



Provision of Immediate Postpartum Long-Acting Reversible Contraceptives Before and After Wisconsin Medicaid's Payment Change

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ABSTRACT

Objectives: We aimed to estimate the association between Medicaid unbundling of payment for long-acting reversible contraceptives (LARC) from the global delivery fee and immediate postpartum (IPP) LARC provision, in a state outside a select group of early-adopters. We also examine the potential moderating roles of hospital academic affiliation and Catholic status on the association between unbundling and IPP LARC provision.

Methods: We used a pre-post design to examine the association between unbundling and IPP LARC provision. We observed Medicaid-covered childbirth deliveries in Wisconsin hospitals between January 2016 and December 2017 ($n = 45,200$) in the State Inpatient Database from the Agency for Healthcare Research and Quality's Healthcare Cost and Utilization Project. We conducted multivariate regressions using generalized linear mixed models.

Results: From 2016 to 2017, IPP LARC provision increased from 0.28% to 0.44% of deliveries ($p = .003$). In our adjusted model, IPP LARC provision was 1.55 times more likely in the post-period versus the pre-period (95% confidence interval, 1.12–2.13). Both before and after unbundling, IPP LARC provision was significantly more common in academic versus nonacademic settings and was exceedingly rare in Catholic institutions.

Conclusions: In contrast with many early adopting states, in this later adopting state, Wisconsin Medicaid's unbundling of LARC from the global fee did not meaningfully change the rates of IPP LARC provision. These results indicate that delivery hospital characteristics are strong correlates of access to IPP LARC and suggest the need for interventions—perhaps outside of the inpatient setting—to ensure that patients can access desired contraceptive methods promptly postpartum.

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Although contraceptive provision after delivery often occurs at the postpartum follow-up visit, hospitals can help patients to access desired care by offering the full method mix before discharge (Rodriguez, Evans, & Espey, 2014). Long-acting reversible contraceptives (LARC)—intrauterine devices (IUDs)

and implants—may be attractive options because they are highly effective and can be provided before patients leave the hospital, called “immediate postpartum” (IPP) placement (Rodriguez et al., 2014; American College of Obstetricians and Gynecologists, 2016). IPP LARC provision has increased substantially in the past several years, and is linked to higher LARC rates postpartum and decreased incidence of short interpregnancies intervals among adolescents (Lopez, Bernholz, Hubacher, Stuart, & Van Vliet, 2015; Moniz, Chang, et al., 2017a; Oduyebo et al., 2019).

At the health care system level, one of the most significant policy barriers to IPP LARC provision is the “global fee” for labor and delivery services (Aiken, Creinin, Kaunitz, Nelson, & Trussell,

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2014). For deliveries covered by Medicaid or private insurance, birthing facilities receive a global labor and delivery fee under one diagnosis-related group code, so if they were to provide LARC, that cost would be deducted from the global fee (Aiken et al., 2014). Because devices are so costly (i.e., upwards of \$600 USD; UCSF Bixby Center for Global Reproductive Health, 2020), provision during the delivery encounter becomes strongly disincentivized (Aiken et al., 2014; Rodriguez et al., 2014). Indeed, nationally, IPP LARC provision occurred in just 0.1% of deliveries from 2008 to 2013 (Moniz, Chang, et al., 2017a).

In response to the global fee, state Medicaid agencies began authorizing separate or additional reimbursement for IPP LARC in 2012, often termed “unbundling” (DeSisto et al., 2017). However, initial interviews with public health representatives from the very first states to implement unbundling suggested that the policy was not sufficient to induce changes in IPP LARC provision (Association of State and Territorial Health Officials [ASTHO], 2014). In response, ASTHO convened representatives from state organizations to facilitate cross-state learning and strategy sharing, where states discussed barriers to implementation, such as lack of preparedness around billing and reimbursement, device stocking and supply issues, and gaps in provider training (DeSisto et al., 2017; Kroelinger et al., 2019). Data from three collaborative states that were early adopters (i.e., adopted unbundling before 2015, which was within 2 years of the first state to do so) demonstrated increases in IPP LARC provision that varied substantially (43% to nearly 8,000%; Okoroh et al., 2018; Steenland Pace, Sinaiko, & Cohen, 2019).

