

## INCIDENCE OF WINTER DEPRESSION VARIES WITHIN TIME ZONES

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**Objectives:** We previously demonstrated a positive latitude cline, spanning 32-47 °N latitude, in the proportion of respondents to our online AutoPIDS survey (1) attesting to winter depression (2). The cline parallels the progressively later clock time of sunrise in winter, which is thought to be depressogenic. At any latitude within a given time zone, the sun also rises progressively later (up to 1 h within 15° longitude zones) from the eastern to western tiers, and then jumps 1 h earlier when the zone is crossed. We therefore sought evidence of variation in the incidence of winter depression within a time zone. **Methods:** Data were analyzed for 1510 adult respondents (22-70 y; 75.4% women) to the AutoPIDS who lived at 39-45 °N latitude in two adjacent time zones, at 3 locations spanning 6° longitude: eastern tier of the Eastern Time zone (69-75 °W longitude, N=837), western tier of the Eastern Time zone (81.5 °W to the Michigan-Indiana/Wisconsin-Illinois border, N=256) and eastern tier of the Central Time zone (state borders to 93.5 °W, N=417). Mean latitude of residence was closely matched within 0.35° across the 3 locations. **Results:** Global Seasonality Score  $\geq 1$ , incidence of winter major depression (DSM-IV-based diagnosis), and wintertime fatigability, hypersomnia and weight gain were all significantly higher in the western tier of the Eastern Time zone than in the eastern tier, and dropped precipitously in the immediately adjacent eastern tier of the Central Time zone. For  $GSS \geq 1$ : west, 41.4%; east, 29.3%;  $\chi^2=13.24$ ,  $P=0.0003$ . Within the spectrum of major depressive symptoms, similar significant west-east differences were seen in the incidence of depressed mood, diminished interest/pleasure, appetite/weight change, insomnia/hypersomnia, fatigue/energy loss, agitation/retardation and worthlessness/guilt. **Conclusions:** The delayed clock time of sunrise in the western tier of a time zone exaggerates the incidence winter depression, raises the proportion of people with clinically significant seasonality, and promotes atypical neurovegetative symptoms. Intervention with artificial dawn simulation or morning bright light therapy could counteract the depressogenic longitude and latitude effects of long winter nights. The current U.S. Congress proposal to extend Daylight Saving Time (or Summer Time) from April-October to March-November would invade the season of winter depression, with particular exacerbation in the western tier of time zones.

**References:** (1) Terman M, White T, Williams J. Automated Personal Inventory for Depression and SAD. [www.cet.org](http://www.cet.org), accessed 15 May 2005. (2) White T, Terman M. The Global Seasonality Score reconsidered: convergence on diagnosis of winter depression. *Chronobiol Int* 2005;21:805.

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