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Outcomes After Community Discharge From Skilled Nursing Facilities: The Role of Medicaid Home and Community-Based Services

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Abstract

This study investigated the association between Medicaid Home and Community-Based Services (HCBS) generosity and post-discharge outcomes among dual-eligible beneficiaries discharged from skilled nursing facilities (SNFs). We linked multiple national datasets for duals discharged from SNFs between 2010 and 2013. Accounting for SNF fixed effects, we estimated the effect of HCBS generosity, measured by its breadth and intensity, on the likelihood of remaining in the community, risks of death, nursing home (NH) admission, and hospitalizations within 30 and 180 days after SNF discharge. We found that higher HCBS generosity was associated with an increased likelihood of remaining in the community. HCBS breadth and intensity were both significantly associated with reduced risks of NH admission, while higher HCBS intensity was related to a reduced risk of acute hospitalizations within 30 days after discharge. Our findings suggest that more generous HCBS programs may facilitate smoother transitions and sustainable community living following SNF discharge.

Keywords

home and community-based care and services; long-term services and supports; health outcomes; Medicaid

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Introduction

Skilled nursing facilities (SNFs) provide essential care and rehabilitation services to millions of individuals after their inpatient stay. Approximately 1.5 million Medicare beneficiaries receive care in SNFs annually, accounting for nearly 2 million SNF stays (MedPAC, 2021), and a significant proportion of these patients return to the community following SNF discharge. However, individuals who experience hospitalization and an SNF stay are often frailer than the general population and may have greater care needs after they return to the community. For instance, many continue to experience difficulties with activities of daily living (ADL) and instrumental activities of daily living (IADL), and have increased physical and personal needs and greater utilization of home care services than before they were hospitalized (Coughlin et al., 1992; Hesselink et al., 2012; Mistiaen et al., 1997). These functional limitations necessitate ongoing support and assistance for individuals to maintain their independence and quality of life within their communities.

Health outcomes following SNF discharge have gained increased attention in recent years. Over the past several years, post-SNF-discharge outcomes have been linked to the quality of care provided by SNFs (MedPAC, 2018). In response, the Centers for Medicare & Medicaid Services (CMS) introduced a quality indicator for SNFs, termed “successful community discharge.” Successful discharge is defined as a patient being discharged from SNFs alive and not experiencing institutionalization or death within at least the following 30 days. A higher rate of successful community discharge is thought to be indicative of better quality SNF care (Abt Associates Inc, 2019). Yet, the quality of care provided in SNFs is not the sole determinant of health outcomes after discharge (Guo et al., 2021; Reistetter et al., 2022). Access to community-based long-term services and supports (LTSS) may also significantly influence the health outcomes of individuals transitioning from an SNF to the community.

However, many older adults, particularly those who recently experienced hospitalization and an SNF stay, do not receive adequate LTSS in their communities to sufficiently address their care needs (Allen et al., 2014; LaPlante et al., 2004; Newcomer et al., 2005; Wolff et al., 2019). Insufficient community support can lead to a multitude of health and safety concerns for these individuals after their discharge from institutions. For example, evidence suggests that unmet needs for personal care services among older adults transitioning from nursing facilities to their communities are associated with adverse health outcomes, including the development of pressure ulcers or falls, as well as increased utilization of medical services, such as emergency room visits, inpatient hospitalizations, and nursing home readmissions (Gaugler et al., 2007; Irvin et al., 2015). The lack of adequate support in meeting the care needs of this vulnerable population can thus contribute to a decline in their overall health and well-being, further emphasizing the importance of receiving adequate LTSS in fostering positive health outcomes for older adults returning to their home or community after SNF stays.

