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Availability and Characteristics of Hospital-Affiliated Tobacco-Cessation Programs in the U.S., 2000–2018

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Abstract

Introduction: Smoking-cessation interventions can increase successful quitting, reduce healthcare costs, and enhance patients' health and well-being. This study assesses changes in the availability of hospital-affiliated smoking-cessation programs over time in the U.S. and examines the hospital characteristics associated with such programs.

Methods: Data were obtained from the American Hospital Association annual surveys. Joinpoint regressions were used to estimate the trends in having hospital-affiliated cessation programs between 2000 and 2018. A logit regression was used to estimate the association between hospital characteristics (bed size, location, teaching status, ownership) and having any hospital-affiliated cessation program. Analyses were conducted in 2019.

Results: The percentage of U.S. hospitals with any tobacco-cessation program increased from 23.8% (95% CI=22.7, 24.9) in 2000 to 45.5% (95% CI=44.2, 46.7) in 2018. There were sharp increases in the cessation programs between 2000 and 2002 but no change between 2015 and 2018. Hospitals with 200 beds (vs <200 beds; OR=2.6, 95% CI=2.5, 2.7), urban hospitals (vs rural; OR=1.3, 95% CI=1.2, 1.3), teaching hospitals (vs nonteaching; OR=1.7, 95% CI=1.7, 1.8), and private not-for-profit hospitals and public hospitals (vs private for-profit; OR=5.1, 95% CI=4.9, 5.3, and OR=3.2, 95% CI=3.0, 3.4, respectively) had higher odds of having a hospital-affiliated tobacco-cessation program.

Conclusions: Less than half of U.S. hospitals reported having any hospital-affiliated cessation program in 2018. Although program prevalence nearly doubled between 2000 and 2015, this increase has not continued in recent years. Further efforts to promote and support hospital-affiliated cessation programs could be beneficial, especially among smaller, rural, nonteaching, and private for-profit hospitals.

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SUPPLEMENTAL MATERIAL

Supplemental materials associated with this article can be found in the online version at <https://doi.org/10.1016/j.amepre.2020.06.024>.

INTRODUCTION

Cigarette smoking is the leading cause of preventable diseases and deaths in the U.S.¹ Evidence-based treatment of tobacco use and dependence increases successful cessation, benefiting patient health.^{2,3} Tobacco-cessation interventions are effective in a variety of healthcare settings, including outpatient, inpatient, and behavioral health settings.^{2–6} As the providers of both ambulatory and inpatient care, hospitals are in a unique position to reach the individuals who use tobacco; at least 70% of individuals who smoke cigarettes visit a healthcare professional each year.² Individuals receiving medical care in a hospital environment may be especially receptive to quitting smoking,^{3,6} creating meaningful opportunities to provide cessation treatment.

Little is known about the availability of hospital-affiliated tobacco-cessation programs in the U.S. One recent study reported that approximately 80% of U.S. hospitals providing oncology services had tobacco-cessation programs,⁷ but hospitals with cessation programs have not been otherwise well characterized. To help fill these gaps, this study examines (1) changes in the availability of hospital-affiliated smoking-cessation programs during 2000–2018 and (2) hospital characteristics associated with having a cessation program.

METHODS

Data were obtained from the American Hospital Association (AHA) annual surveys conducted between 2000 and 2018.⁸ The annual survey of nearly 6,300 U.S. hospitals collects data on a variety of topics, including hospital characteristics, organizational structure, facilities, and services. The survey is sent to all U.S. hospitals, regardless of AHA membership, with a response rate of >75% each year.⁸ For this analysis, the hospitals whose primary patient population was children (about 2%) were excluded.

Measures

The provision of tobacco treatment or cessation program was assessed with the question For each service or facility listed below (e.g., tobacco treatment/cessation program), please check all the categories that describe how each item is provided as of the last day of the reporting period. Nonmutually exclusive response options were (1) owned or provided by my hospital or its subsidiary (hospital-provided),⁹ (2) provided by my health system (in my local community) (system-provided),⁹ (3) provided through a formal contractual arrangement or joint venture with another provider that is not in my system (in my local community) (nonsystem-provided),⁹ and (4) do not provide. A response of (1), (2), or (3) was classified as any hospital-affiliated program.

