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# Design, Characteristics, and Usefulness of State-Based Behavioral Risk Factor Surveillance: 1981–87

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## Synopsis .....

*Since 1981, the Centers for Disease Control has collaborated with State health departments and the District of Columbia to conduct random digit-dialed telephone surveys of adults concerning their health practices and behaviors. This State-based surveillance system, which yields data needed in planning, initiating, and supporting health promotion and disease prevention programs, is described in this paper.*

*Standard methods and questionnaires were used to assess the prevalence of personal health prac-*

*tices and behaviors related to the leading causes of death, including seatbelt use, high blood pressure control, physical activity, weight control, cigarette smoking, alcohol use, drinking and driving, and preventive health practices. Between 1981 and 1983, 29 States (includes the District of Columbia) conducted one-time telephone surveys. Beginning in 1984, most States began collecting data continuously throughout the year, completing approximately 100 interviews per month (range 50–250), with an average of 1,200 completed interviews per year (range 600–3,000). The raw data were weighted to the age, race, and sex distribution for each State from the 1980 census data. This weighting accounts for the underrepresentation of men, whites, and younger persons (18–24 years) in the telephone surveys and, for many health practices, provides prevalence estimates comparable with estimates obtained from household surveys.*

*Nearly all (86 percent) of the States distributed selected survey results to other State agencies, local health departments, voluntary organizations, hospitals, universities, State legislators, and the press. The majority (60 percent) of States used information from the surveys to set State health objectives, prepare State health planning documents, and plan a variety of programs concerning antismoking, the prevention of chronic diseases, and health promotion. Further, nearly two-thirds (65 percent) used results to support legislation, primarily related to the use of tobacco and seatbelts. Most of the States (84 percent) reported that alternative sources for such data (prevalence of behavioral risk factors) were unavailable.*

*Currently in 1988, over 40 State health departments are conducting telephone surveys as part of the Behavioral Risk Factor Surveillance System. This system has proved to be (a) flexible—it provides data on emerging public health problems, such as smokeless tobacco use and AIDS, (b) timely—it provides results within a few months after the data are collected, and (c) affordable—it operates at a fraction of the cost of comparable statewide in-person surveys. The system enables State public health agencies to continue to plan, initiate, and guide statewide health promotion and disease prevention programs and monitor their progress over time.*

**M**AJOR PUBLIC HEALTH initiatives—legislation concerning mandatory use of seatbelts, drinking and driving, clean air—are carried forth at the State level (1). However, data to plan or guide these efforts are often unavailable or are obtained by conducting household surveys or by using estimates derived from national surveys. Because household surveys are expensive, and data from national surveys may not be appropriate for any given State, an alternative source of data is needed.

By 1980, telephone surveys were established as a reliable and affordable method for determining the prevalence of self-reported “behavioral risk factors” in the population (2). Accordingly, in 1981, the Centers for Disease Control (CDC) began working with State health departments to develop a system for estimating, with the use of random digit-dialed telephone surveys, the prevalence of behavioral risk factors in the population (3,4). The goal of the system was to provide data that could be used to plan, implement, and monitor public health programs. Since 1981, many State health departments (see box) have participated in a CDC-coordinated, State-based system for the surveillance of self-reported behaviors and personal health practices (5–8). Described in this paper are the design, characteristics, and usefulness of the Behavioral Risk Factor Surveillance System (BRFSS).

## Background and Design

States participating in BRFSS use similar survey methods, questionnaires, and analyses to ensure comparability of the results from State to State.

**Survey schedules.** Between April 1981 and October 1983, State health department personnel conducted random digit-dialed telephone surveys with the use of CDC’s training, coordination, and standard methods. These surveys were supported, in part, by health education and risk reduction grants from CDC. Beginning in 1984, the surveys evolved into an ongoing surveillance system, with interviews being conducted during 1 week every month, thus yielding annual estimates that were seasonally adjusted. CDC continued to provide training, coordination, and standard methods. In addition, CDC awarded partial funding through cooperative agreements. Since 1984, however, several additional State health departments have conducted surveys with the use of the standard telephone

survey methods and questionnaires, but without CDC funding.

