AAOS
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Supplement to the Management of Surgical Site Infections Systematic Literature Review

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Surgical Site Infection: Diagnostic

Reference Standard Scale Criteria:

***Scale Strength regarding Reference Standard

- **1-3=Weak Strength**
- **4-6=Moderate Strength**
- **7-9=Strong Strength**
- Scale Breakdown

1) Case Notes or Physician Expertise (Physician's opinion/Surgery Pathology) or Clinical (fever, pain, purulence, sinus tract draining) or Microbiology or Aspiration
    a. Each one of these test receive one point by themselves; if there is a combination of them each test gets one point (Ex: Clinical + Surgery Pathology=2)
2) Biomarkers (CRP, ESR, IL-6, etc.) or Imaging (US/CT/PET/Xray)
3) Biomarkers + 1 or Imaging + 1
    a. Biomarkers plus a test from 1 equals 3 and the same for Imaging
4) Culture or Histology/Pathology or Biopsy
    a. Doing any of these studies in the article automatically gets 4 points
5) 4 + 1
    a. Culture or Histo/Patho or Biopsy plus any one of the test from 1 (Case Notes) receive 4 points for a test from 4 plus 1 point from a test in 1
6) 5 + other (Imaging/Biomarkers/etc)
7) Culture + Histology/Pathology/Biopsy or MSIS
    a. Any one of these test combine gets 7 points (Culture + Histo=7 or Biopsy + Patho=7 or Patho + Culture=7 or MSIS=7)
8) 7 + 1 (test from 7 + test from 1=8 total points)
9) 8 + other (Imaging/Biomarkers)

*****When combining test, the higher quality test were given preference in the scoring scale over the lesser quality test which would be given one point each**

- Ex: RS (Culture, histology, purulence, sinus draining)= Culture plus histology automatically gets 7 points, then purulence and sinus tract draining=clinical so it gets one point, which equals 8 points total=**Strong Strength**
- Ex: RS (Culture, sinus draining, purulence, histopathology, PMN)= Culture+Histopathology gets 7 points, PMN is a biomarker so get 1 point, sinus tract draining+purulence is clinical so gets 1 point, for a grand total of 9 points= **Strong Strength**
- Ex: RS is ESR, CRP, WBC, Neutrophils are biomarkers=2=**Weak Strength**
- Ex: RS is ESR, CRP, clinical, purulence, culture= Culture gets 4 points, Clinical/purulence=clinical gets 1 point, ESR/CRP=biomarkers gets 1 point which combines for 6 points= **Moderate Strength**

Diagnostic Quality Evaluations

Study	Representative Population	Clear Selection Criteria	Detailed Enough to Replicate	Reference Standard Identifies Target Condition	Blinding	Other Bias?	Inclusion	Strength
Abou El-Khier,N.T., 2013	●	◑	●	●	◑	●	Include	Moderate Quality
Aggarwal,V.K., 2013	●	●	●	●	●	◑	Include	High Quality
Ahn,J.S., 2015	●	◑	●	●	◑	◑	Include	Moderate Quality
Aksoy,S.Y., 2014	●	●	◑	●	●	●	Include	High Quality
Alijanipour,P., 2013	●	◑	●	●	◑	●	Include	Moderate Quality
Artini,M., 2011	●	◑	●	●	◑	◑	Include	Moderate Quality
Atkins,B.L., 1998	●	◑	●	◑	●	◑	Include	Moderate Quality
Banit,D.M., 2002	●	●	●	●	◑	◑	Include	Moderate Quality
Battaglia,M., 2011	●	◑	●	◑	◑	●	Include	Moderate Quality
Bedair,H., 2011	●	◑	●	◑	◑	●	Include	Moderate Quality
Bemer,P., 2014	●	●	●	◑	●	●	Include	High Quality
Bernard,L., 2002	●	●	●	◑	◑	●	Include	Moderate Quality
Bernard,L., 2004	●	●	◑	●	◑	●	Include	Moderate Quality
Bingham,J., 2014	●	●	●	●	◑	○	Include	Moderate Quality
Blackmur,J.P., 2014	●	●	●	◑	◑	●	Include	Moderate Quality
Bonanzinga,T., 2017	●	◑	●	●	●	●	Include	High Quality
Borens,O., 2013	●	●	●	●	●	●	Include	High Quality
Bori,G., 2011	●	◑	●	◑	◑	●	Include	Moderate Quality
Bottner,F., 2007	●	◑	●	●	●	●	Include	High Quality
Buttaro,M.A., 2010	●	◑	●	◑	●	●	Include	Moderate Quality
Chacko,T.K., 2002	●	◑	●	●	●	●	Include	High Quality
Chik,K.K., 1996	●	◑	◑	◑	●	●	Include	Moderate Quality

Study	Representative Population	Clear Selection Criteria	Detailed Enough to Replicate	Reference Standard Identifies Target Condition	Blinding	Other Bias?	Inclusion	Strength
Choi,H.R., 2016	●	◑	●	●	◑	●	Include	Moderate Quality
Chryssikos,T., 2008	●	●	●	●	●	●	Include	High Quality
Cipriano,C., 2014	●	◑	●	●	◑	◑	Include	Moderate Quality
Cipriano,C.A., 2012	●	●	●	●	◑	●	Include	High Quality
De,Vecchi E., 2016	●	●	●	◑	●	◑	Include	Moderate Quality
De,Winter F., 2003	●	●	●	◑	●	●	Include	High Quality
De,Winter F., 2004	●	◑	●	◑	●	●	Include	Moderate Quality
Deirmengian,C., 2015	●	◑	●	●	◑	●	Include	Moderate Quality
Della Valle,C.J., 1999	●	◑	●	●	◑	●	Include	Moderate Quality
Demirkol,M.O., 1997	●	◑	●	◑	●	●	Include	Moderate Quality
Di,Benedetto P., 2016	●	◑	●	●	◑	●	Include	Moderate Quality
Dinneen,A., 2013	●	◑	●	●	◑	●	Include	Moderate Quality
Drago,L., 2013	●	◑	●	●	●	●	Include	High Quality
El Espera,I, 2004	●	◑	●	◑	●	●	Include	Moderate Quality
Ettinger,M., 2015	●	◑	●	◑	◑	●	Include	Moderate Quality
Fehring,T.K., 1994	●	●	●	◑	◑	◑	Include	Moderate Quality
Fink,B., 2008	●	◑	●	◑	◑	●	Include	Moderate Quality
Fink,B., 2013	●	◑	●	◑	◑	●	Include	Moderate Quality
Frances,Borrego A., 2007	●	◑	●	◑	◑	●	Include	Moderate Quality
Frangiamore,S.J., 2015	●	◑	◑	●	◑	●	Include	Moderate Quality
Frangiamore,S.J., 2015	●	●	◑	●	●	●	Include	High Quality
Frangiamore,S.J., 2016	●	●	●	●	●	●	Include	High Quality

Study	Representative Population	Clear Selection Criteria	Detailed Enough to Replicate	Reference Standard Identifies Target Condition	Blinding	Other Bias?	Inclusion	Strength
Friedrich,M.J., 2014	●	●	●	◑	◑	●	Include	Moderate Quality
Fuster,D., 2011	●	◑	●	●	●	◑	Include	Moderate Quality
Gallo,J., 2008	●	●	●	●	●	◑	Include	High Quality
George,J., 2016	●	●	●	◑	○	●	Include	Moderate Quality
Ghanem,E., 2008	●	◑	●	◑	◑	●	Include	Moderate Quality
Glehr,M., 2013	●	◑	●	●	●	●	Include	High Quality
Glithero,P.R., 1993	●	●	●	◑	◑	●	Include	Moderate Quality
Gomez,E., 2012	●	◑	●	◑	◑	●	Include	Moderate Quality
Greenwood-Quaintance,K.E., 2014	●	◑	●	●	●	○	Include	Moderate Quality
Greidanus,N.V., 2007	●	●	●	◑	◑	●	Include	Moderate Quality
Grosso,M.J., 2014	●	●	●	◑	◑	●	Include	Moderate Quality
Holinka,J., 2011	●	●	●	●	●	◑	Include	High Quality
Hughes,H.C., 2011	●	●	●	●	●	◑	Include	High Quality
Iwata,E., 2016	●	◑	●	◑	◑	●	Include	Moderate Quality
Iyengar,K.P., 2005	●	◑	●	●	◑	●	Include	Moderate Quality
Jacovides,C.L., 2011	●	◑	●	●	●	●	Include	High Quality
Jacovides,C.L., 2012	●	◑	●	◑	◑	●	Include	Moderate Quality
Jordan,R.W., 2015	●	◑	●	●	◑	●	Include	Moderate Quality
Joseph,T.N., 2001	●	●	●	●	●	◑	Include	High Quality
Kasparek,M.F., 2016	●	●	●	●	◑	●	Include	High Quality
Kheir,M.M., 2017	●	◑	●	●	◑	◑	Include	Moderate Quality
Kim,H.O., 2014	●	●	●	●	●	○	Include	Moderate Quality

Study	Representative Population	Clear Selection Criteria	Detailed Enough to Replicate	Reference Standard Identifies Target Condition	Blinding	Other Bias?	Inclusion	Strength
Klett,R., 2003	●	◑	●	◑	●	●	Include	Moderate Quality
Kobayashi,N., 2009	●	●	●	●	◑	◑	Include	Moderate Quality
Kobayashi,N., 2011	●	●	●	◑	◑	●	Include	Moderate Quality
Li,A.E., 2016	●	●	●	○	●	●	Include	Moderate Quality
Lonner,J.H., 1996	●	●	◑	◑	◑	●	Include	Moderate Quality
Love,C., 2004	●	◑	●	◑	◑	●	Include	Moderate Quality
Marin,M., 2012	●	◑	●	◑	●	●	Include	Moderate Quality
Marmor,S., 2016	●	●	●	◑	●	◑	Include	Moderate Quality
Melendez,D.P., 2014	●	◑	●	●	◑	●	Include	Moderate Quality
Moojen,D.J., 2007	●	◑	●	●	◑	●	Include	Moderate Quality
Morgan,P.M., 2009	●	●	●	●	◑	◑	Include	Moderate Quality
Mulcahy,D.M., 1996	●	●	●	●	◑	◑	Include	Moderate Quality
Nagoya,S., 2008	●	●	◑	◑	◑	●	Include	Moderate Quality
Newman,J.M., 2017	●	●	●	●	◑	◑	Include	Moderate Quality
Nijhof,M.W., 1997	●	◑	●	●	●	●	Include	High Quality
Nunez,L.V., 2007	●	◑	●	◑	◑	●	Include	Moderate Quality
Oethinger,M., 2011	●	●	●	●	○	◑	Include	Moderate Quality
Omar,M., 2015	●	●	●	○	◑	●	Include	Moderate Quality
Omar,M., 2016	●	●	●	◑	◑	●	Include	Moderate Quality
Panousis,K., 2005	●	●	●	●	●	●	Include	High Quality
Parvizi,J., 2006	●	●	◑	●	●	●	Include	High Quality
Parvizi,J., 2011	●	◑	●	◑	◑	●	Include	Moderate Quality

Study	Representative Population	Clear Selection Criteria	Detailed Enough to Replicate	Reference Standard Identifies Target Condition	Blinding	Other Bias?	Inclusion	Strength
Peel,T.N., 2016	●	●	◑	●	◑	◑	Include	Moderate Quality
Pelosi,E., 2004	●	●	●	◑	●	●	Include	High Quality
Piper,K.E., 2009	●	◑	●	●	●	◑	Include	Moderate Quality
Piper,K.E., 2010	●	◑	●	◑	◑	●	Include	Moderate Quality
Plodkowski,A.J., 2013	●	◑	●	◑	●	◑	Include	Moderate Quality
Pons,M., 1999	●	◑	●	●	◑	●	Include	Moderate Quality
Portillo,M.E., 2012	●	●	●	◑	◑	◑	Include	Moderate Quality
Portillo,M.E., 2013	●	◑	●	◑	◑	●	Include	Moderate Quality
Puig-Verdie,L., 2013	●	●	●	◑	●	●	Include	High Quality
Rak,M., 2013	●	◑	●	●	◑	●	Include	Moderate Quality
Rand,J.A., 1990	●	●	●	●	●	◑	Include	High Quality
Randau,T.M., 2014	●	◑	●	◑	◑	●	Include	Moderate Quality
Roberts,P., 1992	●	●	●	◑	◑	●	Include	Moderate Quality
Romano,C.L., 2013	●	◑	●	●	●	●	Include	High Quality
Ronde-Oustau,C., 2014	●	●	◑	●	◑	●	Include	Moderate Quality
Rubello,D., 2004	●	◑	◑	◑	●	●	Include	Moderate Quality
Ryu,S.Y., 2014	●	◑	●	●	◑	◑	Include	Moderate Quality
Sampedro,M.F., 2010	●	◑	●	●	●	○	Include	Moderate Quality
Scher,D.M., 2000	●	●	●	●	◑	●	Include	High Quality
Schinsky,M.F., 2008	●	●	◑	●	◑	●	Include	Moderate Quality
Segura,A.B., 2004	●	●	◑	●	◑	●	Include	Moderate Quality
Shen,H., 2015	●	◑	●	◑	◑	●	Include	Moderate Quality

Study	Representative Population	Clear Selection Criteria	Detailed Enough to Replicate	Reference Standard Identifies Target Condition	Blinding	Other Bias?	Inclusion	Strength
Sigmund,I.K., 2017	●	◑	●	●	◑	●	Include	Moderate Quality
Simonsen,L., 2007	●	●	●	●	●	●	Include	High Quality
Smith,E.B., 2014	●	●	●	●	◑	●	Include	High Quality
Spangehl,M.J., 1999	●	◑	●	●	●	●	Include	High Quality
Taylor,T., 1995	●	●	◑	●	◑	●	Include	Moderate Quality
Tetreault,M.W., 2014	●	●	●	●	◑	◑	Include	Moderate Quality
Tischler,E.H., 2014	●	●	●	●	◑	◑	Include	Moderate Quality
Tomas,X., 2011	●	●	●	◑	●	●	Include	High Quality
Trampuz,A., 2006	●	◑	●	◑	◑	●	Include	Moderate Quality
Trampuz,A., 2007	●	●	●	◑	●	●	Include	High Quality
van den Bekerom,M.P., 2006	●	●	●	●	◑	●	Include	High Quality
Vanderstappen,C., 2013	●	◑	●	●	●	◑	Include	Moderate Quality
Vicente,A.G., 2004	●	◑	●	●	●	●	Include	High Quality
Villacis,D., 2014	●	◑	●	◑	●	●	Include	Moderate Quality
Wenter,V., 2015	●	◑	●	○	●	●	Include	Moderate Quality
Wenter,V., 2017	●	●	●	◑	●	◑	Include	Moderate Quality
Wolf,G., 2003	●	◑	◑	●	◑	●	Include	Moderate Quality
Wong,Y.C., 2005	●	◑	●	◑	◑	●	Include	Moderate Quality
Worthington,T., 2010	●	◑	◑	◑	●	●	Include	Moderate Quality
Yapar,Z., 2001	●	◑	●	◑	●	◑	Include	Moderate Quality
Yi,P.H., 2014	●	●	●	●	●	◑	Include	High Quality
Yi,P.H., 2015	●	●	◑	●	●	○	Include	Moderate Quality

Surgical Site Infection: Diagnostic – History and Exam

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Figure 1: Summary of Findings Table Key

	LR +	LR -	
●	≥10	≤0.1	In **"STRONG"** agreement with the reference standard
◕	≥5 but <10	>0.1 but ≤0.2	In **"MODERATE"** agreement with the reference standard
◔	>2 and <5	>0.2 but <0.5	In "**WEAK**" agreement with the reference standard
○	≤2	≥0.5	In **"POOR"** agreement with the reference standard

Summary of Findings: Table 1: Hip - Moderate Quality- History and Exam Vs. Reference Standard

Index Test	Values	Moderate Quality Pons,M., 1999
Clinical exam	Rule In	●
	Rule Out	◔

Table 2: Hip- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Pons,M., 1999	Moderate Quality	80	clinical examination	Histology, microbiology, culture	8	0.63|0.98	40.00|0.38	**STRONG**	WEAK

Summary of Findings: Table 3: Hip & Knee - Moderate Quality- History and Exam Vs. Reference Standard

Index Test	Values	Moderate Quality Bernard,L., 2004
Clinical findings (fever)	Rule In	
	Rule Out	
Clinical findings (fistula)	Rule In	
	Rule Out	

Table 4: Hip & Knee- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Bernard,L., 2004	Moderate Quality	230	clinical findings (fistula)	Culture, purulence	5	0.31|0.95	6.53|0.72	**MODERATE**	POOR
Bernard,L., 2004	Moderate Quality	230	clinical findings (fever)	Culture, purulence	5	0.53|0.90	5.58|0.52	**MODERATE**	POOR

Summary of Findings: Table 5: Knee - History and Exam Vs. Reference Standard

No evidence available

Summary of Findings: Table 6: Multi-site - History and Exam Vs. Reference Standard

No evidence available

Summary of Findings: Table 7: Shoulder - History and Exam Vs. Reference Standard

No evidence available

Summary of Findings: Table 8: Spine - History and Exam Vs. Reference Standard

No evidence available

Surgical Site Infection: Diagnostic – Culture/Biopsy

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Figure 1: Summary of Findings Table Key

	LR +	LR -	
●	≥10	≤0.1	In **"STRONG"** agreement with the reference standard
◕	≥5 but <10	>0.1 but ≤0.2	In **"MODERATE"** agreement with the reference standard
◔	>2 and <5	>0.2 but <0.5	In "**WEAK**" agreement with the reference standard
○	≤2	≥0.5	In **"POOR"** agreement with the reference standard

Summary of Findings: Table 1: Hip - High Quality- Culture/biopsy Vs. Reference Standard

Index Test	Values	High Quality	
		Spangehl,M.J., 1999	Tomas,X., 2011
Ct-Guided Hip Aspiration	Rule In		●
	Rule Out		●
Gram stain	Rule In	●	
	Rule Out	○	
Initial Aspiration Of The Hip Joint	Rule In	●	
	Rule Out	◕	
Intraoperative Swab Culture	Rule In	●	
	Rule Out	◔	
Tissue culture	Rule In	●	
	Rule Out	●	

