

Appendix
Appraisal Table E-1
Key Criteria of Methodologically Sound Cost-Utility Analyses
1. Perspective clearly defined. 2. Perspective societal. 3. Intervention clearly defined. 4. Comparator clearly defined. 5. Source for preference weights clear. 6. Source for preference weights patients or the community. 7. Costs collected alongside a clinical trial or other primary source. 8. Year of monetary units clear. 9. Appropriately discounted future outcomes and costs. 10. Funding source disclosed. 11. Incremental analysis performed. 12. Sensitivity analysis performed.

Article	Key Criteria											
	1	2	3	4	5	6	7	8	9	10	11	12
Birkmeyer et al., 1993 (USA) ²¹	√		√	√	√		√	√	√	√	√	√
Blackmore et al., 1999 (USA) ²²	√		√	√	√	√		√	√	√	√	√
Brothers et al., 1997 (USA) ²³			√	√	√			√		√	√	√
Bryan et al., 1991 (UK) ²⁴	√		√		√	√		√		√		
Chang et al., 1996 (USA) ²⁵	√	√	√	√	√	√	√	√	√	√	√	√
Chung et al., 1998 (USA) ²⁶	√		√	√	√			√		√	√	√
Dranitsaris and Hsu, 1999 (Canada) ²⁷	√		√		√	√	√			√	√	√
Eckman et al., 1995 (USA) ²⁸			√	√	√			√	√	√	√	√
Fisman et al., 2001 (USA) ²⁹		√	√	√	√	√		√	√	√	√	√
Garellick et al., 1998 (Sweden) ³⁰							√	√				
Geelhoed et al., 1994 (Australia) ³¹			√	√	√			√	√	√	√	√
Givon et al., 1998 (Israel) ³²			√					√				√
Gottlob et al., 1999 (USA) ³³			√	√	√	√		√	√		√	√
Hillner et al., 2000 (USA) ³⁴	√	√	√	√	√		√			√	√	√
Jacobson et al., 1991 (USA) ³⁵			√	√				√			√	√
James et al., 1996 (UK) ³⁶	√		√	√	√	√	√					√
Jonsson et al., 1999 (Sweden) ³⁷					√	√			√	√	√	√
Jonsson, 1998 (Sweden) ³⁸									√			√
Jonsson et al., 1995 (Sweden) ³⁹		√	√	√						√	√	√
Jonsson et al., 1996 (Sweden) ⁴⁰		√	√	√					√	√	√	√
Kanis et al., 2001 (Sweden) ⁴¹					√	√			√	√	√	√
Keen and Keen, 2001 (USA) ⁴²	√	√	√	√			√	√			√	√
Keen et al., 2001 (USA) ⁴³			√	√			√	√			√	√
Krijnen et al., 2001 (Netherlands) ⁴⁴			√		√	√	√	√		√	√	√
Kuntz et al., 2000 (USA) ⁴⁵	√	√	√	√	√	√		√	√	√	√	√
Launois et al., 1994 (France) ⁴⁶	√		√	√	√	√	√		√	√	√	
Laupacis et al., 1992 (Canada) ¹⁵		√	√	√	√	√	√	√	√		√	√
Lavernia et al., 1997 (USA) ⁴⁷			√		√	√	√			√		
Malter et al., 1996 (USA) ⁴⁸	√		√	√	√	√	√	√		√	√	√
Minas, 1998 (USA) ⁴⁹			√		√			√		√		√
Patrick et al., 2001 (USA) ⁵⁰	√	√	√		√	√	√	√	√	√	√	√
Pickard et al., 1990 (UK) ⁵¹			√		√		√	√		√	√	
Seguin et al., 1999 (Canada) ⁵²	√		√		√	√	√				√	√
Solomon and Kuntz, 2000 (USA) ⁵³			√	√	√	√		√	√	√	√	√
Tosteson et al., 1990 (USA) ⁵⁴			√	√				√	√	√	√	√
Tsevat et al., 1989 (USA) ⁵⁵	√		√	√	√		√	√		√	√	√
Willis et al., 2001 (Sweden) ⁵⁶	√		√					√	√	√	√	√