**Sampling procedures.** Adult respondents were selected randomly from civilian residents with telephones. The sample was selected with the use of a multistage cluster design procedure based on the Waksberg method (9). According to this method, telephone numbers were randomly generated using the first 8 of the 10 telephone number digits. A “cluster” of 100 telephone numbers was randomly generated using the last 2 of the 10 digits. These clusters were then screened by calling one randomly selected number. If this number was a residence, the entire cluster of 100 numbers was “accepted.” If the number was not working or was a business number, the entire cluster was rejected. The effect of this screening procedure was to improve the efficiency of the surveys by accepting clusters that had a greater probability of having residential numbers.

After a cluster was screened and accepted, numbers were randomly called until three interviews were completed within each cluster. Interviewers made multiple attempts on different occasions to contact a number before substituting it for the next number. After contacting a household, the interviewer randomly selected an adult ages 18 years or older from among the adults residing in the household. In 1984, the respondent with the next birthday was selected to be interviewed. Between 1981 and 1983 and since 1984, the respondent was selected randomly from a list of all adults in the household, with the use of a selection algorithm from Kish (10). If the adult selected was not available at that time, the interview was done during a followup telephone call.

**Response outcomes.** One of four outcomes was possible when a phone number was called: (a) the interview was completed, (b) the respondent refused to be interviewed or hung up during the interview, (c) the number was working but the line was busy, or no one answered after multiple attempts, or (d) the number was not a working residential number, or an eligible respondent could not be identified. To improve efficiency in contacting eligible respondents, the interviews were conducted primarily during weekday evenings, but also during the day and on weekends.

**Data processing.** Upon completing the interviewing cycle each month, the data are keyed and sent to

### Contacts for the Behavioral Risk Factor Surveillance System

Alabama.....	Reginald E. Strickland
Alaska.....	Jennifer Talbot
Arizona.....	Terry Hughes
Arkansas.....	Jim Wohlab
California.....	Larry Parker
Colorado.....	Susan Hill
Connecticut.....	Suzette Benn
Delaware.....	Fred Breukelman
District of Columbia.....	Marc Rivo
Florida.....	Scott Hoecherl
Georgia.....	J. D. Smith
Hawaii.....	Eric Tash
Idaho.....	Joanne Mitten
Illinois.....	Bruce Steiner
Indiana.....	Sunita Joseph
Iowa.....	Suzanne Tietje
Kansas.....	Virginia Lockhart
Kentucky.....	Karen Bramblett
Maine.....	Randy Schwartz
Maryland.....	Alyse Weinstein
Massachusetts.....	Lauren Koumjian Yandel
Michigan.....	Jack Thrush
Minnesota.....	Nagi Salem
Mississippi.....	Ellen Jones
Missouri.....	Nancy Hudson
Montana.....	Robert Moon
Nebraska.....	RoxAnn Thurber
Nevada.....	Martin Brown
New Hampshire.....	Kay Zaso
New Jersey.....	Mary Burgess
New Mexico.....	Lydia Pendley
New York.....	Helen Bzduch
North Carolina.....	Chenetta Washington
North Dakota.....	Barbara Lee
Ohio.....	Ellen Capwell
Oklahoma.....	Neil Hann
Oregon.....	Joyce Grant Worley
Pennsylvania.....	Cathy Becker
Rhode Island.....	Janice Cataldo
South Carolina.....	Dan Lackland
South Dakota.....	Lynn Post
Tennessee.....	David Riding
Texas.....	Juli Fellows
Utah.....	Chris Chakley
Virginia.....	Linda Redman
Washington.....	Kristine Tollestrup
West Virginia.....	Robert Anderson
Wisconsin.....	Richard E. Miller
Wyoming.....	Menlo Futa

CDC for editing. Beginning in 1985, most States began using computer assisted telephone interviewing (CATI). CATI permits direct entry of the data into a computer file, thus facilitating interviewer monitoring, data coding and entry, and quality control procedures. After editing, the data are weighted to account for the 1980 age, race, and sex distribution of adults in each State, as well as for the respondent's probability of selection (3). The prevalence estimates were computed using SESUDAAN, a specialized statistical procedure for analysis of complex sample survey data, and was run using SAS (11,12). In addition, the CDC publishes the annual summary and selected risk-factor specific reports in the Morbidity and Mortality Weekly Report (MMWR) throughout the year. (Copies of these reports are available from CDC upon request.)