Table 2: Hip- High Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Tomas,X., 2011	High Quality	63	CT-guided hip aspiration	Culture	4	0.70|1.00	69.70|.	**STRONG**	**STRONG**
Spangehl,M.J., 1999	High Quality	180	initial aspiration of the hip joint	Sinus draining, purulence, ESR, CRP, Aspiration, Histology, Culture	9	0.86|0.94	15.14|0.15	**STRONG**	**MODERATE**
Spangehl,M.J., 1999	High Quality	180	intraoperative culture of tissue	Sinus draining, purulence, ESR, CRP, Aspiration, Histology, Culture	9	0.94|0.97	30.60|0.06	**STRONG**	**STRONG**
Spangehl,M.J., 1999	High Quality	168	intraoperative swab culture	Sinus draining, purulence, ESR, CRP, Aspiration, Histology, Culture	9	0.76|0.99	115.47|0.24	**STRONG**	WEAK
Spangehl,M.J., 1999	High Quality	202	intraoperative gram stain of tissue	Sinus draining, purulence, ESR, CRP, Aspiration, Histology, Culture	9	0.19|0.98	10.80|0.83	**STRONG**	POOR

Summary of Findings: Table 3: Hip - Moderate Quality- Culture/biopsy Vs. Reference Standard

Index Test	Values	Moderate Quality											
		Banit,D.M., 2002	Battaglia,M., 2011	Bori,G., 2011	Buttaro,M.A., 2010	Fink,B., 2013	Mulcahy,D.M., 1996	Newman,J.M., 2017	Nunez,L.V., 2007	Pons,M., 1999	Roberts,P., 1992	Schinsky,M.F., 2008	Taylor,T., 1995
Frozen Section Culture	Rule In												
	Rule Out												
Joint aspiration	Rule In												
	Rule Out												
Aspiration Arthrography	Rule In												
	Rule Out												
Bacteriology of biopsy	Rule In												
	Rule Out												
Biopsy (bacteriology and histology)	Rule In												
	Rule Out												
Culture	Rule In												
	Rule Out												
Diagnostic aspiration and biopsy	Rule In												
	Rule Out												
Fine Needle Joint Aspiration	Rule In												
	Rule Out												
Frozen Section Culture	Rule In												
	Rule Out												
Histology of biopsy	Rule In												
	Rule Out												
Histology(Interfacemembrane)	Rule In												
	Rule Out												
Histology(Pseudocapsule)	Rule In												
	Rule Out												
Intraoperative Histology	Rule In												
	Rule Out												
Synovial fluid culture	Rule In												
	Rule Out												
Ultrasound-guided aspiration	Rule In												
	Rule Out												
Frozen Sections 1	Rule In												
	Rule Out												
Frozen Sections 2	Rule In												
	Rule Out												

Table 4: Hip- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Battaglia,M., 2011	Moderate Quality	30	ultrasound-guided aspiration	Culture	4	0.69|0.94	11.77|0.33	**STRONG**	WEAK
Bori,G., 2011	Moderate Quality	69	pseudocapsule histology	Culture	4	0.42|0.98	23.75|0.59	**STRONG**	POOR
Bori,G., 2011	Moderate Quality	69	interface membrane histology	Culture	4	0.83|0.98	47.50|0.17	**STRONG**	**MODERATE**
Nunez,L.V., 2007	Moderate Quality	136	frozen section culture	Histology	4	0.86|0.87	6.78|0.16	**MODERATE**	**MODERATE**
Nunez,L.V., 2007	Moderate Quality	136	frozen section culture	Histology	4	0.98|0.99	81.43|0.02	**STRONG**	**STRONG**
Roberts,P., 1992	Moderate Quality	78	fine needle joint aspiration	0	4	0.87|0.95	18.20|0.14	**STRONG**	**MODERATE**
Fink,B., 2013	Moderate Quality	100	joint aspiration	Microbiology, Histology	5	0.64|0.96	17.72|0.37	**STRONG**	WEAK
Fink,B., 2013	Moderate Quality	100	histology of biopsy	Microbiology, Histology	5	0.62|1.00	62.22|.	**STRONG**	**STRONG**
Fink,B., 2013	Moderate Quality	100	bacteriology of biopsy	Microbiology, Histology	5	0.73|0.98	40.33|0.27	**STRONG**	WEAK
Fink,B., 2013	Moderate Quality	100	diagnostic aspiration and biopsy	Microbiology, Histology	5	0.87|0.98	47.67|0.14	**STRONG**	**MODERATE**
Fink,B., 2013	Moderate Quality	100	biopsy (bacteriology and histology)	Microbiology, Histology	5	0.82|0.98	45.22|0.18	**STRONG**	**MODERATE**
Buttaro,M.A., 2010	Moderate Quality	69	frozen section culture	Histology, culture	7	0.82|0.98	47.45|0.19	**STRONG**	**MODERATE**
Mulcahy,D.M., 1996	Moderate Quality	71	aspiration arthrography	Culture and histology	7	0.69|0.91	7.56|0.34	**MODERATE**	WEAK
Pons,M., 1999	Moderate Quality	79	joint aspiration	Histology, microbiology, culture	8	0.63|0.97	19.69|0.39	**STRONG**	WEAK

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Pons,M., 1999	Moderate Quality	80	intraoperative histology	Histology, microbiology, culture	8	1.00|0.98	64.00|.	**STRONG**	**STRONG**
Schinsky,M.F., 2008	Moderate Quality	201	culture	Culture, purulence, histology	8	0.87|0.92	10.62|0.14	**STRONG**	**MODERATE**
Schinsky,M.F., 2008	Moderate Quality	201	frozen section culture	Culture, purulence, histology	8	0.73|0.94	11.80|0.29	**STRONG**	WEAK
Banit,D.M., 2002	Moderate Quality	63	intraoperative frozen section	Culture	4	0.45|0.92	5.91|0.59	**MODERATE**	POOR
Newman,J.M., 2017	Moderate Quality	77	synovial fluid culture	MSIS	7	0.29|1.00	29.41|.	**STRONG**	**STRONG**
Taylor,T., 1995	Moderate Quality	86	fine needle joint aspiration	Surgery pathology, histology, bacteriology, clinical	7	0.93|0.96	22.09|0.07	**STRONG**	**STRONG**

Summary of Findings: Table 5: Hip & Knee – High Quality- Culture/biopsy Vs. Reference Standard

Index Test	Values	High Quality				
		Hughes,H.C., 2011	Kasparek,M.F., 2016	Panousis,K., 2005	Smith,E.B., 2014	Trampuz,A., 2007
Frozen Section Culture	Rule In		●			
	Rule Out		◔			
Histology	Rule In			●		
	Rule Out			●		
Synovasure PJI lateral flow test	Rule In		◕			
	Rule Out		◔			
Broth culture	Rule In				○	
	Rule Out				○	
Gram stain (sonicate fluid)	Rule In					●
	Rule Out					●
Periprosthetic Tissue Culture	Rule In					●
	Rule Out					◔
Periprosthetic Tissue Culture 2	Rule In					◕
	Rule Out					◔
Synovial Fluid Culture	Rule In					●
	Rule Out					◔
Tissue culture	Rule In			●		
	Rule Out			◔		
Culture with direct plate media	Rule In	●				
	Rule Out	●				
Culture with fastidious anaerobic broth media	Rule In	●				
	Rule Out	●				
Culture with BACTEC blood culture bottles	Rule In	●				
	Rule Out	◕				
Culture with cooked meat broth media	Rule In	●				
	Rule Out	◕				
Sonicate Fluid Culture	Rule In					●
	Rule Out					◔
Sonicate Fluid Culture 2	Rule In					●
	Rule Out					◔
Sonicate Fluid Culture 3	Rule In					●
	Rule Out					◔
Sonicate Fluid Culture 4	Rule In					●
	Rule Out					◔
Sonicate Fluid Culture 5	Rule In					●
	Rule Out					◔
Sonicate Fluid Culture 6	Rule In					●
	Rule Out					◔
Sonicate Fluid Culture 7	Rule In					●
	Rule Out					◔
Sonicate Fluid Culture 8	Rule In					●
	Rule Out					◔
Sonicate Fluid Culture 9	Rule In					●
	Rule Out					◔
Sonicate Fluid Culture 10	Rule In					●
	Rule Out					◔
Sonicate Fluid Culture 11	Rule In					◕
	Rule Out					◔
Sonicate Fluid Culture 12	Rule In					●
	Rule Out					◔

Table 6: Hip & Knee- High Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Trampuz,A., 2007	High Quality	140	synovial fluid culture	Purulence, histology, sinus draining	5	0.56|0.98	30.38|0.45	**STRONG**	WEAK
Trampuz,A., 2007	High Quality	331	sonicate fluid culture	Purulence, histology, sinus draining	5	0.80|0.98	40.19|0.21	**STRONG**	WEAK
Trampuz,A., 2007	High Quality	331	sonicate fluid culture	Purulence, histology, sinus draining	5	0.78|0.98	39.55|0.22	**STRONG**	WEAK
Trampuz,A., 2007	High Quality	331	sonicate fluid culture	Purulence, histology, sinus draining	5	0.78|0.99	65.92|0.22	**STRONG**	WEAK
Trampuz,A., 2007	High Quality	331	sonicate fluid culture	Purulence, histology, sinus draining	5	0.78|0.99	65.92|0.22	**STRONG**	WEAK
Trampuz,A., 2007	High Quality	329	sonicate fluid culture	Purulence, histology, sinus draining	5	0.78|0.99	65.45|0.22	**STRONG**	WEAK
Trampuz,A., 2007	High Quality	331	sonicate fluid culture	Purulence, histology, sinus draining	5	0.75|0.99	62.73|0.26	**STRONG**	WEAK
Trampuz,A., 2007	High Quality	331	sonicate fluid culture	Purulence, histology, sinus draining	5	0.73|0.99	61.67|0.27	**STRONG**	WEAK
Trampuz,A., 2007	High Quality	331	sonicate fluid culture	Purulence, histology, sinus draining	5	0.72|0.99	60.61|0.28	**STRONG**	WEAK
Trampuz,A., 2007	High Quality	331	sonicate fluid culture	Purulence, histology, sinus draining	5	0.70|0.99	87.72|0.31	**STRONG**	WEAK
Trampuz,A., 2007	High Quality	331	sonicate fluid culture	Purulence, histology, sinus draining	5	0.68|1.00	172.25|0.32	**STRONG**	WEAK
Trampuz,A., 2007	High Quality	331	peri-prosthetic tissue culture	Purulence, histology, sinus draining	5	0.61|0.99	76.56|0.40	**STRONG**	WEAK
Trampuz,A., 2007	High Quality	326	gram's staining of sonicate fluid	Purulence, histology, sinus draining	5	0.45|1.00	44.74|.	**STRONG**	**STRONG**
Trampuz,A., 2007	High Quality	331	sonicate fluid culture	Purulence, histology, sinus draining	5	0.81|0.89	7.29|0.21	**MODERATE**	WEAK

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Trampuz,A., 2007	High Quality	331	peri-prosthetic tissue culture	Purulence, histology, sinus draining	5	0.73|0.91	8.04|0.29	**MODERATE**	WEAK
Trampuz,A., 2007	High Quality	331	sonicate fluid culture	Purulence, histology, sinus draining	5	0.80|0.97	25.12|0.21	**STRONG**	WEAK
Kasparek,M.F., 2016	High Quality	40	synovasure PJI lateral flow test	MSIS	7	0.67|0.93	9.33|0.36	**MODERATE**	WEAK
Kasparek,M.F., 2016	High Quality	40	frozen section culture	MSIS	7	0.58|0.96	16.33|0.43	**STRONG**	WEAK
Smith,E.B., 2014	High Quality	190	broth culture	MSIS	7	0.19|0.88	1.55|0.92	POOR	POOR
Panousis,K., 2005	High Quality	92	tissue culture	Blood test, aspiration, culture, histology, Surgery pathology	9	0.75|0.96	20.00|0.26	**STRONG**	WEAK
Panousis,K., 2005	High Quality	92	histology	Blood test, aspiration, culture, histology, Surgery pathology	9	0.92|1.00	91.67|.	**STRONG**	**STRONG**
Hughes,H.C., 2011	High Quality	141	culture with direct plate media	Histology, microbiology	7	0.39|1.00	39.13|.	**STRONG**	**STRONG**
Hughes,H.C., 2011	High Quality	141	culture with fastidious anaerobic broth media	Histology, microbiology	7	0.57|1.00	56.52|.	**STRONG**	**STRONG**
Hughes,H.C., 2011	High Quality	141	culture with BACTEC blood culture bottles	Histology, microbiology	7	0.87|0.98	51.30|0.13	**STRONG**	**MODERATE**
Hughes,H.C., 2011	High Quality	141	culture with cooked meat broth media	Histology, microbiology	7	0.83|0.97	24.37|0.18	**STRONG**	**MODERATE**

Summary of Findings: Table 7: Hip & Knee – Moderate Quality- Culture/biopsy Vs. Reference Standard

Index Test	Values	Moderate Quality																
		Atkins,B.L., 1998	Banit,D.M., 2002	Bernard,L., 2004	Bingham,J., 2014	Cazanave,C., 2013	Della Valle,C.J., 1999	Frances,Borrego A., 2007	George,J., 2016	Gomez,E., 2012	Jordan,R.W., 2015	Lonner,J.H., 1996	Oethinger,M., 2011	Rak,M., 2013	Shen,H., 2015	Trampuz,A., 2006	Wong,Y.C., 2005	Greenwood-Quaintance,K.E.,
Culture	Rule In				◕													
	Rule Out				◔													
Frozen section	Rule In								◕									
	Rule Out								○									
Preoperative aspiration	Rule In			●														
	Rule Out			◕														
Sonicate Fluid Cultures With Bactec Bottles	Rule In														◕			
	Rule Out														◕			
Sonication	Rule In					○												
	Rule Out					●												
Standard Culture	Rule In										●							
	Rule Out										○							
Standard Culture+Enrichment	Rule In										○							
	Rule Out										○							
Synovial fluid culture	Rule In					○				●						●		
	Rule Out					●				◔						●		
Synovial Fluid Cultures With Bactec Bottles	Rule In														●			
	Rule Out														◔			
Sonicate fluid culture 1	Rule In									●						◕		●
	Rule Out									◔						◔		◔
Sonicate fluid culture 2	Rule In																	●
	Rule Out																	◔
Sonicate fluid culture 3	Rule In																	●
	Rule Out																	◔
Tissue culture 1	Rule In					○				●				●		◕		
	Rule Out					●				◔				◕		◔		
Tissue culture 2	Rule In					○										●		
	Rule Out					●										◔		
Microbiology 1	Rule In	◔																
	Rule Out	◔																
Microbiology 2	Rule In	●																
	Rule Out	◔																
Microbiology 3	Rule In	●																
	Rule Out	◔																
Frozen Section 1	Rule In		◕									●						
	Rule Out		◔									◕						
Frozen Section 2	Rule In											●						
	Rule Out											◕						
Frozen Sections (intraoperative) 2	Rule In							●										
	Rule Out							◔										
Frozen Section Culture 1	Rule In																◕	
	Rule Out																◕	
Frozen Section Culture 2	Rule In																◔	
	Rule Out																●	
Gram Stain 1	Rule In	●					●						◔					
	Rule Out	○					○						○					
Gram Stain 2	Rule In	●											◕					
	Rule Out	○											○					
Permanent Section Culture 1	Rule In																●	
	Rule Out																●	
Permanent Section Culture 2	Rule In																●	
	Rule Out																●	

Table 8: Hip & Knee – Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Atkins,B.L., 1998	Moderate Quality	297	microbiology	Histology	4	0.71|0.97	22.63|0.30	**STRONG**	WEAK
Atkins,B.L., 1998	Moderate Quality	297	microbiology	Histology	4	0.66|1.00	168.59|0.34	**STRONG**	WEAK
Atkins,B.L., 1998	Moderate Quality	297	gram stain	Histology	4	0.07|1.00	18.73|0.93	**STRONG**	POOR
Atkins,B.L., 1998	Moderate Quality	297	microbiology	Histology	4	0.83|0.81	4.33|0.21	WEAK	WEAK
Atkins,B.L., 1998	Moderate Quality	297	gram stain	Histology	4	0.12|0.99	10.41|0.89	**STRONG**	POOR
Banit,D.M., 2002	Moderate Quality	121	intraoperative frozen section	Culture	4	0.67|0.93	9.52|0.36	**MODERATE**	WEAK
Frances,Borrego A., 2007	Moderate Quality	146	intraoperative frozen section	Culture	4	0.63|0.96	17.81|0.39	**STRONG**	WEAK
Gomez,E., 2012	Moderate Quality	366	sonicate fluid culture	Culture	4	0.73|0.98	41.92|0.28	**STRONG**	WEAK
Gomez,E., 2012	Moderate Quality	366	synovial fluid culture	Culture	4	0.64|0.97	21.27|0.37	**STRONG**	WEAK
Gomez,E., 2012	Moderate Quality	366	tissue culture	Culture	4	0.70|0.99	54.19|0.30	**STRONG**	WEAK
Lonner,J.H., 1996	Moderate Quality	175	frozen section culture	Culture	4	0.84|0.96	21.89|0.16	**STRONG**	**MODERATE**
Lonner,J.H., 1996	Moderate Quality	175	frozen section culture	Culture	4	0.84|0.99	65.68|0.16	**STRONG**	**MODERATE**
Oethinger,M., 2011	Moderate Quality	269	gram stain	Culture	4	0.23|0.92	2.99|0.84	WEAK	POOR
Oethinger,M., 2011	Moderate Quality	390	gram stain	Culture	4	0.09|0.99	7.32|0.92	**MODERATE**	POOR
Bernard,L., 2004	Moderate Quality	127	preoperative aspiration	Culture, purulence	5	0.82|0.94	13.12|0.19	**STRONG**	**MODERATE**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Cazanave,C., 2013	Moderate Quality	.	Sonication	Histology, purulence, sinus draining	5	.|.	-0.75|-0.73	POOR	**STRONG**
Cazanave,C., 2013	Moderate Quality	.	Tissue cultures	Histology, purulence, sinus draining	5	.|.	-0.72|-0.71	POOR	**STRONG**
Cazanave,C., 2013	Moderate Quality	.	Tissue cultures	Histology, purulence, sinus draining	5	.|.	-0.99|-0.97	POOR	**STRONG**
Cazanave,C., 2013	Moderate Quality	.	Synovial fluid culture	Histology, purulence, sinus draining	5	.|.	-0.69|-0.67	POOR	**STRONG**
Rak,M., 2013	Moderate Quality	67	6 tissue cultures	Pathohistology, sinus draining, purulence	5	0.81|0.94	13.81|0.20	**STRONG**	**MODERATE**
Shen,H., 2015	Moderate Quality	110	sonicate fluid cultures with Bactec bottles	Purulence, sinus draining, histology, surgery pathology	5	0.88|0.87	6.60|0.14	**MODERATE**	**MODERATE**
Shen,H., 2015	Moderate Quality	110	synovial fluid cultures with Bactec bottles	Purulence, sinus draining, histology, surgery pathology	5	0.64|0.98	38.40|0.37	**STRONG**	WEAK
Trampuz,A., 2006	Moderate Quality	78	periprosthetic tissue culture	Purulence, histology, sinus draining	5	0.75|0.91	8.10|0.28	**MODERATE**	WEAK
Trampuz,A., 2006	Moderate Quality	78	periprosthetic tissue culture	Purulence, histology, sinus draining	5	0.54|0.98	29.25|0.47	**STRONG**	WEAK
Trampuz,A., 2006	Moderate Quality	78	sonicate fluid culture	Purulence, histology, sinus draining	5	0.75|0.87	5.79|0.29	**MODERATE**	WEAK
Trampuz,A., 2006	Moderate Quality	64	synovial fluid culture	Purulence, histology, sinus draining	5	0.76|1.00	76.47|.	**STRONG**	**STRONG**
Wong,Y.C., 2005	Moderate Quality	40	permanent section culture	Clinical, sinus draining, culture	5	0.79|1.00	78.57|.	**STRONG**	**STRONG**
Wong,Y.C., 2005	Moderate Quality	40	frozen section culture	Clinical, sinus draining, culture	5	0.86|0.85	5.57|0.17	**MODERATE**	**MODERATE**
Wong,Y.C., 2005	Moderate Quality	40	frozen section culture	Clinical, sinus draining, culture	5	0.93|0.77	4.02|0.09	WEAK	**STRONG**
Wong,Y.C., 2005	Moderate Quality	40	permanent section culture	Clinical, sinus draining, culture	5	0.86|1.00	85.71|.	**STRONG**	**STRONG**
George,J., 2016	Moderate Quality	250	frozen section	MSIS	7	0.50|0.94	8.50|0.53	**MODERATE**	POOR