Table E-2 Cost Utility Ratios from Orthopaedic Articles***Interventions found to be cost saving (less costly and more effective than the alternative)**

Subject area	Description of Intervention, Alternative and Target Population
Total Joint Arthroplasty	<p>**Total hip arthroplasty (THA) vs no THA in 60 yo women with hip osteoarthritis in ACR functional class III (significant functional limitation, but not dependent) with best case outcome²⁵</p> <p>Hydroxyapatite-coated total hip arthroplasty (THA) with mean pre-op utility 0.8 vs</p> <ol style="list-style-type: none"> 1) non-coated, non-cemented (cup and stem) THA 2) non-coated, cemented (cup and stem) THA 3) non-coated, hybrid THA³² <p>Antibiotic prophylaxis for bacterial arthritis using amoxicillin/clavulanic acid vs no prophylaxis, for dermal infections in a 60 yo man with joint disease with high susceptibility⁴⁴</p>
Osteoporosis	<p>Hormone replacement therapy vs no treatment in women aged 80 with high risk of hip fracture³⁷</p> <p>Bisphosphonate treatment of osteoporosis with a 50% risk reduction (RR=2) over 5 years vs no treatment in pt aged 80 yo³⁸</p>
Spine	Chemoneurololysis vs surgical discectomy in adults with sciatica and clinical signs of lumbar disc herniation ⁴⁶
Trauma	Exclusion arteriography vs surgical exploration in patients with limb-penetrating or blunt trauma ⁴²
Foot & Ankle	Empiric treatment with antibiotics followed by second course if any test result (x-ray/MRI/Tc bone scan/In leukocyte scan) is positive vs immediate toe amputation in non-insulin-dependent diabetic 56 yo man with a diabetic foot lesion grade 2 or 3 ²⁸

Interventions found to have Cost-Utility Ratios <\$20,000 per QALY

Subject area	Description of Intervention, Alternative and Target Population
Total Joint Arthroplasty	<p>**Total hip arthroplasty (THA) vs no THA (implicit zero-cost alternative) (n<24) and in >85 yo men with significant functional limitation, but not dependent, with best case outcome^{25,36}</p> <p>Cemented total hip arthroplasty (THA) vs no THA (implicit zero-cost alternative)³⁰</p> <p>Revision total hip arthroplasty vs no procedure (implicit zero-cost alternative) (n=2)³⁶</p> <p>Primary total knee arthroplasty vs no procedure (implicit zero-cost alternative) (n=30)^{36,47}</p> <p>Antibiotic prophylaxis for bacterial arthritis using amoxicillin/clavulanic acid vs no prophylaxis, for UTI, RTI or invasive medical procedures in a 60 yo man with joint disease with high susceptibility⁴⁴</p> <p>**Surgical débridement with retention of the prosthesis vs initial 2-stage exchange arthroplasty in older persons with staphylococcal or streptococcal infection and a non-loosened hip prosthesis - frail 80 yo men and women²⁹</p>
Osteoporosis	<p>Hormone replacement therapy vs no treatment in women aged 80 with average risk of hip fracture, bisphosphonate treatment of osteoporosis with a 50% risk reduction (RR=2) over 5 years vs no treatment in pt aged 50-70 yo³⁷</p> <p>Lifetime estrogen therapy from age 50 or 65 yo vs no treatment with hormone replacement therapy or vs 15 years of estrogen therapy from age 50 in healthy 50 yo white women³¹</p> <p>Bone mineral density measurement followed by long-term estrogen-progestin therapy if < 0.9g/cm² vs no screening in women at risk for hip fracture due to osteoporosis⁵⁴</p> <p>Bisphosphonate treatment of osteoporosis with a 50% risk reduction (RR=2) over 5 years vs no treatment in pt aged 50-70 yo³⁸</p> <p>Tibolone 2.5 mg/day vs no intervention in postmenopausal women with osteopenia, age 53 and 65, at risk for osteoporosis-related bone fractures⁵⁶</p>

