1976 Survey of Hospitals' Use of Fuels

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THE AMERICAN HOSPITAL ASSOCIATION (AHA) in the summer of 1976 undertook a survey of the 7,103 member hospitals to obtain basic information about the types of fuel being used for the heating of space and water in the nation's hospitals. The survey questions focused on the fuels and fuel sources currently used; they did not address emergency systems or backup fuels. An AHA self-addressed post card, to be completed by the hospital administrator, was used for data collection.

The AHA requested each hospital to report its fuel use for the 12 months ending December 31, 1975. The response to the survey was 74.3 percent, representing 5,280 hospitals; they accounted for 82.1 percent of all beds in the AHA-member hospitals. This response is statistically significant, and the sample was sufficiently random to permit the assumption that the generated data can be viewed as a reflection of the nation's hospital population.

Results

Forty-nine percent of the hospitals reported using combinations of fossil fuels (natural gas, oil, and coal) and other energy sources for space and water heating; 46 percent used only a single fossil fuel; and the remaining 5 percent used energy sources other than fossil fuels. Other energy sources, in this report, are defined as steam and electricity. Of all hospitals responding, 32 percent stated that they used only natural gas for heating space and water; 13 percent used only oil, and 1 percent, or 64 hospitals, said that coal was the only fuel that they used (see table).

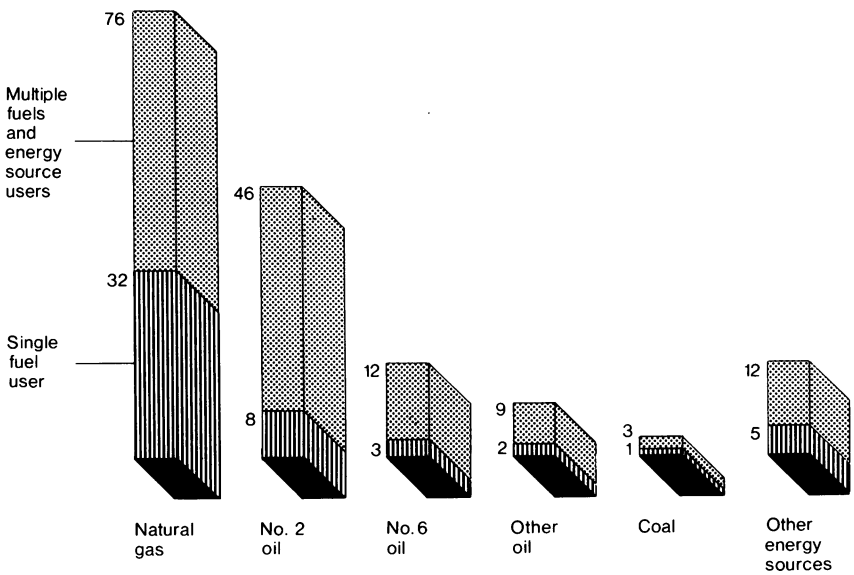
Seventy-six percent, or 4,027 hospitals, used natural gas as their only fuel or in combination with other fuels (fig. 1). Forty-six percent of the participating hospitals used No. 2 oil in combination with other fuels and energy sources, and 8 percent reported that No. 2 oil was their only fuel. Other energy sources, in combination with natural gas, oil, and coal, were used by 12 percent of the hospitals.

(There are six grades of fuel oil. The higher the number, the greater is the processing required to utilize this fuel in a health facility. No. 2 oil is a distillate for general purpose domestic heating in burners. No. 6 oil, which is very viscous, requires preheating for burning and handling.)

The data were also analyzed by size of hospital (fig. 2). Facilities with 6 to 49 beds were the heaviest users of the other category of energy. Of the hospitals with 500 or more beds, 95 percent used oil and 13 percent used coal.

When fuel consumption was examined by region, it was apparent

Figure 1. Percentage distribution of multiple fuels and single fuel users in 1976 survey of 5,280 responding hospitals, by type of energy



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1976 fuel use survey of 5,280 responding hospitals, by State and type of energy used