**Questionnaire.** The questionnaire had two components. The participating States and CDC jointly developed a "core" of questions. For comparability, questions from national surveys (such as the National Health and Nutrition Examination Surveys and the National Health Interview Surveys) were selected and were not changed from year to year. States interested in topics not covered by the core questionnaire developed "modules." These State-specific modules were added at the end of the questionnaire to maintain the comparability of the core between States and over time.

### Assessment of the System

**Characteristics.** We reviewed (a) State participation, (b) questionnaire content, (c) samples sizes and responses rates, (d) representativeness of the sample for 1981-87, and (e) survey costs.

We calculated the response rate for each State in two ways. The "cooperation" rate is the proportion of persons, once contacted, who complete an interview (that is, the ratio of completed interviews to the sum of completed interviews and refusals). The Council of American Survey Research Organization (CASRO) response rate is based on the ratio of completed interviews to the sum of completed interviews, refusals, and a standard fraction of numbers that were working but were either ring-no-answer or busy after multiple attempts (13). This response rate recognizes that a portion of the busy and unanswered telephone numbers have eligible respondents. To determine the representativeness of these surveys, we compared the age, race, and sex distribution of the

Table 1. States participating in the Behavioral Risk Factor Surveillance System, 1981-88

State	1981	1982	1983	1984	1985	1986	1987	1988 <sup>1</sup>
Alabama		P				S	S	S
Alaska		P						
Arizona		P		S	S	S	S	S
Arkansas			P					P
California		P		S	S	S	S	S
Colorado	P						P	
Connecticut					S			S
Delaware		P						
District of Columbia		P			S	S	S	S
Florida	P				S	S	S	S
Georgia	P				S	S	S	S
Hawaii				P		S	S	S
Idaho				S	S	S	S	S
Illinois				S	S	S	S	S
Indiana		P		S	S	S	S	S
Iowa		P						S
Kansas		P						
Kentucky		P			S	S	S	S
Maine							S	S
Maryland						P	S	S
Massachusetts						S	S	S
Michigan		P					S	S
Minnesota				S	S	S	S	S
Mississippi					P			P
Missouri					P	S	S	S
Montana				S	S	S	S	S
Nebraska		P					S	S
Nevada								P
New Hampshire		P					S	S
New Jersey		P						
New Mexico		P				S	S	S
New York			P		S	S	S	S
North Carolina		P		S	S	S	S	S
North Dakota				P	S	S	S	S
Ohio		P		S	S	S	S	S
Oklahoma								S
Oregon								P
Pennsylvania		P						
Rhode Island				S	S	S	S	
South Carolina				S	S	S	S	S
South Dakota				P			S	S
Tennessee		P		S	S	S	S	S
Texas		P		P			S	S
Utah				S	S	S	S	S
Virginia		P						S
Washington							S	S
West Virginia		P		S	S	S	S	S
Wisconsin				S	S	S	S	S
Wyoming		P						

<sup>1</sup> Projected. NOTE: P = conducted a single point-in-time survey; S = conducted monthly surveys throughout the year.

survey participants in each State with the census distribution of that State. Additionally, we assessed the trends over time in the characteristics of participants for those eight States that had collected data in 1981-83, 1984, 1985, 1986, and 1987.

**Usefulness.** In January 1987, the staff of the Division of Nutrition, Center for Health Promo-

tion and Education, CDC, communicated with the BRFSS contacts at the State health departments that had participated in the BRFSS between 1981 and 1986 (table 1). The State of Maine, which conducted a one-time survey at the end of 1986, was not included. The survey contacts represented various programs in their health departments—health education, chronic disease prevention, health promotion, and adult health services. The

contacts reported on the use of the BRFSS data for

- information (press releases, official reports, distribution of reports, conference presentations),
- policy and planning (health planning documents, health objectives, program planning), and
- legislation support (types of legislation supported).

In addition, they reported on the perceived usefulness of data for different risk factors, as well as specific limitations to using the data at the State level.

## Results

Since 1981, most State health departments have conducted telephone surveys of adults. For this report, we consider States to have participated in the BRFSS if they (a) used similar survey methods (either monthly or one-time surveys), (b) used the same questionnaire, and (c) provided CDC with the results for publication in the MMWR.

**State participation.** Between 1981 and 1983, 29 States ("State" includes the District of Columbia) participated in the BRFSS by conducting one-time telephone surveys (table 1). Since 1984, most participating States have collected data monthly. Participation has increased yearly, from 19 in 1984 to 24 in 1985, 27 in 1986, 35 in 1987, and 42 projected for 1988.

