St Thomas solution (10 ml/kg) supplemented with Glycerol Trinitrate (100 mg/l) and epoetin alfa (5000 IU/l), was then initiated at a pressure of 100 mmHg. Standard pneumoplegia with topical cooling of all thoracic organs followed. The heart was excised and instrumented onto the OCS system where after the lungs and liver were procured in tandem.

**Results:** Six male and two female DCD hearts from donors aged 39 ± 10 years were procured. Time from withdrawal of donor support to declaration of death and initiation of cardioplegia was 22 ± 8 min and 32 ± 9 min respectively. Time from skin incision to heart re-perfusion on the OCS system in the clinical cases was 33 ± 6 min.

There was no mortality in the three transplanted DCD heart recipients. The lungs and abdominal organs were all procured without deleterious effect from the modified retrieval process.

**Conclusion:** We believe that for retrievals requiring blood drainage for priming an ex-vivo resuscitation device, the methods described have been demonstrated to be efficient, safe and reproducible.

### 22 Functional Assessment of the DCD Heart Within the Donor and Ex Vivo

**Purpose:** After almost 50 years following the first successful DCD human heart transplant, the significance of this untapped donor pool has recently been rediscovred. Unfortunately the mandatory warm ischaemic period encountered following death and its effect upon subsequent graft function still remains. In the absence of a currently available ex vivo functional assessment platform we sought to identify whether function could be assessed within the donor following reperfusion with extra corporeal membrane oxygenation (ECMO).

**Methods:** A porcine DCD model was created (n=3) following hypoxic cardiac arrest after cessation of mechanical ventilation. Hearts were then left undisturbed at 37°C for 15 minutes following mechanical asystole. ECMO perfusion was then established and cardiac function restored. After 60 minutes, hearts were weaned from ECMO before functional assessment was undertaken using cardiac output measurements and load independent indices derived from pressure-volume (PV) loops. Hearts were then explanted onto the TransMedics Organ Care System before functional assessment in working mode. DCD heart performance was compared against normal controls (n=4) both within the donor and upon the OCS.

**Results:** All results are expressed as a mean +/- SD. DCD hearts required dopamine to be successfully weaned from ECMO. On 10 µg.kg.min of dopamine support cardiac output, mixed venous saturations and PRSW values trended back to pre withdrawal function. In control hearts cardiac output upon the OCS was 3 fold less than that within the donor. When assessing DCD hearts on the OCS, cardiac output and PRSW were almost half in comparison to controls. Following an inotropic challenge upon the OCS, DCD hearts again trended back toward baseline revealing inotropic reserve.

**Conclusion:** Cardiac function can be successfully assessed within the donor following reperfusion upon ECMO. DCD hearts subjected to 15 mins of warm ischaemia following death reveal significant impairment but still retain inotropic reserve.

### Functional Values of DCD and Control Hearts Within the Donor and Ex Vivo

<table>
<thead>
<tr>
<th>Functional Values of DCD and Control Hearts</th>
<th>Donor</th>
<th>Ex Vivo</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Situ</td>
<td>In Situ</td>
<td>Control</td>
</tr>
<tr>
<td>Heart Rate (bpm)</td>
<td>(n=4)</td>
<td>(n=4)</td>
</tr>
<tr>
<td>115 (10)</td>
<td>160 (10)</td>
<td>117 (23)</td>
</tr>
<tr>
<td>Cardiac Output (L/min)</td>
<td>8.9 (1.8)</td>
<td>5.2 (0.3)</td>
</tr>
<tr>
<td>Cardiac Index</td>
<td>4.1 (0.2)</td>
<td>3.2 (0.4)</td>
</tr>
<tr>
<td>Mixed Venous Saturations (%)</td>
<td>55 (4)</td>
<td>60 (4)</td>
</tr>
<tr>
<td>PrSW (mmHg)</td>
<td>1286 (128)</td>
<td>1612 (143)</td>
</tr>
<tr>
<td>PRSW (mmHg)</td>
<td>-949 (-132)</td>
<td>-1116 (-393)</td>
</tr>
</tbody>
</table>
| 23 Shorter Cold Ischemic Time in Older Donors Post-Heart Transplant Appears to Be Protective

**Purpose:** The use of older donors in heart transplant (≥50 years old) has been reported to have less good outcome compared to younger donors (<50 years old). These older donors may have preexisting coronary artery disease, and have risk factors including hypertension, diabetes and hyperlipidemia. It has been postulated that the use of older donors with relatively short cold ischemic times may have improved outcomes. Therefore, we sought to answer this question by evaluating our older donors and cold ischemic time.

