LETTERS TO THE EDITOR

Kidney Transplant in Children: Strategic Timing During Summer School Breaks

To the Editor:

Kidney transplantation is the optimal treatment for children with kidney failure, improving survival and development compared with dialysis.[1,2] However, the immediate post-transplant period requires a typical hospitalization of approximately 1 wk, with a subsequent home recovery period, and high risk of early rehospitalization.[3] School absenteeism, particularly among children with chronic illness, may negatively affect long-term development and disrupt young patients' lives.[4,5] We aimed to describe changes in weekly transplant rates between summer break versus nonsummer break weeks to understand whether the school calendar informs strategic timing of pediatric kidney transplantation for school-age recipients.

We used Scientific Registry of Transplant Recipients data (see Item S1: Supplemental Methods) to identify all US kidney transplants from 2001-2022 for recipients aged 0-65 years, excluding multiorgan transplants (n=330,117). We defined "school-age" recipients as those 6-17 years and defined the "summer school break period" as weeks 23-32 of the year.

We calculated the mean number of transplants per week of the year for living donor kidney transplants (LDKT), which can be electively scheduled based on family preferences, and deceased donor kidney transplants (DDKT), for which timing is determined by organ availability. We compared weekly transplant rates during the summer school break period versus nonsummer break weeks among school-age children (n=13,050) and compared characteristics of recipients transplanted during each period. We compared transplant rates during the summer school break period versus nonsummer break weeks for preschool-age children (≤5 years, n=3,553), and adults (18-65 years, n=313,514), for whom parental or employment obligations may still apply.

Among school-age recipients, weekly LDKT transplant rate increased by 73% during the summer school break period, from 3.7 transplants/week during nonsummer break weeks to 6.4 transplants/wk (Fig 1A). In contrast, weekly DDKT rate increased only 7% during the summer break period (7.1-7.6 transplants/wk). For LDKT among school-age children, there was a greater summer break increase for transplants involving preemptively transplanted recipients (93% increase, 1.5/wk to 2.9/wk) compared with those with recipients on dialysis (59% increase, 2.2/wk to 3.5/wk); however, this difference was not seen among DDKT recipients (preemptive: 10% increase, 6.8/wk to 7.5/wk; on dialysis: 10% increase 5.2/wk to 5.7/wk) (Fig 2).

Among preschool age children and adults, the summer break increase in transplant rate was small for both LDKT (preschool: 6% increase, 1.6/wk to 1.7/wk; adult: 13% increase, 95.0/wk to 107.3/wk) and DDKT (preschool: 13% increase, 1.5/wk to 1.7/wk; adult: 5% increase, 175.1/wk to 183.3/wk) (Fig 1B and C). Although not the focus of our study, there were observable increases in the LDKT rate immediately preceding the winter holiday period among all age groups, suggesting these times may be strategically used to minimize time off work for recipients, caregivers, and/or donors.

Among school-age recipients, those receiving transplants during the summer school break period were more likely to have non-Hispanic White race/ethnicity (53% vs 47%, $P < 0.001$) and private insurance (46% vs 40%, $P < 0.001$) (Tables S1, S2). This finding was consistent when analyzing only LDKT but not DDKT recipients (Table S3).

Among school-age LDKT recipients, for whom transplant can be electively scheduled, transplant rate increased nearly 2-fold during the summer school break period, suggesting preferential scheduling to avoid school disruptions. A greater increase in LDKT during the summer for preemptive recipients compared with those receiving dialysis, which is associated with poor outcomes and itself can be disruptive, suggests that school-related scheduling preferences may be impeded by dialysis complications or superseded by the medical urgency of reducing dialysis exposure. Further, utilization of summer scheduling flexibility is only possible for LDKT recipients, yet these recipients are less likely to have minority race and lower socioeconomic status.[6,7] However, even when analyzing only LDKTs, summer break recipients were more likely to have advantaged sociodemographic characteristics, suggesting differences in summer transplant utilization are independent of living donor availability. Although our analysis is merely descriptive, and we are limited by an inability to confirm schooling status for included recipients, this same increase was not seen among preschool-age children or adults, suggesting school schedules are an important component of family scheduling preferences.[8] Future analyses may further confirm these findings by pursuing multivariate analyses and examining how these trends may have changed over time, particularly given recent changes in workplace flexibility, which may affect children with employed parents.

