



Medicaid Participation among Liver Transplant Candidates after the Affordable Care Act Medicaid Expansion

Dmitry Tumin, PhD, Eliza W Beal, MD, Khalid Mumtaz, MBBS, MSc, Don Hayes Jr, MD, MS, Joseph D Tobias, MD, Timothy M Pawlik, MD, MPH, PhD, FACS, W Kenneth Washburn, MD, FACS, Sylvester M Black, MD, PhD

- BACKGROUND:** The 2014 Medicaid expansion in participating states increased insurance coverage among people with chronic health conditions, but its implications for access to surgical care remain unclear. We investigated how Medicaid expansion influenced the insurance status of candidates for liver transplantation (LT) and transplant center payor mix.
- STUDY DESIGN:** Data on LT candidates aged 18 to 64 years, in 2012 to 2013 (pre-expansion) and 2014 to 2015 (post-expansion), were obtained from the United Network for Organ Sharing registry. Change between the 2 periods in the percent of LT candidates using Medicaid was compared between expansion and nonexpansion states. Multivariable logistic regression was used to determine how Medicaid expansion influenced individual LT candidates' likelihood of using Medicaid insurance.
- RESULTS:** The study included 33,017 LT candidates, of whom 29,666 had complete data for multivariable analysis. Medicaid enrollment increased by 4% after Medicaid expansion in participating states. One-quarter of the transplant centers in these states experienced $\geq 10\%$ increase in the proportion of LT candidates using Medicaid insurance. Multivariable analysis confirmed that Medicaid expansion was associated with increased odds of LT candidates using Medicaid insurance (odds ratio 1.49; 95% CI 1.34, 1.66; $p < 0.001$). However, the absolute number and demographic characteristics of patients listed for LT did not change in Medicaid expansion states during the post-expansion period.
- CONCLUSIONS:** Candidates for LT became more likely to use Medicaid after the 2014 Medicaid expansion policy came into effect. Enactment of this policy did not appear to increase access to LT or address socioeconomic and demographic disparities in access to the LT wait list. (J Am Coll Surg 2017;225:173–180. © 2017 by the American College of Surgeons. Published by Elsevier Inc. All rights reserved.)

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From the Department of Anesthesiology and Pain Medicine (Tumin, Tobias), the Section of Pulmonary Medicine (Hayes), and the Division of Transplantation (Washburn), Nationwide Children's Hospital; and the Departments of Pediatrics (Tumin, Tobias), Surgery (Beal, Pawlik, Washburn, Black), Internal Medicine (Mumtaz, Hayes), and Anesthesiology (Tobias), the Division of Gastroenterology, Hepatology & Nutrition (Mumtaz), and the Comprehensive Transplant Center (Washburn, Black), The Ohio State University Wexner Medical Center, Columbus, OH.

Correspondence address: Dmitry Tumin, PhD, The Ohio State University, Nationwide Children's Hospital, 700 Children's Dr, Columbus, OH 43205. email: tumin.1@osu.edu

The Patient Protection and Affordable Care Act (ACA), enacted in 2010 and implemented in stages through 2014, profoundly reshaped health insurance provision in the US.¹ The optional state-level expansion of eligibility for Medicaid public insurance was an ACA component that achieved significant reductions in the number of Americans without health insurance.¹⁻³ Among Americans with chronic health conditions, Medicaid expansion was linked to a 5% reduction in the uninsured rate.⁴ This increase in insurance coverage suggests that Medicaid expansion may have increased health care use and facilitated improved access to primary and preventive care.^{4,5} Yet the benefits of Medicaid expansion for access to specialty and surgical care are less certain.^{3,6} In the case of solid organ transplantation, a treatment option of last resort for patients with end-stage organ failure, Medicaid

Abbreviations and Acronyms

ACA	= Patient Protection and Affordable Care Act
ESLD	= end-stage liver disease
LT	= liver transplantation
MELD	= Model for End-stage Liver Disease

expansion has been reported to be associated with increased heart transplant wait listing rates among African Americans with heart failure⁷; however, it did not increase wait listing rates among patients requiring kidney, liver, or lung transplantation.⁸