**Questionnaire and data collection.** The behaviors and health practices that were surveyed concerned seatbelt use, high blood pressure control, physical activity, dieting practices, salt use, cigarette smoking, alcohol use, drinking and driving, and preventive health practices, such as cholesterol and breast cancer screening and influenza vaccination (table 2). The format and questions in the core were modified slightly between 1983 and 1984 but have remained unchanged since 1984. (Copies of the questionnaire are available from the CDC upon request.) State-specific questions were added at the end of the core questionnaire in 11 States in 1986, 14 States in 1987, and 32 States in 1988. A wide variety of topics were covered by these questions, including cervical, breast, and colorectal cancer screening, self-reported morbidity and health status, health care visits, health insurance, occupational exposures, use of child safety restraints, AIDS knowledge and awareness, smoke detector

use, smoking cessation, perceived health problems, and sources of health information.

**Sample sizes and response rates.** Between 1981 and 1983, the number of completed interviews ranged from 455 to 1,837 telephone interviews during the 1- to 6-week interviewing period (table 3). Between 1984 and 1986, the number of completed interviews ranged from approximately 50 to 250 per month, leading to an annual total of approximately 600 to 3,000 completed interviews per State.

Response rates varied from State to State and from year to year (table 3). The cooperation rate, which is the proportion of eligible respondents contacted who completed an interview, varied from a low of 62 percent in one State in 1985 to a high of 95 percent in other States in 1981-83 and 1987. However, the median cooperation rate for all participating States has remained relatively constant over time. The CASRO response rate, which is the proportion of the telephone numbers called that resulted in completed interviews, ranged from a low of 43 percent in one State in 1987 to a high of 86 percent in another State in 1982. As with the cooperation rate, the median CASRO response rate for all participating States has remained relatively constant over time.

**Representativeness.** Compared with the census estimates for each participating State, the telephone surveys underrepresented males, young persons (18-24 years old), and whites, and slightly overrepresented blacks and the elderly (data not shown). For illustration, the data for the eight States that have participated every year since 1981 are shown in table 4. The extent of this representation was similar in all participating States since 1981 and has remained relatively constant.

**Usefulness.** Risk factor data related to cigarette smoking was cited by the State surveillance contacts as being the most useful, followed by seatbelt use, alcohol, overweight, hypertension, and physical activity. The most common use of the data was for information dissemination, with 37 of the 43 States (86 percent) publishing the data in a State document and nearly three-fourths of the States releasing data summaries to the press (table 5). Over half of the States used behavioral risk factor data in preparing a State health planning document, in establishing State health objectives, or in planning specific programs. Finally, nearly two-thirds of the States reported using behavioral risk

Table 2. Behavioral risk factor survey questionnaire content by year, 1981-87

Variables	1981-83	1984	1985	1986	1987
<i>Blood pressure</i>					
Blood pressure status	X	X	X	X	X
Doing to control	...	X	X	X	...
When blood pressure last taken	X	...	...	...	...
<i>Physical activity</i>					
Exercise and work activities	X	...	...	...	...
Leisure time physical activity	...	X	X	X	X
<i>Body weight and dieting</i>					
Height, weight	X	X	X	X	X
On a diet	X	X	X	X	X
Eating fewer calories, exercising	...	...	X	X	X
Perceived weight status, pounds lost	X	...	...	...	...
<i>Diet</i>					
Use of salt at the table	...	X	X	X	X
Cholesterol lowering diet	X	...	...	...	X
Eating red meat	...	X	...	...	...
<i>Smoking</i>					
Current status and amount	X	X	X	X	X
Quit attempts in the past year	...	X	X	X	X
Age of onset	X	...	...	...	...
<i>Smokeless tobacco</i>					
Current status	...	...	...	X	X
Duration, quit attempts, knowledge of	...	...	...	X	...
<i>Alcohol</i>					
Amount, bingeing, drinking and driving	X	X	X	X	X
Beer, wine, liquor in past month	...	X	X	X	X
Any drinks in past 12 months	X	...	...	...	...
<i>Preventive practices</i>					
Cholesterol testing and awareness	...	...	...	...	X
Breast cancer screening	...	...	...	...	X
Influenza vaccination	...	...	...	...	X
<i>Demographics</i>					
Age, sex, race, ethnicity, education	X	X	X	X	X
Income, employment, and marital status	...	X	X	X	X
<i>Miscellaneous</i>					
Seatbelt use	X	X	X	X	X
Stress	X	...	...	...	...
Pregnancy status	X	...	X	X	X
Use of oral contraceptives	X	...	...	...	...