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Greenwood-Quaintance,K.E., 2014	Moderate Quality	431	sonicate fluid culture	MSIS	7	0.70|0.99	97.28|0.30	**STRONG**	WEAK
Greenwood-Quaintance,K.E., 2014	Moderate Quality	431	sonicate fluid culture	MSIS	7	0.73|0.99	104.54|0.27	**STRONG**	WEAK
Greenwood-Quaintance,K.E., 2014	Moderate Quality	431	sonicate fluid culture	MSIS	7	0.77|0.98	38.09|0.24	**STRONG**	WEAK
Jordan,R.W., 2015	Moderate Quality	197	standard culture + enrichment	MSIS	7	0.44|0.59	1.06|0.96	POOR	POOR
Jordan,R.W., 2015	Moderate Quality	197	standard culture	MSIS	7	0.25|0.98	13.75|0.76	**STRONG**	POOR
Della Valle,C.J., 1999	Moderate Quality	413	intraoperative gram stain	Culture, Histology, Purulence	8	0.15|0.99	12.68|0.86	**STRONG**	POOR
Bingham,J., 2014	Moderate Quality	58	culture	MSIS	7	0.81|0.88	6.83|0.21	**MODERATE**	WEAK

Summary of Findings: Table 9: Knee - High Quality- Culture/biopsy Vs. Reference Standard

Index Test	Values	High Quality van den Bekerom,M.P., 2006
Aspiration Fluid Culture	Rule In	
	Rule Out	

Table 10: Knee- High Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
van den Bekerom,M.P., 2006	High Quality	68	aspiration fluid culture	WBC, ESR, CRP, aspiration, radiology, arthrography	7	0.71|0.74	2.73|0.39	WEAK	WEAK

Summary of Findings: Table 11: Knee – Moderate Quality - Culture/biopsy Vs. Reference Standard

Index Test	Values	Moderate Quality				
		Fink,B., 2008	Frances,Borrego A., 2007	Melendez,D.P., 2014	Morgan,P.M., 2009	Ryu,S.Y., 2014
Synovial Fluid Culture	Rule In			●		●
	Rule Out			●		◔
Aspiration	Rule In	●				
	Rule Out	◔				
Biopsy	Rule In	●				
	Rule Out	●				
Preoperative bacteriology examination	Rule In	●				
	Rule Out	◔				
Preoperative histology examination	Rule In	●				
	Rule Out	◕				
Tissue culture	Rule In					●
	Rule Out					●
Sonicate Fluid Culture	Rule In					●
	Rule Out					●
Frozen Sections (intraoperative)	Rule In		◕			
	Rule Out		◔			
Gram stains	Rule In				●	
	Rule Out				○	

Table 12: Knee- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Fink,B., 2008	Moderate Quality	145	preoperative histology examination	Histology and Microbiology	5	0.90|0.95	18.90|0.11	**STRONG**	**MODERATE**
Fink,B., 2008	Moderate Quality	145	preoperative bacteriology examination	Histology and Microbiology	5	0.78|0.98	40.69|0.23	**STRONG**	WEAK
Fink,B., 2008	Moderate Quality	145	biopsy	Histology and Microbiology	5	1.00|0.98	52.50|.	**STRONG**	**STRONG**
Fink,B., 2008	Moderate Quality	145	aspiration	Histology and Microbiology	5	0.73|0.95	15.23|0.29	**STRONG**	WEAK
Ryu,S.Y., 2014	Moderate Quality	95	tissue culture	Histology, purulence, sinus draining, specimens	8	0.69|1.00	68.75|.	**STRONG**	**STRONG**
Ryu,S.Y., 2014	Moderate Quality	45	sonicate fluid culture	Histology, purulence, sinus draining, specimens	8	0.77|1.00	76.67|.	**STRONG**	**STRONG**
Ryu,S.Y., 2014	Moderate Quality	89	synovial fluid culture	Histology, purulence, sinus draining, specimens	8	0.72|0.96	20.20|0.29	**STRONG**	WEAK
Melendez,D.P., 2014	Moderate Quality	103	synovial fluid culture	MSIS	7	0.86|1.00	85.71|.	**STRONG**	**STRONG**
Morgan,P.M., 2009	Moderate Quality	921	intraoperative gram stain	Culture, histology, purulence, sinus draining	8	0.27|1.00	182.83|0.73	**STRONG**	POOR
Frances,Borrego A., 2007	Moderate Quality	63	intraoperative frozen section	Culture	4	0.67|0.90	6.50|0.37	**MODERATE**	WEAK

Summary of Findings: Table 13: Multi-Site - High Quality- Culture/biopsy Vs. Reference Standard

Index Test	Values	High Quality					
		Aggarwal,V.K., 2013	Borens,O., 2013	Drago,L., 2013	Gallo,J., 2008	Holinka,J., 2011	Puig-Verdie,L., 2013
6 periprosthetic tissue cultures	Rule In			◔			
	Rule Out			◔			
Culture	Rule In				◕		
	Rule Out				○		
DL-dithiothreitol (DTT)	Rule In			●			
	Rule Out			◕			
Gram stain from sediment of sonication fluid	Rule In					●	
	Rule Out					●	
Microcalorimetry of sonication fluid	Rule In		●				
	Rule Out		●				
Prosthetic material for sonication	Rule In			●			
	Rule Out			◔			
Sonication culture	Rule In					●	
	Rule Out					◔	
Peri-Implant Tissue Culture 1	Rule In						◕
	Rule Out						●
Peri-Implant Tissue Culture 2	Rule In						◕
	Rule Out						●
Peri-Implant Tissue Culture 3	Rule In						◕
	Rule Out						●
Peri-Implant Tissue Culture 4	Rule In						◕
	Rule Out						●
Peri-Implant Tissue Culture 5	Rule In						◕
	Rule Out						●
Peri-Implant Tissue Culture 6	Rule In						◕
	Rule Out						●
Peri-Implant Tissue Culture 7	Rule In						○
	Rule Out						●
Peri-Implant Tissue Culture 8	Rule In						◕
	Rule Out						●
Peri-Implant Tissue Culture 9	Rule In						◕
	Rule Out						●
Sonication-Fluid Culture 4	Rule In						◕
	Rule Out						●
Sonication-Fluid Culture 5	Rule In						◕
	Rule Out						●
Sonication-Fluid Culture 6	Rule In						◕
	Rule Out						●
Sonication-Fluid Culture 7	Rule In						○
	Rule Out						●
Sonication-Fluid Culture 8	Rule In						◔
	Rule Out						●
Sonication-Fluid Culture 9	Rule In						○
	Rule Out						●
Swab culture 1	Rule In	●					
	Rule Out	◔					
Swab culture 2	Rule In	◕					
	Rule Out	◔					
Sonication-Fluid Culture 1	Rule In						○
	Rule Out						●
Sonication-Fluid Culture 2	Rule In						○
	Rule Out						●
Sonication-Fluid Culture 3	Rule In						○
	Rule Out						●
Tissue culture 1	Rule In	●				◕	
	Rule Out	●				○	
Tissue culture 2	Rule In	●				●	
	Rule Out	◔				◔	

Table 14: Multi-Site- High Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Puig-Verdie,L., 2013	High Quality	.	sonication-fluid culture (SFC)	Culture	4	.|.	85.50|0.15	**STRONG**	**MODERATE**
Puig-Verdie,L., 2013	High Quality	.	sonication-fluid culture (SFC)	Culture	4	.|.	87.00|0.13	**STRONG**	**MODERATE**
Puig-Verdie,L., 2013	High Quality	.	sonication-fluid culture (SFC)	Culture	4	.|.	100.00|0.00	**STRONG**	**STRONG**
Puig-Verdie,L., 2013	High Quality	.	sonication-fluid culture (SFC)	Culture	4	.|.	33.32|0.07	**STRONG**	**STRONG**
Puig-Verdie,L., 2013	High Quality	.	sonication-fluid culture (SFC)	Culture	4	.|.	100.00|0.00	**STRONG**	**STRONG**
Puig-Verdie,L., 2013	High Quality	.	peri-implant tissue culture	Culture	4	.|.	75.00|0.25	**STRONG**	WEAK
Puig-Verdie,L., 2013	High Quality	.	peri-implant tissue culture	Culture	4	.|.	97.00|0.52	**STRONG**	POOR
Puig-Verdie,L., 2013	High Quality	.	peri-implant tissue culture	Culture	4	.|.	85.20|0.15	**STRONG**	**MODERATE**
Puig-Verdie,L., 2013	High Quality	.	peri-implant tissue culture	Culture	4	.|.	58.00|0.42	**STRONG**	WEAK
Puig-Verdie,L., 2013	High Quality	.	peri-implant tissue culture	Culture	4	.|.	56.20|0.44	**STRONG**	WEAK
Puig-Verdie,L., 2013	High Quality	.	peri-implant tissue culture	Culture	4	.|.	60.90|0.39	**STRONG**	WEAK
Puig-Verdie,L., 2013	High Quality	.	sonication-fluid culture (SFC)	Culture	4	.|.	100.00|0.00	**STRONG**	**STRONG**
Puig-Verdie,L., 2013	High Quality	.	peri-implant tissue culture	Culture	4	.|.	100.00|0.00	**STRONG**	**STRONG**
Puig-Verdie,L., 2013	High Quality	.	peri-implant tissue culture	Culture	4	.|.	76.70|0.23	**STRONG**	WEAK
Puig-Verdie,L., 2013	High Quality	.	peri-implant tissue culture	Culture	4	.|.	50.00|0.50	**STRONG**	POOR

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Puig-Verdie,L., 2013	High Quality	.	sonication-fluid culture (SFC)	Culture	4	.|.	14.94|0.08	**STRONG**	**STRONG**
Puig-Verdie,L., 2013	High Quality	.	sonication-fluid culture (SFC)	Culture	4	.|.	146.67|0.12	**STRONG**	**MODERATE**
Puig-Verdie,L., 2013	High Quality	.	sonication-fluid culture (SFC)	Culture	4	.|.	90.60|0.09	**STRONG**	**STRONG**
Aggarwal,V.K., 2013	High Quality	117	tissue culture	MSIS	7	0.93|0.98	40.60|0.07	**STRONG**	**STRONG**
Aggarwal,V.K., 2013	High Quality	117	swab culture	MSIS	7	0.53|0.98	23.20|0.48	**STRONG**	WEAK
Aggarwal,V.K., 2013	High Quality	117	tissue culture	MSIS	7	0.63|0.98	27.55|0.38	**STRONG**	WEAK
Aggarwal,V.K., 2013	High Quality	117	swab culture	MSIS	7	0.70|0.89	6.09|0.34	**MODERATE**	WEAK
Borens,O., 2013	High Quality	39	microcalorimetry of sonication fluid	Purulence, sinus draining, histology, WBC, Aspiration	7	1.00|0.96	27.00|.	**STRONG**	**STRONG**
Gallo,J., 2008	High Quality	94	culture of joint fluid from total joint arthroplasty	Sinus draining, histology/culture, clinical, ESR/CRP, radiology	7	0.43|0.94	6.96|0.60	**MODERATE**	POOR
Drago,L., 2013	High Quality	76	6 periprosthetic tissue cultures	ESR, CRP, Aspiration, histology, culture	9	0.71|0.76	3.04|0.37	WEAK	WEAK
Drago,L., 2013	High Quality	76	DL-dithiothreitol (DTT)	ESR, CRP, Aspiration, histology, culture	9	0.86|0.94	14.57|0.15	**STRONG**	**MODERATE**
Drago,L., 2013	High Quality	76	prosthetic material for sonication	ESR, CRP, Aspiration, histology, culture	9	0.71|0.94	12.14|0.30	**STRONG**	WEAK
Holinka,J., 2011	High Quality	40	tissue culture	Culture, aspiration, purulence, pathohistology, sinus draining	9	0.43|0.95	8.14|0.60	**MODERATE**	POOR

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Holinka,J., 2011	High Quality	40	gram stain from sediment of sonication fluid	Culture, aspiration, purulence, pathohistology, sinus draining	9	0.57|1.00	57.14|.	**STRONG**	**STRONG**
Holinka,J., 2011	High Quality	40	sonication culture	Culture, aspiration, purulence, pathohistology, sinus draining	9	0.67|0.95	12.67|0.35	**STRONG**	WEAK
Holinka,J., 2011	High Quality	40	tissue culture	Culture, aspiration, purulence, pathohistology, sinus draining	9	0.57|0.95	10.86|0.45	**STRONG**	WEAK

Summary of Findings: Table 15: Multi-Site - Moderate Quality- Culture/biopsy Vs. Reference Standard

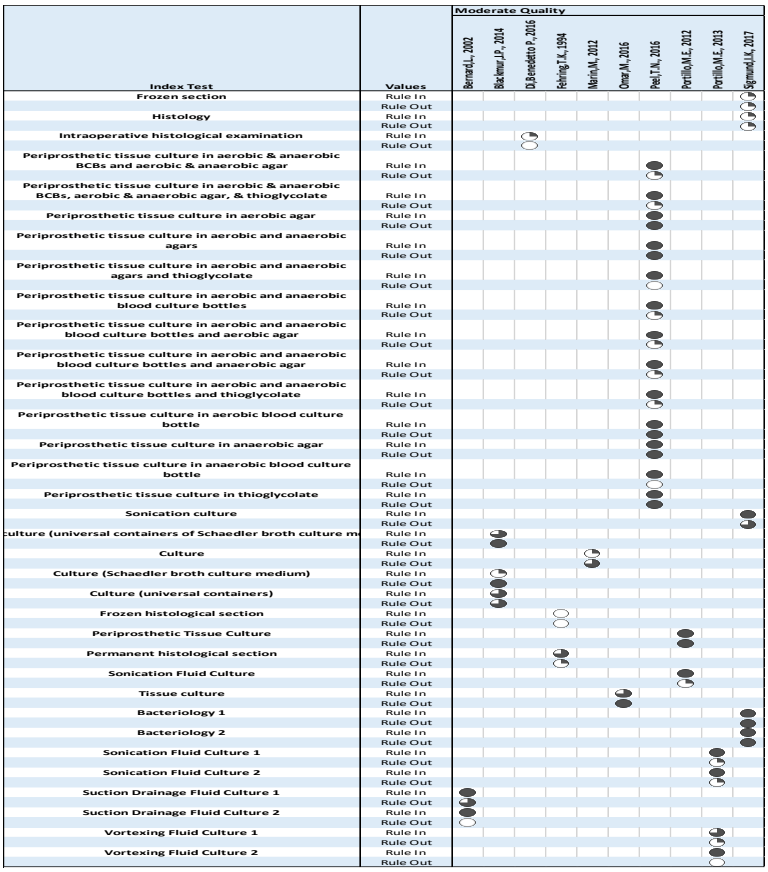


Table 16: Multi-Site- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Fehring,T.K., 1994	Moderate Quality	97	frozen histological section	Culture	4	0.18|0.90	1.74|0.91	POOR	POOR
Fehring,T.K., 1994	Moderate Quality	97	permanent histological section	Culture	4	0.82|0.86	5.86|0.21	**MODERATE**	WEAK
Portillo,M.E., 2012	Moderate Quality	86	sonication fluid culture	Culture	4	0.67|0.98	41.33|0.34	**STRONG**	WEAK
Portillo,M.E., 2012	Moderate Quality	86	periprosthetic tissue culture	Culture	4	0.71|1.00	70.83|.	**STRONG**	**STRONG**
Bernard,L., 2002	Moderate Quality	66	suction drainage fluid culture	Clinical, culture	5	0.81|0.96	20.31|0.20	**STRONG**	**MODERATE**
Bernard,L., 2002	Moderate Quality	880	suction drainage fluid culture	Clinical, culture	5	0.25|0.99	24.11|0.76	**STRONG**	POOR
Blackmur,J.P., 2014	Moderate Quality	67	standard culture practice with Schaedler broth culture medium	Purulence, pain, histology	5	0.95|0.77	4.12|0.06	WEAK	**STRONG**
Blackmur,J.P., 2014	Moderate Quality	67	broth-culture (universal containers of Schaedler broth culture medium)	Purulence, pain, histology	5	0.95|0.88	8.24|0.06	**MODERATE**	**STRONG**
Blackmur,J.P., 2014	Moderate Quality	67	standard culture practice (universal containers)	Purulence, pain, histology	5	0.83|0.88	7.19|0.19	**MODERATE**	**MODERATE**
Marin,M., 2012	Moderate Quality	63	culture	Purulence, Histology, sinus draining	5	0.89|0.67	2.67|0.17	WEAK	**MODERATE**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Portillo,M.E., 2013	Moderate Quality	135	vortexing fluid culture	Pus, sinus draining, inflammation, WBC, Neutrophil, culture	6	0.69|0.92	8.57|0.34	**MODERATE**	WEAK
Portillo,M.E., 2013	Moderate Quality	135	sonication fluid culture	Pus, sinus draining, inflammation, WBC, Neutrophil, culture	6	0.60|0.99	60.00|0.40	**STRONG**	WEAK
Portillo,M.E., 2013	Moderate Quality	135	vortexing fluid culture	Pus, sinus draining, inflammation, WBC, Neutrophil, culture	6	0.40|0.99	40.00|0.61	**STRONG**	POOR
Portillo,M.E., 2013	Moderate Quality	135	sonication fluid culture	Pus, sinus draining, inflammation, WBC, Neutrophil, culture	6	0.71|0.93	10.20|0.31	**STRONG**	WEAK
Di,Benedetto P., 2016	Moderate Quality	157	intraoperative histological examination	Definitive microbiology culture (synovial fluid and tissue culture)	7	0.38|0.82	2.19|0.75	WEAK	POOR
Peel,T.N., 2016	Moderate Quality	369	periprosthetic tissue culture in aerobic and anaerobic agars and thioglycolate	IDSA PJI criteria	7	0.44|0.99	37.33|0.56	**STRONG**	POOR
Peel,T.N., 2016	Moderate Quality	369	periprosthetic tissue culture in aerobic and anaerobic blood culture bottles and aerobic agar	IDSA PJI criteria	7	0.62|0.99	52.41|0.38	**STRONG**	WEAK
Peel,T.N., 2016	Moderate Quality	369	periprosthetic tissue culture in aerobic & anaerobic BCBs, aerobic & anaerobic agar, & thioglycolate	IDSA PJI criteria	7	0.68|0.97	21.27|0.34	**STRONG**	WEAK