State	Total respondents	Only natural gas		Only oil		Only coal		Only non-fossil fuels		Multiple types of fossil fuels and energy sources [1]		Only fossil fuels	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
United States, total	5,280	1,681	32	668	13	64	1	242	5	2,625	49	2,413	46
New England	308	5	2	118	38	0	0	9	3	176	57	123	40
Connecticut	50	0	0	13	26	0	0	3	6	34	68	13	26
Maine	47	0	0	27	58	0	0	1	2	19	40	27	58
Massachusetts	145	2	1	40	28	0	0	4	3	99	68	42	29
New Hampshire	28	0	0	20	71	0	0	1	4	7	25	20	71
Rhode Island	19	1	5	8	42	0	0	0	0	10	53	9	47
Vermont	19	2	11	10	52	0	0	0	0	7	37	12	63
Middle Atlantic	681	89	13	157	23	23	3	33	5	379	56	269	39
New Jersey	119	4	3	35	29	0	0	2	2	78	66	39	32
New York	302	32	11	73	24	3	1	14	5	180	59	108	36
Pennsylvania	260	53	20	49	19	20	8	17	7	121	46	122	47
South Atlantic	766	117	15	153	20	9	1	51	7	436	57	279	36
Delaware	13	1	8	3	23	0	0	0	0	9	69	4	31
District of Columbia	19	0	0	8	42	0	0	1	5	10	53	8	42
Florida	178	35	20	32	18	0	0	20	11	91	51	67	38
Georgia	123	26	21	14	11	0	0	12	10	71	58	40	32
Maryland	66	4	6	10	15	0	0	4	6	48	73	14	21
North Carolina	145	6	4	47	32	1	1	5	3	86	60	54	37
South Carolina	63	3	5	10	16	0	0	1	1	49	77	13	21
Virginia	98	7	7	22	22	5	5	5	5	59	60	34	34
West Virginia	61	35	58	7	11	3	5	3	5	13	21	45	74
East south central	325	122	38	14	4	5	1	17	5	167	52	141	43
Alabama	88	28	32	3	3	1	1	6	7	50	57	32	36
Kentucky	92	27	29	8	9	4	4	6	7	47	51	39	42
Mississippi	54	42	77	1	2	0	0	1	2	10	19	43	79
Tennessee	91	25	27	2	2	0	0	4	4	60	66	27	29
West south central	622	463	74	7	1	0	0	29	5	123	20	470	75
Arkansas	66	49	74	2	3	0	0	2	3	13	20	51	77
Louisiana	105	73	69	1	1	0	0	6	6	25	24	74	70
Oklahoma	95	69	73	0	0	0	0	8	8	18	19	69	73
Texas	356	272	76	4	1	0	0	13	4	67	19	276	77
East north central	897	351	39	51	6	16	2	21	2	458	51	418	47
Illinois	223	117	52	8	4	7	3	2	1	89	40	132	59
Indiana	114	27	24	7	6	1	1	6	5	73	64	35	31
Michigan	208	86	42	13	6	1	[2]	7	3	101	49	100	48
Ohio	206	74	36	7	3	6	3	6	3	113	55	87	42
Wisconsin	146	47	32	16	11	1	1	0	0	82	56	64	44
West north central	703	178	25	78	11	4	1	23	3	420	60	260	37
Iowa	118	26	22	3	3	0	0	1	1	88	74	29	25
Kansas	125	65	52	2	2	0	0	4	3	54	43	67	54
Minnesota	152	11	7	26	17	0	0	8	5	107	71	37	24
Missouri	127	36	28	4	3	0	0	10	8	77	61	40	31
Nebraska	75	24	32	2	3	0	0	0	0	49	65	26	35
North Dakota	53	13	25	21	39	2	4	0	0	17	32	36	68
South Dakota	53	3	6	20	37	2	4	0	0	28	53	25	47
Mountain	333	150	45	24	7	5	2	21	6	133	40	179	54
Arizona	52	31	59	0	0	0	0	4	8	17	33	31	59
Colorado	77	32	42	5	6	0	0	1	1	39	51	37	48
Idaho	44	12	27	9	21	1	2	5	11	17	39	22	50
Montana	51	26	51	5	10	1	2	2	4	17	33	32	63
Nevada	17	5	29	3	18	0	0	1	6	8	47	8	47
New Mexico	40	23	57	0	0	0	0	1	3	16	40	23	57
Utah	30	8	26	2	7	2	7	7	23	11	37	12	40
Wyoming	22	13	59	0	0	1	5	0	0	8	36	14	64
Pacific	644	206	32	63	10	2	[2]	38	6	335	52	271	42
Alaska	15	2	13	8	54	0	0	3	20	2	13	10	67
California	436	166	38	19	4	0	0	12	3	239	55	185	42
Hawaii	18	0	0	6	33	0	0	3	17	9	50	6	33
Oregon	64	18	28	13	20	2	3	3	5	28	44	33	51
Washington	111	20	18	17	15	0	0	17	15	57	52	37	33

[1] Energy sources include steam and electricity. [2] Less than 1 percent.