Table 3. Median sample sizes and response rates, by year

Year	Sample size <sup>1</sup>			Response rates <sup>2</sup>				
	Median	Range	Number of States	Median cooperation rate (percent)	Range (percent)	Median CASRO (percent)	Range (percent)	Number of States
1981-83	797	455-1,837	29	86	69-95	72	55-86	21
1984	675	476-1,501	17	83	68-92	67	52-82	17
1985	1,174	628-2,386	22	82	62-94	65	46-86	20
1986	1,182	559-3,023	26	86	70-94	67	50-80	25
1987	1,388	1,048-3,234	32	84	68-95	65	43-85	29

<sup>1</sup> Includes all States collecting data in 1981-83 and States that provided CDC with a complete data record for 1984-87.

<sup>2</sup> States that had missing data needed for computing the response rates were eliminated from this analysis. The cooperation rate is based on the ratio of completed interviews to the sum of completed interviews and refusals. The

CASRO (Council of American Survey Research Organization) response rate was based on the ratio of completed interviews to the sum of completed interviews, refusals, and a standard fraction of numbers which were working but for which an interview was not completed (13).

Table 4. Age, race, and sex distribution, by year, for the sample compared with the census estimates of States that collected data in 1981–83, 1984, 1985, 1986, and 1987<sup>1</sup>, in percentages

Sex, age, and race	1980 census <sup>2</sup>	1981–83 sample	1984 sample	1985 sample	1986 sample	1987 sample
<b>Sex</b>						
Men.....	48	42	40	40	41	42
Women.....	52	58	60	60	59	58
<b>Age (years)</b>						
18–24.....	19	14	12	12	11	11
25–34.....	24	26	25	24	24	24
35–44.....	16	20	20	19	21	20
45–54.....	14	14	13	12	13	13
55–64.....	13	14	13	13	13	13
65 and older.....	15	13	17	19	19	19
<b>Race</b>						
White.....	83	80	79	80	79	81
Black.....	10	12	14	13	14	13
Hispanic.....	5	6	5	6	5	4
Other.....	3	3	2	2	2	2

<sup>1</sup> Includes the 8 States that have collected information on age, race, and sex from 1981 to 1987 (Arizona, California, District of Columbia, Indiana,

Montana, North Carolina, Ohio, and Tennessee).

<sup>2</sup> The census estimate is based on the 1980 census for the 8 States.

factor data to support legislative initiatives. Of those States, 75 percent used the data to support antismoking legislation and 43 percent for seatbelt legislation.

Several limitations were encountered by State surveillance contacts when using these data for the purposes mentioned. The limitation cited most frequently related to difficulties in communicating the results to agencies responsible for the programs (table 6). For example, although data were collected on self-reported high blood pressure, few State high blood pressure coordinators were involved in the questionnaire design or data analysis and dissemination. Among other limitations, the most frequently cited was that data were available for too few years to monitor changes in risk factors over time. The respondents were also asked whether other sources of data were available on the personal health practices of State residents; 84 percent reported that alternative sources for such data were unavailable.

**Survey costs.** Since 1984, CDC has provided most of the participating States with funds through cooperative agreements. These funds cover approximately half of the costs for the surveys. The amount provided to each State has increased from \$11,200 in 1984 to \$14,420 in 1985, \$17,300 in 1986, and \$25,000 in 1987. Considering that costs per State are approximately twice the amount provided by cooperative agreement, the cost per completed interview for the period 1984–87 was

about \$25–\$30 (the increased costs approximated the increased sample sizes).

## Discussion

Epidemiologic surveillance is the ongoing systematic collection, analysis, and interpretation of health data for planning, implementing, and evaluating public health programs (14). Although State-based public health programs for reducing the prevalence of behavioral risk factors are well-established, the regular surveillance of these behaviors at the State level has only recently begun.

Since 1981, nearly every State health department has conducted telephone surveillance—either one-time surveys or ongoing monthly surveillance—to determine the prevalence of behavioral risk factors among adults. The use of comparable methods and questionnaires enables these data to be routinely published in MMWR. These publications compare and contrast the results from State to State, highlighting the importance of behaviors in health promotion and disease prevention efforts.