To date, more than three-quarters of states (43 and the District of Columbia) have unbundled IPP LARC, but little is known about experiences of states that adopted within the last few years (American College of Obstetricians and Gynecologists, 2019). Outside of the supportive environment of the collaborative, later adopting states may have had fewer resources for overcoming implementation challenges. Conversely, by incorporating “lessons learned” by states that had implemented prior and guidance from professional organizations, they might be able to deliver IPP LARC more effectively (Horvath, Bumpus, & Luchowski, 2019; Rankin et al., 2016). Finally, challenges to abortion and contraceptive access at the state and federal levels may have heightened postpartum patients’ interest in LARC in recent years (Guttmacher Institute, 2018; Pace, Dusetzina, Murray Horwitz, & Keating, 2019). This rapidly changing context underscores the need to examine unbundling in states that adopted the policy more recently, which will provide critical insight for later adopting states and states considering adoption in the current political environment.

The association between unbundling and IPP LARC provision also likely differs by hospital-level factors, and quantifying that variation is critical to guide prioritization of technical assistance, education, and outreach resources to ensure equitable access to IPP LARC. Hospital-level factors—including academic affiliation and Catholic status—are highly associated with IPP LARC access, but have been understudied in the context of unbundling (Hill et al., 2017). Catholic health care institutions restrict contraceptive care provision among other reproductive services, which may impose a hard limit to the promise of Medicaid unbundling, especially in states with high saturation of Catholic facilities (Uttley & Khaikin, 2016). However, no research has systematically examined how associations between unbundling and IPP LARC provision vary by hospital Catholic status. On the other hand, hospital academic affiliation facilitates patient access to IPP LARC (Castleberry, Stark, L., Schulkin, J., & Grossman, 2019;

Holden et al., 2018; Okoroh et al., 2018). Many academic obstetrics and gynecology departments received funding for IPP LARC services through external training programs (Hill, Slusky, & Ginther, 2019; Simonson, Gerard, Pomerantz, Mullersman, & Landy, 2014). Experiences of two early adopting states suggested that IPP LARC provision occurred nearly exclusively at academic hospitals, due at least in part to significant efforts from faculty “champions” to implement it (Okoroh et al., 2018). The extent to which academic affiliation confers advantage in later adopting states is underexplored, and documenting this relationship is critical to identifying particular settings where additional policies and programs may be needed to promote equitable access to IPP LARC.

To address these gaps, we quantified the associations between unbundling and the provision of IPP LARC in Wisconsin, and how they vary by hospital academic affiliation and Catholic status. The distribution of births in Wisconsin—with about 25% occurring in academic hospitals and about 40% in Catholic hospitals—will provide adequate variation to investigate differences in provision by these factors (Wisconsin Department of Health Services, 2018). This study is the first to quantitatively examine a state outside a select group of states that adopted the policy within the past few years and was not one of the select group of states that participated in the multistate collaborative, thus representing a more real-world test of the policy change. Further, by incorporating salient hospital characteristics into our examination of the policy change, this study may shed light on systems-level factors that structure patients’ access to these methods.

Methods

Research Design

We used a pre–post design to estimate the association between unbundling and IPP LARC provision from the perspective of Wisconsin Medicaid. This intervention was discrete: unbundling took effect on January 1, 2017 (Baron, Potter, & Schrage, 2018; Forward Health, 2017). We observed inpatient discharge records in the 12 months before and after the policy change. To identify the association between unbundling and IPP LARC provision, we examined the natural experiment of Wisconsin’s unbundling policy change. We then added interaction terms to examine the extent to which that association varied by hospital-level factors.

Data Sources

We used data from the Wisconsin State Inpatient Database (SID). The State Inpatient Databases, from the Agency for Healthcare Research and Quality’s Healthcare Cost and Utilization Project (HCUP), represent a census of hospitalizations each year (Agency for Healthcare Research and Quality, 2019). A distinct advantage of the State Inpatient Database is that it reflects the hospitals’ records of all inpatient discharges, not billed claims—which some evidence suggests may not adequately capture IPP LARC services rendered (Palm et al., 2020). These data include clinical diagnoses and procedures and expected payer; Wisconsin’s data also has hospital identifiers and billing codes. We used the hospital National Provider Index to identify hospital names using the National Plan and Provider Enumeration System. During the study period, there were 96 birthing hospitals in the state of Wisconsin.