Figure 2. Percentage distribution of multiple fuels and single fuel users in 1976 survey of 5,280 responding hospitals, by size of facility and type of energy

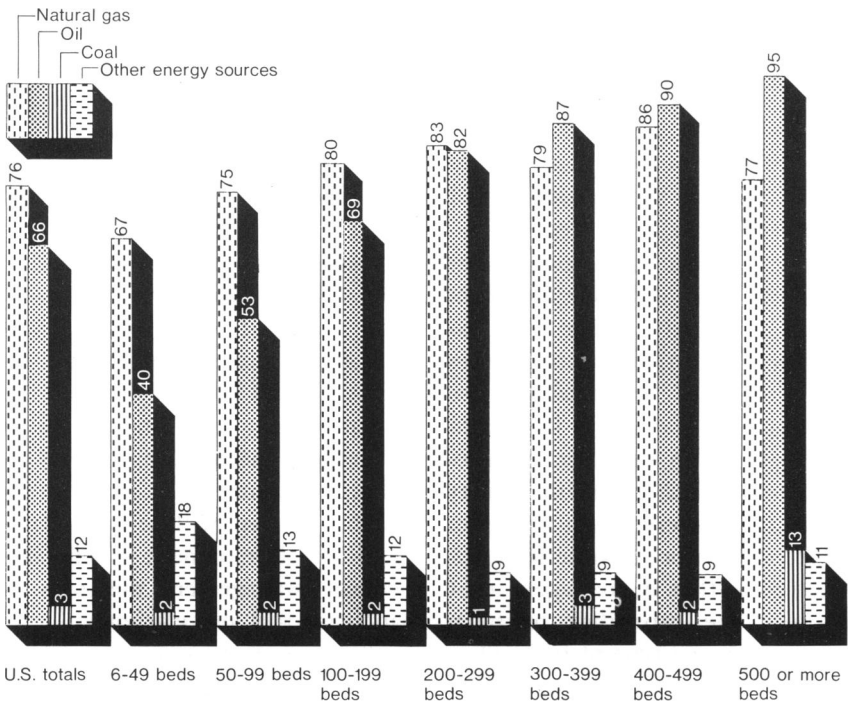
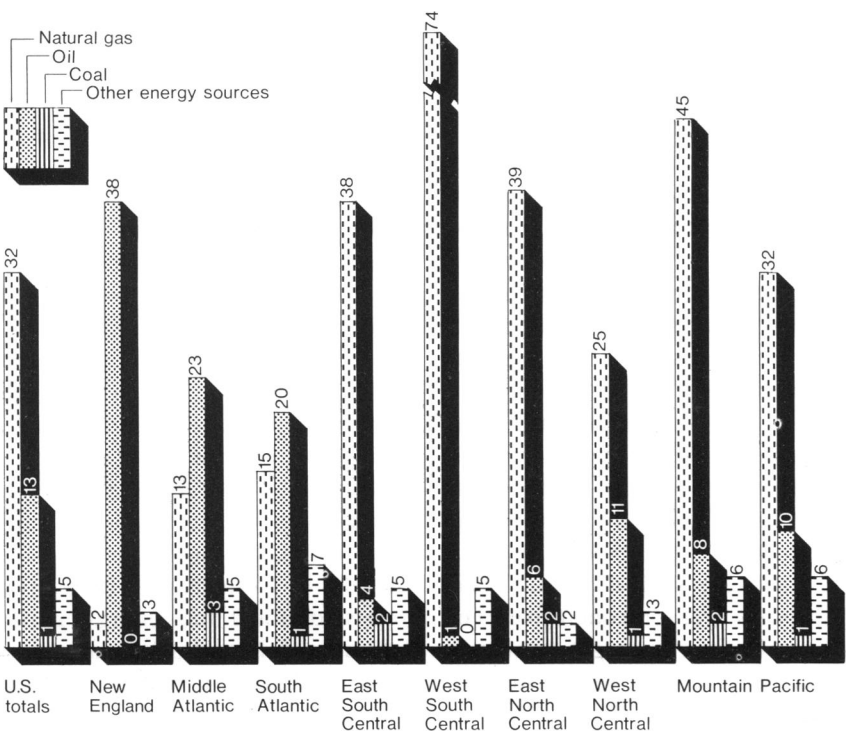


Figure 3. Percentage distribution of single fuel users in 1976 survey of 5,280 responding hospitals, by region and type of energy



that oil is used most along the eastern seaboard. In New England, 38 percent of the respondents indicated oil was their only fuel. Twenty-three percent of the hospitals in the middle Atlantic region used only oil and, in the south Atlantic region, 20 percent used only oil.

In the remainder of the country, the most widely used fuel was natural gas. Seventy-four percent of the west south-central region respondents used only natural gas, as did 45 percent of the mountain region respondents (fig. 3).

