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RAND Study: Economic Value of Advanced Transfemoral Prosthetics

Washington, DC – September 9, 2017 – In light of cost-cutting pressure from payers, in particular Medicare where total payments for prosthetics declined 15% during the 2010-14 period despite advances in technologies, and a 2015 attempt to tighten rules even more, there has been in urgent need to demonstrate the value of advanced prosthetics and related services. The RAND Corporation is a non-profit, non-partisan research institution respected for decades of key contributions to inform public policy debates, who undertook this needed comprehensive economic valuation for advanced prosthetics. The conclusion of RAND's efforts serves as a marker that is answering not only specific questions about the cost-effectiveness of technology utilization, but will also provide a P&O specific basis for a generation of researchers and health economists to build upon.

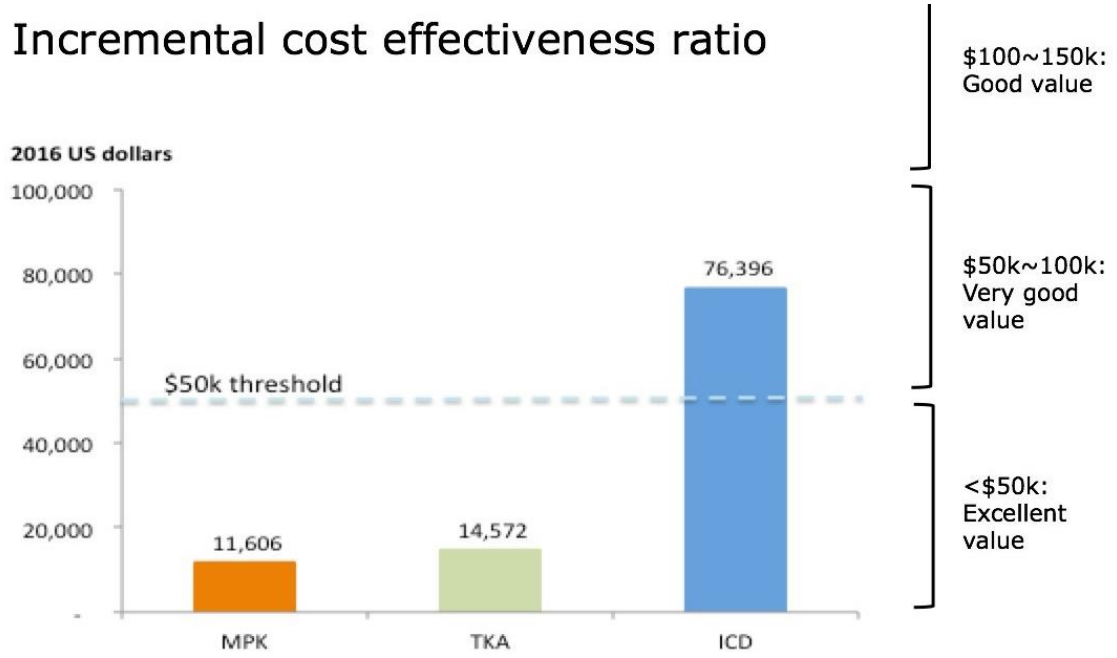
Due to recent advances in technologies, prosthetic knees and feet allow for more dynamic movements and improve user quality of life, but payers have recently started questioning their value for money. To answer this question, RAND undertook a study that simulated the differential clinical outcomes and cost of microprocessor-controlled knees (MPK) compared to non-microprocessor controlled knees (NMPK). We conducted a literature review of the clinical and economic impacts of prosthetic knees, convened technical expert panel meetings, compiled the input parameters required, and constructed and implemented a simulation model over a 10-year time period for unilateral transfemoral Medicare amputees with a Medicare Functional Classification Level of 3 and 4. RAND found that compared to NMPK, MPK is associated with sizeable improvement in physical function and reductions in incidences of falls and osteoarthritis. The effect on low-back pain, depression, obesity, diabetes, and cardiovascular disease could not be quantified due to the lack of data.

RAND's study showed that 26% of patients who received more advanced prosthetic limbs with MPK will fall per year, contrasted to patients receiving non-MPK limbs, of whom 82% will fall per year. 10.4% of these are medical falls with a range of costs: 7% of these medical falls result in death (cost $27,338); 40% result in major injuries with inpatient and/or skilled nursing facility treatment (cost $23,363), and the remaining 53% have minor injuries (cost $1,091). There are 22 fall-related deaths per 10,000 patient years for the non-MPK amputees, and 4 fall-related deaths per 10,000 patient years for the MPK amputees—18 lives saved by MPK usage. The simulation data show 66 injurious falls with the MPK, and 289 with the non-MPK. MPK amputees have a lower incidence of osteoarthritis due to lower vertical ground force (14% for MPK vs. 20% for non-MPK), although evidence is not robust. While MPK users have approximately $4,220 lower direct and indirect healthcare costs per year than non-MPK users, but the higher cost for the prosthesis itself exceeds that yearly savings. RAND's simulation results show that over a 10-year time period, compared to NMPK, MPK is associated with an incremental cost of $10,604 per person and an increase of 0.91 quality adjusted life year per person, resulting in an incremental cost of $11,606 per quality adjusted life year gained. The results suggest that the incremental cost of MPK is in line with commonly accepted criteria for good value for money and with the incremental cost of other medical devices that are currently covered by U.S. payers.

In general terms, the RAND study followed rigorous, well-accepted methods for formal health care cost-effectiveness analysis. This is a complex analytical endeavor, but the results are not too difficult to interpret. For a specific "event pathway" for treatment and outcomes, probabilities of results are calculated and

summed up, as are the associated costs. A substantial measure that is used to convey the end result of the analysis is called an incremental cost effectiveness ratio. The incremental cost-effectiveness ratio equals the difference (increment) in cost divided by the difference (increment) in effectiveness or outcome between alternative treatments. The outcome is just as important as cost. If you have better outcomes, this improves the cost effectiveness ratio just as much as decreasing cost would.

A scientific study seeks to answer carefully specified questions, and we must be careful not to generalize beyond the data we have. For example, in the current study RAND could only draw firm conclusions where there is sufficient published peer reviewed data already available. The continued collection and publication of high-quality data about our patient populations, alternative treatments and outcomes is essential.



MPK microprocessor controlled knee; TKA: total knee arthroplasty; ICD: implantable cardioverter defibrillator. The reference ICER ratios are based on lifetime benefits whereas the ICER of MPK is for a 10-year time period. Institute for Clinical and Economic Review's criteria are used to judge value.

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About AOPA
AOPA, based in Alexandria, Virginia, is the largest non-profit organization dedicated to helping orthotic and prosthetic businesses and professionals navigate the multitude of issues surrounding the delivery of quality patient care. The association was founded when needs of returning veterans in the aftermath of World War I required a national organization to address the educational and research requirements of the industry.

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