Medicaid Home and Community-Based Services (HCBS) is the primary source of community-based LTSS for low-income older adults dually enrolled in Medicare and Medicaid (referred to as “duals”), who often live with disabilities and comorbidities and are

particularly at risk of negative health outcomes. Recognizing the importance of community-based care, Medicaid has shifted its focus over the past several decades from institutional LTSS toward HCBS, aiming to provide alternatives for those preferring to remain in the community while potentially reducing the rapid growth in LTSS costs. As a result, Medicaid's investment in HCBS has grown substantially: the percentage of total Medicaid LTSS expenditures allocated to HCBS more than tripled, from 18% in 1995 to 59% in 2019, with HCBS users accounting for nearly 80% of individuals who used Medicaid LTSS in 2019 (KFF, 2022). Despite the national trend of expanding HCBS, substantial cross-state variation has been documented in the generosity with which states provide HCBS to Medicaid enrollees. In 2012, for example, the breadth of HCBS, that is, proportion of older duals who used HCBS, ranged from 19% to 80% across states, and the intensity of HCBS, that is, average HCBS expenditure per user, ranged from $58 to $1,910 (Wang, Temkin-Greener, et al., 2021). The expansion and cross-state variation of HCBS may have influenced health outcomes among community-dwelling older adults. One study (Konetzka et al., 2012) found that while HCBS users were particularly vulnerable to avoidable hospital admissions compared to the full Medicaid and US populations, states with more generous HCBS had lower rates of avoidable hospitalizations among HCBS users. For duals who are hospitalized and receive post-acute care in SNFs, the expansion of Medicaid HCBS could lead to better met care needs within the community and improved health outcomes after SNF discharge.

Although researchers have examined the relationship between HCBS generosity and the likelihood of SNF discharge (Wang, Temkin-Greener, et al., 2021), no study has specifically explored the role of HCBS on post-discharge outcomes. This study aims to investigate the association between Medicaid HCBS breadth and intensity, two distinct aspects of HCBS generosity, and four post-discharge outcomes: mortality, hospitalization, nursing home admission, and a composite measure of all three, indicating the likelihood of remaining in community. These outcomes were evaluated within two timeframes, 30 and 180 days following SNF discharge. We utilized multiple national data sources to construct HCBS breadth and intensity measures and modeled the relationships using SNF fixed effects. This approach effectively captured the change in outcomes as a function of the variation in HCBS policies, allowing for an accurate assessment of the influence of HCBS policies on post-discharge outcomes.

Methods

Data

For this study, we linked, at the individual level, several national datasets for calendar years 2010 through 2013 including Medicaid Analytic eXtract (MAX), Medicare Master Beneficiary Summary File (MBSF), Medicare Provider Analysis and Review (MEDPAR), Minimum Data Set (MDS), and several publicly available datasets.

The Medicaid Analytic eXtract (MAX) was employed to construct the HCBS generosity measures, as its Personal Summary file includes data on beneficiaries' demographic characteristics, Medicaid enrollment, Medicaid managed care enrollment, waiver enrollment, service utilization, and payments. MAX data from 2010 to 2012 are

available nationally (with the exception of Kansas and Maine for 2010 and Idaho for 2011), and data from 28 states are available for 2013. Newer data were not used due to the inconsistency in HCBS measurement and data quality concerns (Caswell et al., 2021). The CMS introduced a new generation of Medicaid administrative data, namely, the Transformed Medicaid Statistical Information System Analytical File (TAF). This data became available in certain states beginning in 2013 and nationally in 2016. Given that the methods for identifying HCBS claims and recipients differ significantly in the TAF, we chose not to merge the two generations of Medicaid data to prevent measurement errors.

The Minimum Data Set (MDS) is a comprehensive assessment tool required by the federal government for all residents in Medicare- or Medicaid-certified SNFs. Residents are assessed at the time of admission, at least every quarter for long-stay residents, whenever a change in status occurs, and at discharge. The assessments contain detailed information on individuals' health status and information on admission and discharge.

Master Beneficiary Summary File (MBSF) data include Medicare beneficiary enrollment information, Medicare– Medicaid dual status, Medicare Advantage (MA) enrollment, and death records. Medicare Provider Analysis and Review (MedPAR) contains information about Medicare inpatient claims.

Lastly, we obtained publicly available data containing information on facility and county characteristics from several sources, including the Nursing Home Compare (NHC), the LTCfocus, Area Health Resource File (AHRF), and American Community Survey (ACS).

Cohort

The study cohort consisted of individuals who were receiving full benefits from both Medicare and Medicaid on a fee-for-service (FFS) basis, had newly entered an SNF for post-acute care between January 1, 2010, and September 1, 2013, and were discharged back into the community within 100 days of SNF admission.

