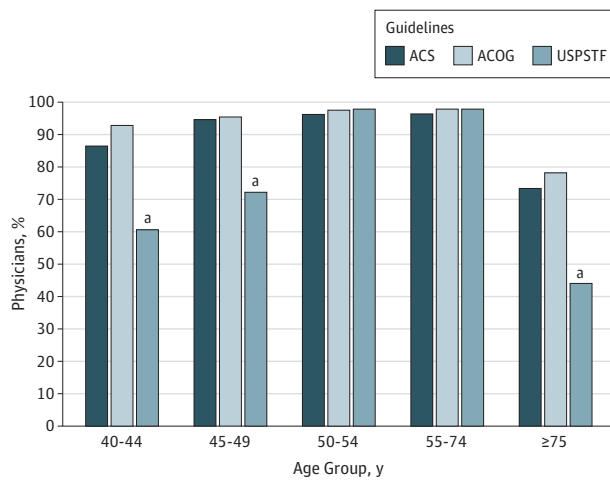


**Figure 2. Proportion of Physicians Who Recommend Breast Cancer Screening Categorized by Which Guidelines Physicians Report Trusting the Most**



ACOG, American Congress of Obstetricians and Gynecologists; ACS, American Cancer Society; USPSTF, US Preventive Services Task Force. <sup>a</sup>Denotes statistically significant ( $P < .05$ ) differences based on most trusted organizational guideline.

mended screening to women 40 years or older. Our findings are largely consistent with a 2014 survey of PCPs from 4 clinical networks where similar proportions of physicians recommended screening with higher rates noted among gynecologists.<sup>5</sup> We also found sharp differences in recommendations based on which guidelines physicians trusted most, which may suggest that current practices reflect both varying adherence to guidelines as well as differences in which guidelines are trusted. The results provide an important benchmark as guidelines continue evolving and underscore the need to delineate barriers and facilitators to implementing guidelines in clinical practice.

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## Hospital Risk of Data Breaches

As the adoption of electronic record and health information technology rapidly expands, hospitals and other health providers increasingly suffer from data breaches.<sup>1</sup> A data breach is an impermissible use or disclosure that compromises the security or privacy of the protected health information and is commonly caused by a malicious or criminal attack, system glitch, or human error.<sup>2,3</sup> Policy makers, hospital administrators, and the public are highly interested in reducing the incidence of data breaches. In this retrospective data analysis, we use data from the Department of Health and Human Services (HHS) to examine what type of hospitals face a higher risk of data breaches.

**Methods** | Under the Health Information Technology for Economic and Clinical Health Act of 2009, all health care providers covered by the Health Insurance Portability and Accountability Act must notify HHS of any breach of protected health information affecting 500 or more individuals within 60 days from the discovery of the breach. The Department of Health and Human Services publishes the submitted data breach incidents on its website, with the earliest submission date as October 21, 2009. We were able to link 141 acute care hospitals to their 2014 fiscal year Medicare cost reports filed with the Centers for Medicare and Medicaid Services (CMS). The unlinked hospitals include long-term care hospitals, Veterans Affairs and military hospitals, hospital systems, and hospitals unidentifiable in the CMS data set. We applied multivariable and regression analyses to compare these 141 hospitals with other acute care hospitals to understand what type of hospitals face a higher risk of breaches.<sup>4</sup> Statistical analysis was performed with SAS 9.4 (SAS Institute Inc) and STATA 14 (StataCorp LLC). For statistical analysis, *t* tests were used, and  $P < .05$  was considered significant.