Hospital characteristics¹⁰ assessed for this study were bed size (<200 beds or ≥200 beds), location (rural or urban, based on core-based statistical area⁸), teaching hospital (yes or no), and ownership type (private for-profit, private not-for-profit, or public).

Statistical Analysis

The annual percentage of hospitals with a tobacco-cessation program was calculated by the program provider type (hospital-provided, system-provided, nonsystem-provided, and

any hospital-affiliated). Joinpoint regression analyses were used to estimate the annual percentage change (APC) of having a cessation program, by provider type, during 2000—2018. Joinpoint regression can detect the segmented trends in data and report variations in slopes.

Logit regression was used to examine the association of hospital characteristics with having any hospital-affiliated cessation program using pooled data from 2000 to 2018. ORs and 95% CIs were calculated. For all analyses, $p < 0.05$ was used to determine the statistical significance. Analyses were performed in 2019 using Stata, version 14.

RESULTS

During 2000—2018, the total number of hospitals in the analytical sample increased slightly from 5,903 in 2000 to 6,076 in 2018 (Appendix Table 1, available online). Most of the hospitals were small (<200 beds), urban, nonteaching, and private not-for-profit. The percentage of hospitals with any hospital-affiliated cessation program increased from 23.8% (95% CI=22.7, 24.9) in 2000 to 45.5% (95% CI=44.2, 46.7) in 2018 (Figure 1). The rate of increase was highest during 2000—2002 (APC=20.6%, $p < 0.001$); however, the rate of increase slowed during 2002—2007 (APC=4.2%, $p < 0.001$) and during 2007—2015 (APC=1.2%, $p < 0.05$). The percentage of hospitals with any cessation program did not change during 2015—2018 (APC= -1.3%, $p = 0.30$).

By program provider type, the percentage of hospital-provided programs increased from 19.4% in 2000 to 37.5% in 2008. The associated APC was 16.8% during 2000—2003 ($p < 0.001$) and 3.6% during 2003—2008 ($p < 0.05$); however, the percentage of hospital-provided programs did not change significantly during 2008—2018 (APC=0.11%, $p = 0.67$). The percentage of system-provided programs increased from 5% in 2000 to 12.6% in 2018 (APC=5.5%, $p < 0.001$).

Hospitals with ≥ 200 beds, urban location, teaching affiliation, and private not-for-profit or public organization had higher odds of having any hospital-affiliated tobacco-cessation program (Table 1).

DISCUSSION

Less than half of U.S. hospitals reported having any hospital-affiliated tobacco-cessation program in 2018. Although the percentage of having any cessation program nearly doubled from 2000 to 2018, the largest increase occurred during 2000—2002. This increase slowed substantially between 2002 and 2015, and no significant change occurred between 2015 and 2018. It is unclear what is causing the observed changes in the adoption of hospital-affiliated tobacco-cessation programs. The rapid increase in the programs around 2000 may be related to the updates in the clinical practice guidelines¹¹ and an increasing availability of over-the-counter cessation medications during this time³; however, these associations cannot be directly assessed in this paper. Reasons for recent slowdowns in program adoption are also unclear, but a number of environmental factors may be related; for example, the Joint Commission adopted tobacco-related quality measures in 2012 as voluntary measures.¹² Previous literature has noted a limited uptake of health systems—

based cessation interventions^{13,14} despite the evidence that such programs increase the likelihood of treatment delivery and successful cessation.^{3,15-17} Regardless of the cause of the observed trend, this study's findings underscore an opportunity to promote and support the implementation of hospital-affiliated programs to increase tobacco cessation.

