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Availability of Insurance Linkage Programs in U.S. Emergency Departments

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Introduction: As millions of uninsured citizens who use emergency department (ED) services are now eligible for health insurance under the Affordable Care Act, the ED is ideally situated to facilitate linkage to insurance. Forty percent of U.S. EDs report having an insurance linkage program. This is the first national study to examine the characteristics of EDs that offer or do not offer these programs.

Methods: This was a secondary analysis of data from the National Survey for Preventive Health Services in U.S. EDs conducted in 2008-09. We compared EDs with and without insurance programs across demographic and operational factors using univariate analysis. We then tested our hypotheses using multivariable logistic regression. We also further examined program capacity and priority among the sub-group of EDs with no insurance linkage program.

Results: After adjustment, ED-insurance linkage programs were more likely to be located in the West (RR= 2.06, 95% CI = 1.33 – 2.72). The proportion of uninsured patients in an ED, teaching hospital status, and public ownership status were not associated with insurance linkage availability. EDs with linkage programs also offer more preventive services (RR = 1.87, 95% CI = 1.37–2.35) and have greater social worker availability (RR = 1.71, 95% CI = 1.12–2.33) than those who do not. Four of five EDs with a patient mix of ≥25% uninsured and no insurance linkage program reported that they could not offer a program with existing staff and funding.

Conclusion: Availability of insurance linkage programs in the ED is not associated with the proportion of uninsured patients served by an ED. Policy or hospital-based interventions to increase insurance linkage should first target the 27% of EDs with high rates of uninsured patients that lack adequate program capacity. Further research on barriers to implementation and cost effectiveness may help to facilitate increased adoption of insurance linkage programs. [West J Emerg Med. 2014;15(4):529–535.]

INTRODUCTION

Uninsured patients accounted for approximately 20% of emergency department (ED) visits nationally in 2009.[1] Many uninsured individuals, including one-third of non-elderly adults and two-thirds of children, are eligible for public insurance programs.[2-5] Given the high proportion of uninsured patients, the ED is uniquely positioned to help uninsured but eligible patients obtain public insurance coverage. ED insurance linkage programs screen to identify uninsured but eligible patients, and then either directly assist with enrollment

or provide a referral to another entity that facilitates insurance enrollment. These programs have the potential to benefit both patients and hospitals; patients who obtain insurance have increased access to care and reduced unmet medical needs,[6,7] and hospitals benefit from a cost-effective program that has the potential to save millions of dollars in uncompensated care costs due to retroactive insurance reimbursements.[8-10] Moreover, increasing insurance linkage is an especially pertinent issue now given the recent expansion of Medicaid eligibility with the Affordable Care Act.[11]

A recent national survey of preventive services in EDs found that only 38% of EDs routinely offer insurance eligibility screening and linkage.[12] Furthermore, ED directors rated insurance linkage the third highest priority among 11 preventive services most commonly offered in the ED (after primary care linkage and tobacco cessation counseling and tied with alcohol screening).[12] Despite the relatively high priority of these programs, there is a gap in the literature regarding ED insurance linkage programs. While we estimate (based on the preventive survey results) that over 1,000 EDs offer insurance linkage programs across the country, to our knowledge, there have been only 4 studies published discussing a total of 6 ED insurance linkage programs.[9,10,13,14] From a national standpoint, it is unknown what kind of EDs have insurance linkage programs, and which ED characteristics increase or decrease the likelihood of having such a program. This information would help ED directors and policymakers identify target areas for ED insurance linkage programs to reduce uninsured rates across the United States.

This is the first study of which we are aware to examine characteristics associated with U.S. EDs providing insurance screening and linkage services. Specifically, we compared patient demographic and hospital characteristics of EDs with and without insurance linkage programs. We hypothesized that 4 variables would be positively associated with the presence of insurance linkage programs: (1) higher rates of uninsured patients in the ED, (2) teaching hospital status, (3) public hospital status, and (4) availability of other preventive services. EDs with higher rates of uninsured patients may be more likely to have insurance programs given the greater benefit to be derived from successful insurance linkage, including increased healthcare access for patients and retroactive claim reimbursements for the ED. Teaching hospitals may be more likely to have insurance linkage programs given their published success at other teaching hospitals.[9,10] We also felt public hospitals may have a lower barrier for program establishment given existing relationships with other public entities (e.g. local Medicaid offices) that enroll patients into insurance, especially as a partnership with a public organization has been shown to be an effective model for insurance linkage.[10] Additionally, an increased number of preventive services offerings may indicate the availability of resources or an ED administrator's belief in the importance of providing various patient services; an ED administrator's

perceived barriers to providing preventative services have been found to be associated with a decreased likelihood of a preventative service being offered.[15]