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Peel,T.N., 2016	Moderate Quality	370	periprosthetic tissue culture in aerobic and anaerobic blood culture bottles	IDSA PJI criteria	7	0.60|0.99	50.54|0.40	**STRONG**	WEAK
Peel,T.N., 2016	Moderate Quality	369	periprosthetic tissue culture in aerobic and anaerobic blood culture bottles and anaerobic agar	IDSA PJI criteria	7	0.62|0.98	31.45|0.38	**STRONG**	WEAK
Peel,T.N., 2016	Moderate Quality	369	periprosthetic tissue culture in aerobic and anaerobic blood culture bottles and thioglycolate	IDSA PJI criteria	7	0.63|0.99	53.13|0.37	**STRONG**	WEAK
Peel,T.N., 2016	Moderate Quality	369	periprosthetic tissue culture in aerobic agar	IDSA PJI criteria	7	0.26|1.00	26.50|.	**STRONG**	**STRONG**
Peel,T.N., 2016	Moderate Quality	369	periprosthetic tissue culture in thioglycolate	IDSA PJI criteria	7	0.33|1.00	33.33|.	**STRONG**	**STRONG**
Peel,T.N., 2016	Moderate Quality	369	periprosthetic tissue culture in anaerobic blood culture bottle	IDSA PJI criteria	7	0.48|1.00	120.62|0.52	**STRONG**	POOR
Peel,T.N., 2016	Moderate Quality	369	periprosthetic tissue culture in aerobic & anaerobic BCBs and aerobic & anaerobic agar	IDSA PJI criteria	7	0.64|0.98	32.31|0.37	**STRONG**	WEAK

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Peel,T.N., 2016	Moderate Quality	369	periprosthetic tissue culture in aerobic and anaerobic agars	IDSA PJI criteria	7	0.33|1.00	33.33|.	**STRONG**	**STRONG**
Peel,T.N., 2016	Moderate Quality	369	periprosthetic tissue culture in anaerobic agar	IDSA PJI criteria	7	0.15|1.00	14.53|.	**STRONG**	**STRONG**
Peel,T.N., 2016	Moderate Quality	369	periprosthetic tissue culture in aerobic blood culture bottle	IDSA PJI criteria	7	0.43|1.00	42.74|.	**STRONG**	**STRONG**
Sigmund,I.K., 2017	Moderate Quality	49	histology	Modified MSIS criteria	7	0.69|0.67	2.08|0.46	WEAK	WEAK
Sigmund,I.K., 2017	Moderate Quality	49	frozen section	Modified MSIS criteria	7	0.69|0.78	3.12|0.40	WEAK	WEAK
Sigmund,I.K., 2017	Moderate Quality	49	bacteriology	Modified MSIS criteria	7	0.92|0.94	16.62|0.08	**STRONG**	**STRONG**
Sigmund,I.K., 2017	Moderate Quality	49	sonication culture	Modified MSIS criteria	7	0.85|0.94	15.23|0.16	**STRONG**	**MODERATE**
Sigmund,I.K., 2017	Moderate Quality	49	bacteriology	Modified MSIS criteria	7	0.85|1.00	84.62|.	**STRONG**	**STRONG**
Omar,M., 2016	Moderate Quality	62	tissue culture	Sinus draining/purulence/Microbiology/culture/serology and synovial findings	3	0.92|0.82	5.07|0.10	**MODERATE**	**STRONG**

Summary of Findings Table 17: Shoulder - Moderate Quality- Culture/biopsy Vs. Reference Standard

Index Test	Values	Moderate Quality Grosso,M.J., 2014
Preoperative shoulder aspiration culture	Rule In	
	Rule Out	

Table 18: Shoulder- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Grosso,M.J., 2014	Moderate Quality	35	preoperative shoulder aspiration culture	Culture	4	0.19|0.95	3.56|0.86	WEAK	POOR

Summary of Findings Table 19: Spine - Moderate Quality- Culture/biopsy Vs. Reference Standard

Index Test	Values	Moderate Quality	
		Ahn,J.S., 2015	Sampedro,M.F., 2010
Suction Drainage Fluid Culture	Rule In	○	
	Rule Out	○	
Peri-Implant Tissue Culture 1	Rule In		●
	Rule Out		●
Peri-Implant Tissue Culture 2	Rule In		◕
	Rule Out		○
Peri-Implant Tissue Culture 3	Rule In		●
	Rule Out		◔
Sonication-Fluid Culture 1	Rule In		●
	Rule Out		○
Sonication-Fluid Culture 2	Rule In		●
	Rule Out		○
Sonication-Fluid Culture 3	Rule In		●
	Rule Out		●

Table 20: Spine- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Ahn,J.S., 2015	Moderate Quality	133	suction tip culture	CDC Prevention Guidelines, purulence	6	0.60|0.66	1.76|0.61	POOR	POOR
Sampedro,M.F., 2010	Moderate Quality	98	peri-implant tissue culture	Purulence, histology, sinus draining, culture	8	0.23|1.00	22.73|.	**STRONG**	**STRONG**
Sampedro,M.F., 2010	Moderate Quality	98	peri-implant tissue culture	Purulence, histology, sinus draining, culture	8	0.41|0.95	7.77|0.62	**MODERATE**	POOR
Sampedro,M.F., 2010	Moderate Quality	98	sonication-fluid culture (SFC)	Purulence, histology, sinus draining, culture	8	0.41|0.99	31.09|0.60	**STRONG**	POOR
Sampedro,M.F., 2010	Moderate Quality	98	sonication-fluid culture (SFC)	Purulence, histology, sinus draining, culture	8	0.36|0.99	27.64|0.64	**STRONG**	POOR
Sampedro,M.F., 2010	Moderate Quality	98	peri-implant tissue culture	Purulence, histology, sinus draining, culture	8	0.73|0.95	13.82|0.29	**STRONG**	WEAK
Sampedro,M.F., 2010	Moderate Quality	98	sonication-fluid culture (SFC)	Purulence, histology, sinus draining, culture	8	0.91|0.97	34.55|0.09	**STRONG**	**STRONG**

Surgical Site Infection: Diagnostic – Inflammatory Markers

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Figure 1: ROC Curve - Hip - CRP vs. Culture/Histology

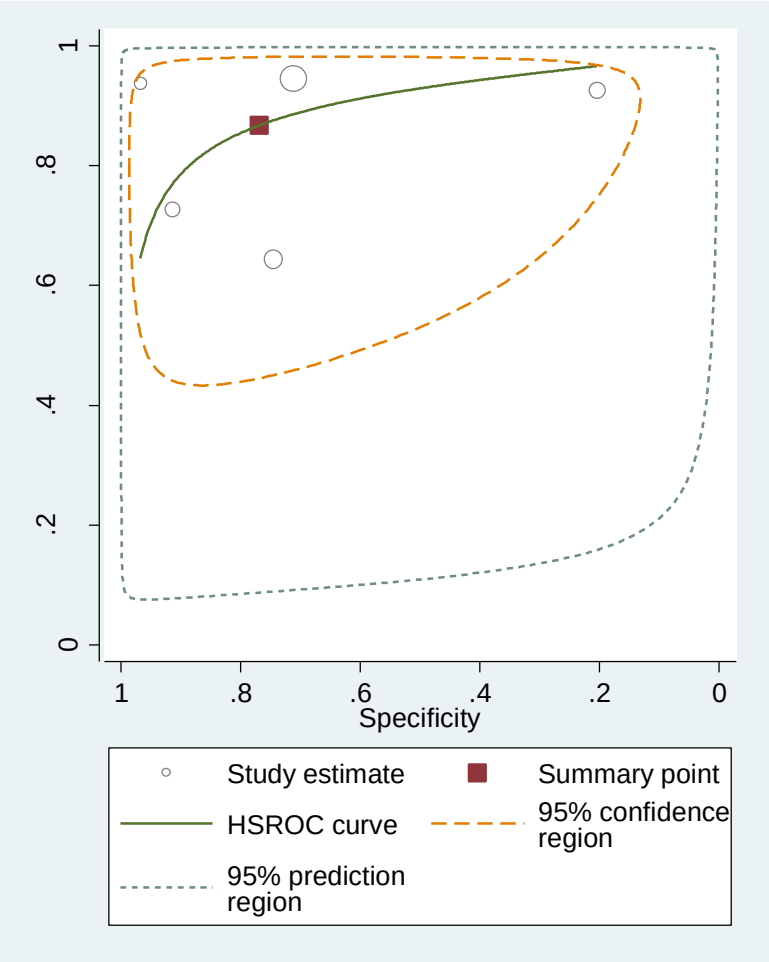


Table 1: Meta-Analysis – Hip – CRP vs. Culture/Histology

Meta-analysis of diagnostic accuracy

Log likelihood = -31.106519 Number of studies = 5

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Bivariate						
E(logitSe)	1.878207	.4912832			.9153101	2.841105
E(logitSp)	1.20528	.7067416			-.1799082	2.590468
Var(logitSe)	.7649483	.6789581			.1343126	4.356598
Var(logitSp)	2.265384	1.645298			.5456736	9.404824
Corr(logits)	-.278784	.5773234			-.9075142	.7354631
HSROC						
Lambda	3.382666	.8360473			1.744043	5.021289
Theta	.7725552	.6164703			-.4357044	1.980815
beta	.5428456	.5613696	0.97	0.334	-.5574185	1.64311
s2alpha	1.898813	1.76435			.3072969	11.73293
s2theta	.8416939	.6595093			.1812154	3.909428
Summary pt.						
Se	.8674051	.0565042			.7140855	.9448571
Sp	.7694627	.1253688			.4551439	.9302456
DOR	21.83441	16.84235			4.814515	99.02172
LR+	3.762537	2.00898			1.321258	10.71455
LR-	.1723214	.0729024			.075202	.3948654
1/LR-	5.803109	2.455067			2.532508	13.29752

Covariance between estimates of E(logitSe) & E(logitSp) -.0729177

Figure 2: Summary of Findings Table Key

	LR +	LR -	
●	≥10	≤0.1	In **"STRONG"** agreement with the reference standard
◕	≥5 but <10	>0.1 but ≤0.2	In **"MODERATE"** agreement with the reference standard
◔	>2 and <5	>0.2 but <0.5	In "**WEAK**" agreement with the reference standard
○	≤2	≥0.5	In **"POOR"** agreement with the reference standard

Summary of Findings: Table 2: Hip - High Quality- Inflammatory Markers Vs. Reference Standard

Index Test	Values	High Quality		
		Simonsen,L., 2007	Spangehl,M.J., 1999	Yi,P.H., 2014
%PMN	Rule In			◕
	Rule Out			◔
CRP	Rule In	○	●	●
	Rule Out	◔	●	●
ESR	Rule In	○	◕	○
	Rule Out	○	◔	◕
Frozen section	Rule In		●	
	Rule Out		◔	
Local signs of infection	Rule In	○		
	Rule Out	○		
Repeat Aspiration Of The Hip Joint	Rule In		●	
	Rule Out		◕	
WBC	Rule In	○	◕	
	Rule Out	○	○	
WBC (synovial fluid)	Rule In		●	●
	Rule Out		○	●
WBC (synovial fluid, % neutrophils)	Rule In		◕	
	Rule Out		◕	

Table 3: Hip- High Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Yi,P.H., 2014	High Quality	72	synovial white blood cells (WBC)	MSIS	7	0.97|1.00	97.22|.	**STRONG**	**STRONG**
Yi,P.H., 2014	High Quality	73	C-reactive protein (CRP)	MSIS	7	0.89|1.00	88.89|.	**STRONG**	**STRONG**
Yi,P.H., 2014	High Quality	73	erythrocyte sedimentation rate (ESR)	MSIS	7	0.92|0.54	2.00|0.15	POOR	**MODERATE**
Yi,P.H., 2014	High Quality	73	percentage of polymorphonuclear neutrophils (% PMN)	MSIS	7	0.81|0.89	7.45|0.22	**MODERATE**	WEAK
Simonsen,L., 2007	High Quality	76	white blood cell (WBC)	Culture, Histology, clinical	8	0.56|0.51	1.13|0.87	POOR	POOR
Simonsen,L., 2007	High Quality	76	erythrocyte sedimentation rate (ESR)	Culture, Histology, clinical	8	0.63|0.53	1.34|0.70	POOR	POOR
Simonsen,L., 2007	High Quality	76	local signs of infection	Culture, Histology, clinical	8	0.48|0.71	1.69|0.73	POOR	POOR
Simonsen,L., 2007	High Quality	76	C-reactive protein (CRP)	Culture, Histology, clinical	8	0.93|0.20	1.16|0.36	POOR	WEAK
Spangehl,M.J., 1999	High Quality	183	white blood cell (WBC) in synovial fluid	Sinus draining, purulence, ESR, CRP, Aspiration, Histology, Culture	9	0.36|0.99	55.36|0.65	**STRONG**	POOR
Spangehl,M.J., 1999	High Quality	181	white blood cell (WBC) in synovial fluid % neutrophils	Sinus draining, purulence, ESR, CRP, Aspiration, Histology, Culture	9	0.89|0.85	5.94|0.13	**MODERATE**	**MODERATE**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Spangehl,M.J., 1999	High Quality	202	intraoperative frozen section of tissue	Sinus draining, purulence, ESR, CRP, Aspiration, Histology, Culture	9	0.80|0.94	13.36|0.21	**STRONG**	WEAK
Spangehl,M.J., 1999	High Quality	202	white blood cell (WBC)	Sinus draining, purulence, ESR, CRP, Aspiration, Histology, Culture	9	0.20|0.96	5.57|0.83	**MODERATE**	POOR
Spangehl,M.J., 1999	High Quality	171	erythrocyte sedimentation rate (ESR)	Sinus draining, purulence, ESR, CRP, Aspiration, Histology, Culture	9	0.82|0.85	5.64|0.21	**MODERATE**	WEAK
Spangehl,M.J., 1999	High Quality	180	repeat aspiration of the hip joint	Sinus draining, purulence, ESR, CRP, Aspiration, Histology, Culture	9	0.81|0.97	25.74|0.20	**STRONG**	**MODERATE**
Spangehl,M.J., 1999	High Quality	142	C-reactive protein (CRP)	Sinus draining, purulence, ESR, CRP, Aspiration, Histology, Culture	9	0.96|0.92	12.39|0.04	**STRONG**	**STRONG**

Summary of Findings: Table 4: Hip - Moderate Quality- Inflammatory Markers Vs. Reference Standard

Index Test	Values	Moderate Quality											
		Alijanipour,P., 2013	Buttaro,M.A., 2010	Choi,H.R., 2016	Fink,B., 2013	Marmor,S., 2016	Newman,J.M., 2017	Omar,M., 2015	Piper,K.E., 2010	Schinsky,M.F., 2008	Tetreault,M.W., 2014	Worthington,T., 2010	Yi,P.H., 2015
%PMN	Rule In						◔	◕					◕
	Rule Out						◕	◕					◔
%PMN 2	Rule In						◔						
	Rule Out						◔						
CRP	Rule In	◔	◕		◔				◔	◔		●	◔
	Rule Out	◕	◔		◔				◔	●		●	●
CRP 2	Rule In	◕											
	Rule Out	◕											
CRP (serum)	Rule In							◕			◕		
	Rule Out							◔			●		
CRP (synovial)	Rule In							●					
	Rule Out							●					
CRP (synovial) 2	Rule In										◕		
	Rule Out										◕		
CRP and IL-6	Rule In		●										
	Rule Out		●										
CRP, aspiration, and biopsy	Rule In				◕								
	Rule Out				◕								
ESR	Rule In	◔	◕					◕	◔	○		●	◔
	Rule Out	●	◔					◔	○	●		●	◕
ESR 2	Rule In	◕											
	Rule Out	◔											
ESR and CRP	Rule In	◔											
	Rule Out	◔											
ESR and CRP 2	Rule In	◔							◔				
	Rule Out	◔							◔				
IL-6	Rule In		◕									◔	
	Rule Out		○									◔	
Soluble Intercellular Adhesion Molecule-1	Rule In											◔	
	Rule Out											●	
Synovial Fluid (WBC)	Rule In						◔						
	Rule Out						○						
Synovial fluid white blood cell count	Rule In			●									
	Rule Out			●									
WBC	Rule In							◕					
	Rule Out							◕					
WBC (synovial fluid)	Rule In									●			●
	Rule Out									◕			●
WBC (synovial fluid, differential)	Rule In									◔			
	Rule Out									◕			
ESR, CRP and WBC 1	Rule In									●			
	Rule Out									●			
ESR, CRP and WBC 2	Rule In									◕			
	Rule Out									◕			
ESR, CRP and WBC 3	Rule In									◕			
	Rule Out									◕			
ESR, CRP and WBC 4	Rule In									●			
	Rule Out									●			
Synovial Fluid Parameters From Aspiration (Biomarkers)	Rule In						◔						
	Rule Out						◔						
Synovial Fluid Parameters From Aspiration (Biomarkers) 2	Rule In						◔						
	Rule Out						◔						
Multiplex immunoassay	Rule In					◔							
	Rule Out					◔							

