

## SUPPLEMENTAL DIGITAL CONTENT TO BE PUBLISHED

### *Visualizing Geographic Variation in MMaT*

Suppose a resident of Wapakoneta, a small town in northeast Ohio, is in need of a liver transplant. At what transplant centers might that resident consider listing? And at what MELD might he expect to receive a transplant? To answer these questions, we used a weighted average of the median MELD/PELD at transplant (MMaT) of all transplant centers in the continental U.S. based on distance to those transplant centers. All subsequent analysis only considers transplant centers which did, on average, 10 transplants per LSAM run.

Suppose the distance from Wapakoneta to each of the  $n$  transplant centers in the continental U.S. is  $d_1, d_2, \dots, d_n$  with  $d_1$  being the distance to the closest transplant center,  $d_2$  being the distance to the second closest transplant center, and so on. For each transplant center we define a corresponding weight  $w_i$ :

$$w_i := \frac{\exp\left(-\frac{d_i^{5/4}}{d_1}\right)}{\sum_{j=1}^n \exp\left(-\frac{d_j^{5/4}}{d_1}\right)}.$$

If  $m_i$  is the MMaT for transplant center  $i$ , then we estimate that our resident living in Wapakoneta, Ohio would expect an MMaT of

$$MMaT := \sum_{i=1}^n w_i m_i.$$

Thus the above equation is a weighted average of the MMaT across all transplant centers, where the weight  $w_i$  can be loosely interpreted as the probability our Wapakoneta resident will list at transplant center  $i$ .

The table below shows the 9 transplant centers at which our Wapakoneta resident is most likely to list based on distance (the remaining transplant centers had a combined negligible effect). It includes the distance  $d_i$ , the probability  $w_i$  he will list, and the MMat  $m_i$  at each of those centers. Our Wapakoneta resident is most likely to list at transplant center OHOU (Ohio State University Medical Center) with a probability of 0.56 at 63 nm away, he is second most likely to list at OHCM (Children's Hospital Medical Center Cincinnati) with a probability of 0.15 at 86 nm away and so on. Thus using the above equation we can estimate the MMat in Wapakoneta, Ohio as

$$MMat \approx \sum_{i=1}^9 w_i m_i = 26.57.$$

	Code	$d_i(nm)$	$w_i$	$m_i$
1	OHOU	63	0.56	24
2	OHCM	86	0.15	35
3	OHUC	88	0.14	29
4	INIM	103	0.05	25
5	MIUM	106	0.05	25
6	MIHF	119	0.02	25
7	MIBH	126	0.01	26
8	OHCC	130	0.01	28
9	OHUH	130	0.01	28