METHODS
Study Design and Population
This study was a secondary analysis of data from the National Survey of Preventive Health Services in U.S. EDs (September 2008 to April 2009).[12] The authors of the primary study randomly sampled 350 (7%) of 4,874 EDs from the 2007 National Emergency Department Inventory (NEDI)-USA database. The response rate of 80% (n=277) amounted to a nationally representative sample of 6% of EDs in the United States. The local institutional review board found this study exempt from human subjects research.

Survey Content and Administration
The National Survey asked ED directors about availability and interest in 11 preventive services including ED insurance linkage.[12] We obtained information on insurance linkage from the response to the question, "Is there a system in place that routinely performs screening for insurance and linkage of eligible uninsured patients to insurance programs in your ED?" Respondents who answered "no" were asked a follow-up question on ED capacity to offer insurance linkage: "If not, could you offer this service routinely with existing staff and funding?" We determined the priority of preventive services needed with the question, "Of the services above unavailable in your ED, which services would you most like to offer given your patient population?" In addition to information on preventive services, the survey also asked ED directors for information on social work availability, percentage of uninsured patients, and measures of ED crowding.

We also collected the following baseline ED characteristics from the 2007 NEDI-USA database: annual ED visit volume, teaching hospital status (membership in the Council of Teaching Hospitals and Health Systems), Urban Influence Code (a validated county-based measure of urban ⁄ rural status), and U.S. geographic region (Northeast, South, Midwest, and West). Public hospital status was determined by linking the 2007 American Hospital Association Annual Survey data to the 2007 NEDI-USA database. We collected information on state-level insurance rates was from the U.S. Census Bureau's 2009 Current Population Survey Annual Social and Economic Supplements (http://www.census.gov accessed October 29, 2012).

Data Analysis
We first tabulated sociodemographic and operational variables of the EDs in our entire sample. We then compared how EDs that offer insurance screening and linkage differed from EDs that did not offer this service. We analyzed unadjusted comparisons of the characteristics between the two groups of EDs using Fisher's exact tests given our

small sample size. A p-value of less than 0.05 was a priori designated as statistically significant.

We then tested our hypotheses using multivariable logistic regression. To adjust for potential confounders, we *a priori* chose to include in the model any variables that were not part of our original hypothesis but had p<0.20 in the unadjusted analysis. We then removed non-key variables from the model if the coefficients were not significant at the 95% confidence interval level and if they did not change other coefficients by more than 10% for the final model. This 2-step method has previously been applied by Berg et al. in a similar analysis of the National Survey of Preventive Health Services in U.S. EDs data.[15] As the prevalence of insurance linkage programs is greater than 10%, we report coefficients using relative risk ratios (RR) instead of odds ratios (OR) as recommended in the literature.[16,17] This was done using the Stata plug-in program "oddsrisk."

We also conducted a sub-group analysis of EDs with no insurance linkage program separately to determine if there was a relationship between their reported program capacity, uninsured patient load, and priority among 11 public health initiatives by tabulating the frequencies of these variables. All analyses were conducted using Stata 12.1 (StataCorp, College Station, TX).

RESULTS

The availability of ED insurance linkage programs within our nationally representative sample compared across different demographic and operational characteristics is shown in Table 1. ED insurance linkage differed significantly by geographic region (p=0.01). Urban settings were found to have a higher proportion of insurance linkage programs than rural settings (40% vs. 20%), but this was not statistically significant (p=0.08). The proportion of uninsured patients in the ED was not found to be associated with the availability of insurance linkage. There were no significant differences in the rate of insurance linkage by several operational variables including visit volume, crowding, teaching hospital or public hospital status. EDs with more than the average number of preventive services were more likely to have an insurance linkage program (p<0.01). Availability of social work services 24 hours per day was also associated with having an insurance linkage program (p<0.01).