Although State health department participation can be considered as one measure of the BRFSS' success, it is important to understand the strengths and limitations of the system. First, a surveillance system should provide accurate estimates of the prevalence of behavioral risk factors in the population. Although the true prevalence of health practices in a population is difficult to determine, weighted estimates from telephone surveys have

been shown to be comparable when compared with in-person surveys (15,16). Specifically, results from a statewide survey in Michigan were found to provide overall prevalence estimates comparable to a statewide household survey (R. F. Anda, D. L. Dodson, D. F. Williamson, and P. L. Remington: Telephone versus in-person estimates of smoking and alcohol use: a comparison of two statewide surveys. Submitted for publication). Further, in 1983, a telephone survey of the 21 continental States that did not participate in the Behavioral Risk Factor Surveys was conducted. These results were combined with the results from the 28 participating States and the District of Columbia to provide a nationally representative sample (3,4). The estimates of behavioral risk factors provided by these surveys were similar to estimates from other in-person national surveys conducted about that same time (17-19).

Several advantages exist when using telephone surveys for the routine surveillance of health practices. First, because the data are collected on an ongoing basis, questions can be added to the questionnaire at any time to yield data on emerging public health problems. Previously, many State health departments had no system to collect population-based information in a timely fashion. This system has been used to address various health issues. For example, in 1986, in response to the emerging problem of smokeless tobacco use, questions that assessed use of smokeless tobacco and knowledge of the health consequences were added to the core questionnaire. Also in 1986, several States added questions on the knowledge and attitudes of AIDS in order to plan statewide public education programs. Finally, in 1987, all participating States collected data on cholesterol and breast cancer screening to plan or modify screening programs.

Second, results from the surveys are available quickly. For example, States have added questions on public attitudes regarding seatbelt legislation (personal communication with staff of the State health departments for Tennessee and Georgia, May 1987). Within 2 months of adding these questions to the surveys, statewide prevalence estimates were reported to their legislators in support of mandatory seatbelt legislation. This rapid turnaround is facilitated because the telephone surveys are "institutionalized" and are always available to respond to the need for public health data.

Finally, these telephone surveys provide an affordable method for State health departments to

Table 5. Number and percent of participating States that use the behavioral risk factor surveillance data for informational, planning and policy, and legislative purposes

Purpose	Total States	Number	Percent
<i>Information</i>			
Press releases .....	43	30	71
State publications .....	43	37	86
Official documents.....	37	31	84
Working papers .....	37	13	35
Distribution of reports to:			
State agencies (nonhealth) .....	43	29	67
Local health agencies.....	43	24	56
Voluntary health agencies.....	43	14	33
Hospital, HMOs .....	43	13	30
Health professionals.....	43	12	28
Universities .....	43	12	28
Legislature .....	43	11	26
Libraries.....	43	4	9
Business .....	43	4	9
Federal agencies.....	43	4	9
Outreach (for example, health and State fairs, cooperative extension) .....	43	9	21
Presentations at conferences-			
meetings .....	43	34	79
Statewide.....	34	21	62
Local health agency .....	34	10	29
Public health association.....	34	8	24
Health promotion meetings.....	34	7	21
Internal health department meetings .....	34	5	15
National conferences .....	34	5	15
Voluntary health agency .....	34	4	12
University.....	34	3	9
<i>Planning and policy</i>			
Preparation of State health plan ..	43	26	60
Setting State health objectives....	43	23	53
Program planning .....	43	27	63
Health promotion.....	27	13	48
Chronic disease .....	27	11	41
Antismoking .....	27	9	33
Seatbelt, highway safety .....	27	7	26
Nutrition.....	27	5	19
Alcohol.....	27	3	11
Modify existing programs.....	43	14	33
<i>Legislative</i>			
Data ever used to support legislation .....	43	28	65
Types of legislation supported:			
Antismoking .....	28	21	75
Seatbelt .....	28	12	43
Alcohol use.....	28	4	14
Chronic disease .....	28	4	14
Other (for example, health promotion, cost containment) ..	28	5	18

routinely collect population-based risk factor prevalence data. Numerous studies have demonstrated that in-person surveys are at least twice as expensive as telephone surveys, and probably four to five times as expensive when conducted over a large geographic area, such as an entire State (2,16).