We accessed historical web pages using the Internet Archive (www.archive.org/web) to determine hospital characteristics. We classified hospitals as academic if they were obstetrics residency rotation sites for academic departments of obstetrics and gynecology during the study period. We determined hospital Catholic status using the Catholic Health Association's directory (Catholic Health Association of the United States, 2020) along with online media searches to identify timing of mergers.

The Institutional Review Board at the University of Wisconsin–Madison deemed this study not human subjects research and therefore exempt from full review.

Study Sample

Our study population included patients with a childbirth delivery and Medicaid as primary payer in the 12 months before and after the policy change (January 1, 2016, to December 31, 2017). We selected this study period based on results from prior-adopting states that demonstrated increases in provision shortly after implementation; that is, a doubling of rates within the first 3–6 months (Okoroh et al., 2018; Steenland et al., 2019; Steenland, Pace, Sinaiko, & Cohen, 2021). Deliveries were iden-

following codes indicating IUD or implant placement: ICD-10-CM codes Z30.014, Z30.017, or Z30.430; ICD-10-PCS codes 0UH97HZ, 0JHF3HZ, 0JHD3HZ, 0JHH3HZ, or 0JHG3HZ; Current Procedural Terminology codes 11981 or 58300; and Healthcare Procedural Coding System codes J7307, J7297, J7298, J7300, or J7301.

Analytic Approach

We first calculated the unadjusted percentages of deliveries with provision of IPP LARC. We then used generalized linear mixed models with a logit link, accounting for nonindependence among clustered data, and providing the opportunity to examine cluster-specific effects (Gelman & Hill, 2007). Our empirical model for this question is specified in (1) below. For each delivery, p_{ij} reflects the probability of IPP LARC provision for patient j in hospital i . The *policy* variable equals 1 if unbundling was in place in month t and 0 if it was not. The *academic* and *Catholic* variables are binary variables that reflect whether or not the delivery hospital is academically affiliated or a Catholic institution, respectively. The model adjusts for patient age and race, and ε_{ij} represents a random error.

$$\text{logit}(p_{ij}) = \alpha_i + \beta_1(\text{policy})_{ij} + \beta_2(\text{academic})_{ij} + \beta_3(\text{Catholic})_{ij} + \beta_4(\text{age})_{ij} + \beta_5(\text{race})_{ij} + \varepsilon_{ij}, \alpha_i = \alpha_0 + b_i \quad (1)$$

tified by the presence of at least one of the following codes: Diagnosis-Related Groups codes 765 to 768 or 774 to 775, ICD-10-CM codes O80, O82, or Z37.0 to Z37.9, and ICD-10-PCS codes 10D00Z0-2 or 10D07Z3-8.

Measures

Our outcome was documentation of IPP LARC provision in the patient-level hospital discharge record (yes vs. no). We defined IPP LARC provision as the presence of one or more of the

We exponentiated the coefficients to obtain odds (for α_i) and odds ratios (for β_s). Then, the random intercept α_i reflects the hospital-specific baseline odds of IPP LARC provision during a delivery hospitalization. The coefficient β_1 reflects the log odds ratio of IPP LARC provision after versus before the policy change. The coefficients β_4 and β_5 represent the log odds ratios of IPP LARC provision associated with delivering in an academic versus nonacademic hospital and a Catholic versus non-Catholic hospital, respectively. Next, to examine how associations may differ by hospital characteristics, we added interaction terms for

Table 1

Characteristics of Medicaid-Covered Patients with Childbirth Deliveries in Wisconsin, by Period, Wisconsin State Inpatient Database, Agency for Healthcare Research and Quality's Healthcare Cost and Utilization Project [2016–2017] (N = 45,200)