Table 5: Hip- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Omar,M., 2015	Moderate Quality	80	white blood cell (WBC)	Sinus draining/purulence/Microbiology/culture/serology and synovial findings	3	0.86|0.86	6.32|0.17	**MODERATE**	**MODERATE**
Omar,M., 2015	Moderate Quality	80	serum C-reactive protein (CRP)	Sinus draining/purulence/Microbiology/culture/serology and synovial findings	3	0.76|0.86	5.62|0.28	**MODERATE**	WEAK
Omar,M., 2015	Moderate Quality	80	erythrocyte sedimentation rate (ESR)	Sinus draining/purulence/Microbiology/culture/serology and synovial findings	3	0.80|0.92	9.60|0.22	**MODERATE**	WEAK
Omar,M., 2015	Moderate Quality	80	synovial C-reactive protein (CRP)	Sinus draining/purulence/Microbiology/culture/serology and synovial findings	3	0.95|0.93	14.05|0.05	**STRONG**	**STRONG**
Omar,M., 2015	Moderate Quality	80	percentage of polymorphonuclear neutrophils (% PMN)	Sinus draining/purulence/Microbiology/culture/serology and synovial findings	3	0.90|0.90	8.90|0.11	**MODERATE**	**MODERATE**
Worthington,T., 2010	Moderate Quality	46	interleukin-6 (IL-6)	Microbiology	4	0.81|0.77	3.48|0.24	WEAK	WEAK
Worthington,T., 2010	Moderate Quality	46	soluble intercellular adhesion molecule-1	Microbiology	4	0.94|0.73	3.52|0.09	WEAK	**STRONG**
Worthington,T., 2010	Moderate Quality	46	C-reactive protein (CRP)	Microbiology	4	0.94|0.97	28.13|0.06	**STRONG**	**STRONG**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Worthington,T., 2010	Moderate Quality	46	erythrocyte sedimentation rate (ESR)	Microbiology	4	0.81|1.00	81.25|.	**STRONG**	**STRONG**
Fink,B., 2013	Moderate Quality	100	CRP, aspiration, and biopsy	Microbiology, Histology	5	0.84|0.87	6.63|0.18	**MODERATE**	**MODERATE**
Fink,B., 2013	Moderate Quality	100	C-reactive protein (CRP)	Microbiology, Histology	5	0.64|0.75	2.53|0.48	WEAK	WEAK
Piper,K.E., 2010	Moderate Quality	221	erythrocyte sedimentation rate (ESR)	Purulence, histopathology, sinus draining, culture	6	0.47|0.84	3.03|0.63	WEAK	POOR
Piper,K.E., 2010	Moderate Quality	221	C-reactive protein (CRP)	Purulence, histopathology, sinus draining, culture	6	0.74|0.78	3.35|0.34	WEAK	WEAK
Piper,K.E., 2010	Moderate Quality	221	erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP)	Purulence, histopathology, sinus draining, culture	6	0.76|0.71	2.60|0.33	WEAK	WEAK
Buttaro,M.A., 2010	Moderate Quality	69	C-reactive protein (CRP) and interleukin-6 (IL-6)	Histology, culture	7	0.55|1.00	54.55|.	**STRONG**	**STRONG**
Buttaro,M.A., 2010	Moderate Quality	69	erythrocyte sedimentation rate (ESR)	Histology, culture	7	0.73|0.86	5.27|0.32	**MODERATE**	WEAK
Buttaro,M.A., 2010	Moderate Quality	69	C-reactive protein (CRP)	Histology, culture	7	0.73|0.91	8.44|0.30	**MODERATE**	WEAK
Buttaro,M.A., 2010	Moderate Quality	69	interleukin-6 (IL-6)	Histology, culture	7	0.36|0.95	7.03|0.67	**MODERATE**	POOR
Choi,H.R., 2016	Moderate Quality	138	synovial fluid white blood cell (WBC) count	MSIS and ICMPJI criteria	7	0.92|0.93	13.49|0.09	**STRONG**	**STRONG**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Yi,P.H., 2015	Moderate Quality	102	synovial fluid white blood cell (WBC) count	MSIS	7	1.00|0.95	18.20|.	**STRONG**	**STRONG**
Yi,P.H., 2015	Moderate Quality	102	percentage of polymorphonuclear neutrophils (% PMN)	MSIS	7	0.82|0.87	6.20|0.21	**MODERATE**	WEAK
Yi,P.H., 2015	Moderate Quality	129	C-reactive protein (CRP)	MSIS	7	0.94|0.78	4.22|0.08	WEAK	**STRONG**
Yi,P.H., 2015	Moderate Quality	131	erythrocyte sedimentation rate (ESR)	MSIS	7	0.83|0.82	4.71|0.20	WEAK	**MODERATE**
Schinsky,M.F., 2008	Moderate Quality	201	erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and white blood cell (WBC) count	Culture, purulence, histology	8	0.84|1.00	83.64|.	**STRONG**	**STRONG**
Schinsky,M.F., 2008	Moderate Quality	201	erythrocyte sedimentation rate (ESR)	Culture, purulence, histology	8	0.96|0.39	1.58|0.09	POOR	**STRONG**
Schinsky,M.F., 2008	Moderate Quality	201	synovial fluid white blood cell (WBC) count	Culture, purulence, histology	8	0.84|0.93	12.21|0.18	**STRONG**	**MODERATE**
Schinsky,M.F., 2008	Moderate Quality	201	erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and white blood cell (WBC) count	Culture, purulence, histology	8	0.84|0.87	6.43|0.19	**MODERATE**	**MODERATE**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Schinsky,M.F., 2008	Moderate Quality	201	C-reactive protein (CRP)	Culture, purulence, histology	8	0.95|0.71	3.29|0.08	WEAK	**STRONG**
Schinsky,M.F., 2008	Moderate Quality	201	erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and white blood cell (WBC) count	Culture, purulence, histology	8	0.82|0.90	7.96|0.20	**MODERATE**	**MODERATE**
Schinsky,M.F., 2008	Moderate Quality	201	erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and white blood cell (WBC) count	Culture, purulence, histology	8	0.91|0.91	10.21|0.10	**STRONG**	**STRONG**
Schinsky,M.F., 2008	Moderate Quality	201	synovial fluid white blood cell (WBC) differential	Culture, purulence, histology	8	0.84|0.82	4.70|0.20	WEAK	**MODERATE**
Marmor,S., 2016	Moderate Quality	242	multiplex immunoassay	Microbiological cultures on periprosthetic tissue samples obtained during surgery	6	0.73|0.84	4.48|0.32	WEAK	WEAK
Alijanipour,P., 2013	Moderate Quality	1194	erythrocyte sedimentation rate (ESR)	MSIS	7	0.95|0.71	3.30|0.07	WEAK	**STRONG**
Alijanipour,P., 2013	Moderate Quality	1200	erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP)	MSIS	7	0.75|0.84	4.70|0.30	WEAK	WEAK
Alijanipour,P., 2013	Moderate Quality	1194	C-reactive protein (CRP)	MSIS	7	0.88|0.68	2.77|0.18	WEAK	**MODERATE**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Alijanipour,P., 2013	Moderate Quality	1194	erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP)	MSIS	7	0.86|0.61	2.18|0.23	WEAK	WEAK
Alijanipour,P., 2013	Moderate Quality	1194	C-reactive protein (CRP)	MSIS	7	0.90|0.88	7.51|0.11	**MODERATE**	**MODERATE**
Alijanipour,P., 2013	Moderate Quality	1194	erythrocyte sedimentation rate (ESR)	MSIS	7	0.78|0.90	7.81|0.25	**MODERATE**	WEAK
Newman,J.M., 2017	Moderate Quality	77	synovial fluid parameters from aspiration (biomarkers)	MSIS	7	0.76|0.78	3.53|0.30	WEAK	WEAK
Newman,J.M., 2017	Moderate Quality	77	synovial fluid parameters from aspiration (biomarkers)	MSIS	7	0.82|0.78	3.80|0.23	WEAK	WEAK
Newman,J.M., 2017	Moderate Quality	77	white blood cell (WBC) synovial fluid	MSIS	7	0.47|0.87	3.53|0.61	WEAK	POOR
Newman,J.M., 2017	Moderate Quality	77	polymorphonuclear cells percentage (PMN %)	MSIS	7	0.88|0.75	3.53|0.16	WEAK	**MODERATE**
Newman,J.M., 2017	Moderate Quality	77	polymorphonuclear cells percentage (PMN %)	MSIS	7	0.76|0.80	3.82|0.29	WEAK	WEAK
Tetreault,M.W., 2014	Moderate Quality	59	serum C-reactive protein (CRP)	MSIS	7	1.00|0.84	6.29|.	**MODERATE**	**STRONG**
Tetreault,M.W., 2014	Moderate Quality	59	synovial C-reactive protein (CRP)	MSIS	7	0.87|0.86	6.36|0.15	**MODERATE**	**MODERATE**

Summary of Findings: Table 6: Hip & Knee - High Quality- Inflammatory Markers Vs. Reference Standard

Index Test	Values	High Quality							
		Bonanzinga,T., 2017	Bottner,F., 2007	Cipriano,C.A., 2012	Frangiamore,S.J., 2016	Glehr,M., 2013	Jacovides,C.L., 2011	Panousis,K., 2005	Parvizi,J., 2006
Alpha-defensin assay	Rule In	●							
	Rule Out	●							
ESR	Rule In		◕	◔				◔	
	Rule Out		◔	◕				◔	
ESR 2	Rule In			◔					
	Rule Out			●					
CRP	Rule In		●	◔		◔	●	○	
	Rule Out		●	●		◔	◕	○	
CRP 2	Rule In		●	◕		◔			
	Rule Out		●	◕		◔			
CRP 3	Rule In					◔			
	Rule Out					◕			
CRP 4	Rule In					◔			
	Rule Out					◔			
CRP 5	Rule In					◔			
	Rule Out					◕			
CRP and IL-6	Rule In		◕			◔			
	Rule Out		●			◔			
CRP and preoperative leukocyte level	Rule In					◔			
	Rule Out					◕			
CRP and procalcitonin	Rule In					◔			
	Rule Out					◕			
IL-6	Rule In		◕			◔	○		
	Rule Out		●			◔	●		
IL-6 2	Rule In					◔			
	Rule Out					◔			
IL-6 3	Rule In					○			
	Rule Out					◕			
IL-6 and preoperative leukocyte level	Rule In					○			
	Rule Out					◔			
IL-6 and procalcitonin	Rule In					◔			
	Rule Out					◔			
IL-8	Rule In				◕		●		
	Rule Out				◔		●		
Leukocyte Count	Rule In								●
	Rule Out								●
Lymphocyte Percentage	Rule In								◕
	Rule Out								●
Monocyte Percentage	Rule In								◔
	Rule Out								●
Neutrophil Percentage	Rule In								●
	Rule Out								●
Procalcitonin	Rule In		●			○			
	Rule Out		○			◔			
Procalcitonin 2	Rule In					●			
	Rule Out					●			
Procalcitonin 3	Rule In					○			
	Rule Out					◔			
Procalcitonin 4	Rule In					○			
	Rule Out					◔			
Procalcitonin 5	Rule In					○			
	Rule Out					◔			
Procalcitonin and preoperative leukocyte level	Rule In					◔			
	Rule Out					◔			
Synovial Fluid (WBC)	Rule In			●					
	Rule Out			●					
Synovial fluid white blood cell count	Rule In			◔					
	Rule Out			◕					
TNF-a	Rule In		◕		●				
	Rule Out		○		◔				
Vascular Endothelial Growth Factor	Rule In						◕		
	Rule Out						◔		
WBC	Rule In		○						
	Rule Out		◔						
Alpha 2-macroglobulin	Rule In						●		
	Rule Out						◕		
IL-1B	Rule In				◕				
	Rule Out				◕				
IL-10	Rule In				◕				
	Rule Out				◔				
GM-CSF	Rule In				◕				
	Rule Out				◔				
IL-2	Rule In				◔				
	Rule Out				◔				
IFN-Y	Rule In				●				
	Rule Out				◔				
IL-G	Rule In				●				
	Rule Out				◕				
IL-12p	Rule In				●				
	Rule Out				◔				
Preoperative leukocyte level	Rule In					○			
	Rule Out					◔			
Preoperative leukocyte level 2	Rule In					◔			
	Rule Out					◔			
Preoperative leukocyte level 3	Rule In					○			
	Rule Out					◔			
Preoperative leukocyte level 4	Rule In					○			
	Rule Out					◔			
Preoperative leukocyte level 5	Rule In					○			
	Rule Out					◔			
Synovial fluid (%PMN)	Rule In			◕					
	Rule Out			●					
Synovial fluid (%PMN) 2	Rule In			◕					
	Rule Out			●					

Table 7: Hip & Knee- High Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Jacovides,C.L., 2011	High Quality	74	C-reactive protein (CRP)	Sinus draining, purulence, culture, aspiration	6	0.87|0.98	37.45|0.13	**STRONG**	**MODERATE**
Jacovides,C.L., 2011	High Quality	74	interleukin-6 (IL-6)	Sinus draining, purulence, culture, aspiration	6	0.00|0.61	0.00|.	POOR	**STRONG**
Jacovides,C.L., 2011	High Quality	74	alpha 2-macroglobulin (a2M)	Sinus draining, purulence, culture, aspiration	6	0.81|0.95	17.34|0.20	**STRONG**	**MODERATE**
Jacovides,C.L., 2011	High Quality	74	interleukin-8 (IL-8)	Sinus draining, purulence, culture, aspiration	6	0.90|0.98	38.84|0.10	**STRONG**	**STRONG**
Jacovides,C.L., 2011	High Quality	74	vascular endothelial growth factor (VEGF)	Sinus draining, purulence, culture, aspiration	6	0.77|0.91	8.32|0.25	**MODERATE**	WEAK
Bonanzinga,T., 2017	High Quality	156	alpha-defensin assay	PJI Consensus Group criteria (intraoperative culture and histology)	7	0.97|0.97	30.66|0.04	**STRONG**	**STRONG**
Bottner,F., 2007	High Quality	78	C-reactive protein (CRP)	Culture, histology	7	0.95|0.96	27.14|0.05	**STRONG**	**STRONG**
Bottner,F., 2007	High Quality	78	white blood cell (WBC)	Culture, histology	7	0.71|0.60	1.77|0.48	POOR	WEAK
Bottner,F., 2007	High Quality	78	interleukin-6 (IL-6)	Culture, histology	7	0.95|0.88	7.76|0.05	**MODERATE**	**STRONG**
Bottner,F., 2007	High Quality	78	C-reactive protein (CRP) and interleukin-6 (IL-6)	Culture, histology	7	1.00|0.86	7.13|.	**MODERATE**	**STRONG**
Bottner,F., 2007	High Quality	78	tumor necrosis factor (TNF-a)	Culture, histology	7	0.43|0.95	8.14|0.60	**MODERATE**	POOR

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Bottner,F., 2007	High Quality	78	erythrocyte sedimentation rate (ESR)	Culture, histology	7	0.81|0.89	7.69|0.21	**MODERATE**	WEAK
Bottner,F., 2007	High Quality	78	C-reactive protein (CRP)	Culture, histology	7	0.95|0.91	10.86|0.05	**STRONG**	**STRONG**
Bottner,F., 2007	High Quality	78	procalcitonin (PCT)	Culture, histology	7	0.33|0.98	19.00|0.68	**STRONG**	POOR
Glehr,M., 2013	High Quality	84	procalcitonin (PCT)	Parvizi criteria	7	0.82|0.55	1.83|0.33	POOR	WEAK
Glehr,M., 2013	High Quality	84	preoperative leukocyte level	Parvizi criteria	7	0.91|0.34	1.39|0.26	POOR	WEAK
Glehr,M., 2013	High Quality	84	C-reactive protein (CRP)	Parvizi criteria	7	0.84|0.79	4.04|0.21	WEAK	WEAK
Glehr,M., 2013	High Quality	84	interleukin-6	Parvizi criteria	7	0.82|0.69	2.64|0.26	WEAK	WEAK
Glehr,M., 2013	High Quality	84	procalcitonin (PCT)	Parvizi criteria	7	0.47|1.00	47.27|.	**STRONG**	**STRONG**
Glehr,M., 2013	High Quality	84	preoperative leukocyte level	Parvizi criteria	7	0.73|0.72	2.64|0.38	WEAK	WEAK
Glehr,M., 2013	High Quality	84	C-reactive protein (CRP) and interleukin-6 (IL-6)	Parvizi criteria	7	0.84|0.69	2.69|0.24	WEAK	WEAK
Glehr,M., 2013	High Quality	84	C-reactive protein (CRP) and preoperative leukocyte level	Parvizi criteria	7	0.93|0.59	2.24|0.12	WEAK	**MODERATE**
Glehr,M., 2013	High Quality	84	interleukin-6 (IL-6) and preoperative leukocyte level	Parvizi criteria	7	0.89|0.52	1.85|0.21	POOR	WEAK