**Results** | Between October 21, 2009, and December 31, 2016, 1798 data breaches were reported.<sup>5</sup> Among them, 1225 breaches

**Table 1. Hospitals Breached More Than Once Between October 21, 2009, and December 25, 2016**

Hospital Name	State	Frequency
Montefiore Medical Center	NY	4
University of Rochester Medical Center & Affiliates	NY	4
Brigham and Women's Hospital	MA	3
Cook County Health & Hospitals System	IL	3
Mount Sinai Medical Center	FL	3
St Vincent Hospital and Healthcare, Inc	IN	3
Advocate Health and Hospitals Corporation	IL	2
Aventura Hospital and Medical Center	FL	2
Beth Israel Deaconess Medical Center	MA	2
Children's Medical Center of Dallas	TX	2
Children's National Medical Center	DC	2
Florida Hospital	FL	2
Georgetown University Hospital	DC	2
Henry Ford Hospital	MI	2
Holy Cross Hospital	FL	2
Hospital for Special Surgery	NY	2
Jersey City Medical Center	NJ	2
Jewish Hospital	KY	2
Kern Medical Center	CA	2
Long Beach Memorial Medical Center	CA	2
Lucile Packard Children's Hospital	CA	2
Martin Army Community Hospital	GA	2
Massachusetts General Hospital	MA	2
Mercy Medical Center Redding	CA	2
Mount Sinai Medical Center	NY	2
NYU Hospitals Center	NY	2
Phoebe Putney Memorial Hospital	GA	2
Rady Children's Hospital - San Diego	CA	2
Riverside County Regional Medical Center	CA	2
St Elizabeth's Medical Center	MA	2
Thomas Jefferson University Hospitals, Inc	PA	2
Titus Regional Medical Center	TX	2
UC Davis Medical Center	CA	2

were reported by health care providers and the remaining by business associates, health plans, or health care clearing houses. There were 257 breaches reported by 216 hospitals in the data, with median (interquartile range [IQR]) 1847 (872-4859) affected individuals per breach; 33 hospitals that had been breached at least twice and many of which are large major teaching hospitals (**Table 1**). **Table 2** lists hospitals with more than 20 000 total affected individuals. For the 141 acute care victim hospitals linked to their 2014 CMS cost reports, the median (IQR) number of beds was 262 (137-461) and 52 (37%) were major teaching hospitals. In contrast, among 2852 acute care hospitals not identified as having breaching incidents, the median (IQR) number of hospital beds was 134 (64-254), and 265 (9%) were major teaching hospitals. Hospital size and major teaching status were positively associated with the risk of data breaches ( $P < .001$ ).

**Discussion** | A fundamental trade-off exists between data security and data access. Broad access to health information, es-

**Table 2. Breached Hospitals With More Than 20 000 Total Affected Individuals**

Hospital Name	State	Total Affected Individuals
Advocate Health and Hospitals Corporation <sup>a</sup>	IL	4 031 767
AHMC Healthcare Inc and affiliated Hospitals	CA	729 000
Jacobi Medical Center	NY	90 060
Providence Hospital	MI	83 945
St Vincent Hospital and Healthcare, Inc <sup>a</sup>	IN	65 666
Cincinnati Children's Hospital Medical Center	OH	60 998
Montefiore Medical Center <sup>a</sup>	NY	53 715
Kaiser Foundation Hospital- Orange County	CA	49 000
Methodist Dallas Medical Center	TX	44 000
Seton Family of Hospitals	TX	39 000
Jersey City Medical Center <sup>a</sup>	NJ	37 847
Santa Rosa Memorial Hospital	CA	33 702
Cook County Health & Hospitals System <sup>a</sup>	IL	30 148
Integrity Transitional Hospital	TX	29 514
St Luke's Cornwall Hospital	NY	29 156
Gibson General Hospital	IN	28 893
Blount Memorial Hospital, Inc	TN	27 799
Jamaica Hospital Medical Center	NY	26 162
Our Lady of Peace Hospital	KY	24 600
Thomas Jefferson University Hospitals, Inc <sup>a</sup>	PA	24 150
Children's National Medical Center <sup>a</sup>	DC	22 107
Reid Hospital & Health Care Services	IN	22 001
Florida Hospital <sup>a</sup>	FL	21 484
Rady Children's Hospital - San Diego <sup>a</sup>	CA	20 428

<sup>a</sup> Hospitals that experienced at least 1 breach occurring between October 21, 2009, and December 31, 2016.

sential for hospitals' quality improvement efforts and research and education needs, inevitably increases risks for data breaches and makes "zero breach" an extremely challenging objective. The evolving landscape of breach activity, detection, management, and response requires hospitals to continuously evaluate their risks and apply best data security practices. Despite the call for good data hygiene,<sup>6</sup> little evidence exists of the effectiveness of specific practices in hospitals. Identification of evidence-based effective data security practices should be made a research priority.