We excluded those who did not maintain Medicare and full Medicaid benefits throughout the entire follow-up period (30 days or 180 days). Moreover, since the variable of interest, HCBS generosity, can only be calculated for Medicaid FFS recipients with the data available, we excluded duals with Medicaid comprehensive managed care organization (MCO) coverage, managed long-term services and supports (MLTSS) coverage, and the Program of All-Inclusive Care for the Elderly (PACE) coverage. At the state level, we also excluded 11 states (Arizona, Delaware, Hawaii, Kentucky, Minnesota, New Jersey, New Mexico, New York, Tennessee, Texas, and Utah) due to the inability to accurately measure HCBS generosity, given the high prevalence or the expansion of Medicaid managed care programs in these states. After removing individuals based on missing covariates, our analytical sample comprised 121,184 and 110,501 individuals for the 30-day and 180-day post-discharge outcomes, respectively.

Measures

Outcome.—In this study, we used two follow-up periods, 30 days and 180 days after SNF discharge, to capture both short-term and long-term post-discharge outcomes. For

each follow-up period, the primary outcome variable was whether an individual remained in the community without experiencing "adverse" events (i.e., nursing facility admission, hospitalization, or death). We further examined each of these three events separately as secondary outcomes. Specifically, for nursing facility admission, we defined a dichotomous variable identified from MDS as having any NH care record during the follow-up period. Hospitalization was a dichotomous variable indicating whether the individual had any hospitalizations while living in the community. This outcome was identified from MedPAR. Death was identified from MBSF.

HCBS Generosity Measures.—Following the literature (Gonçalves et al., 2020; Wang, Temkin-Greener, et al., 2021) concerning HCBS generosity, we assessed HCBS generosity in terms of its breadth and intensity. Breadth was defined as the proportion of FFS older duals who utilized any HCBS in a given year, capturing realized access to Medicaid HCBS. Intensity reflects the quantity of services used by individuals conditional on receiving HCBS, and it was calculated as the average monthly HCBS spending per user per month, adjusted for the Area Wage Index. These represent different dimensions of generosity and may be associated with different outcomes (Gonçalves et al., 2020).

Covariates.—To reduce confounding, we included a comprehensive set of covariates related to post-discharge outcomes. Individual-level covariates encompassed sociodemographic characteristics (e.g., age, gender, race, and marital status), functional status (activities of daily living [ADL]), cognitive status (cognitive function scale [CFS]), 14 active diagnoses, health conditions, and SNF treatments (e.g., insulin injection) at the time of SNF discharge. The selection of diagnoses, conditions, and treatments was based on CMS's risk adjustment for successful community discharge (Acumen, 2016). Individual demographics, functional status, diagnoses, and treatment measures were identified from the SNF discharge assessment in the MDS.

Skilled nursing facilities' facility-level covariates included the number of beds, for-profit status, chain affiliation, occupancy rate, percentage of residents covered by Medicare and Medicaid, and the overall quality rating from NHC, measured on a 1 to 5 scale where 5 indicates the highest quality. County-level covariates consisted of economic factors (e.g., median household income, poverty rate, and deep poverty rate), housing factors (e.g., percent of homes occupied by owners, median house value, and median rent), and factors related to LTSS supply (i.e., nursing home beds per 1,000 population, home health agencies per 1,000 population, and female labor force participation) (HRSA, 2013).

Statistical Approach

Descriptive analyses were conducted to examine the individual characteristics and outcomes for duals who were discharged from SNFs to the community. We then conducted individual-level analyses using a repeated cross-sectional study design. Linear probability models with SNF fixed effects and robust standard errors were estimated to examine the association between HCBS generosity and the likelihood of remaining in the community after discharge, accounting for individual demographics and health status at SNF discharge. SNF fixed effects accounted for overall SNF quality of care and other facility-level time-invariant

characteristics that might affect residents' likelihood of remaining in the community after discharge. SNF fixed effects also account for time-invariant characteristics at all levels larger than SNFs, such as counties or states.

For secondary analyses, we applied a similar model for the outcomes of death and hospitalization. For nursing home admission, we used Cox proportional hazards models (Lefaivre et al., 2009), a commonly used model for length-of-stay data, with mixed effects to test its relationship with HCBS generosity. This multilevel model accounted for state fixed effects, county random effects, SNF random effects, and year fixed effects.