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Glehr,M., 2013	High Quality	84	C-reactive protein (CRP) and procalcitonin (PCT)	Parvizi criteria	7	0.84|0.83	4.85|0.20	WEAK	**MODERATE**
Glehr,M., 2013	High Quality	84	interleukin-6 (IL-6) and procalcitonin (PCT)	Parvizi criteria	7	0.84|0.69	2.69|0.24	WEAK	WEAK
Glehr,M., 2013	High Quality	84	procalcitonin (PCT)	Parvizi criteria	7	0.91|0.34	1.39|0.26	POOR	WEAK
Glehr,M., 2013	High Quality	84	procalcitonin (PCT) and preoperative leukocyte level	Parvizi criteria	7	0.73|0.79	3.52|0.34	WEAK	WEAK
Glehr,M., 2013	High Quality	124	procalcitonin (PCT)	Parvizi criteria	7	0.77|0.59	1.86|0.39	POOR	WEAK
Glehr,M., 2013	High Quality	124	procalcitonin (PCT)	Parvizi criteria	7	0.88|0.37	1.40|0.31	POOR	WEAK
Glehr,M., 2013	High Quality	124	interleukin-6 (IL-6)	Parvizi criteria	7	0.86|0.67	2.63|0.21	WEAK	WEAK
Glehr,M., 2013	High Quality	124	interleukin-6 (IL-6)	Parvizi criteria	7	0.94|0.52	1.96|0.12	POOR	**MODERATE**
Glehr,M., 2013	High Quality	124	C-reactive protein (CRP)	Parvizi criteria	7	0.81|0.80	4.13|0.24	WEAK	WEAK
Glehr,M., 2013	High Quality	124	C-reactive protein (CRP)	Parvizi criteria	7	0.90|0.74	3.44|0.14	WEAK	**MODERATE**
Glehr,M., 2013	High Quality	124	preoperative leukocyte level	Parvizi criteria	7	0.81|0.59	1.96|0.33	POOR	WEAK
Glehr,M., 2013	High Quality	124	preoperative leukocyte level	Parvizi criteria	7	0.90|0.39	1.47|0.26	POOR	WEAK
Glehr,M., 2013	High Quality	84	C-reactive protein (CRP)	Parvizi criteria	7	0.80|0.79	3.87|0.25	WEAK	WEAK
Glehr,M., 2013	High Quality	84	C-reactive protein (CRP)	Parvizi criteria	7	0.91|0.72	3.30|0.13	WEAK	**MODERATE**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Glehr,M., 2013	High Quality	84	preoperative leukocyte level	Parvizi criteria	7	0.80|0.48	1.55|0.41	POOR	WEAK
Parvizi,J., 2006	High Quality	168	neutrophil percentage	CRP, ESR, aspiration, purulence, culture	7	0.93|0.95	17.12|0.08	**STRONG**	**STRONG**
Parvizi,J., 2006	High Quality	168	lymphocyte percentage	CRP, ESR, aspiration, purulence, culture	7	0.95|0.86	7.01|0.06	**MODERATE**	**STRONG**
Parvizi,J., 2006	High Quality	168	leukocyte count	CRP, ESR, aspiration, purulence, culture	7	0.90|0.99	66.91|0.10	**STRONG**	**STRONG**
Parvizi,J., 2006	High Quality	168	monocyte percentage	CRP, ESR, aspiration, purulence, culture	7	0.94|0.65	2.66|0.10	WEAK	**STRONG**
Cipriano,C.A., 2012	High Quality	61	synovial fluid white blood cell (WBC) count	Culture, sinus draining, purulence, histopathology, PMN	9	0.89|0.81	4.70|0.13	WEAK	**MODERATE**
Cipriano,C.A., 2012	High Quality	61	C-reactive protein (CRP)	Culture, sinus draining, purulence, histopathology, PMN	9	0.95|0.71	3.32|0.07	WEAK	**STRONG**
Cipriano,C.A., 2012	High Quality	61	synovial fluid percentage of polymorhonuclear cells (% PMN)	Culture, sinus draining, purulence, histopathology, PMN	9	1.00|0.81	5.25|.	**MODERATE**	**STRONG**
Cipriano,C.A., 2012	High Quality	810	C-reactive protein (CRP)	Culture, sinus draining, purulence, histopathology, PMN	9	0.86|0.83	5.17|0.17	**MODERATE**	**MODERATE**
Cipriano,C.A., 2012	High Quality	810	synovial fluid percentage of polymorhonuclear cells (% PMN)	Culture, sinus draining, purulence, histopathology, PMN	9	0.95|0.87	7.53|0.05	**MODERATE**	**STRONG**
Cipriano,C.A., 2012	High Quality	810	erythrocyte sedimentation rate (ESR)	Culture, sinus draining, purulence, histopathology, PMN	9	0.87|0.67	2.65|0.19	WEAK	**MODERATE**
Cipriano,C.A., 2012	High Quality	61	erythrocyte sedimentation rate (ESR)	Culture, sinus draining, purulence, histopathology, PMN	9	0.95|0.60	2.34|0.09	WEAK	**STRONG**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Cipriano,C.A., 2012	High Quality	810	synovial fluid white blood cell (WBC) count	Culture, sinus draining, purulence, histopathology, PMN	9	0.91|0.93	13.15|0.10	**STRONG**	**STRONG**
Panousis,K., 2005	High Quality	92	C-reactive protein (CRP)	Blood test, aspiration, culture, histology, Surgery pathology	9	0.67|0.64	1.84|0.52	POOR	POOR
Panousis,K., 2005	High Quality	92	erythrocyte sedimentation rate (ESR)	Blood test, aspiration, culture, histology, Surgery pathology	9	0.75|0.68	2.31|0.37	WEAK	WEAK
Frangiamore,S.J., 2016	High Quality	90	IL-1B	ESR, CRP, histology, culture	8	0.90|0.86	6.66|0.11	**MODERATE**	**MODERATE**
Frangiamore,S.J., 2016	High Quality	90	IL-8	ESR, CRP, histology, culture	8	0.74|0.92	8.75|0.28	**MODERATE**	WEAK
Frangiamore,S.J., 2016	High Quality	90	IL-10	ESR, CRP, histology, culture	8	0.77|0.85	5.08|0.27	**MODERATE**	WEAK
Frangiamore,S.J., 2016	High Quality	90	GM-CSF	ESR, CRP, histology, culture	8	0.74|0.86	5.47|0.30	**MODERATE**	WEAK
Frangiamore,S.J., 2016	High Quality	90	IL-2	ESR, CRP, histology, culture	8	0.77|0.80	3.81|0.28	WEAK	WEAK
Frangiamore,S.J., 2016	High Quality	90	IFN-Y	ESR, CRP, histology, culture	8	0.74|0.97	21.89|0.27	**STRONG**	WEAK
Frangiamore,S.J., 2016	High Quality	90	IL-G	ESR, CRP, histology, culture	8	0.81|0.97	23.79|0.20	**STRONG**	**MODERATE**
Frangiamore,S.J., 2016	High Quality	90	TNF-a	ESR, CRP, histology, culture	8	0.71|0.97	20.94|0.30	**STRONG**	WEAK
Frangiamore,S.J., 2016	High Quality	90	IL-12p	ESR, CRP, histology, culture	8	0.68|0.97	19.98|0.33	**STRONG**	WEAK

Summary of Findings: Table 8: Hip & Knee - Moderate Quality- Inflammatory Markers Vs. Reference Standard

Index Test	Values	Moderate Quality												
		Abou El-Khier,N.T., 2013	Alijanipour,P., 2013	Bernard,L., 2004	Bingham,J., 2014	Cipriano,C., 2014	De,Vecchi E., 2016	Deirmengian,C., 2015	Dinneen,A., 2013	Friedrich,M.J., 2014	Randau,T.M., 2014	Tetreault,M.W., 2014	Tischler,E.H., 2014	Trampuz,A., 2006
Synovial fluid aspiration (c-reactive protein)	Rule In						●							
	Rule Out						◕							
Synovial fluid aspiration (glucose)	Rule In						◔							
	Rule Out						◔							
Synovial fluid aspiration (leucocyte esterase)	Rule In						●							
	Rule Out						●							
WBC	Rule In	◔								◔				
	Rule Out	◕								○				
WBC, CRP, Procalcitonin, IL-6	Rule In										◔			
	Rule Out										○			
Alphadefensin-1	Rule In				●									
	Rule Out				●									
Cell count	Rule In				◕									
	Rule Out				●									
CRP	Rule In	◕	●	◕	◔					◔	◔			
	Rule Out	●	◕	●	◔					◔	◔			
CRP (synovial)	Rule In											◕		
	Rule Out											◕		
CRP (serum)	Rule In											◔		
	Rule Out											●		
ESR	Rule In	◔	●	○	◔									
	Rule Out	◔	◔	◔	○									
IL-6	Rule In	◕												
	Rule Out	●												
IL-6 (joint aspirate)	Rule In										◔			
	Rule Out										◔			
IL-6 (joint aspirate) 2	Rule In										●			
	Rule Out										○			
IL-6 (serum)	Rule In										○			
	Rule Out										◔			
IL-6 (serum) 2	Rule In										◔			
	Rule Out										○			
IL-6 and CRP	Rule In	●												
	Rule Out	●												
Leukocyte count (synovial fluid)	Rule In													◕
	Rule Out													●
Lipopolysaccharide binding protein	Rule In									◔				
	Rule Out									○				
Neutrophils	Rule In								◕					
	Rule Out								◕					
PCR expression of TLR1	Rule In					●								
	Rule Out					●								
PCR expression of TLR6	Rule In					◔								
	Rule Out					◕								
Polynuclear count	Rule In			◔										
	Rule Out			○										
Procalcitonin	Rule In										●			
	Rule Out										●			
Synovial fluid alphadefensin immunoassay	Rule In							●						
	Rule Out							●						
Synovial Fluid Differential	Rule In													●
	Rule Out													●
Synovial WBC	Rule In								◕					
	Rule Out								◕					
Leukocyte Esterase Strip Test 1	Rule In							●					●	
	Rule Out							●					◔	
Leukocyte Esterase Strip Test 2	Rule In												◔	
	Rule Out												◔	

Table 9: Hip & Knee- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Bernard,L., 2004	Moderate Quality	171	erythrocyte sedimentation rate (ESR)	Culture, purulence	5	0.87|0.47	1.63|0.27	POOR	WEAK
Bernard,L., 2004	Moderate Quality	228	C-reactive protein (CRP)	Culture, purulence	5	0.97|0.81	5.07|0.04	**MODERATE**	**STRONG**
Bernard,L., 2004	Moderate Quality	228	polynuclear count	Culture, purulence	5	0.54|0.81	2.84|0.57	WEAK	POOR
De,Vecchi E., 2016	Moderate Quality	129	synovial fluid aspiration (leucocyte esterase)	Presence of sinus tract communicating with the prosthesis or isolation of the same pathogen by culture from at least 2 separate tissue or fluid samples obtained from the affected prosthetic joints; or having 3 of the following: elevated erythrocyte sedimentation rate and serum CRP concentration, elevated synovial fluid count or positive LE, high percentage of synovial fluid polymorphonuclear neutrophils, positive histology of periprosthetic tissue and single positive culture	6	0.93|0.97	31.48|0.08	**STRONG**	**STRONG**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
De,Vecchi E., 2016	Moderate Quality	129	synovial fluid aspiration (glucose)	Presence of sinus tract communicating with the prosthesis or isolation of the same pathogen by culture from at least 2 separate tissue or fluid samples obtained from the affected prosthetic joints; or having 3 of the following: elevated erythrocyte sedimentation rate and serum CRP concentration, elevated synovial fluid count or positive LE, high percentage of synovial fluid polymorphonuclear neutrophils, positive histology of periprosthetic tissue and single positive culture	6	0.78|0.81	4.18|0.27	WEAK	WEAK

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
De,Vecchi E., 2016	Moderate Quality	129	synovial fluid aspiration (c-reactive protein)	Presence of sinus tract communicating with the prosthesis or isolation of the same pathogen by culture from at least 2 separate tissue or fluid samples obtained from the affected prosthetic joints; or having 3 of the following: elevated erythrocyte sedimentation rate and serum CRP concentration, elevated synovial fluid count or positive LE, high percentage of synovial fluid polymorphonuclear neutrophils, positive histology of periprosthetic tissue and single positive culture	6	0.81|0.94	13.85|0.20	**STRONG**	**MODERATE**
Friedrich,M.J., 2014	Moderate Quality	120	white blood cell (WBC)	Purulence, histology, aspiration, Surgery pathology	6	0.21|0.94	3.75|0.84	WEAK	POOR
Friedrich,M.J., 2014	Moderate Quality	120	lipopolysaccharide-binding protein	Purulence, histology, aspiration, Surgery pathology	6	0.65|0.71	2.21|0.50	WEAK	POOR
Friedrich,M.J., 2014	Moderate Quality	120	C-reactive protein (CRP)	Purulence, histology, aspiration, Surgery pathology	6	0.63|0.82	3.46|0.46	WEAK	WEAK
Randau,T.M., 2014	Moderate Quality	120	serum interleukin-6	Synovial fluid, histology, microbiology	6	0.79|0.58	1.90|0.36	POOR	WEAK

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Randau,T.M., 2014	Moderate Quality	120	procalcitonin (PCT)	Synovial fluid, histology, microbiology	6	0.13|1.00	12.50|.	**STRONG**	**STRONG**
Randau,T.M., 2014	Moderate Quality	120	serum interleukin-6	Synovial fluid, histology, microbiology	6	0.48|0.89	4.31|0.59	WEAK	POOR
Randau,T.M., 2014	Moderate Quality	120	joint aspirate interleukin-6	Synovial fluid, histology, microbiology	6	0.63|0.86	4.50|0.44	WEAK	WEAK
Randau,T.M., 2014	Moderate Quality	120	white blood cell (WBC)	Synovial fluid, histology, microbiology	6	0.21|0.94	3.75|0.84	WEAK	POOR
Randau,T.M., 2014	Moderate Quality	120	C-reactive protein (CRP)	Synovial fluid, histology, microbiology	6	0.63|0.82	3.46|0.46	WEAK	WEAK
Randau,T.M., 2014	Moderate Quality	120	joint aspirate interleukin-6	Synovial fluid, histology, microbiology	6	0.48|0.97	17.25|0.54	**STRONG**	POOR
Alijanipour,P., 2013	Moderate Quality	1773	erythrocyte sedimentation rate (ESR)	MSIS	7	0.80|0.93	11.42|0.22	**STRONG**	WEAK
Alijanipour,P., 2013	Moderate Quality	1773	C-reactive protein (CRP)	MSIS	7	0.87|0.94	14.53|0.14	**STRONG**	**MODERATE**
Bingham,J., 2014	Moderate Quality	61	C-reactive protein (CRP)	MSIS	7	0.79|0.67	2.37|0.32	WEAK	WEAK
Bingham,J., 2014	Moderate Quality	61	erythrocyte sedimentation rate (ESR)	MSIS	7	0.53|0.81	2.76|0.59	WEAK	POOR
Bingham,J., 2014	Moderate Quality	61	alpha defensin-1 assay	MSIS	7	1.00|0.95	21.00|.	**STRONG**	**STRONG**
Bingham,J., 2014	Moderate Quality	61	cell count	MSIS	7	0.95|0.86	6.63|0.06	**MODERATE**	**STRONG**
Cipriano,C., 2014	Moderate Quality	50	PCR expression of TLR1	MSIS	7	0.95|1.00	95.24|.	**STRONG**	**STRONG**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Cipriano,C., 2014	Moderate Quality	50	PCR expression of TLR6	MSIS	7	0.86|0.83	4.97|0.17	WEAK	**MODERATE**
Deirmengian,C., 2015	Moderate Quality	38	leukocyte esterase (LE) colorimetric test strip	MSIS	7	0.69|1.00	68.75|.	**STRONG**	**STRONG**
Deirmengian,C., 2015	Moderate Quality	46	synovial fluid a-defensin immunoassay	MSIS	7	1.00|1.00	100.00|.	**STRONG**	**STRONG**
Dinneen,A., 2013	Moderate Quality	75	neutrophils	Culture, Histology	7	0.88|0.88	7.24|0.13	**MODERATE**	**MODERATE**
Dinneen,A., 2013	Moderate Quality	75	synovial white blood cells (WBC)	Culture, Histology	7	0.88|0.90	9.04|0.13	**MODERATE**	**MODERATE**
Tetreault,M.W., 2014	Moderate Quality	119	synovial C-reactive protein (CRP)	MSIS	7	0.88|0.85	5.86|0.15	**MODERATE**	**MODERATE**
Tetreault,M.W., 2014	Moderate Quality	119	serum C-reactive protein (CRP)	MSIS	7	0.97|0.76	4.01|0.04	WEAK	**STRONG**
Abou El-Khier,N.T., 2013	Moderate Quality	40	interleukin-6 (IL-6)	Purulence, histology, sinus draining, culture	8	1.00|0.90	9.67|.	**MODERATE**	**STRONG**
Abou El-Khier,N.T., 2013	Moderate Quality	40	white blood cell (WBC)	Purulence, histology, sinus draining, culture	8	0.91|0.76	3.77|0.12	WEAK	**MODERATE**
Abou El-Khier,N.T., 2013	Moderate Quality	40	C-reactive protein (CRP)	Purulence, histology, sinus draining, culture	8	1.00|0.86	7.25|.	**MODERATE**	**STRONG**
Abou El-Khier,N.T., 2013	Moderate Quality	40	erythrocyte sedimentation rate (ESR)	Purulence, histology, sinus draining, culture	8	0.82|0.83	4.75|0.22	WEAK	WEAK
Abou El-Khier,N.T., 2013	Moderate Quality	40	interleukin-6 (IL-6) and C-reactive protein (CRP)	Purulence, histology, sinus draining, culture	8	1.00|1.00	100|.	**STRONG**	**STRONG**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Tischler,E.H., 2014	Moderate Quality	189	leukocyte esterase strip test	MSIS	7	0.65|0.97	22.39|0.36	**STRONG**	WEAK
Tischler,E.H., 2014	Moderate Quality	189	leukocyte esterase strip test	MSIS	7	0.79|0.81	4.15|0.26	WEAK	WEAK
Trampuz,A., 2006	Moderate Quality	45	synovial fluid leukocyte count	Purulence, histology, sinus draining	5	1.00|0.83	6.00|.	**MODERATE**	**STRONG**
Trampuz,A., 2006	Moderate Quality	45	synovial fluid differential	Purulence, histology, sinus draining	5	1.00|0.97	30.00|.	**STRONG**	**STRONG**

Summary of Findings: Table 10: Knee - Moderate Quality- Inflammatory Markers Vs. Reference Standard