This study has 3 important limitations. First, data breaches affecting fewer than 500 individuals were not examined. Second, since each victim hospital was matched to CMS cost report based on the name and state, the matching might be incomplete or inaccurate for some hospitals. Finally, our analysis is limited to the hospital industry. Future studies that examine the characteristics of other types of health care entities that experienced data breaches are warranted.

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## Experience and Outcomes of Hepatitis C Treatment in a Cohort of Homeless and Marginally Housed Adults

Approximately 44% of homeless adults are hepatitis C virus (HCV)-infected.<sup>1-5</sup> Historically, homeless and marginally housed (HMH) adults have faced barriers to HCV treatment. New, interferon-free therapies have excellent cure rates and improved tolerability, reducing barriers for treatment.<sup>6</sup> To our knowledge, no published studies have documented the treatment of HMH populations with these therapies. The Boston Health Care for the Homeless Program (BHCHP) began treating HMH adults with oral agents in 2014.

**Methods** | We retrospectively describe the experience and outcomes of oral direct acting antiviral agents for HCV in a cohort of HCV-infected HMH adults. The study protocol was approved by the Institutional Review Board at Massachusetts General Hospital and deemed to meet Minimal Risk criteria. Patients received treatment at BHCHP, a federally qualified health center providing integrated primary care services via a patient-centered medical home approach to more than 11 000 individuals in the Boston area annually. Patients were not compensated for their participation. The HCV treatment team (a care coordinator [1.0 full-time equivalent], nurse [0.5 full-time equivalent], and 3 primary care clinicians [1 nurse practitioner, 0.25 full-time equivalent, and 2 primary care physicians—0.1 full-time equivalent combined]) provided care. Patients had an initial evaluation

**Table. Baseline Characteristics of the Cohort of 64 Hepatitis C Virus (HCV)-Infected Homeless and Marginally Housed Adults Treated With Oral Therapy**

Characteristic	Sustained Virologic Response, No. (%)	
	Not Achieved (n = 2)	Achieved (n = 62)
Age, mean (SD), y	53.5 (7.8)	55.5 (7.7)
Sex		
Male	1 (50)	48 (77)
Race		
Nonwhite	1 (50)	28 (53)
Ethnicity		
Hispanic	0	45 (74)
Veteran	0	5 (8)
Education		
<High school graduate or GED	1 (50)	25 (42)
Employment		
Part-time	2 (100)	7 (12)
Full-time	0	6 (10)
Unemployed	0	20 (33)
Disability	0	27 (45)
Insured	2 (100)	60 (97)
History of incarceration	0	22 (36)
Homeless	0	26 (42)
HIV coinfectd	0	29 (47)
Genotype		
Mixed	0	7 (11)
1	1 (50)	49 (79)
2	1 (50)	3 (5)
4	0	3 (5)
Fibrosis-4 value, mean (SD)	4.34	3.80 (5.84)
METAVIR stage		
F0	0	3 (5)
F1	0	22 (36)
F2	0	9 (14)
F3	0	6 (10)
F4	2 (100)	22 (35)
Reactive		
Hepatitis A virus	1 (100)	48 (83)
Hepatitis B virus	0	29 (49)
Alanine aminotransferase level, U/L, mean (SD)	98.5 (50.5)	63.5 (6.1)
HCV treatment experience	0	12 (19)
HCV treatment regimen		
Sofosbuvir-ribavirin	1 (50)	3 (5)
Simeprevir-sofosbuvir	0	5 (8)
Ledipasvir-sofosbuvir	1 (50)	49 (79)
Ledipasvir-sofosbuvir-ribavirin	0	5 (8)
History of IDU	1 (50)	46 (84)
Used drugs (including marijuana) during HCV treatment	0	16 (26)

Abbreviations: GED, General Educational Development test; HIV, human immunodeficiency virus; IDU, injection drug use.

SI conversion factor: To convert alanine aminotransferase to microkatals per liter, multiply by 0.0167.