The multivariable logistic regression result is shown in Table 2. After adjustment for ED characteristics, a greater proportion of uninsured patients was not significantly associated with having an insurance linkage program; compared to the reference group of a patient population of <15% uninsured, EDs with 15-24% uninsured and more than 25% uninsured had a RR of 1.12 (95% CI = 0.65 – 1.73) and 1.17 (95% CI = 0.67 – 1.81) respectively. Teaching hospital and public hospitals status were also not found to be associated with the availability of insurance linkage services (RR = 0.72, 95% CI = 0.27 – 1.59 and RR = 0.94, 95% CI

= 0.57 – 1.45, respectively). EDs with a greater number of preventive services were more likely to have an insurance linkage program (RR = 1.87, 95% CI = 1.37-2.35). The visit volume was not significantly associated with having an insurance linkage program.

We found two ED characteristics not included in our original hypotheses which were strongly associated with insurance linkage programs in the multivariable model: region and social worker availability. Compared to an ED in the Midwest, an ED in the West was more likely to have an insurance linkage program (RR= 2.06, 95% CI = 1.33 – 2.72). After adjusting for state-level uninsured rates, the relative risk for an ED in the West vs. Midwest having a linkage program decreased to 1.90 but remained statistically significant (95% CI = 1.11 – 2.66). Additionally, the model supported our finding from the univariate analysis that EDs with insurance linkage programs were more likely to have a social worker available 24 hours per day (RR = 1.71, 95% CI = 1.12–2.33).

Finally, a sub-group analysis of EDs with no insurance linkage program availability found that 70% of all EDs with no insurance linkage program, including 80% of EDs with a patient mix of ≥25% uninsured, reported insufficient staff and funding to offer an insurance linkage program. These EDs with both ≥25% uninsured patients and inadequate program capacity represent 27% of EDs without insurance linkage programs. Moreover, the proportion of ED directors ranking insurance linkage programs a top 3 priority did not differ significantly by the proportion of uninsured patients served. Of EDs with no insurance linkage program, 37% of EDs with ≥25% uninsured rated insurance linkage among their top 3 priorities compared to 45% of EDs with <25% uninsured (p=0.33).

DISCUSSION

Our analyses suggest that the availability of ED insurance linkage programs is associated with location in the U.S. West but not with the proportion of uninsured patients in the ED, hospital teaching status, or public ownership status. EDs offering a greater number of preventive services and 24-hour social worker availability were found to be more likely to have an ED insurance linkage programs. Among EDs with the highest rates of uninsured patients, 4 out of 5 reported lacking necessary funding for programs.

Our findings indicate that insurance linkage program prevalence varies widely across U.S. regions, with insurance linkage programs being most common in the West. This result cannot be explained by regional-level differences in the uninsured rate (12% in Midwest, 12% in Northeast, 17% in West, and 18% in South),[18] but may be better explained by state-level differences in uninsured rates. Adjusting for the percentage of uninsured patients in each state attenuated the association between regions and insurance linkage program availability (Table 2). However, the fact that the RR for the West region remained statistically significant even after adjusting for state-level insurance rates suggests that other

Table 1. Emergency department (ED) and hospital characteristics by insurance linkage availability.

Characteristic	Insurance linkage program n=104 (38%)		No insurance linkage program, n=173 (62%)		Total	p-value
	n	%	n	%	N	
ED demographics						
Region						
West	27	54%	23	46%	50	0.01
Northeast	17	49%	18	51%	35	
South	38	34%	75	66%	113	
Midwest	22	28%	57	72%	79	
Urban influence code						
Urban (metro/micro)	90	40%	135	60%	225	0.08
Rural (rural/frontier)	14	27%	38	73%	52	
Percentage of uninsured patients*						
Less than 5%	2	18%	9	82%	11	0.39
5-24%	65	40%	99	60%	164	
25% and greater	36	38%	59	62%	95	
ED operations						
Teaching hospital						
Teaching	9	43%	12	57%	21	0.64
Non-teaching	95	37%	161	63%	256	
Publicly owned hospital						
Yes	27	34%	52	66%	79	0.58
No	76	39%	121	61%	197	
Offers preventive programs (excluding insurance linkage)						
0 - 3 programs	40	27%	107	73%	147	<0.01
4 - 10 programs	64	49%	66	51%	130	
Offers social worker services (24 hours per day)						
Yes	28	57%	21	43%	49	<0.01
No	76	33%	152	67%	228	
Visit volume (2007)						
Less than 10,000	25	29%	62	71%	87	0.09
10,000-19,999	15	33%	31	68%	46	
20,000-39,999	39	46%	45	54%	84	
40,000 and greater	25	42%	35	58%	60	
Crowding status (by Center for Disease Control and Prevention criteria[+])						
Crowded	55	43%	72	57%	127	0.08
Not crowded	49	33%	101	67%	150	