Index Test	Values	Moderate Quality										
		Alijanipour,P., 2013	Bedair,H., 2011	Fink,B., 2008	Ghanem,E., 2008	Greidanus,N.V., 2007	Marmor,S., 2016	Parvizi,J., 2011	Piper,K.E., 2010	Ronde-Oustau,C., 2014	Tetreault,M.W., 2014	Vanderstappen,C., 2013
CRP	Rule In	●	◔	◔		◕			◔			
	Rule Out	●	○	◔		●			◔			
CRP 2	Rule In	◔	◔			◕						
	Rule Out	●	◔			●						
ESR	Rule In	◔	○			◕			◕			
	Rule Out	●	●			●			◔			
ESR 2	Rule In	◕	◔			◕						
	Rule Out	◕	○			◕						
ESR and CRP	Rule In	◔				●			◔			
	Rule Out	●				◕			◕			
ESR and CRP 2	Rule In	◕				●						
	Rule Out	◕				◔						
CRP (serum) 2	Rule In										◕	
	Rule Out										◕	
CRP (synovial) 3	Rule In										●	
	Rule Out										◕	
ESR or CRP	Rule In					◔						
	Rule Out					●						
ESR or CRP 2	Rule In					◔						
	Rule Out					●						
CRP (Intra-Articular) 1	Rule In									◕		●
	Rule Out									●		●
CRP (Intra-Articular) 2	Rule In									◕		◕
	Rule Out									◕		●
CRP (serum) 1	Rule In									◕		
	Rule Out									○		
CRP (serum) 2	Rule In									◕		
	Rule Out									●		
Fluid leukocyte count	Rule In				◕							
	Rule Out				◕							
Fluid leukocyte count and CRP	Rule In				●							
	Rule Out				◕							
Fluid leukocyte count and ESR	Rule In				●							
	Rule Out				◕							
Fluid leukocyte count and fluid neutrophil percentage	Rule In				●							
	Rule Out				◕							
Fluid leukocyte count or CRP	Rule In				○							
	Rule Out				●							
Fluid leukocyte count or ESR	Rule In				◔							
	Rule Out				●							
Fluid leukocyte count or fluid neutrophil percentage	Rule In				◕							
	Rule Out				●							
Fluid neutrophil percentage	Rule In				●							
	Rule Out				●							
Fluid neutrophil percentage and CRP	Rule In				●							
	Rule Out				◕							
Fluid neutrophil percentage and ESR	Rule In				●							
	Rule Out				◕							
Fluid neutrophil percentage or CRP	Rule In				○							
	Rule Out				●							
Fluid neutrophil percentage or ESR	Rule In				◔							
	Rule Out				●							
Synovial fluid (%PMN)	Rule In		◔									
	Rule Out		◔									
Synovial fluid (WBC)	Rule In		●									
	Rule Out		●									
Synovial fluid (WBC) 2	Rule In		●									
	Rule Out		◕									
Synovial fluid (WBC, adjusted)	Rule In		●									
	Rule Out		●									
Leukocyte Esterase 1	Rule In							●				
	Rule Out							●				
Leukocyte Esterase 2	Rule In							◕				
	Rule Out							●				
Multiplex immunoassay	Rule In						◔					
	Rule Out						◔					

Table 11: Knee- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Greidanus,N.V., 2007	Moderate Quality	151	erythrocyte sedimentation rate (ESR)	Culture	4	0.93|0.83	5.50|0.08	**MODERATE**	**STRONG**
Greidanus,N.V., 2007	Moderate Quality	151	erythrocyte sedimentation rate (ESR) or C-reactive protein (CRP)	Culture	4	0.96|0.77	4.22|0.06	WEAK	**STRONG**
Greidanus,N.V., 2007	Moderate Quality	151	erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP)	Culture	4	0.89|0.93	13.46|0.12	**STRONG**	**MODERATE**
Greidanus,N.V., 2007	Moderate Quality	151	erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP)	Culture	4	0.80|0.93	12.11|0.21	**STRONG**	WEAK
Greidanus,N.V., 2007	Moderate Quality	151	erythrocyte sedimentation rate (ESR)	Culture	4	0.82|0.87	6.23|0.20	**MODERATE**	**MODERATE**
Greidanus,N.V., 2007	Moderate Quality	151	C-reactive protein (CRP)	Culture	4	0.91|0.86	6.44|0.10	**MODERATE**	**STRONG**
Greidanus,N.V., 2007	Moderate Quality	151	C-reactive protein (CRP)	Culture	4	0.93|0.83	5.50|0.08	**MODERATE**	**STRONG**
Greidanus,N.V., 2007	Moderate Quality	151	erythrocyte sedimentation rate (ESR) or C-reactive protein (CRP)	Culture	4	0.96|0.77	4.22|0.06	WEAK	**STRONG**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Bedair,H., 2011	Moderate Quality	146	synovial fluid percentage of polymorphonuclear neutrophils (% PMN)	Culture, purulence	5	0.84|0.69	2.74|0.23	WEAK	WEAK
Bedair,H., 2011	Moderate Quality	146	adjusted synovial fluid white blood cell (WBC) count	Culture, purulence	5	0.95|0.92	12.03|0.06	**STRONG**	**STRONG**
Bedair,H., 2011	Moderate Quality	146	synovial fluid white blood cell (WBC) count	Culture, purulence	5	0.95|0.91	10.94|0.06	**STRONG**	**STRONG**
Bedair,H., 2011	Moderate Quality	146	C-reactive protein (CRP)	Culture, purulence	5	0.53|0.86	3.71|0.55	WEAK	POOR
Bedair,H., 2011	Moderate Quality	146	erythrocyte sedimentation rate (ESR)	Culture, purulence	5	1.00|0.12	1.13|.	POOR	**STRONG**
Bedair,H., 2011	Moderate Quality	146	synovial fluid white blood cell (WBC) count	Culture, purulence	5	0.84|0.99	106.95|0.16	**STRONG**	**MODERATE**
Bedair,H., 2011	Moderate Quality	146	erythrocyte sedimentation rate (ESR)	Culture, purulence	5	0.16|0.94	2.51|0.90	WEAK	POOR
Bedair,H., 2011	Moderate Quality	146	C-reactive protein (CRP)	Culture, purulence	5	0.68|0.66	2.02|0.48	WEAK	WEAK
Fink,B., 2008	Moderate Quality	145	C-reactive protein (CRP)	Histology and Microbiology	5	0.73|0.81	3.81|0.34	WEAK	WEAK
Ghanem,E., 2008	Moderate Quality	429	fluid leukocyte count and C-reactive protein (CRP)	Sinus draining, aspiration, culture	6	0.86|0.93	12.18|0.15	**STRONG**	**MODERATE**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Ghanem,E., 2008	Moderate Quality	429	fluid neutrophil percentage and erythrocyte sedimentation rate (ESR)	Sinus draining, aspiration, culture	6	0.89|0.98	47.61|0.11	**STRONG**	**MODERATE**
Ghanem,E., 2008	Moderate Quality	429	fluid neutrophil percentage or C-reactive protein (CRP)	Sinus draining, aspiration, culture	6	1.00|0.45	1.81|.	POOR	**STRONG**
Ghanem,E., 2008	Moderate Quality	429	fluid neutrophil percentage or erythrocyte sedimentation rate (ESR)	Sinus draining, aspiration, culture	6	0.97|0.66	2.89|0.05	WEAK	**STRONG**
Ghanem,E., 2008	Moderate Quality	429	fluid leukocyte count	Sinus draining, aspiration, culture	6	0.91|0.88	7.59|0.11	**MODERATE**	**MODERATE**
Ghanem,E., 2008	Moderate Quality	429	fluid leukocyte count or fluid neutrophil percentage	Sinus draining, aspiration, culture	6	0.98|0.83	5.81|0.03	**MODERATE**	**STRONG**
Ghanem,E., 2008	Moderate Quality	429	fluid neutrophil percentage	Sinus draining, aspiration, culture	6	0.95|0.95	18.19|0.05	**STRONG**	**STRONG**
Ghanem,E., 2008	Moderate Quality	429	fluid leukocyte count and erythrocyte sedimentation rate (ESR)	Sinus draining, aspiration, culture	6	0.85|0.97	25.34|0.15	**STRONG**	**MODERATE**
Ghanem,E., 2008	Moderate Quality	429	fluid leukocyte count and fluid neutrophil percentage	Sinus draining, aspiration, culture	6	0.85|0.99	114.02|0.15	**STRONG**	**MODERATE**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Ghanem,E., 2008	Moderate Quality	429	fluid leukocyte count or erythrocyte sedimentation rate (ESR)	Sinus draining, aspiration, culture	6	0.99|0.59	2.41|0.02	WEAK	**STRONG**
Ghanem,E., 2008	Moderate Quality	429	fluid leukocyte count or C-reactive protein (CRP)	Sinus draining, aspiration, culture	6	0.99|0.41	1.70|0.01	POOR	**STRONG**
Ghanem,E., 2008	Moderate Quality	429	fluid neutrophil percentage and C-reactive protein (CRP)	Sinus draining, aspiration, culture	6	0.89|0.97	29.75|0.12	**STRONG**	**MODERATE**
Parvizi,J., 2011	Moderate Quality	108	leukocyte esterase	Sinus draining, purulence, culture, WBC	6	0.80|1.00	80.00|.	**STRONG**	**STRONG**
Parvizi,J., 2011	Moderate Quality	108	leukocyte esterase	Sinus draining, purulence, culture, WBC	6	0.93|0.87	7.28|0.08	**MODERATE**	**STRONG**
Piper,K.E., 2010	Moderate Quality	297	erythrocyte sedimentation rate (ESR)	Purulence, histopathology, sinus draining, culture	6	0.71|0.89	6.34|0.33	**MODERATE**	WEAK
Piper,K.E., 2010	Moderate Quality	297	C-reactive protein (CRP)	Purulence, histopathology, sinus draining, culture	6	0.83|0.79	3.96|0.22	WEAK	WEAK
Piper,K.E., 2010	Moderate Quality	297	erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP)	Purulence, histopathology, sinus draining, culture	6	0.87|0.75	3.45|0.18	WEAK	**MODERATE**
Ronde-Oustau,C., 2014	Moderate Quality	21	intra-articular C-reactive protein (CRP)	MSIS	7	1.00|0.82	5.50|.	**MODERATE**	**STRONG**
Ronde-Oustau,C., 2014	Moderate Quality	21	serum C-reactive protein (CRP)	MSIS	7	0.50|0.91	5.50|0.55	**MODERATE**	POOR

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Ronde-Oustau,C., 2014	Moderate Quality	21	intra-articular C-reactive protein (CRP)	MSIS	7	0.90|0.91	9.90|0.11	**MODERATE**	**MODERATE**
Ronde-Oustau,C., 2014	Moderate Quality	21	serum C-reactive protein (CRP)	MSIS	7	1.00|0.82	5.50|.	**MODERATE**	**STRONG**
Vanderstappen,C., 2013	Moderate Quality	44	intra-articular C-reactive protein (CRP)	MSIS	7	0.91|0.94	15.00|0.10	**STRONG**	**STRONG**
Vanderstappen,C., 2013	Moderate Quality	44	intra-articular C-reactive protein (CRP)	MSIS	7	1.00|0.85	6.60|.	**MODERATE**	**STRONG**
Marmor,S., 2016	Moderate Quality	107	multiplex immunoassay	Microbiological cultures on periprosthetic tissue samples obtained during surgery	6	0.74|0.74	2.81|0.35	WEAK	WEAK
Alijanipour,P., 2013	Moderate Quality	755	erythrocyte sedimentation rate (ESR)	MSIS	7	0.94|0.68	2.98|0.08	WEAK	**STRONG**
Alijanipour,P., 2013	Moderate Quality	755	C-reactive protein (CRP)	MSIS	7	0.97|0.70	3.25|0.04	WEAK	**STRONG**
Alijanipour,P., 2013	Moderate Quality	755	erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP)	MSIS	7	0.96|0.54	2.08|0.08	WEAK	**STRONG**
Alijanipour,P., 2013	Moderate Quality	755	erythrocyte sedimentation rate (ESR)	MSIS	7	0.87|0.87	6.71|0.15	**MODERATE**	**MODERATE**
Alijanipour,P., 2013	Moderate Quality	755	C-reactive protein (CRP)	MSIS	7	0.92|0.94	15.17|0.09	**STRONG**	**STRONG**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Alijanipour,P., 2013	Moderate Quality	755	erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP)	MSIS	7	0.89|0.85	5.93|0.13	**MODERATE**	**MODERATE**
Tetreault,M.W., 2014	Moderate Quality	60	synovial C-reactive protein (CRP)	MSIS	7	0.82|0.93	11.80|0.19	**STRONG**	**MODERATE**
Tetreault,M.W., 2014	Moderate Quality	60	serum C-reactive protein (CRP)	MSIS	7	0.88|0.84	5.42|0.14	**MODERATE**	**MODERATE**

Summary of Findings: Table 12: Multi-Site - Moderate Quality- Inflammatory Markers Vs. Reference Standard

Index Test	Values	Moderate Quality			
		Ettinger,M., 2015	Kheir,M.M., 2017	Marmor,S., 2016	Sigmund,I.K., 2017
Synovasure test (detection of alpha-defensin levels)	Rule In				
	Rule Out				
CRP	Rule In				
	Rule Out				
IL-6	Rule In				
	Rule Out				
Lipopolysaccharide binding protein	Rule In				
	Rule Out				
Procalcitonin	Rule In				
	Rule Out				
Tumor necrosis factor alpha	Rule In				
	Rule Out				
Leukocyte Esterase Strip Test 1	Rule In				
	Rule Out				
Leukocyte Esterase Strip Test 2	Rule In				
	Rule Out				
CRP and IL-6 1	Rule In				
	Rule Out				
CRP and IL-6 2	Rule In				
	Rule Out				
Multiplex immunoassay 1	Rule In				
	Rule Out				
Multiplex immunoassay 2	Rule In				
	Rule Out				
Multiplex immunoassay 3	Rule In				
	Rule Out				
Multiplex immunoassay 4	Rule In				
	Rule Out				
Multiplex immunoassay 5	Rule In				
	Rule Out				
Multiplex immunoassay 6	Rule In				
	Rule Out				
Multiplex immunoassay 7	Rule In				
	Rule Out				
Multiplex immunoassay 8	Rule In				
	Rule Out				

Table 13: Multi-Site- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Ettinger,M., 2015	Moderate Quality	77	Interleukin-6 and C-reactive protein	Symptoms, time, histology	5	0.25|0.98	14.25|0.76	**STRONG**	POOR
Ettinger,M., 2015	Moderate Quality	77	Procalcitonin	Symptoms, time, histology	5	0.90|0.28	1.25|0.36	POOR	WEAK
Ettinger,M., 2015	Moderate Quality	77	Interleukin 6	Symptoms, time, histology	5	0.80|0.88	6.51|0.23	**MODERATE**	WEAK
Ettinger,M., 2015	Moderate Quality	77	CRP	Symptoms, time, histology	5	0.80|0.63	2.17|0.32	WEAK	WEAK
Ettinger,M., 2015	Moderate Quality	77	Tumor necrosis factor ?	Symptoms, time, histology	5	0.35|0.86	2.49|0.76	WEAK	POOR
Ettinger,M., 2015	Moderate Quality	77	Lipopolysaccharide binding protein	Symptoms, time, histology	5	0.85|0.72	3.03|0.21	WEAK	WEAK
Ettinger,M., 2015	Moderate Quality	77	Interleukin-6 and C-reactive protein	Symptoms, time, histology	5	0.75|0.98	42.75|0.25	**STRONG**	WEAK
Marmor,S., 2016	Moderate Quality	358	multiplex immunoassay	Microbiological cultures on periprosthetic tissue samples obtained during surgery	6	0.72|0.81	3.74|0.34	WEAK	WEAK
Marmor,S., 2016	Moderate Quality	275	multiplex immunoassay	Microbiological cultures on periprosthetic tissue samples obtained during surgery	6	0.33|0.84	2.14|0.79	WEAK	POOR
Marmor,S., 2016	Moderate Quality	105	multiplex immunoassay	Microbiological cultures on periprosthetic tissue samples obtained during surgery	6	0.83|0.73	3.13|0.23	WEAK	WEAK

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Marmor,S., 2016	Moderate Quality	202	multiplex immunoassay	Microbiological cultures on periprosthetic tissue samples obtained during surgery	6	0.58|0.83	3.36|0.50	WEAK	POOR
Marmor,S., 2016	Moderate Quality	147	multiplex immunoassay	Microbiological cultures on periprosthetic tissue samples obtained during surgery	6	0.75|0.79	3.63|0.32	WEAK	WEAK
Marmor,S., 2016	Moderate Quality	199	multiplex immunoassay	Microbiological cultures on periprosthetic tissue samples obtained during surgery	6	0.64|0.82	3.60|0.43	WEAK	WEAK
Marmor,S., 2016	Moderate Quality	325	multiplex immunoassay	Microbiological cultures on periprosthetic tissue samples obtained during surgery	6	0.76|0.82	4.22|0.29	WEAK	WEAK
Marmor,S., 2016	Moderate Quality	290	multiplex immunoassay	Microbiological cultures on periprosthetic tissue samples obtained during surgery	6	0.38|0.85	2.54|0.73	WEAK	POOR
Kheir,M.M., 2017	Moderate Quality	79	Leukocyte Esterase Strip Test	MSIS criteria	7	0.18|0.96	4.12|0.86	WEAK	POOR
Kheir,M.M., 2017	Moderate Quality	77	Leukocyte Esterase Strip Test	Delphi criteria	7	0.26|1.00	26.32|.	**STRONG**	**STRONG**
Sigmund,I.K., 2017	Moderate Quality	49	C-reactive protein (CRP)	Modified MSIS criteria	7	0.77|0.78	3.46|0.30	WEAK	WEAK
Sigmund,I.K., 2017	Moderate Quality	49	synovasure test (detection of alpha-definsin levels)	Modified MSIS criteria	7	0.69|0.94	12.46|0.33	**STRONG**	WEAK

Summary of Findings: Table 14: Shoulder - High Quality- Inflammatory Markers Vs. Reference Standard

Index Test	Values	High Quality Frangiamore,S.J., 2015
Synovial fluid (IL-6) 1	Rule In	
	Rule Out	
Synovial fluid (IL-6) 2	Rule In	
	Rule Out	

Table 15: Shoulder- High Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Frangiamore,S.J., 2015	High Quality	35	synovial fluid IL-6	ESR, CRP, Histology, Culture	8	0.87|0.90	8.67|0.15	**MODERATE**	**MODERATE**
Frangiamore,S.J., 2015	High Quality	35	synovial fluid IL-6	ESR, CRP, Histology, Culture	8	0.87|0.95	17.33|0.14	**STRONG**	**MODERATE**

Summary of Findings Table 16: Shoulder – Moderate Quality- Inflammatory Markers Vs. Reference Standard

Index Test	Values	Moderate Quality				
		Frangiamore,S.J., 2015	Grosso,M.J., 2014	Piper,K.E., 2009	Piper,K.E., 2010	Villacis,D., 2014
Blood leukocyte count	Rule In			○		
	Rule Out			○		
Immunofluorescence microscopy	Rule In			●		
	Rule Out			○		
Synovial fluid differential	Rule In			◔		
	Rule Out			◔		
Synovial fluid leukocyte count	Rule In			◕		
	Rule Out			○		
Alphadefensin	Rule In	●				
	Rule Out	◔				
CRP	Rule In		◕	◔	◔	○
	Rule Out		○	○	○	○
ESR	Rule In		◔	◔	◕	○
	Rule Out		○	○	○	○
ESR and CRP	Rule In				◔	
	Rule Out				○	
IL-6	Rule In					○
	Rule Out					●
IL-6 (serum)	Rule In		○			
	Rule Out		○			
Intraoperative frozen section	Rule In		◕			
	Rule Out		○			
PCR (sonicate fluid)	Rule In			●		
	Rule Out			◔		

