



Research for Health Scheme

Stage 1 - Call for Challenges Application Form

- This call is open to doctors, nurses and allied health professionals employed by the NHS.
- Please use this form to describe a specific issue or challenge which you are currently facing in your area of healthcare delivery.
- The deadline for submission is 25 Feb 2014. Please email this application form to Lisa.Wheatley@Bristol.ac.uk
- If your challenge is selected, University of Bristol researchers have the opportunity to bid for funds to help them develop a solution. They will work in partnership with you to make sure the new technology, device or innovation will really work for you, your colleagues and your patients.

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Challenge Title (max 20 Words)
Bearing Surfaces in Total Hip Arthroplasty

Please describe the specific problem which needs addressing
Commonly used bearing surfaces in total hip arthroplasty include metal on polyethylene (MoP), metal on metal (MoM), ceramic on ceramic (CoC) and ceramic on polyethylene (CoP). All of these bearing couples are associated with problems. In the case of couples using polyethylene, the polyethylene wears and the wear debris induces osteolysis (bone loss) and loosening of the components. MoM bearings are associated with localised and systemic reactions to metal wear debris leading to an increased risk of early failure and potential long-term health implications for the patient. Ceramics are expensive and despite their excellent wear properties are

sensitive to fracture and hence catastrophic failure. There are thus very sensitive to malpositioning during implantation, errors in which increase the risk of failure. Once a ceramic bearing has failed, it must usually be revised to another CoC bearing to avoid catastrophic wear from retained microscopic ceramic particles.

We seek a bearing couple that is cost effective, has very low wear, inert wear debris when this is produced that does not cause local or systemic problems, is easy to implant and tolerant of variations in positioning.

How does this issue impact on you, your colleagues and your patients?

Failure of THAs for any of the reasons listed above may require revision (redo) surgery. Failure of THA is associated with increased pain and decreased function for patients. When patients undergo revision surgery for any reason, the function they achieve afterwards is worse than for primary (first time) surgery. Revision surgery takes longer, is more costly than primary surgery and is associated with a longer hospital stay, longer recovery period, higher rate of complications, morbidity and mortality than primary surgery. The aim of primary THA is therefore to implant a THA that will last the patient for the rest of their life. A bearing surface as described above would help us to achieve this goal and reduce the risk of failure of the implants in the short and long term.

Can you estimate how many patients or staff are affected by this problem?
Can you describe any associated financial implications for the NHS or patients?
(Don't worry if you are not able to answer this question at this stage – it is not compulsory)

86,488 total hip arthroplasties (THAs) were performed in England, Wales and Northern Ireland during 2012, a 19% increase over the last 5 years. 76,448 were primary procedures and 10,040 were revisions. The majority of the primary THAs were performed due to osteoarthritis and 60% of primary THAs used a MoP bearing couple. The revision burden (due to failed THAs) is currently 12% and is increasing. Approximately 70% of revisions are performed due to wear, loosening and other problems associated with the wear of bearings. The mean cost of performing a revision THA in non-infected cases is approximately £12,000 (2008 costs) compared to £4,650 for primary THA.