Characteristic	Pre-period (2016) (n = 22,795)		Post-period (2017) (n = 22,405)		χ^2 Test, Pre vs. Post p Value
	Total N	Col %	Total N	Col %	
Hospital Academic Affiliation					
Academic	5,884	25.8	5,852	26.1	.46
Nonacademic	16,911	74.2	16,553	73.9	
Hospital Catholic status					
Catholic	9,847	43.2	9,344	41.7	.001
Not Catholic	12,948	56.8	13,061	58.3	
Patient age					
<20	1,956	8.6	1,847	8.2	.43
20–24	6,475	28.4	6,401	28.6	
25–29	7,412	32.5	7,227	32.3	
30–34	4,639	20.4	4,562	20.4	
≥35	2,313	10.2	2,368	10.6	
Patient race/ethnicity					
Non-Hispanic White	11,480	50.4	11,082	49.5	<.0001
Non-Hispanic Black	5,090	22.3	5,427	24.2	
Hispanic	3,927	17.2	3,769	16.8	
Other or unknown	2,298	10.1	2,127	9.5	

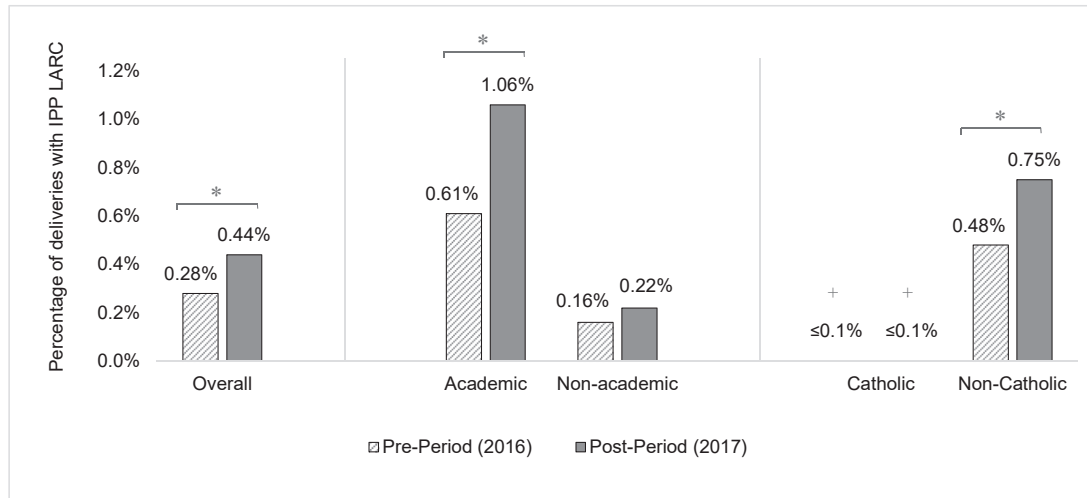


Figure 1. Percentage of Medicaid-Covered Patients with Childbirth Deliveries in Wisconsin Hospitals Receiving Immediate Postpartum Long-Acting Reversible Contraceptives, by Period and Hospital Characteristics, Wisconsin State Inpatient Database, Agency for Healthcare Research and Quality's Healthcare Cost and Utilization Project [2016–2017] (N = 45,200) *Pre- and post-period values differ significantly ($p < .05$). + $\leq 0.1\%$; data suppressed due to small cell sizes, per HCUP data use agreement.

Catholic status and academic affiliation, separately. We also estimated all models using a more expansive definition of Medicaid coverage: Medicaid as either primary or secondary payer.

Results

Sample Characteristics

As shown in Table 1, our sample included 22,795 patients with Medicaid-covered deliveries in the pre-period (January to December 2016) and 22,405 in the post-period (January to December 2017). In both years, one-third of patients were between 25 and 29 years old, and approximately three-quarters delivered in academically affiliated hospitals. Approximately

one-half of births occurred to White patients and 42%–43% took place in Catholic hospitals; these characteristics varied significantly over time (both $p < .01$), but the differences were within 2 percentage points.

Descriptive Change in IPP LARC Provision

As shown in Figure 1, from 2016 to 2017, IPP LARC provision increased from 0.28% of patients with Medicaid-covered deliveries to 0.44% ($p = .003$). The relative frequency of IUD versus implants among LARC placements favored IUDs in the pre-period (54%) but implants in the post-period (59%), although this difference was not significant ($p = .07$; data not shown). In academic hospitals, IPP LARC provision increased from 0.61% to 1.06% ($p = .008$), whereas in nonacademic hospitals, there was

Table 2
Unadjusted and Adjusted Odds of Immediate Postpartum Long-Acting Reversible Contraceptive Provision Among Medicaid-Covered Patients with Childbirth Deliveries in Wisconsin, Wisconsin State Inpatient Database, Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project [2016–2017] (N = 45,200)