Although these data indicate preferential scheduling of pediatric LDKT during the summer school break period, it is not clear whether this strategy is appropriate or beneficial. Strategic scheduling of transplantation during the summer may hypothetically ameliorate academic and interpersonal challenges experienced by children with chronic illness, yet premature transplantation could increase immunosuppression duration and risk of graft failure over the lifetime.[5,9] Rather, our analysis demonstrates that preferences for summer scheduling are affecting patient behaviors, and we ought to be cognizant of not only the benefits and harms of these choices, but to whom they are accessible. Further research is needed to determine the medical and psychosocial effect of transplant scheduling on short- and long-term outcomes.

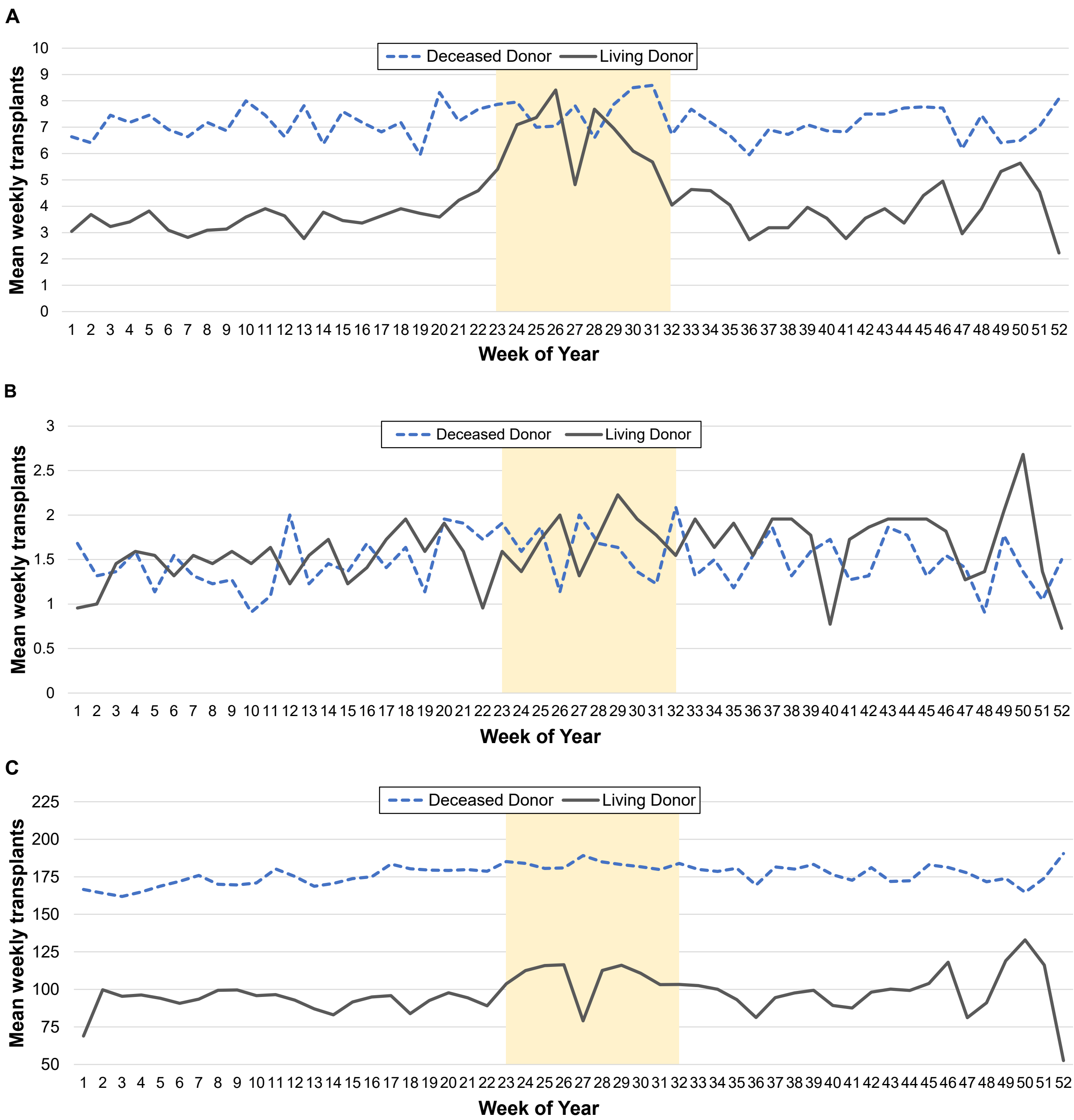

Figure 1. Living donor versus deceased donor kidney transplants for US kidney transplant recipients by week of year, 2001-2022. (A) Kidney transplants among school-age recipients, 6-17 years. (B) Kidney transplants among pre-school aged recipients, ≤5 years. (C) Kidney transplants among adults, 18-65 years.

