the province of the other.

Budget

Quality and quantity of work that an agency can perform are probably more dependent on its budget than on any other single factor. In this study, the annual per capita expenditure was the basis for comparison. Forty-six agencies reported data which could be used, including seven for which the budget was estimated from personnel salary data. The number is rather disappointing as it represents only 56 percent of the 82 jurisdictions reporting active programs. In many instances where air pollution control was an activity in a larger department, it was stated that the budget was not kept separately. Even in such situations, it seems that it would be essential to proper management to know approximately the portion of the budget used for the air sanitation program.

Expenditures varied from 1 cent to 53 cents per capita, with a median of 8 cents. For agencies in health and building departments, the median budget was about 5 cents per capita. For those in other departments and for independent agencies, the median cost varied from 9 to 11 cents per capita.

No correlation between population served and per capita expenditures was observed. Per capita costs were related to the number of personnel provided per 100,000 population (table 2). Furthermore, a comparison of budget data for 1952 with 1956 data showed that cost changes were not related to population changes but that they were related to differences in the number of personnel.

Information was obtained and analyzed concerning salaries paid various categories of full-time technical and professional personnel (table 3). Salaries paid technically trained personnel exceeded those of other employees. No comparison was made with compensation in

Table 3. Salaries paid personnel other than head of air pollution control agencies, air pollution control survey, 1956

Personnel classification	Number agencies reporting	Lowest grade—minimum salary [1]			Highest grade—maximum salary [1]		
		Lowest	Median	Highest	Lowest	Median	Highest
Engineers	13	$4, 200	$5, 280	$6, 950	$4, 200	$7, 430	$12. 000
Chemists	9	4. 104	5, 000	6, 192	4, 992	6, 149	11, 100
Inspectors	25	2, 980	4, 000	5, 743	3, 582	4, 500	6, 900
Laboratory assistants	4	2, 750	3, 075	3, 600	3, 600	3, 667	3, 925
Supervising inspector	7	3, 770	5, 647	6, 900	4, 576	6, 198	9, 564

[1] When a fixed salary for a grade was reported, the single salary was used in both maximum and minimum calculations.

other fields of employment, but salaries of scientific personnel were generally below national averages. Surprisingly, the director's compensation did not appear to be related to the budget of the agency or the number of personnel supervised, but it varied with population served and education required. College training was required in 25 of 31 communities with more than 100,000 population. It was not required, however, in 7 of 8 communities smaller than 100,000.

It should be emphasized here that numbers of personnel employed were not related to area of the community or population served. Commercial and industrial characteristics of the communities were not described sufficiently to test for a correlation with such factors.

With respect to engineering personnel in particular, it was noted that there was little opportunity for a college graduate to begin employment directly upon graduation and make a career in an air pollution control agency. Most of the agencies required experience for all engineering positions.

Type of Services

More comprehensive services were generally provided for the communities with larger populations (table 4). The data indicated that to

Table 4. Percentage of agencies with specified services, by population group, air pollution control survey, 1956

Type of service	Population group						
	Under 50,000 (N=10)	50,000–99,000 (N=10)	100,000–199,000 (N=14)	200,000–499,000 (N=14)	500,000–999,000 (N=13)	1,000,000 and over (N=8)	All reporting (N=69)
Complaint investigation	90	100	100	100	92	100	98
Violation detection	100	80	93	79	92	100	90
Operation and maintenance surveys	70	30	29	64	62	100	57
Plan review	30	30	21	71	77	75	52
Installation permits	50	40	71	57	77	75	62
License, equipment installers	10	20	29	36	23	0	22
License, equipment operators	0	10	0	14	23	0	8
License, plants	10	0	7	7	31	25	13
Plant air pollution source surveys	40	30	29	50	62	88	48
Area air pollution source surveys	30	30	29	57	46	88	45
Vegetative surveys	10	10	21	7	0	25	12
Laboratory services	20	10	14	36	15	88	28
Stack sampling	20	20	14	14	47	75	29
Air sampling:							
Particulates	20	40	29	57	62	88	48
Gases	0	20	7	36	62	75	32
Weather	0	20	7	14	47	50	22
Other service	0	0	21	14	31	63	20

provide the barest of service for a balanced program required at least 5 cents per capita. To provide minimally adequate services and personnel seemed to necessitate from 10 to 15 cents. For more complete services 15 cents or more per capita would be needed, depending upon the local problem and emphasis demanded.

Most of the agencies reported that detection and determination of air pollution violations result mainly from visual and olfactory observations. Frequently, these observations are supplemented by simple test equipment, such as a smokescope. This would indicate that small communities can readily engage in air pollution control programs without maintaining extensive laboratory facilities or equipment, particularly if technical assistance is available from the State health department.

One-third of the agencies reported no laboratory services available. Another one-third reported that State laboratories or commercial or institutional laboratories were used when needed. The remaining one-third reported that laboratory services of various types were part of the local program.

A thoughtful investigator might assume that techniques for achieving community participation in the air sanitation program would receive primary attention. The survey results were therefore quite surprising. Only about one-tenth of the agencies reported any continuing industry or citizens committee to advise the control officials on matters of general interest. In fact, about one-third of the departments reported little or no community participation. Four agencies stated that their only contact was through complaints, and it appeared in at least one instance that even this contact was resented by the control agency. It is suggested that in most communities there are many people and many groups of people who can, and will if asked, contribute to an air sanitation program. With so few employees in most agencies, it is amazing that this method of multiplying effort has not been utilized more fully.

Conclusion

This paper is by no means exhaustive; rather it is suggestive of areas of administration of air pollution control programs worthy of further investigation. While much has been written concerning technical progress, little attention has been given to the administrative mechanisms necessary to use the technical knowledge effectively. To achieve the objective of clean air, administrative practice must keep pace with technical advances.

National Advisory Committee

A National Advisory Committee on Chronic Illness and Health of the Aged has been formed by Surgeon General Leroy E. Burney to advise on Public Health Service policy and programs for the complex medical, social, and economic problems associated with chronic illness and aging.

The 13-member committee met for the first time in Washington, D. C., October 17–18, 1957. Members are:

Dr. Robert Dyer, chief, division of preventive medical services, California State Department of Health, Berkeley; Dr. Michael N. Dacso, director, department of physical medicine and rehabilitation, Goldwater Memorial Hospital, New York City; Dr. Kieffer D. Davis, medical director, Phillips Petroleum Company, Bartlesville, Okla.; Dr. Wilbert C. Davison, dean and professor of pediatrics, Duke University School of Medicine, Durham, N. C.

Dr. Ralph E. Dwork, director, Ohio State Department of Health; Dr. Henry B. Mulholland, assistant dean, University of Virginia Medical School, Charlottesville, Va.; Dr. Herbert K. Cooper, Lancaster (Pa.) Cleft Palate Center; Miss Emilie G. Sargent, executive director, Visiting Nurse Association, Detroit, Mich.

Commissioner John W. Tramburg, New Jersey State Department of Institutes and Agencies; William L. Rutherford, Forest Park Foundation, Peoria, Ill.; Dr. Cecil G. Sheps, executive director, Beth Israel Hospital, Boston, Mass.; Miss Helen M. Lipscomb, executive director, Chronic Illness Service Center, San Francisco; and Ben Grossman, director, Drexel Home, Chicago.