Spine	Spinal discectomy vs no procedure (implicit zero-cost alternative) (n=17) ³⁶
	Computed tomography (CT) vs radiography in trauma patients with moderate risk of cervical spine fracture ²²
	Surgery for non-metastatic spinal disorders vs no surgery in UK pts with spinal disorders referred for admittance to a regional neurosurgical center (n=159) ²²
Trauma	Treatment by tertiary trauma care center vs non-specialized center for patients admitted to the hospital for trauma ⁵¹
	Proximity arteriography vs observation in patients with penetrating extremity trauma ⁵²
Tumor	Prophylactic pamidronate infusions vs no prophylactic treatment for skeletally related events (placebo) in metastatic breast cancer patients receiving either 1st or 2nd line chemotherapy with at least one osteolytic bone lesion ⁴³
Foot & ankle	Chiropractic services vs no chiropractic services in >60 yo domiciliary and clinic patients needing routine and special chiropractic ²⁷
Sports Med	Anterior cruciate ligament (ACL) reconstruction with a patellar tendon autograft vs non-operative care in patients in late teens and 20s with an ACL tear ²⁴
	Autologous chondrocyte implantation vs no procedure in patients with full-thickness cartilage lesions of the knee ³³
Hand	Endoscopic carpal tunnel release vs open carpal tunnel release in carpal tunnel syndrome (age group 25 to 65) and in 25-65 yo persons with hand numbness and tingling along median nerve distribution and persistent hand pain which awakens the person at night ⁴⁹
	Open carpal tunnel release (n=4) and Dupuytren surgery (n=5) vs no procedure (implicit zero-cost alternative) ³⁶

Interventions found to have Cost-Utility Ratios \geq \$20,000 and \leq \$100,000 per QALY

Subject area	Description of Intervention, Alternative and Target Population
Total Joint Arthroplasty	**Total hip arthroplasty (THA) (cemented or uncemented) vs no THA (implicit zero-cost alternative) at one year post-op ²⁶
	Hydroxyapatite-coated total hip arthroplasty (THA) vs no THA (implicit zero-cost alternative) with mean pre-op utility 0.8 ³²
	Primary total knee arthroplasty 3 mo post surgery vs no procedure ⁴⁷
	Prophylactic course of erythromycin vs no prophylaxis in a 65 yo patient with an artificial joint undergoing dental procedures ⁵⁷
	Antibiotic prophylaxis for bacterial arthritis using amoxicillin/clavulanic acid vs no prophylaxis, for dermal infections in a 60 yo man with joint disease with low susceptibility ⁴⁴
	**Surgical débridement with retention of the prosthesis vs initial 2 stage exchange arthroplasty in older persons with staphylococcal or streptococcal infection and a non-loosened hip prosthesis - 65 yo men and women ²⁹
	Autologous blood donation, and transfusion if necessary vs no autologous donation, with allogeneic transfusion if necessary in patients undergoing bilateral or revision joint replacement at tertiary-care center with no autologous over-transfusion relative to allogeneic blood ⁵⁵
Osteoporosis	Hormone replacement therapy vs no treatment in women aged 70 with average or high risk of hip fracture ³⁷
	15 years of estrogen therapy from age 50 yo vs no treatment with hormone replacement therapy and lifetime estrogen therapy from age 50 yo vs lifetime estrogen therapy from age 65 in healthy 50 yo white women ³¹
	Bisphosphonates vs no treatment in women aged 60 with average or high risk of hip fracture ³⁷
	Bone mineral density measurement followed by long-term estrogen-progestin therapy if $<1.0\text{g/cm}^2$ vs bone mineral density measurement followed by long-term estrogen-progestin therapy if $<0.9\text{g/cm}^2$ in women at risk for hip fracture due to osteoporosis ⁵⁴
	Screen and treat with alendronate at T scores < -1 vs using alendronate if a fracture occurs in 55 yo postmenopausal women with rheumatoid arthritis receiving estrogen replacement therapy ²¹
	Using alendronate if a fracture occurs vs using etidronate if a fracture occurs in 55 yo postmenopausal women with rheumatoid arthritis receiving estrogen replacement therapy or not ²¹