Characteristic	(1) Unadjusted		(2) Adjusted, without Interaction Terms	
	OR	95% CI	aOR	95% CI
Policy change	1.55	(1.13–2.13)	1.55	(1.12–2.13)
Hospital academic affiliation				
Academic	—	—	11.32	(1.59–80.78)
Nonacademic	—	—	Ref	—
Hospital Catholic status				
Catholic	—	—	.028	(0.003–0.29)
Not Catholic	—	—	Ref	—
Patient age				
<20	—	—	1.48	(0.89–2.45)
20–24	—	—	.84	(0.56–1.26)
25–29	—	—	Ref	—
30–34	—	—	.76	(0.48–1.21)
≥35	—	—	.69	(0.38–1.25)
Patient race/ethnicity				
Non-Hispanic White	—	—	Ref	—
Non-Hispanic Black	—	—	1.91	(1.22–2.98)
Hispanic	—	—	1.91	(1.19–3.05)
Other or unknown	—	—	1.02	(0.52–2.00)

Model 1 is unadjusted, no interaction; model 2 is adjusted for variables in table, no interaction

no significant change (from 0.16% to 0.22%). The IPP LARC provision in non-Catholic hospitals increased from 0.48% to 0.75% ($p = .0002$). In Catholic hospitals, provision of IPP LARC was extremely rare in both periods ($<0.05\%$).

Logistic Regression Models

Table 2 presents unadjusted (model 1) and adjusted (model 2) odds from logistic regression models predicting IPP LARC provision. The unadjusted odds ratio (OR) of IPP LARC provision in the post-versus pre-period was 1.55 (95% confidence interval [CI], 1.13–2.13). Similarly, in the adjusted model (model 2), patients were 1.55 times more likely to receive IPP LARC in the post-period compared with in the pre-period (95% CI, 1.12–2.13). Overall, IPP LARC provision was more than 11 times more likely among patients delivering in an academically affiliated hospital (OR, 11.32; 95% CI, 1.59–80.78), and 35 times less likely among patients delivering in a Catholic hospital (OR, 0.028; 95% CI, 0.003–0.29). Provision was more common among Black (OR, 1.91; 95% CI, 1.22–2.98) and Hispanic (OR, 1.91; 95% CI, 1.19–3.05) patients. Models that include interaction terms for hospital-level factors demonstrate that the unbundling \times academic affiliation term and the unbundling \times Catholic status term are both nonsignificant ($p = .49$ and $p = .77$, respectively). Results were robust to the inclusion of patients with Medicaid as secondary payer (Appendix A).

Discussion

This study is the first to examine the association between unbundling and IPP LARC provision in a later adopting, non-ASTHO collaborative state, and to assess whether hospital Catholic status and academic affiliation moderate that association. We found a significant increase in IPP LARC provision from the pre-period to the post-period. However, the increase is small in practical terms: even in the post-period, fewer than one-half of one percent of deliveries were accompanied by an IPP LARC code. Our findings in this later-adopting state suggest that unbundling did not dramatically change provision of IPP LARC.

Comparing these results to previously published studies helps provide a sense of scale. In addition to having the smallest absolute percentage of LARC provision in the post-period (0.44% of Medicaid-covered deliveries), Wisconsin also had the second-smallest relative increase in IPP LARC provision pre-versus post-unbundling (1.57-fold). For comparison, early adopting, ASTHO collaborative states Louisiana and South Carolina demonstrated much larger relative pre-post differences (17- and 80-fold, respectively).

The idea that unbundling does not automatically confer access to IPP LARC—but rather, that its effectiveness is highly variable based on context—is echoed in qualitative research on policy implementation. For example, in Louisiana, providers successfully championed device stocking efforts to hospital administrators (Okoroh et al., 2018). However, overall, states cited a multitude of barriers to implementation, including challenges with payer preparedness around billing and reimbursement, device stocking/supply and up-front costs, clinical expertise, and awareness among providers and hospital administrators (Brown, Greenfield, & Rapkin, 2020; Hill et al., 2019; Hofler et al., 2017; Okoroh et al., 2018; Rankin et al., 2016). Although we cannot measure these systems-level barriers in this study, it may be that some or all of these were also at play in Wisconsin, several years later.

