Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Cadavers suitable for organ donation were transferred from local hospital critical care units (within a 20-mile radius) by ambulance to a facility for surgical recovery of transplantable organs and tissue, run by the Mid-America Transplant Services (MTS), a regional organ procurement organisation (OPO). The MTS facility had an operating theatre equipped to provide full operating room capabilities, and a preoperative unit was constructed adjacent to the operating theatre to receive the cadavers for continuous monitoring. This process of organ and tissue extraction was compared with a procedure in which organs and tissue were obtained in local hospitals.

Type of intervention
Cadaveric-donor organ recovery.

Economic study type
Cost-effectiveness analysis.

Study population
No characteristics of patients receiving the extracted organs and tissue were given. The study only gave information on the characteristics of the cadavers, initially the cadavers for the MTS facility were limited to abdominal organ recoveries, full vital-organ recovery was achieved in the 12th cadaver. Donors less than 10 years old were excluded from the MTS facility as were donors with active haemorrhage, haemodynamic instability or refractory hypoxemia.

Setting
The setting was organ recovery units. The economic study was carried out in the USA.

Dates to which data relate
The effectiveness evidence was from 2001. No information was given on the dates of the resources or the prices used.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
Costing was carried out on the same group of cadavers as those providing the effectiveness evidence. The costing appeared to have been done prospectively.

Study sample
No power calculations were reported. There were 25 cadaveric donors transferred to the centralised facility and 42 consecutive cadaveric donors were managed in hospitals. The authors stated that "donation at the MTS facility was
limited to abdominal organ recoveries until all involved personnel gained enough experience and any unanticipated problems were addressed before thoracic organ recoveries were permitted”.

**Study design**
This was a multi-centred observational study involving several hospitals within a particular region and one specialised extraction facility. The organ recovery process, organ recovery rates and recipient transplant outcomes were assessed. The recipient transplant outcomes were monitored at 1, 3, and 12 months following transplantation.

**Analysis of effectiveness**
No cadavers were excluded from the analyses. The hospital group of cadavers was younger than those in the MTS group (30.2 +/-15.0 years compared to 44.1 +/-15.8 years). Both groups of cadavers were shown to have similar characteristics in terms of demographics, cause of death and vasopressor utilisation. The production (not clinical) outcomes that were measured were: the number of organs/tissue extracted that were suitable for transplant, the organ cold ischaemia time (CIT) and procedural times. Procedural time categories included: MTS facility management, total donor management, surgery start delay, incision to x-clamp and total organ recovery (OR) time.

**Effectiveness results**
The effectiveness results were as follows:

152 organs (3.62 per cadaver) were extracted in the hospital group of which 141 (3.36 per cadaver) were transplanted.

78 organs (3.12 per cadaver) were extracted from the MTS group of which 65 (2.6 per cadaver) were transplanted.

There was no significant difference between the groups of cadavers as to the number of organs per cadaver extracted and transplanted.

With the exception of the pancreas, there was no significant difference between the two groups of cadavers as to the CIT of the organs; the CIT was 630 +/- 40 minutes in the hospital group and 355 +/- 135 minutes in the MTS group, (p<0.001). However, the trend was for the MTS CIT to be lower.

Tissue recovery was accomplished in 67% of hospital donors and 68% for MTS donors (no significant difference).

Total donor management time in minutes was 718 +/- 229 for hospital and 539 +/- 118 for MTS, (p<0.001).

Surgery start delay in minutes was 77 +/- 33 for hospital and 25 +/- 12 for MTS, (p<0.001).

There was no significant difference in time for incision to x-clamp or total OR time.

**Clinical conclusions**
The extraction of organs from cadavers in a centralised extraction facility, as described in this study, could be accomplished without reducing the number of organs and tissue recovered from the cadavers as compared to an extraction of organs in hospitals, and with significant reductions in cadaver donor management time and surgery start delay, which are expected to be more convenient for the donor relations and to help in hospital resource management.

**Measure of benefits used in the economic analysis**
No summary measure of benefit was used so a cost-consequences analysis was conducted.

**Direct costs**
The cost/resource boundary was not stated. Preoperative costs and anaesthesia costs were calculated for both groups. Operating room costs were included for the hospital group of cadavers and transport costs were included for the MTS.
cadavers, (in the paper the latter is incorrectly displayed in the table as being a cost for the hospital cadavers). No discounting was carried out as all costs calculated were incurred within one year. Resource consumption was measured prospectively in the effectiveness study, but the source of unit costs was not given. Unit costs and quantities were not broken down. Charges were used for OR instead of real costs.

Statistical analysis of costs
Statistical tests were performed to compare costs between groups. The type of test was not reported.

Indirect Costs
No indirect costs were included.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was carried out.

Estimated benefits used in the economic analysis
None were calculated.

Cost results
The average cost per cadaver organ donor was $12,918 for the hospital donors and $10,636 for the MTS donors, (p<0.0023).

Synthesis of costs and benefits
Costs and benefits were not combined.

Authors' conclusions
The authors concluded that the centralised MTS facility did not reduce the effectiveness of organ and tissue extraction from cadavers, that there were important time reductions, and that it resulted in lower costs.

CRD COMMENTARY - Selection of comparators
The choice of comparator, hospital based cadaver organ recovery, was justified by its widespread use. However, you, as the user of this database, must decide if this is the most appropriate comparator for your setting.

Validity of estimate of measure of effectiveness
The estimates of productivity were based on an observational study. Clinical outcomes of the recipients could have been measured and reported as the authors reported that follow-up was carried out at 1, 3 and 12 months. Although surgery start delay may be merely a proxy for family frustration, an alternative possible proxy could have been refusal rates of donation. The following indicate that the internal validity of the study was limited. The sample sizes were small so it is possible the results were due to chance. The study population differed for the two groups as only cadaver donors aged 10 or over were referred to the MTS. The authors acknowledged that this would probably affect and explain the lower figures for organs per donor recovered. There was a possibility of performance bias as the process used in the centralised MTS facility changed during the course of the study.
Validity of estimate of measure of benefit
No summary measure of benefit was calculated. See the effectiveness comments above.

Validity of estimate of costs
Not all relevant costs were included.

The study was essentially concerned with productivity outcomes and most related costs categories appear to have been included. It would have been useful, however, had the authors reported the cost items such as labour, which were a key factor for introducing the new donor management system. Quantities and their unit costs were not included. Also no price year was provided, making it impossible to reproduce the results in another setting. Charges instead of real costs were used for OR, which may have biased the results.

Other issues
The authors wrote that their study was the first one to examine a centralised facility for donor extraction; they referred to other studies that dealt with different aspects of the transplantation process. The authors reported the outcomes for each variable, however, the detail was lacking for the costs. Their conclusions reflected the scope of the analysis, but the overall internal validity was low. The issue of generalisability to other settings was not addressed.

Implications of the study
The authors argue that their study shows that a centralised MTS facility for donor extraction lowers costs without damaging health outcomes for patients receiving organs. However, the conclusion should be treated with caution given the limited internal validity of the study.

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None stated.

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