**Methods:** Between 1994 and 2010, we evaluated 748 heart transplant patients and divided them into those who received donor hearts ≥50 years old and <50 years old. Patients were further divided into those who had a cold ischemic time of <120 minutes (short), 120-140 minutes (medium), and 240 minutes (long). Endpoints included 5-year actuarial graft survival, freedom from cardiac allograft vasculopathy (CAV), freedom from non-fatal major adverse cardiac events (NF-MACE: myocardial infarction, new congestive heart failure, percutaneous coronary intervention/angioplasty, pacemaker/ICD insertion and stroke) and freedom from 1-year treated rejection.

**Results:** Patients who received older donor hearts with short ischemic times appeared to have comparable long-term outcomes to patients who received a younger donor heart with short ischemic times. Patients who received an older donor heart with a cold ischemic time of 120-240 minutes and >240 minutes had poorer outcomes compared to patients who received a younger donor heart in each time group (see table).

**Conclusion:** A shortened cold ischemic time appears to confer better long-term graft survival in heart transplant patients with older donors. This will be of value in selection of older donors.

### 24 Donor Under Sizing Results in Worse Post-Transplant Survival in LVAD Patients: A UNOS Database Analysis

**Purpose:** Donor to recipient undersizing can result in diminished graft and recipient survival. This study examines post-transplant survival in patients with a size (BMI) mismatch of ≥ 20% with and without a continuous flow LVAD.

**Methods:** The United Network of Organ Sharing database was retrospectively queried from January 2008 to December 2013 to identify adult patients who underwent heart transplantation. This population was divided into 2 groups: donor:recipient BMI ratio ≤ 0.8 (BMI undersize group) and > 0.8. The BMI undersize group was further subdivided into those who had a continuous flow LVAD at the time of transplant and those who did not. Kaplan-Meier analysis was used to compare survival between groups.

**Results:** A total of 10,524 patients received a heart transplant during this time period of which 1666 (15.8%) received a donor heart with a BMI ratio ≤ 0.8. Of the BMI undersize group, 595 (35.7%) had an LVAD at transplant and 1071 (64.3%) did not. Characteristics for all groups are shown in Table 1.
Without BMI undersizing, survival was equivalent between patients with and without an LVAD at the time of transplant (Fig 1A, p = 0.467); however, for patients with BMI undersizing of > 20%, 3-year survival was reduced for patients who had an LVAD vs. those without an LVAD at the time of transplant (81.7 vs. 83.1, p = 0.039, Figure 1B).

**Conclusion:** A donor to recipient BMI ratio of ≤ 0.8 results in worse long-term survival for patients with an LVAD at the time of heart transplantation. Careful donor selection with regard to size should be considered for patients supported with an LVAD.

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**25**

**Do Donor Lifestyle Choices and Polysubstance Abuse Affect Long Term Survival in Heart Transplant Recipients?**

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**Purpose:** High risk (HR) behavior negatively impacts donor acceptance. We sought to evaluate impact of negative lifestyle choices and substance abuse in donors on long-term outcomes in heart transplant recipients (HTX).

**Methods:** UNOS registry for adult HTX from 2000 to 2013 was queried. HTX were categorized into 2 groups; Non-High Risk (NHR) and HR donors based upon CDC definition—history of IV drug use, prostitution, HR sexual activity, HIV exposure and hemophilic patients. We sought to evaluate impact of substance abuse including alcohol, tobacco or cocaine. t-test for continuous variable analysis and Chi-square were used. Kaplan Meier survival curves were created to analyze impact of substance abuse on HTX survival.

**Results:** 17,546 HTX were identified. In HR group, 42.61% had blood type O, 77.96% were males, 69.23% were Caucasians. In HR donor group, 54.04% were Type O, mean donor age was 29.9 ± 9.5 years and body mass index (BMI) was 26.16 ± 4.8 kg/m² and 68.82% were Caucasians. Analysis of HTX characteristics did not demonstrate any significant difference in age and BMI between HR and NHR. However, donor age and BMI were significantly lower in HTX. Equivalent waiting times was seen in both groups. Rejection and graft failure secondary to acute or chronic rejection at 1 year were not statistically significant between groups. Post-HTX survival at 5 years was similar in both groups (Fig and Table 1).

**Conclusion:** HR donor behavior negatively impacts acceptance decision. HR donor behaviors and polysubstance abuse in donors does not adversely affect outcomes in HTX. Negative lifestyle choices should not deter organ acceptance.

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**Fatal Fulminant Accelerated Rejection in a Cardiac Transplant Recipient With Natural Killer Cell Infiltrate**

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**Introduction:** Accelerated rejection is uncommon in cardiac transplantation. The mechanism is believed to be mediated by cytotoxic T cells and/or anti-HLA alloantibodies resulting from a memory response to the donor allograft in sensitized patients. However, animal studies suggest a role for innate immune responses in rejection. We report a case of fatal fulminant accelerated rejection with a predominant natural killer (NK) cell infiltrate in a woman five days after orthotopic heart transplantation.

**Case Report:** A 37-year-old, gravida 4, para 2, female with peripartum cardiomyopathy underwent a bivacal orthotopic heart transplant with a blood group...