

Supplementary Table 1: Data that could be extracted from narratives of 973 waitlist candidates with approved HPS exceptions

Available clinical data	Number with data, (%)
Transthoracic echocardiogram (TTE)	833 (85.6)
Definitive shunt on TTE	815 (97.8)
Definitive intrapulmonary shunt on TTE	461 (56.6)
Timing of bubbles reported as “late” when shunt when definitively present	112 (13.7)
Macro-aggregated albumin (MAA) scan performed	223 (23.7)
MAA shunt fraction reported	114 (51.1)
Pulmonary function test data	165 (17.0)
Presence or absence of concomitant pulmonary disease	973 (100.0)
Need for supplemental oxygen	384 (39.5)
Arterial blood gas (ABG)	855 (87.8)
ABG on room-air	747 (87.4)

Supplementary Table 2: Pre-liver transplant HPS waitlist candidates dying on the waitlist or within 90 days of de-listing for waitlist candidates with HPS MELD exceptions*

PaO ₂ category	Deaths on the waitlist or within 90 days of delisting, (%)
≤44.0mmHg, N=94	9 (9.6)
44.1-54.0mmHg, N=344	30 (8.7)
54.1-61.0mmHg, N=364	32 (8.8)
≥61.1mmHg, N=84	6 (7.1)
Can't determine, N=87	9 (10.3)

* PaO₂ categories based on best-fit cubic spline PaO₂ cutpoints. "Can't determine" patients are those without room-air oxygenation data. P=0.96 for chi-square test comparing the proportion dying on the waitlist or within 90 days of de-listing.

Supplementary Figure 1: Flow diagram of inclusion of liver transplant waitlist candidates submitting an HPS exception application from 2002-2012