	Vitamin D with calcium (\$125/yr) vs no treatment in women at average risk of hip fracture age 60 ⁵³
	Lifetime lifestyle intervention (Ca and exercise) from age 50 yo vs no treatment with hormone replacement therapy and no intervention in healthy 50 yo white women ³¹
	5-year treatment with medication for osteoporosis that creates a 50% reduction in fracture risk vs no treatment in 62-yo woman with established osteoporosis (a bone mineral density measurement of 1 SD below the mean) but otherwise healthy ⁴¹
	Treatment to reduce the incidence of osteoporotic hip fracture vs no preventative treatment in 62-yo woman with established osteoporosis (a bone mineral density of 1 SD below the mean; i.e. RR= \sim 2) ³⁹
Spine	Surgical discectomy vs medical therapy in patients with a herniated lumbar intervertebral disc ⁴⁰
	Computed tomography (CT) vs radiography in trauma patients with low risk of cervical spine fracture ⁴⁸
	**Laminectomy with non-instrumented fusion vs laminectomy without fusion in patients with spondylolisthesis and spinal stenosis ⁴⁵
Hand	Flexor tenosynovectomy vs no procedure (implicit zero-cost alternative) (n=3) ³⁶

Interventions found to have Cost-Utility Ratios >\$100,000 per QALY

Subject area	Description of Intervention, Alternative and Target Population
Total Joint Arthroplasty	Prophylactic course of penicillin vs no prophylaxis in a 65 yo patient with an artificial joint undergoing dental procedures ⁵⁷
	Autologous blood donation, and transfusion if necessary vs no autologous donation, with allogeneic transfusion if necessary in patients undergoing bilateral or revision joint replacement at tertiary-care center with autologous over-transfusion relative to allogeneic blood ⁵⁵
	Autologous blood donation, and transfusion if necessary, vs no autologous donation, with allogeneic transfusion if necessary, in patients undergoing primary unilateral hip or knee replacement at tertiary-care center with or without autologous over-transfusion relative to allogeneic blood ⁵⁵
	Surveillance duplex venous ultrasound performed within 2 weeks of TJA vs no ultrasound ²³
Osteoporosis	Hormone replacement therapy vs no treatment in women aged 50 or 60 with average or high risk of hip fracture ³⁷
	Unselective hormone replacement therapy vs bone mineral density measurement followed by long-term estrogen-progestin therapy if < 1.1g/cm ² in women at risk for hip fracture due to osteoporosis ⁵⁴
	Bisphosphonates vs no treatment in women aged 50 with average or high risk of hip fracture ³⁷
	Treat all with alendronate vs screen and treat with alendronate at T scores < -1 in 55 yo postmenopausal women with rheumatoid arthritis receiving estrogen replacement therapy ²¹
	Vitamin D with calcium (\$125/yr) vs no treatment in women at average risk of hip fracture age 50 ⁵³
Spine	**Laminectomy with instrumented fusion vs laminectomy with non-instrumented fusion in patients with spondylolisthesis and spinal stenosis ⁴⁵
Tumor	Pamidronate vs placebo in women undergoing chemotherapy or hormonal therapy for metastatic breast cancer with one or more osteolytic lesions >1cm in diameter and an expected survival of greater than 9 months ³⁴
Other	Aquatic exercise class at least twice a week vs no exercise/usual care (less than 1 hour of exercise per week) in patients with osteoarthritis aged 55-75 ⁵⁰

Interventions found to have Cost-Utility Ratios that are Dominated (More costly and less effective than the alternative)

Total Joint Arthroplasty	Antibiotic prophylaxis for bacterial arthritis using amoxicillin/clavulanic acid vs no prophylaxis, for UTI, RTI or invasive medical procedures in a 60 yo man with joint disease with low susceptibility ⁴⁴
	Duplex venous surveillance with phlebography performed within 2 weeks of TJA vs no ultrasound ²³
	Oral penicillin regimen for patients with total prosthetic hip and/or knee joints vs no antibiotic prophylaxis for dental procedures in patient with no history of allergic responses to penicillin ³⁵
Foot & ankle	Feet general surgery vs no procedure (implicit zero-cost alternative) (n=7) ³⁶
Hand	Metacarpophalangeal joint replacement vs no procedure (implicit zero-cost alternative)(n=7) ³⁶

*All ratios converted to 2002 US\$ **Ratios from articles meeting the Reference Case recommendations listed in the text