We performed several sensitivity analyses to check the robustness of the main findings. First, since hospitalizations occurring immediately after discharge from SNFs are unlikely due to HCBS generosity, we excluded individuals who were hospitalized on the same day or within three days of SNF discharge. Second, because models with SNF fixed effects might not yield stable estimates if the number of observations in an SNF is too small, we excluded individuals who were discharged from SNFs with fewer than five observations. Third, since death is a competing risk of nursing home admission, we used two different strategies: (1) limiting the sample only to those who did not die during the follow-up period and (2) using a competing risk model with standard errors accounting for SNF clustering effects. Lastly, potential sample selection issues exist, as post-discharge outcomes can only be observed for those discharged from SNF to the community, and discharge decisions might not be random and may be associated with factors related to post-discharge outcomes. In addition to controlling for comprehensive covariates at SNF discharge, we adopted a two-step selection model (Puhani, 2000) that may resolve the issue of possibly a non-random selection of individuals into the sample (i.e., those discharged from SNFs). The first step, the selection function, estimated the likelihood of discharge, and the main model estimated the unbiased relationship between HCBS and remaining in the community.

Results

In Table 1, we present the unadjusted outcomes of interest for 30-day and 180-day post-discharge cohorts. Overall, 79% and 50% of the identified duals remained in the community alive without NH admissions or hospitalizations for 30 and 180 days after SNF discharge, respectively. During the 30-day post-discharge period, 2% of duals died, 10% experienced NH admission, and 16% were hospitalized. Within 180 days after discharge, 11% of duals died, 26% had NH admission, and 43% experienced at least one hospital stay.

In Table 2, we present the estimated coefficients of the variable of interest, HCBS breadth and intensity, adjusted for the full list of covariates and SNF fixed effects. We found that a 10-percentage-point increase in HCBS breadth led to a 0.7-percentage-point increase ($p < 0.05$) in the likelihood of remaining in the community, while a $100 increase in HCBS intensity led to a 0.1-percentage-point increase ($p < 0.05$) during the first 30 days post-discharge. Neither HCBS breadth nor intensity was statistically significantly associated with the likelihood of remaining in the community within the 180-day period. Full results are shown in Appendix Table 1.

For secondary outcomes, presented in Table 3, we found that increases in either HCBS breadth or intensity were associated with reduced risks of NH admission within 30 and 180 days. A 10-percentage-point increase in breadth was related to 4% and 3% lower risks of NH admission in 30 days and 180 days after discharge, while a $100 increase in intensity was related to a 1% lower risk of NH admission in both 30 and 180 days. For hospitalization, a $100 increase in intensity was associated with a 0.1% lower likelihood of hospitalizations within 30 days after SNF discharge, while no significant association was found between intensity and hospitalization in the 180-day period, as well as between breadth and hospitalization in both post-discharge periods. We did not detect statistically significant associations between HCBS generosity and death in either of the post-discharge periods.

Findings from the sensitivity analyses (Appendix Tables 2 and 3) were mostly consistent with the main analyses, with a few exceptions. For most sensitivity analyses, there were small variations in the coefficients, but the direction of the association between HCBS breadth/intensity and post-discharge outcomes remained similar to the main analyses. When using the competing risk model for nursing home placement instead of the Cox mixed-method model, the findings suggested that HCBS intensity was related to a reduced risk of NH admission at 30 days, and no significant relationship was found between HCBS generosity and NH admission within 180 days.

Discussion

In this study we investigated the relationship between Medicaid HCBS generosity, measured in terms of breadth and intensity, and post-SNF discharge outcomes, including remaining in the community, death, nursing home admission, and hospitalization. Our findings suggest that increased HCBS generosity, in terms of both breadth and intensity, is associated with improved post-discharge outcomes for dual-eligible individuals discharged from SNFs in either or both 30-day and 180-day post-discharge periods.

Our results align with previous research examining the relationship between HCBS spending and post-discharge outcomes among NH long-stay residents who returned home (Irvin et al., 2015). Although the transition from facility to home may be different for post-acute care residents and long-stay residents, more generous HCBS seems to facilitate a smoother transition and sustainable community living for dual SNF users.