In this study, we also built on the prior literature by quantitatively estimating associations between IPP LARC provision and relevant delivery hospital characteristics. Both before and after unbundling took effect, provision of IPP LARC was significantly more common in academic settings versus nonacademic settings and was exceedingly rare in Catholic hospitals. These results may reflect relatively greater preparedness or capacity for IPP LARC provision or successful outreach to academic partners by ASTHO and the American College of Obstetricians and Gynecologists (Kroelinger et al., 2015). Although workarounds may exist in Catholic facilities for the provision of some contraceptive methods, our data in these institutions indicate that IPP LARC provision is virtually inaccessible for patients delivering in Catholic hospitals (Guihi et al., 2017). Finally, we found that Black and Hispanic patients were nearly twice as likely as White patients to have a hospital discharge indicating IPP LARC during the study period. This pattern may reflect differences in patients' contraceptive preferences; if so, the fact that Black and Hispanic patients in Wisconsin are especially likely to give birth at Catholic hospitals would suggest a mismatch between preferences and access (Shepherd, Franke, & Chiasson, 2020). However, it may be that providers are differentially recommending LARC to patients of color (Dehlendorf et al., 2010). Indeed, recent qualitative research from unbundling states documents concerning reports—largely from racially minoritized patients—of undue pressure to use IPP LARC (Mann, White, Rogers, & Gomez, 2019; Sznajder, Carvajal, & Sufrin, 2020).

Our findings should also be considered in light of limitations. We did not find evidence of a concurrent or immediately precipitating event at the state or local level that would confound the observed unbundling-IPP LARC relationship. We reached that conclusion after consulting with a local clinical expert and searching online for clinical and public health recommendations that may have been released around the time of unbundling. Although there is some evidence of increased demand nationally for LARC immediately after the 2016 presidential election (Pace et al., 2019), it is unclear whether any resulting changes in contraceptive use in Wisconsin would have occurred in the late pre-period (i.e., post-election, late 2016) or in the early post-period (i.e., pre-inauguration, early 2017). Nonetheless, we acknowledge that we cannot rule out the possibility of a confounding event. We considered using an interrupted time series design, but there were too few LARC placements to support an analysis by month. We also considered using a differences-in-differences design, but we felt we lacked a control group that had the data elements required to capture LARC provision and would also be protected from spillover effects. For example, non-Medicaid births may have been indirectly influenced by Medicaid's LARC unbundling, via subsequent efforts to promote access to IPP LARC among the broader population of postpartum patients, regardless of insurance status (Centers for Disease Control and Prevention, 2018; University of Michigan Institute for Healthcare Policy and Innovation, 2018). Additionally, while it is possible that there could be human errors in IPP LARC documentation in inpatient discharge records, we have no reason to think these would have differed systematically from the pre-to the post-period.

Implications for Practice and/or Policy

With an intervention as complex as IPP LARC, more research is needed to understand how promising practices for placement—such as securing and maintaining device supply and

training providers in insertion—can be integrated into models of postpartum care delivery. It may also be that interventions outside of the inpatient setting are needed to fill gaps in service availability; for example, so that patients delivering at Catholic hospitals can still obtain their preferred method promptly postpartum. Future research should delve deeper into the unbundling experiences of hospitals that were particularly successful at delivering IPP LARC, as well as investigate additional strategies to integrate IPP LARC provision into postpartum care. Further, as argued by reproductive justice advocates, policies and programs should facilitate access to the full range of contraceptive methods, rather than only select methods, in order to preserve patients' reproductive autonomy (Moniz, Spector-Bagdady, Heisler, & Harris, 2017b). Finally, it is critical that policies that promote insertion of provider-dependent methods also cover removal, so that when patients wish to have their devices removed, they may do so freely.

Conclusions

We observed a very small increase in IPP LARC provision from the pre-period to the post-period, suggesting that the policy change did not significantly expand patients' access to these methods. We found large differences in provision—both before and after unbundling—by hospital academic affiliation and Catholic status, indicating that postpartum patients' likelihood of receiving LARC depends a great deal on the characteristics of their delivery hospital.

Supplementary Data

Supplementary data related to this article can be found at doi:10.1016/j.whi.2021.02.009.

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