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## Lab Tests for Metal on Metal Implant Deterioration

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Metal on Metal (MoM) hip implants were developed with the expectation that they would have increased durability, less chance of hip dislocation and less wear, allowing them to be used in younger, more active individuals. While most recipients benefit from joint replacement, some patients have experienced adverse effects due to excessive wear of the implant and deposition of metal particles into surrounding tissue.

Orthopedic implants contain several metal alloys. The acetabular cup is made of porous titanium which allows bone to grow into the implant, strengthening the bond between bone and implant. The ball and socket joint where motion occurs, is made from a hard alloy that facilitates smooth motion and weight bearing. The most commonly used alloy is a combination of cobalt and chromium. Continuous motion at the MoM surfaces releases microparticles of chromium and cobalt into the surrounding tissue and metal ions into the circulation.

In symptomatic patients, measurement of serum chromium and cobalt concentrations is helpful in assessing the degree of MoM implant wear. All patients with MoM implants have approximately 10 times higher levels of these two metals than unexposed individuals. Modest increases in serum chromium (3-6 ng/mL) and in serum cobalt (4-10 ng/mL) concentrations are likely to be associated with a prosthetic device in good condition. Clinically important implant wear is indicated when serum chromium exceeds 15 ng/mL and cobalt exceeds 10 ng/mL. Elevated chromium and cobalt concentrations may indicate implant wear, but not systemic toxicity.

Increased serum chromium and cobalt concentrations in the absence of symptoms such as joint pain do not, independently, indicate implant wear. Serum cobalt and chromium are highest in the first year after implant and slowly decline in subsequent years, reaching a steady state around 3 years after implant. For this reason, it is advisable to repeat serum cobalt and chromium at 6 months

and yearly to see if concentrations have dropped before recommending revision. Reference range for chromium is 0-0.3 ng/mL and for cobalt is 0-0.9 ng/mL.

Proper specimen collection is essential for accurate interpretation of results. Most specimen collection tubes contain chromium in the rubber stopper. Specimens must be collected in vacutainer tubes with a royal blue-top, which are free of trace elements. Blood should not be drawn into plastic syringes with black rubber plunger seals because they contain high concentration of both cobalt and chromium. Specimens should not be collected for at least 96 hours after receiving iodine or gadolinium contrast media. Testing of joint fluid is not recommended.

## Recalcitrant Rhinovirus

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Human rhinoviruses (HRVs) are traditionally associated with 'common cold' upper respiratory tract infection, otitis media, and sinusitis. However, the advent of PCR testing for respiratory specimens has clearly demonstrated causation of lower respiratory tract infection as well. HRV can be a serious pathogen in children, immunocompromised hosts, and chronic pulmonary disease patients.

HRV is in the genus Enterovirus, has 3 genetically distinct groups and more than 100 serotypes, which baffles efforts at anti-viral drug and vaccine development. HRV is transmitted by either contact (person to person or contaminated surfaces) or aerosols. This is a hardy virus group that can survive on indoor surfaces for days at ambient temperature & on uncleansed skin for 2 hours. Most infections occur in spring, summer, & fall months, while influenza & RSV predominate in winter. Symptoms associated with HRV can be clinically indistinguishable from those caused by coronavirus, which is the second most common 'cold' virus.

Exacerbations of chronic obstructive pulmonary disease and asthma, severe bronchiolitis in children, and fatal pneumonia in the elderly & immunocompromised are now known to be within HRVs' spectrum of illness. Stem cell transplant,

lung transplant & those with hematopoietic malignancies and cystic fibrosis are the most vulnerable to severe lower respiratory tract HRV infections among immunocompromised patients. Morbidity & mortality in long-term care facilities due to HRV community-acquired pneumonia has been recently reported.

Hand hygiene and adherence to institutional isolation policies are crucial to limiting the potential transmission of HRV within health-care facilities. HRV has been the third most commonly detected virus (only slightly behind influenza and RSV) on Saint Luke's Microbiology's Respiratory Panel PCR this season.

### **Who's Screening for Prostate Cancer with PSA?**

In July 2012, the U.S. Preventive Services Task Force (USPSTF) found that "The mortality benefits of PSA-based prostate cancer screening through 11 years are, at best, small and potentially none, and the harms are moderate to substantial". The task force recommended against PSA-based screening for prostate cancer for men in the general U.S. population of any age. USPSTF also stated that PSA-based screening leads to substantial over-diagnosis of prostate tumors and overtreatment.

The recommendation was based on an analysis of the evidence from trials of PSA screening in the European Randomized Study of Screening for Prostate Cancer (ERSPC) and the prostate arm of the Prostate, Lung, Colorectal, and Ovarian (PLCO) Cancer Screening Trial in the United States that were published in 2009 (N Engl J Med. 2009;360:1310-1319 & 1320-1328).

PLCO did not demonstrate any benefit of PSA screening. ERSPC was updated in 2012 with an average follow-up of 11 years. It found a 21% decrease in prostate cancer mortality in the population of men invited to screen and a 29% reduction in those who were actually screened. But this reduction in mortality came at a cost. Prevention of one death from prostate cancer at 11 years follow-up required inviting 1055 men to be

A presentation at the American Public Health Association annual meeting in October 2012 reported a 25% reduction in men participating in prostate cancer screening between 2008 and 2011. They attributed this change to awareness of the studies published in 2009.

Medicare allows for a PSA blood test to be performed for screening purposes once a year on men who are 50 and older. When a PSA test is requested as part of a yearly routine exam in the absence of symptoms, a PSA SCREEN is ordered. A diagnostic Prostate Specific Antigen blood test (PSA DIAG) is ordered when the ICD-9 code submitted is covered by the Medicare Program, when testing is being performed to confirm or rule out a suspected diagnosis, or when there is an established diagnosis of disease.

To determine if Saint Luke's Health System has experienced a decline in screening for prostate cancer with PSA following publication of these studies, the ratio of PSA tests ordered for screening versus diagnosis from physician offices was compared between 2010 and 2012.

<b>Year</b>	<b>Ratio</b>
2010	0.36
2011	0.33
2012	0.48

The ratio has not decreased, suggesting that Saint Luke's physicians and patients have not changed their attitudes towards screening for prostate cancer with PSA. However, closer analysis of data from 2012 revealed significant variability in practice between physicians practicing at different campuses. For example the PSA screening to diagnostic ratio was 0.08 for physicians practicing at SLS, 0.14 at SLE, 0.40 at SLH and 2.96 at SLN. This data suggests that physicians and patients at SLS and SLE have largely decided not to screen for prostate cancer with PSA.

### **Preventing Falsely Low Blood Glucose Results**

Saint Luke's Regional Laboratories has begun collecting outpatient blood glucose specimens in grey top tubes to prevent glycolysis. Glucose results will be charted on a separate line from chemistry panels.