Regarding the different results for the 30-day and 180-day follow-up periods, our findings suggest that the association between HCBS generosity and post-discharge outcomes is more robust in the 30-day period. This may be because HCBS is particularly important immediately following SNF discharge when patients are generally frailer and may not have established other care arrangements. During this period, HCBS can provide vital support for patients to successfully transition back into the community and avoid adverse outcomes. However, in the 180-day period, neither HCBS breadth nor intensity was significantly associated with most outcomes, except for nursing facility admission. This may indicate that other factors, such as informal care or the patient’s recovery trajectory or new changes in health status, might play a more prominent role in determining long-term outcomes.

Our study also found consistent associations between HCBS generosity and lower risks of nursing facility admission. This suggests that HCBS may help people remain at home by providing essential services that support independent living, such as personal care, home modifications, and care coordination. Previous research has shown that HCBS can help reduce NH admission by addressing the unmet needs of older adults in the community and delaying the need for institutional care (Wang, Yan, et al., 2021). While it is essential to acknowledge that the effect size for HCBS is small, 4% and 1% lower risks for NH admission for every 10-percentage-point increase in breadth or $100 increase in intensity, the savings due to reduced NH admissions could be substantial, given that more than one million Medicaid beneficiaries use NH in a year (KFF, 2023) and the estimated cost per stay is greater than $120,000 dollars (American Council on Aging, 2022; DHHS, 2019).

Interestingly, this study found that a higher level of HCBS intensity, rather than HCBS breadth, was related to a reduced risk of having any acute hospitalizations in the short term after discharge. This is consistent with what was found for community-dwelling HCBS users in general, where states with higher shares of LTSS spending on HCBS had lower rates of avoidable hospitalization among HCBS users (Konetzka et al., 2012). Simply having any HCBS coverage may not be sufficient to prevent community-originated hospitalizations after SNF discharge, and more intensive services may be required to prevent these hospitalizations. For instance, a previous study found that an early home health visit within a week of SNF discharge was associated with a reduced risk of 30-day hospital readmission (Carnahan et al., 2017). The use of a specific type of HCBS was not identified in the findings presented here, but the intensity measure may to some extent reflect type of services. Future research is needed to explore the effect of different types of HCBS.

There are several limitations to our study that should be acknowledged. First, while our analysis accounted for the individual functioning status and comorbidities at the starting point of the follow-up period, potential endogeneity remains a concern. The difference in overall health status of HCBS enrollees due to HCBS policy may still confound the relationship between HCBS and health outcomes. For example, states/counties with broader HCBS coverage may include relatively healthier enrollees in unmeasured ways, who are likely to have better outcomes regardless of HCBS policies. However, our sensitivity analysis using a two-step selection model confirmed the positive association between HCBS generosity and remaining in the community for 30 days. Second, our analysis focused on dual-eligible individuals who used SNFs and HCBS, and the findings may not be generalizable to other populations or settings. Dual-eligible individuals may have unique healthcare needs and greater vulnerability to adverse outcomes, which could potentially influence the impact of HCBS on post-discharge outcomes. Third, our study used aggregate measures of HCBS generosity (breadth and intensity), which may not fully capture the specific aspects of HCBS programs that are most influential for post-discharge outcomes. While disentangling breadth and intensity of Medicaid HCBS policies allowed us to examine the role of different aspects of HCBS, the relationship between HCBS and outcomes could vary depending on the type of service. Further research is needed to identify the most effective components of HCBS programs in supporting community living for older adults after SNF discharge. Fourth, our study, covering the period from 2010 to 2013, may not fully reflect the evolving Medicaid landscape, which has increasingly shifted toward

managed care. Although we believe our findings are still applicable, the changing context of HCBS provision within managed care models warrants further investigation in future studies to understand its current impact on health outcomes.

The policy implications of our findings underscore the importance of investing in comprehensive, patient-centered HCBS policies that enable older adults to age in place, maintain their independence, and reduce the burden on the healthcare system. As the population ages and the demand for long-term care services increases, our study highlights the need for policymakers to not only expand access to HCBS but also provide more intensive services to address the complex health and functional needs of older adults transitioning back to their communities.