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SUPPLEMENTAL MATERIALS

Supplementary File (PDF)

Item S1: Supplemental methods.

Table S1: Characteristics of School-age Pediatric Kidney Transplant Recipients (6-17 Years) by Timing of Kidney Transplant.

Table S2: Characteristics of School-age Pediatric Kidney Transplant Recipients (6-17 Years) by Donor Type.

Table S3: Characteristics of School-age Pediatric Kidney Transplant Recipients (6-17 Years) by Donor Type and Transplant Timing.

ARTICLE INFORMATION

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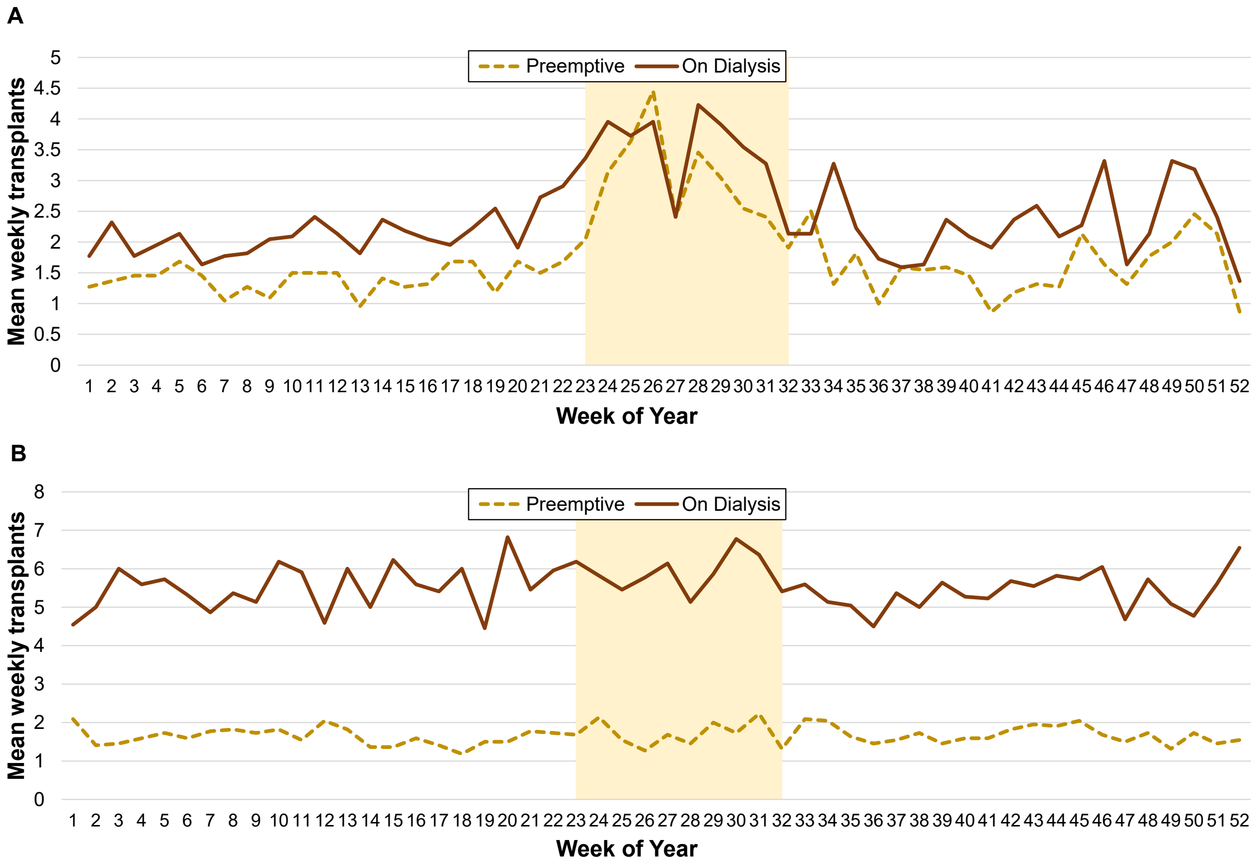

Figure 2. Kidney transplants among school-age recipients (age 6-17 years) by pretransplant dialysis status. (A) Living donor kidney transplants. (B) Deceased donor kidney transplants.

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