This study found hospitals that were large (bed size ≥ 200), urban, teaching, and private not-for-profit or public hospitals had higher odds of having any hospital-affiliated tobacco-cessation program. These findings are congruent with the literature suggesting adherence to clinical guidelines differs by hospital characteristics, including geography, ownership, and teaching affiliation.^{18,19} A broader adoption of systematic hospital-affiliated cessation interventions has the potential to increase successful quitting, reduce hospital readmissions, reduce healthcare costs, and enhance patients' well-being.^{2,16,17,20} Future efforts could focus on identifying and overcoming barriers to the adoption of healthcare system—level changes known to support and promote the delivery of cessation treatment.^{2,3,15}

Limitations

This study is subject to some limitations. First, AHA data do not provide detailed information on what type of tobacco-cessation services (counseling or pharmacotherapy) are used and to whom (hospital employees, inpatients, or outpatients) the services were provided. Second, AHA data only capture the tobacco-cessation programs that are funded by hospitals or health systems. Nonhospital—funded programs that clinicians may be referring patients to, such as quitlines, are not included in this analysis. However, there are several strengths to this study. To our knowledge, this is the first comprehensive and national description of hospital-affiliated tobacco-cessation programs over time. The large number of hospitals included in the survey were beneficial for assessing the associations between a hospital-affiliated tobacco-cessation program and a variety of hospital characteristics.

CONCLUSIONS

Despite the increase in the percentage of hospitals having any hospital-affiliated cessation program during 2000—2015, no change occurred during 2015—2018. In 2018, less than half of U.S. hospitals reported having a tobacco-cessation program. These findings underscore the opportunities to promote and support the implementation of hospital-affiliated cessation programs, especially in smaller, rural, nonteaching, and private for-profit hospitals. Strategies to improve the uptake of tobacco-cessation programs could include developing and disseminating evidence-based clinical practice guidelines and linking smoking cessation—related quality measures with payments to clinicians, clinics, or health systems.³

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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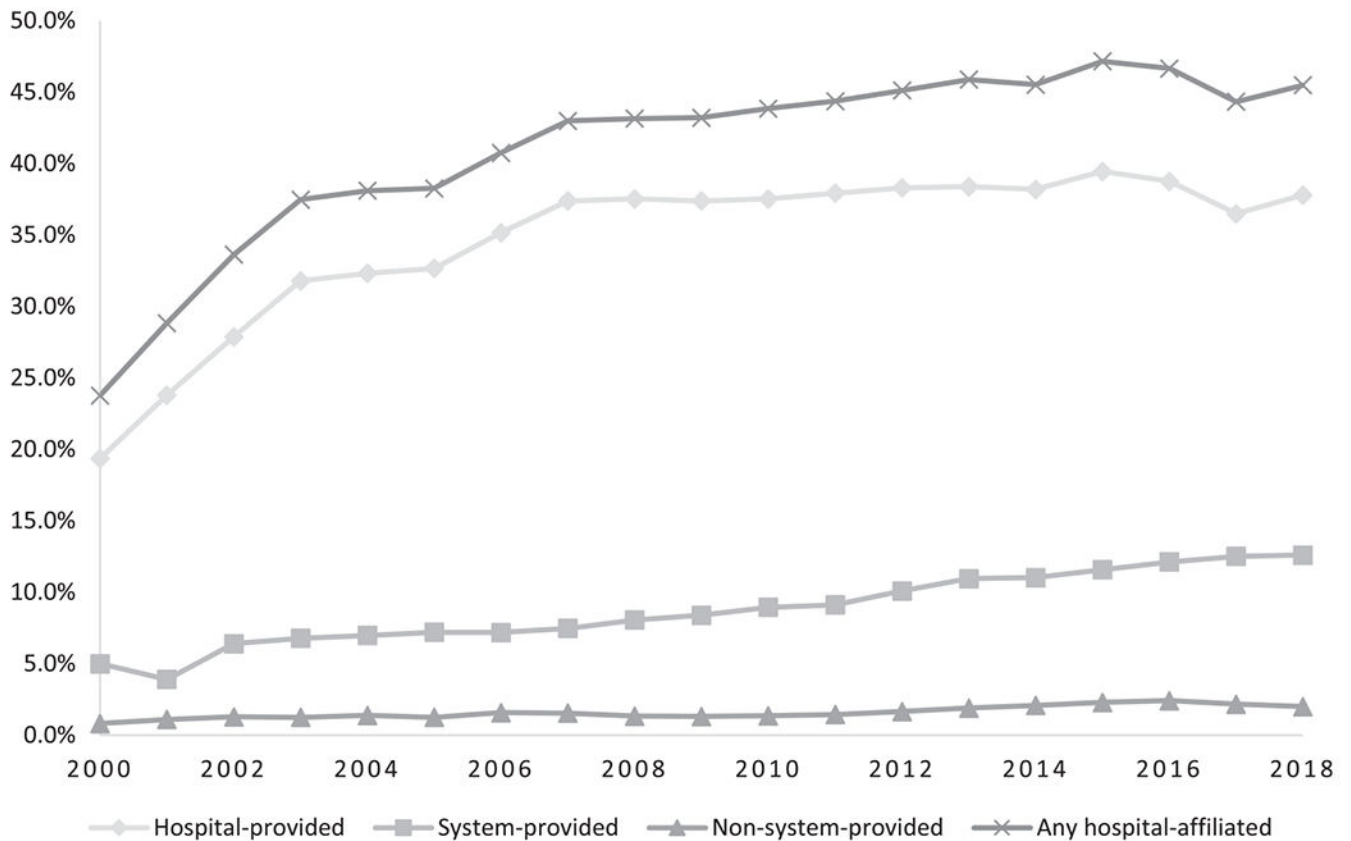