In conclusion, our study provides evidence that increased HCBS generosity, in terms of breadth and intensity, is associated with improved post-discharge outcomes for dual-eligible individuals discharged from SNFs. These findings underscore the potential benefits of expanding access to HCBS services and inform policy decisions related to the design and implementation of Medicaid HCBS programs.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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What this paper adds

- This paper found that the generosity of Medicaid HCBS is associated with greater likelihood of remaining in the community after being discharged from skilled nursing facilities (SNFs).
- The role of Medicaid HCBS differs in the immediate period and longer period following discharge.
- Both the breadth and intensity of HCBS are associated with reduced nursing home placement following SNF discharge.

Applications of study findings

- The findings suggest that the importance of investing in comprehensive HCBS policies shouldn't be underestimated, as it may enable older adults to age in place, maintain their independence, and reduce the burden on the healthcare system.
- The synergy between Medicaid HCBS and Medicare post-acute care should be considered and further guide the better coordination between those services.

Table 1.

Descriptive Statistics for the Cohorts for 30-Day and 180-Day Outcomes.

	Sample for 30-Day Outcomes	Sample for 180-Day Outcomes
	***N* = 121,184**	***N* = 110,501**
Outcomes (for 30-day/180-day post-discharge period)		
Successful remaining in the community	78.55	50.28
Death	2.21	11.46
NH admission	10.05	26.43
Hospitalization	16.47	42.85
Individual characteristics		
Age (sd)	78.21 (8.44)	78.33 (8.44)
Male	26.29	25.75
Race		
White	71.91	71.66
Black	17.38	17.19
Other	10.71	11.15
Marital status		
Married	19.13	18.81
Widowed	43.64	43.82
Divorced	18.53	18.48
Separated	1.94	1.95
Never married	14.61	14.78
ADL 28-point score (sd)	12.89 (6.15)	12.98 (6.12)
Cognitive function scale (CFS)		
Intact	55.32	54.99
Mild	21.53	21.72
Moderate	10.26	10.44
Severe	1.87	1.93
Missing	11.02	10.90
Anemia	32.55	32.60
Heart failure	23.88	23.93

	Sample for 30-Day Outcomes	Sample for 180-Day Outcomes
	N = 121,184	*N* = 110,501
Diabetes	42.48	80.77
Hypertension	80.83	42.43
ADRD	20.05	20.12
Asthma/COPD	30.60	30.59
Pneumonia	12.25	12.33
Hip fracture	7.91	7.88
Other fracture	9.38	9.26
Malnutrition	3.17	3.12
Anxiety	20.49	20.41
Manic depression	2.63	2.61
Psychotic disorder	3.30	3.31
Schizophrenia	2.34	2.35
Incontinence	42.95	43.13
Shortness of breath: Exertion	12.71	12.75
Shortness of breath: Sitting	3.39	3.42
Shortness of breath: Lying flat	6.93	6.98
Swallowing problem	3.50	3.53
Weight loss	9.50	9.46
Insulin injection	25.83	25.84

Table 2.

Results From the Main Regression Analysis—Likelihood of Remaining in the Community (Alive and No NH Admission/Hospitalization).

Follow-Up Period: 30 Days		
Variables	**Estimates**	***p*-Value**
HCBS breadth (10%-point)	.00712**	.119
HCBS intensity ($100)	.00120**	.259
Follow-Up Period: 180 Days		
Variables	**Estimates**	***p*-Value**
HCBS breadth (10%-point)	.00627*	.893
HCBS intensity ($100)	−.000237	.779

** $p < 0.05$

* $p < 0.1$. Models accounted for SNF FE and individual covariates.

Table 3.

Results From the Main Regression Analysis—Secondary Analysis.

	Follow-Up Period	Death[a] (Coefficient)	NH Admission[b] (Hazard Ratio)	Hospitalization[a] (Coefficient)
HCBS breadth (10-percentage-point)	30 days	−.18	.96**	−.45
	180 days	−.07	.97**	−.22
HCBS intensity ($100)	30 days	.007	.99**	−.11**
	180 days	.01	.99**	−.01

** $p < 0.05$

*** $p < 0.01$.

[a]Models accounted for SNF FE and individual covariates.

[b]Models accounted for county and SNF RE and individual, facility, and county covariates.

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