Table 6. Number and percent of States reporting factors that limit the usefulness of behavioral risk data

Factor	Total States	Number	Percent
<i>Organizational</i>			
Inadequate communication in the health department . . . . .	43	13	30
Insufficient time, staff, expertise . .	43	8	19
Surveillance not a State priority . . .	43	6	14
Other . . . . .	43	4	9
<i>Data-related</i>			
Too few years of data available . . .	43	9	21
Data presented are of low quality . .	43	5	12
Data are not program-specific . . . .	43	4	9

As with all surveys, several limitations of the BRFSS must be considered. First, there is often a tendency to disaggregate the data into age-, race- and sex-specific rates. These disaggregated estimates have large sampling errors, which preclude their use in making comparisons or following trends over time. Second, telephone surveys such as the BRFSS may lead to biased population estimates because of the underrepresentation of certain groups. This bias may result from difficulty in contacting these persons, from higher refusal rates, or from lower rates of telephone coverage (16). The CASRO response rates of 65–72 percent in the BRFSS compare favorably with other surveys using random digit-dialed telephone techniques, but are considerably lower than the response rates (88–90 percent) obtained for in-person interviews in the National Health Interview Surveys (20). This bias can affect prevalence estimates because of differences in risk factors, age, sex, or education between respondents and nonrespondents.

Although it has been shown that the characteristics of persons with and without telephones differ (21), this bias is probably less important. For example, in the 1985 Health Promotion and Disease Prevention Supplement to the Health Interview Survey, the prevalence of smoking was 50 percent in households without telephones and 29 percent in households with telephones (22). Despite these marked differences, the overall rate of smoking (30 percent) was similar to the rate in the households with telephones because of the high rate of telephone coverage in the United States. Because the amount and direction of bias varies depending on the specific risk factor and on the extent of telephone coverage, these potential biases must always be considered when interpreting results from telephone surveys.

Most descriptions of surveillance systems tend to focus on the systematic collection, analysis, and

interpretation of health data (23,24), whereas relatively little has been written about how the data collected from surveillance systems are used to support efforts to control and prevent disease (25,26). Although the latter is difficult to assess, in this paper we address the usefulness of the surveillance system as perceived by the participants. Our results suggest that State-specific data on personal health practices and behaviors are being disseminated to the public through the press, as well as through State publications that also reach the professional health care community. The regular and timely communication of this information is important for any organized effort concerning disease prevention; surveillance data can be used to reinforce ongoing programs as well as to demonstrate the need for new initiatives in health promotion and disease prevention.

The majority of State health department surveillance contacts report having used data on personal health practices and behaviors to assist in setting State health objectives and in formulating State health plans. Health planning documents that incorporate measurable objectives are now considered essential tools of State health agencies (27). These documents can be useful in monitoring the progress of State health efforts, in rationalizing need for interventions, in identifying target groups, and in presenting budgetary requirements to funding bodies (28,29).

Our results also indicate that most States have found behavioral risk factor data to be useful in supporting a variety of legislative efforts at the State level. Although legislation is not traditionally thought of as a health promotion intervention, various studies have indicated that legal regulations can have a significant effect on the prevalence of certain behaviors (30). The importance of using objective and representative data to support legislative efforts has recently been underscored (31).

Although our results are encouraging, we believe there is room for improvement. Our findings indicate that over a quarter of States participating in the surveillance system did not release their results through the press, did not use the data for policy or planning, or never used the data to support legislation. Most of the limitations to using behavioral risk factor data that were reported in this study can be reduced or eliminated in the future. Finally, because these surveys address a wide variety of behaviors and health practices, it is important to facilitate communication with the agencies responsible for the related programs. Based on the findings from our survey,

discussions are underway with representatives from various State health education, epidemiology, and health statistics groups about ways to both facilitate communication and improve the usefulness of these data for State health departments.

In summary, more than 40 State health departments are conducting telephone surveys to determine the prevalence of behavioral risk factors and health practices in their States. Standardized survey methods and questionnaires used in this system enable State health departments to compare their results with those of other States and with the nation as a whole and to follow changes over time. Estimates of the prevalence of health practices and behaviors provided by the Behavioral Risk Factor Surveillance System complement other sources of data—mortality statistics, hospital discharge data, and national prevalence data—and assist in efforts to plan, implement, and guide health promotion and disease prevention programs at the State level.

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