In 12 States, more than 50 percent of the respondents used only natural gas. Mississippi was the State in which hospitals were most dependent on this energy source—77 percent of the respondents reported using natural gas as their only fuel. Mississippi was followed, in dependency on natural gas by Texas, 76 percent; Arkansas, 74 percent; and Oklahoma, 73 percent.

The greatest hospital dependency on oil was in New Hampshire. In this State, 71 percent of the respondents reported using oil as their only fuel for heating. New Hampshire was followed by Maine, 58 percent; Alaska, 54 percent; and Vermont, 52 percent.

The fossil fuel that hospitals used the least was coal. Pennsylvania hospitals reported the greatest dependency on this fuel—8 percent of the State's respondents used only coal for heating.

The extensive dependency on fossil fuels (2,413 hospitals) clearly indicates that the lack of continuous supplies of oil, natural gas, or coal for these facilities would definitely affect the delivery of health care, and shortages of natural gas, oil embargos, or prolonged coal strikes would affect the quality and quantity of health care that these facilities de-

liver. In 18 States, more than 50 percent of the respondents used only fossil fuels for heating purposes. Mississippi hospitals had the highest dependency on fossil fuels; 79 percent of the State's respondents used only fossil fuels as an energy source. Total dependency on fossil fuels was also great in Arkansas, 77 percent of hospitals; Texas, 77 percent; and West Virginia, 74 percent (see table).

Implications

Assuming that the reported data are reliable and that a linear relationship exists between the respondent population of 5,280 hospitals and the universe of 7,103 hospitals, the following conclusions can be reached:

- 2,273 hospitals, or approximately 1 out of 3, completely depended on natural gas for heating space and water; they would have no alternate fuel burning capacity if natural gas were not available to them.
- 923 hospitals, or approximately 1 in 8, depended solely on oil for heating space and water; these facilities would experience curtailment in their operations in the event oil was not available to them.
- 355 hospitals, or approximately 1 out of 20, relied on energy sources other than fossil fuels for heating space and water.

With the exception of the east coast hospitals, which are primarily dependent on oil, the majority of the hospitals in the United States relied on natural gas for space and water heating. Thirty-two percent used only natural gas, 13 percent only oil, and 1 percent only coal. Thus, an oil embargo, price increase, or production reductions by the Organization of Petroleum Exporting Countries would have the greatest significance to hospitals in the East, but decreased domestic natural gas production, limitations on imported liquefied natural gas, or increases in the wellhead price of domestic natural gas would have the greatest impact on hospitals in the west south-central and mountain State regions.

The number of hospitals that reported using only one fuel form was significantly higher than expected. This situation underscores the hospitals' vulnerability to shortages in the single fuel form they use. With domestic gas production declining, health facility decision makers must develop plans to be more flexible in utilizing fuels—that is, managers must acquire the capability to burn more than one type of fuel. They should also consider supplementing their available energy supplies by adapting for nonconventional energy-generating sources such as solar energy and waste heat recovery systems. Failure to take these steps can disrupt the normal delivery of health care services.

Lessons for the Future

This survey was the first accumulation on a national scale of information about the energy consumption of hospitals. Several complications emerged in collecting the data which must be addressed in future surveys of energy use. Hospital staffs do not appear to be familiar with the process of collecting or reporting such data. Although one question requested information on the quantity of fuels used during the survey year, the respondents lacked experience in reporting such data and their responses were inconclusive. For example, in giving gas consumption in units of 1,000 cubic feet, responses varied by millions of cubic feet for similar facilities.

For planning purposes, it is not sufficient to tabulate the amount of energy consumed; it is desirable to know how the energy was used. For instance, knowing that 10 million cubic feet of gas was consumed is not as meaningful as knowing that 6 million cubic feet was needed for heating and cooling, 1.5 million cubic feet for lighting, 1.2 million for laundry, 800,000 for food service, 300,000 for medical equipment, and 200,000 for sterilization and incineration. The more detailed the records that a health facility keeps of types, amounts, and costs of energy consumed, the more meaningful the data will be for analysis and for development of effective energy management measures to increase fuel use efficiency.

The most disconcerting result of this study was that, according to the responses, the number of hospitals that were solely dependent on only one fuel form was much higher than was expected. The overwhelming dependency on fossil fuels as energy sources was expected and came as no surprise.

The era of cheap and plentiful fossil fuel is over. Presently the nation is experiencing inflation, rising prices, supply interruptions, and an increased dependency on imports. This scenario has contributed directly to more expensive health care, and we can no longer afford these rising costs. Health facility decision makers must implement policies that will reduce dependency on fossil fuels. They must adopt prudent energy management programs and begin using alternate fuel sources. Failure to make these changes will result in continually increasing costs for fossil fuel energy, rising costs to deliver health care, and disruptions in the normal delivery of health care services.