In the setting of liver transplantation (LT), expanded eligibility for Medicaid has complex implications for access to this procedure. On one hand, Medicaid enrollment of previously uninsured patients may broaden access to timely diagnosis of end-stage liver disease (ESLD), referral for LT, and transplant evaluation, potentially reducing disparities in LT wait listing.^{9,10} On the other hand, new enrollees in Medicaid may encounter existing barriers to being listed and ultimately undergoing LT. Only 1 in 6 patients with ESLD is ever placed on the LT wait list,¹¹ and patients with Medicaid are less likely to be listed for LT than patients with commercial or Medicare insurance.¹² Centers may be reluctant to list some patients with Medicaid insurance for LT if they lack appropriate social support or have a history of noncompliance with treatment. In turn, psychosocial limitations associated with Medicaid insurance participation may explain the worse post-transplantation outcomes seen in LT recipients with Medicaid insurance.^{13,14} As evinced by unchanged LT listing rates after Medicaid expansion,⁸ an increase in Medicaid enrollment among patients with ESLD may not necessarily lead to greater representation of patients with Medicaid among those listed for LT.

Despite the lack of change in the number of patients listed for LT,⁸ we have recently demonstrated rapid shifts from commercial to Medicaid coverage in a cohort of LT recipients after Medicaid expansion.¹⁵ These data suggest that among patients referred for LT, a significant proportion of individuals with commercial insurance might prefer Medicaid coverage if it were available. For example, public insurance that is not tied to work participation may be preferable to employer-linked commercial insurance, given the low rate of employment among LT recipients.¹⁶ Therefore, we hypothesized that in states that expanded Medicaid eligibility, more adult LT candidates participated in Medicaid after Medicaid eligibility was expanded in 2014. We evaluated this hypothesis using center-specific and individual-level data from the United Network for Organ Sharing registry.

METHODS

The study was deemed not human subjects research, and therefore exempt from review, by the IRB at Nationwide Children's Hospital. The United Network for Organ Sharing registry was queried for patients listed for LT between January 2012 and December 2013 (pre-Medicaid expansion era), and between January 2014 and December 2015 (post-Medicaid expansion era).¹⁷ Patients younger than 18 years or older than 64 years at listing were excluded from the analysis, in order to focus on the population ineligible for children's health insurance programs and age-based Medicare coverage. Patients whose insurance status at listing was not reported were also excluded. Patients with missing data on study covariates were excluded from the secondary analysis of individual insurance status.

State participation in Medicaid expansion was determined according to whether each state expanded Medicaid eligibility as of January 1 2014.¹⁸ States that delayed Medicaid expansion until a later date in 2014 to 2015 (Alaska, Indiana, Michigan, New Hampshire, Pennsylvania) were excluded from the analysis. The annual numbers of patients listed for LT in the age range of 18 to 64 years, and the annual proportions of patients in this age range with Medicaid insurance, were plotted separately for states that did and did not participate in Medicaid expansion. Transplant centers were included in the analysis if the majority (>50%) of patients listed in the pre-Medicaid expansion era were aged 18 to 64 years. Centers averaging <10 LT listings per year of patients aged 18 to 64 years in the pre-Medicaid expansion era were excluded.

The primary outcome was center-specific change in the percent of patients listed for LT, who had Medicaid insurance as opposed to any other insurance type. Transplant centers reported the projected primary source of payment for LT at the time of listing using the online UNet system, as previously described.¹⁹ The percentage of LT candidates with Medicaid was determined separately in the pre-expansion (2012 to 2013) and post-expansion (2014 to 2015) periods; and the change in the percent of LT candidates with Medicaid between these periods was calculated for each center. Centers' change in the percent of LT candidates with Medicaid was compared between Medicaid expansion and nonexpansion states using a Wilcoxon rank-sum test, with a 95% CI for the difference in medians calculated using the Hodges-Lehmann method. By comparing this outcome between states that did and did not participate in Medicaid expansion, we aimed to exclude the influences of contemporary changes in liver disease treatment and LT allocation policy, whose effects were shared across all states.

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