*n=270 for this variable only.
[+]Presence of at least one of the following 3 criteria, as reported by the ED director: left without being seen rate ≥ 3%, any annual time on ambulance diversion, and mean waiting room time ≥ 1 hour.

Table 2. Multivariable models of factors related to insurance linkage availability.

	Original model		Model adjusted for state-level insurance rate	
Characteristics	Relative risk	95% CI	Relative risk	95% CI
Midwest (reference)	1.00		1.00	
South	1.14	0.64 – 1.79	0.96	0.45 – 1.73
Northeast	1.51	0.80 – 2.35	1.54	0.81 – 2.38
West	2.06	1.33 – 2.72	1.90	1.11 – 2.66
Proportion uninsured <15% (reference)	1.00		1.00	
Proportion uninsured 15-24%	1.12	0.65 – 1.73	1.11	0.64 – 1.72
Proportion uninsured ≥25%	1.17	0.67 – 1.81	1.16	0.66 – 1.80
Teaching hospital	0.72	0.27 – 1.59	0.74	0.28 – 1.60
Publicly owned hospital	0.94	0.57 – 1.45	0.93	0.56 – 1.44
Preventive services available (>3)	1.87	1.37 – 2.35	1.84	1.34 – 2.33
Social worker available (24 hours/day)	1.71	1.12 – 2.33	1.72	1.12 – 2.34
Annual visit volume (by 1,000s)	1.01	0.99 – 1.01	1.01	0.99 – 1.02
2009 state uninsured rate (%)			1.03	0.97 – 1.09

CI, confidence interval

factors are involved. Some possible explanations, which we were not able to resolve with this study, include regional differences in public insurance policy, hospital associations and practices, or knowledge sharing with nearby programs.

Contrary to our hypothesis, the rate of uninsured patients in an ED was not significantly associated with having an insurance linkage program. We had expected that EDs with a higher proportion of uninsured patients would be more likely to have an insurance program, as the potential benefits for both patients and the hospital are greater. One explanation is that EDs with high rates of uninsured patients lack adequate resources to start an insurance linkage program. In our sample, 4 out of 5 EDs with an uninsured patient population of ≥25% reported not having adequate staff or funding to support an insurance linkage program. This may be due to the fact that the hospitals with a high burden of uninsured patients are also the same hospitals with limited resources (e.g. large safety-net hospitals). Another possible explanation is that EDs with high rates of uninsured patients do not necessarily see insurance linkage as a top priority; we found that ED directors' ratings of insurance linkage as a priority did not differ based on the proportion of uninsured patients. Perhaps EDs with high uninsured patient loads face other burdens that ED directors feel are a better use of their resources, or these EDs are more willing to absorb uncompensated care costs given their Medicaid Disproportionate Share Hospital payments.

A third possible explanation on why the rate of uninsured patients in an ED is not associated with insurance linkage availability is that ED directors lack knowledge on benefits and costs of insurance linkage programs. The few studies published on this subject show remarkable cost effectiveness. For example, programs as low cost as simply handing out

public insurance applications have been found to be successful at enrolling uninsured patients.[14] Furthermore, while EDs may require an initial investment to help establish a program, retroactive reimbursements from successfully enrolled patients have been shown to be enough to sustain the program and even yield gains for the hospital.[9,10] It is possible that some ED directors overestimate costs and/or underestimate benefits of these programs despite a high ratio of uninsured patients. Dissemination of previous results on low-cost and successful models of insurance linkage programs, and additional research on the return on investment of these programs, are needed to encourage more ED directors to consider starting these programs.