Figure 1.

Availability of hospital-affiliated tobacco-cessation programs by program provider type, American Hospital Association annual survey, 2000–2018.

Note: Hospitals whose primary services were provided to children were excluded. The program provider types are defined as follows in the paper: hospital-provided, provided by hospital or its subsidiary; system-provided, provided by the hospital's healthcare system in local community; nonsystem-provided, provided through a formal contractual arrangement or joint venture with another provider that is not in the hospital system in local community; and any hospital-affiliated, having either a hospital-provided, system-provided, or nonsystem provided cessation program. The more detailed definitions for program provider type were described as follows in the AHA survey: *Owned or provided by the hospital or its subsidiary.* All patient revenues, expenses, and utilization related to the provision of the service are reflected in the hospital's statistics reported elsewhere in this survey. *Provided by my health system (in my local community).* Another healthcare provider in the same system as your hospital provides the service and patient revenues, expenses, and utilization related to the provision of the service are recorded at the point where the service was provided and would not be reflected in your hospital's statistics reported elsewhere in this survey (A system is a corporate body that owns, leases, religiously sponsors, or manages health providers). *Provided through a partnership or joint venture with another provider that is not in my system.* All the patient revenues and utilization related to the provision of the service are recorded at the site where the service was provided and would not be reflected

in your hospital statistics reported elsewhere in this survey (A joint venture is a contractual arrangement between 2 or more parties forming an unincorporated business. The participants in the arrangement remain independent and separate outside of the venture's purpose). Because hospitals could check all that apply on the category of tobacco-cessation programs, the individual provider types of program may not add up exactly to any hospital-affiliated program.

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Table 1.

Hospital Characteristics Associated With Having Any Hospital-Affiliated Tobacco-Cessation Program, American Hospital Association Annual Survey, 2000–2018

Characteristics	N	OR (95% CI)
Bed size	115,653	
<200 beds	85,640	1.0
200 beds	30,013	2.6 (2.5, 2.7)
Location	115,653	
Rural	32,317	1.0
Urban	59,835	1.3 (1.2, 1.3)
Teaching	115,653	
No	83,461	1.0
Yes	31,933	1.7 (1.7, 1.8)
Ownership	115,653	
Private for-profit	27,723	1.0
Private not-for-profit	57,995	5.1 (4.9, 5.3)
Public	29,881	3.2 (3.0, 3.4)

Note: Boldface indicates statistical significance ($p < 0.001$).

Census divisions and year dummies were also controlled in the model.

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