We also found that, contrary to our hypothesis, neither teaching hospital status nor public hospital status was associated with insurance linkage program availability. Given the success of ED insurance linkage programs at teaching hospitals,[9,10] we expected that more teaching hospitals would have adopted insurance linkage programs. However, perhaps a publication bias exists, as academic institutions may just be more likely to evaluate these programs. Public (county-owned) hospitals may not have higher rates of insurance linkage programs for several reasons, including that their mission to take care of all patients regardless of ability-to-pay and their existing uncompensated care budget may render insurance linkage a lower priority. It is possible that public hospitals are not fully using potential partnerships with other public organizations who conduct insurance enrollment, as this has been found to be an effective method of insurance linkage from the ED.[10] We recommend that teaching hospitals and publicly owned hospitals, especially those with high rates of uninsured patients, consider establishing insurance linkage programs.

Our findings suggest a strong association between availability of insurance linkage programs and existing ED preventive and social work services. One reason for this result may be that EDs with a higher level of resources tend to have multiple programs, due to similar resource requirements of these programs. Also, EDs with existing preventive or social work programs may have a mission that encompasses public health programs outside of medical care, making them more likely to adopt an insurance linkage program.

The next steps in this research area are two-fold: 1) to disseminate existing studies and conduct additional research supporting the potential cost effectiveness and return on investment from ED insurance linkage programs and 2) to elucidate barriers besides limited staff and funding to insurance linkage program adoption, especially among EDs with adequate resources but still without an insurance linkage program. Research that demonstrates the effectiveness of, and estimates the positive return on investment for, insurance linkage programs will help hospital leaders and ED directors more accurately assess the value of insurance linkage programs within their own EDs and may encourage hospitals with limited resources to start an ED-based program. Research on barriers to insurance linkage programs will help policymakers establish interventions specifically aimed at reducing these barriers to adoption.

Continued expansion of insurance linkage programs will allow the nation's EDs to reduce the high number of uninsured but eligible individuals, and subsequently increase patient access to care and decrease unmet medical needs.[6,7] In particular, the ED has the potential to serve as an important intervention site for the Affordable Care Act's Medicaid Expansion in which an additional 10 -11 million people are newly eligible for public insurance,[11] especially as recent estimates indicate that 1 in 10 of these individuals currently use the ED as their routine source of healthcare.[19] We recommend that policy or hospital-based interventions to increase insurance linkage programs first target providing resources for the 27% of EDs that report having both high rates of uninsured patients and inadequate program capacity, as both patients and the ED would reap the greatest benefit from insurance programs. Furthermore, policymakers should also focus on the EDs with high rates of uninsured patients who report having adequate financial and staff capacity to determine and address additional barriers besides financial and staff resources that may exist to establishing an insurance linkage program.

LIMITATIONS

There are several potential limitations that must be considered when interpreting the study findings. First, we gathered our data from a survey that collected information from one individual at each ED rather than objective reported hospital measures. However, it is likely that ED directors (respondents) are knowledgeable about the services and characteristics of their ED. and that this did not introduce significant bias into the study. Second, although we were able to determine several characteristics associated with insurance linkage availability, our relatively small sample size constrained the number of variables we were able to include in the model. This limitation may have prevented us from finding significant associations between additional variables and insurance linkage. Third, the proportion of ED patients who are uninsured could not be compared between our sample and the total 2007 NEDI-USA database as this information was not available. It is possible that our sample overestimated the proportion of EDs with greater than 25% of patients uninsured, as the 2009 National Hospital Ambulatory Medical Care Survey estimates the average proportion of uninsured patients in EDs to be 15% (vs. 34% in our sample).[20] However, as our sample was randomly selected and all other demographic and operational characteristics were nationally representative, it is likely that this variable is also representative of all U.S. EDs.

CONCLUSION

ED insurance linkage programs are a cost-effective outreach intervention that both increases enrollment rates for uninsured eligible patients and decreases financial losses of uncompensated care for hospitals. The surprising finding that rates of uninsurance are not associated with EDs having insurance linkage programs may be explained by inadequate resources, lack of priority, or limited knowledge of cost effectiveness of these programs. We recommend that policymakers and hospital-based interventions trying to increase insurance enrollment target EDs with high rates of uninsured patients, starting with financial assistance for the EDs that also report having inadequate staff and funding to establish an insurance linkage program. Further research on return on investment and insurance linkage program barriers may also help increase the proportion of EDs with these services, and allow the ED to serve as an important intervention site to meet national goals to reduce the uninsured population.

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