Table 17: Shoulder- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Villacis,D., 2014	Moderate Quality	34	C-reactive protein (CRP)	Culture	4	0.21|0.65	0.61|1.21	POOR	POOR
Villacis,D., 2014	Moderate Quality	34	erythrocyte sedimentation rate (ESR)	Culture	4	0.07|0.95	1.43|0.98	POOR	POOR
Villacis,D., 2014	Moderate Quality	34	interleukin-6	Culture	4	0.00|0.95	0.00|.	POOR	**STRONG**
Grosso,M.J., 2014	Moderate Quality	72	serum IL-6 level	Culture, Pre/Post op findings	5	0.13|0.94	2.00|0.93	POOR	POOR
Grosso,M.J., 2014	Moderate Quality	69	intraoperative frozen section	Culture, Pre/Post op findings	5	0.29|0.96	6.56|0.74	**MODERATE**	POOR
Grosso,M.J., 2014	Moderate Quality	69	erythrocyte sedimentation rate (ESR)	Culture, Pre/Post op findings	5	0.42|0.82	2.34|0.71	WEAK	POOR
Grosso,M.J., 2014	Moderate Quality	69	C-reactive protein (CRP)	Culture, Pre/Post op findings	5	0.46|0.93	6.88|0.58	**MODERATE**	POOR
Piper,K.E., 2010	Moderate Quality	64	erythrocyte sedimentation rate (ESR)	Purulence, histopathology, sinus draining, culture	6	0.16|0.98	7.11|0.86	**MODERATE**	POOR
Piper,K.E., 2010	Moderate Quality	64	C-reactive protein (CRP)	Purulence, histopathology, sinus draining, culture	6	0.42|0.84	2.71|0.69	WEAK	POOR
Piper,K.E., 2010	Moderate Quality	64	erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP)	Purulence, histopathology, sinus draining, culture	6	0.42|0.82	2.37|0.70	WEAK	POOR
Piper,K.E., 2009	Moderate Quality	28	synovial fluid leukocyte count	Purulence, histopathology, sinus draining	7	0.50|0.94	9.00|0.53	**MODERATE**	POOR
Piper,K.E., 2009	Moderate Quality	134	PCR with sonicate fluid	Purulence, histopathology, sinus draining	7	0.58|0.99	58.15|0.43	**STRONG**	WEAK

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Piper,K.E., 2009	Moderate Quality	117	blood leukocyte count	Purulence, histopathology, sinus draining	7	0.23|0.88	1.91|0.88	POOR	POOR
Piper,K.E., 2009	Moderate Quality	106	erythrocyte sedimentation rate (ESR)	Purulence, histopathology, sinus draining	7	0.31|0.93	4.10|0.75	WEAK	POOR
Piper,K.E., 2009	Moderate Quality	28	synovial fluid differential	Purulence, histopathology, sinus draining	7	0.70|0.78	3.15|0.39	WEAK	WEAK
Piper,K.E., 2009	Moderate Quality	106	C-reactive protein (CRP)	Purulence, histopathology, sinus draining	7	0.46|0.84	2.84|0.64	WEAK	POOR
Piper,K.E., 2009	Moderate Quality	134	immunofluorescence microscopy	Purulence, histopathology, sinus draining	7	0.39|0.98	19.89|0.62	**STRONG**	POOR
Frangiamore,S.J., 2015	Moderate Quality	33	alpha-defensin	ESR, CRP, Histology, Culture	8	0.64|0.95	14.00|0.38	**STRONG**	WEAK

Summary of Findings Table 18: Spine – Moderate Quality- Inflammatory Markers Vs. Reference Standard

Index Test	Values	Moderate Quality	
		Iwata,E., 2016	Piper,K.E., 2010
Lymphocyte count at 4 days postoperatively	Rule In		
	Rule Out		
CRP	Rule In		
	Rule Out		
ESR	Rule In		
	Rule Out		
ESR and CRP	Rule In		
	Rule Out		
Lymphocyte Count At 7 Days Postoperatively	Rule In		
	Rule Out		

Table 19: Spine- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Piper,K.E., 2010	Moderate Quality	54	erythrocyte sedimentation rate (ESR)	Purulence, histopathology, sinus draining, culture	6	0.64|0.83	3.67|0.43	WEAK	WEAK
Piper,K.E., 2010	Moderate Quality	54	C-reactive protein (CRP)	Purulence, histopathology, sinus draining, culture	6	0.57|0.85	3.81|0.50	WEAK	POOR
Piper,K.E., 2010	Moderate Quality	54	erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP)	Purulence, histopathology, sinus draining, culture	6	0.79|0.75	3.14|0.29	WEAK	WEAK
Iwata,E., 2016	Moderate Quality	141	lymphocyte count at 7 days postoperatively	Centers for Disease Control and Prevention criteria for SSI	7	0.64|0.78	2.95|0.46	WEAK	WEAK
Iwata,E., 2016	Moderate Quality	141	C-reactive protein (CRP) at 7 days postoperatively	Centers for Disease Control and Prevention criteria for SSI	7	0.91|0.89	8.44|0.10	**MODERATE**	**STRONG**
Iwata,E., 2016	Moderate Quality	141	lymphocyte count at 4 days postoperatively	Centers for Disease Control and Prevention criteria for SSI	7	0.91|0.65	2.63|0.14	WEAK	**MODERATE**

Surgical Site Infection: Diagnostic – Lab Values

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Figure 1: Summary of Findings Table Key

	LR +	LR -	
●	≥10	≤0.1	In **"STRONG"** agreement with the reference standard
◕	≥5 but <10	>0.1 but ≤0.2	In **"MODERATE"** agreement with the reference standard
◔	>2 and <5	>0.2 but <0.5	In "**WEAK**" agreement with the reference standard
○	≤2	≥0.5	In **"POOR"** agreement with the reference standard

Summary of Findings: Table 1: Hip - Lab Values Vs. Reference Standard

No evidence available

Summary of Findings: Table 2: Hip & Knee - High Quality- Lab Values Vs. Reference Standard

Index Test	Values	High Quality Panousis,K., 2005
Joint aspiration	Rule In	
	Rule Out	
PCR	Rule In	
	Rule Out	

Table 3: Hip & Knee- High Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Panousis,K., 2005	High Quality	92	PCR	Blood test, aspiration, culture, histology, Surgery pathology	9	0.92|0.74	3.49|0.11	WEAK	**MODERATE**
Panousis,K., 2005	High Quality	92	joint aspiration	Blood test, aspiration, culture, histology, Surgery pathology	9	0.67|0.95	13.33|0.35	**STRONG**	WEAK

Summary of Findings: Table 4: Hip & Knee - Moderate Quality- Lab Values Vs. Reference Standard

Index Test	Values	Moderate Quality				
		Cazanave,C., 2013	Gomez,E., 2012	Jacovides,C.L., 2012	Rak,M., 2013	Greenwood-Quaintance,K.E.,
PCR	Rule In	○			●	
	Rule Out	●			◔	
Sonicate fluid culture and PCR	Rule In		●			
	Rule Out		◔			
Sonicate fluid PCR	Rule In		●			
	Rule Out		◔			
Sonicate PCR	Rule In		◕			
	Rule Out		◔			
Tissue culture, sonicate fluid culture, and sonicate fluid PCR	Rule In		●			
	Rule Out		◕			
PCR 1	Rule In			◔		
	Rule Out			◕		
PCR 2	Rule In			○		
	Rule Out			○		
PCR 3	Rule In			○		
	Rule Out			◔		
PCR 4	Rule In			○		
	Rule Out			◕		
onicate fluid PCR-electrospray ionization mass spectrometry 1	Rule In					◕
	Rule Out					◕
onicate fluid PCR-electrospray ionization mass spectrometry 2	Rule In					●
	Rule Out					◔
onicate fluid PCR-electrospray ionization mass spectrometry 3	Rule In					●
	Rule Out					◕

Table 5: Hip & Knee- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Gomez,E., 2012	Moderate Quality	366	sonicate fluid PCR	Culture	4	0.70|0.98	32.51|0.30	**STRONG**	WEAK
Gomez,E., 2012	Moderate Quality	366	sonicate PCR	Culture	4	0.80|0.91	8.80|0.22	**MODERATE**	WEAK
Gomez,E., 2012	Moderate Quality	366	sonicate fluid culture and PCR	Culture	4	0.79|0.97	25.91|0.22	**STRONG**	WEAK
Gomez,E., 2012	Moderate Quality	366	tissue culture, sonicate fluid culture, and sonicate fluid PCR	Culture	4	0.83|0.96	19.16|0.18	**STRONG**	**MODERATE**
Cazanave,C., 2013	Moderate Quality	.	PCR	Histology, purulence, sinus draining	5	.|.	-0.80|-0.78	POOR	**STRONG**
Rak,M., 2013	Moderate Quality	67	BR 16S rRNA gene PCR	Pathohistology, sinus draining, purulence	5	0.75|0.94	12.75|0.27	**STRONG**	WEAK
Jacovides,C.L., 2012	Moderate Quality	35	BAC detection PCR with Ibis technique	Surgery pathology, ESR, CRP, culture	6	0.85|0.73	3.19|0.20	WEAK	**MODERATE**
Jacovides,C.L., 2012	Moderate Quality	30	BAC detection PCR with Ibis technique	Surgery pathology, ESR, CRP, culture	6	0.50|0.67	1.50|0.75	POOR	POOR
Jacovides,C.L., 2012	Moderate Quality	72	BAC detection PCR with Ibis technique	Surgery pathology, ESR, CRP, culture	6	0.95|0.12	1.08|0.38	POOR	WEAK
Jacovides,C.L., 2012	Moderate Quality	55	BAC detection PCR with Ibis technique	Surgery pathology, ESR, CRP, culture	6	0.95|0.42	1.66|0.11	POOR	**MODERATE**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Greenwood-Quaintance,K.E., 2014	Moderate Quality	431	sonicate fluid PCR-electrospray ionization mass spectrometry	Culture	7	0.83|0.91	9.48|0.19	**MODERATE**	**MODERATE**
Greenwood-Quaintance,K.E., 2014	Moderate Quality	431	sonicate fluid PCR-electrospray ionization mass spectrometry	Culture	7	0.78|0.94	12.03|0.24	**STRONG**	WEAK
Greenwood-Quaintance,K.E., 2014	Moderate Quality	431	sonicate fluid PCR-electrospray ionization mass spectrometry	Culture	7	0.81|0.94	12.93|0.20	**STRONG**	**MODERATE**

Summary of Findings: Table 6: Knee - Moderate Quality- Lab Values Vs. Reference Standard

Index Test	Values	Moderate Quality	
		Melendez,D.P., 2014	Ryu,S.Y., 2014
PCR (sonicate fluid) 1	Rule In		●
	Rule Out		●
PCR (sonicate fluid) 2	Rule In		●
	Rule Out		●
PCR (sonicate fluid) 3	Rule In		●
	Rule Out		●
PCR (sonicate fluid) 4	Rule In		◕
	Rule Out		●
PCR (sonicate fluid) 5	Rule In		◔
	Rule Out		●
PCR (sonicate fluid) 6	Rule In		◕
	Rule Out		●
PCR (sonicate fluid) 7	Rule In		◔
	Rule Out		●
PCR (tissue) 1	Rule In		○
	Rule Out		●
PCR (tissue) 2	Rule In		○
	Rule Out		○
PCR (tissue) 3	Rule In		◔
	Rule Out		○
PCR (tissue) 4	Rule In		◔
	Rule Out		●
PCR (tissue) 5	Rule In		◕
	Rule Out		●
PCR and Mass Spectrometry	Rule In	●	
	Rule Out	◕	

Table 7: Knee- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Melendez,D.P., 2014	Moderate Quality	103	PCR-electrospray ionization mass spectrometry	MSIS	7	0.81|0.95	16.60|0.20	**STRONG**	**MODERATE**
Ryu,S.Y., 2014	Moderate Quality	95	tissue PCR (8 assay panels)	Histology, purulence, sinus draining, specimens	8	0.02|1.00	1.56|.	POOR	**STRONG**
Ryu,S.Y., 2014	Moderate Quality	95	tissue PCR (8 assay panels)	Histology, purulence, sinus draining, specimens	8	0.02|0.97	0.48|1.02	POOR	POOR
Ryu,S.Y., 2014	Moderate Quality	36	sonicate fluid PCR (10 assay panel)	Histology, purulence, sinus draining, specimens	8	0.78|1.00	78.26|.	**STRONG**	**STRONG**
Ryu,S.Y., 2014	Moderate Quality	36	sonicate fluid PCR (10 assay panel)	Histology, purulence, sinus draining, specimens	8	0.22|1.00	21.74|.	**STRONG**	**STRONG**
Ryu,S.Y., 2014	Moderate Quality	36	sonicate fluid PCR (10 assay panel)	Histology, purulence, sinus draining, specimens	8	0.35|1.00	34.78|.	**STRONG**	**STRONG**
Ryu,S.Y., 2014	Moderate Quality	36	sonicate fluid PCR (10 assay panel)	Histology, purulence, sinus draining, specimens	8	0.09|1.00	8.70|.	**MODERATE**	**STRONG**
Ryu,S.Y., 2014	Moderate Quality	36	sonicate fluid PCR (10 assay panel)	Histology, purulence, sinus draining, specimens	8	0.04|1.00	4.35|.	WEAK	**STRONG**
Ryu,S.Y., 2014	Moderate Quality	36	sonicate fluid PCR (10 assay panel)	Histology, purulence, sinus draining, specimens	8	0.09|1.00	8.70|.	**MODERATE**	**STRONG**
Ryu,S.Y., 2014	Moderate Quality	36	sonicate fluid PCR (10 assay panel)	Histology, purulence, sinus draining, specimens	8	0.04|1.00	4.35|.	WEAK	**STRONG**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Ryu,S.Y., 2014	Moderate Quality	95	tissue PCR (8 assay panels)	Histology, purulence, sinus draining, specimens	8	0.16|0.97	4.84|0.87	WEAK	POOR
Ryu,S.Y., 2014	Moderate Quality	95	tissue PCR (8 assay panels)	Histology, purulence, sinus draining, specimens	8	0.05|1.00	4.69|.	WEAK	**STRONG**
Ryu,S.Y., 2014	Moderate Quality	95	tissue PCR (8 assay panels)	Histology, purulence, sinus draining, specimens	8	0.08|1.00	7.81|.	**MODERATE**	**STRONG**

Summary of Findings: Table 8: Multi-Site - High Quality- Lab Values Vs. Reference Standard

Index Test	Values	High Quality	
		Bemer,P., 2014	Gallo,J., 2008
PCR	Rule In	●	●
	Rule Out	◔	◔

Table 9: Multi-Site- High Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Gallo,J., 2008	High Quality	101	PCR assay of joint fluid from total joint arthroplasty	Sinus draining, histology/culture, clinical, ESR/CRP, radiology	7	0.71|0.97	23.57|0.29	**STRONG**	WEAK
Bemer,P., 2014	High Quality	299	16S rRNA gene PCR assay	Clinical, bacteriology, histology	6	0.73|0.95	15.43|0.28	**STRONG**	WEAK

Summary of Findings: Table 10: Multi-Site -Moderate Quality- Lab Values Vs. Reference Standard

Index Test	Values	Moderate Quality					
		Artini,M., 2011	Kheir,M.M., 2017	Kobayashi,N., 2009	Moojen,D.J., 2007	Omar,M., 2016	Portillo,M.E., 2012
MSIS criteria	Rule In		◔				
	Rule Out		○				
PCR	Rule In			◔	◕	○	
	Rule Out			◔	●	◔	
PCR 2	Rule In			◕	◔		
	Rule Out			◔	◕		
PCR 3	Rule In			●			
	Rule Out			●			
ELISA (>35, >40) 1	Rule In	●					
	Rule Out	◕					
ELISA (>35, >40) 2	Rule In	●					
	Rule Out	◔					
Multiplex PCR of sonication fluid	Rule In						●
	Rule Out						●

Table 11: Multi-Site- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Artini,M., 2011	Moderate Quality	63	enzyme-linked immunosorbent assay (ELISA)	Culture	4	0.90|0.91	10.16|0.11	**STRONG**	**MODERATE**
Artini,M., 2011	Moderate Quality	63	enzyme-linked immunosorbent assay (ELISA)	Culture	4	0.69|0.94	11.72|0.33	**STRONG**	WEAK
Moojen,D.J., 2007	Moderate Quality	76	polymerase chain reaction (PCR)-reverse line blot hybridization	ESR, Radiology, CRP, clinical	4	0.97|0.89	8.71|0.04	**MODERATE**	**STRONG**
Moojen,D.J., 2007	Moderate Quality	76	polymerase chain reaction (PCR)-reverse line blot hybridization	ESR, Radiology, CRP, clinical	4	0.89|0.78	3.96|0.14	WEAK	**MODERATE**
Portillo,M.E., 2012	Moderate Quality	86	multiplex PCR of sonication fluid	Culture	4	0.96|1.00	95.83|.	**STRONG**	**STRONG**
Kobayashi,N., 2009	Moderate Quality	36	PCR	Physical exam, clinical, CRP/ESR, histology, surgery pathology	7	0.65|0.84	4.10|0.42	WEAK	WEAK
Kobayashi,N., 2009	Moderate Quality	36	PCR	Physical exam, clinical, CRP/ESR, histology, surgery pathology	7	0.59|0.93	8.27|0.44	**MODERATE**	WEAK
Kobayashi,N., 2009	Moderate Quality	36	PCR	Physical exam, clinical, CRP/ESR, histology, surgery pathology	7	0.61|1.00	60.87|.	**STRONG**	**STRONG**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Kheir,M.M., 2017	Moderate Quality	77	MSIS criteria	Delphi criteria	7	0.26|0.88	2.18|0.84	WEAK	POOR
Omar,M., 2016	Moderate Quality	62	swab PCR	Sinus draining/purulence/Microbiology/culture/serology and synovial findings	3	0.69|0.64	1.89|0.49	POOR	WEAK

Summary of Findings: Table 12: Shoulder - Lab Values Vs. Reference Standard

No evidence available

Summary of Findings: Table 13: Spine - Lab Values Vs. Reference Standard

No evidence available

Surgical Site Infection: Diagnostic – Imaging

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Figure 1: ROC Curve – Hip - Imaging vs. Culture/Histology

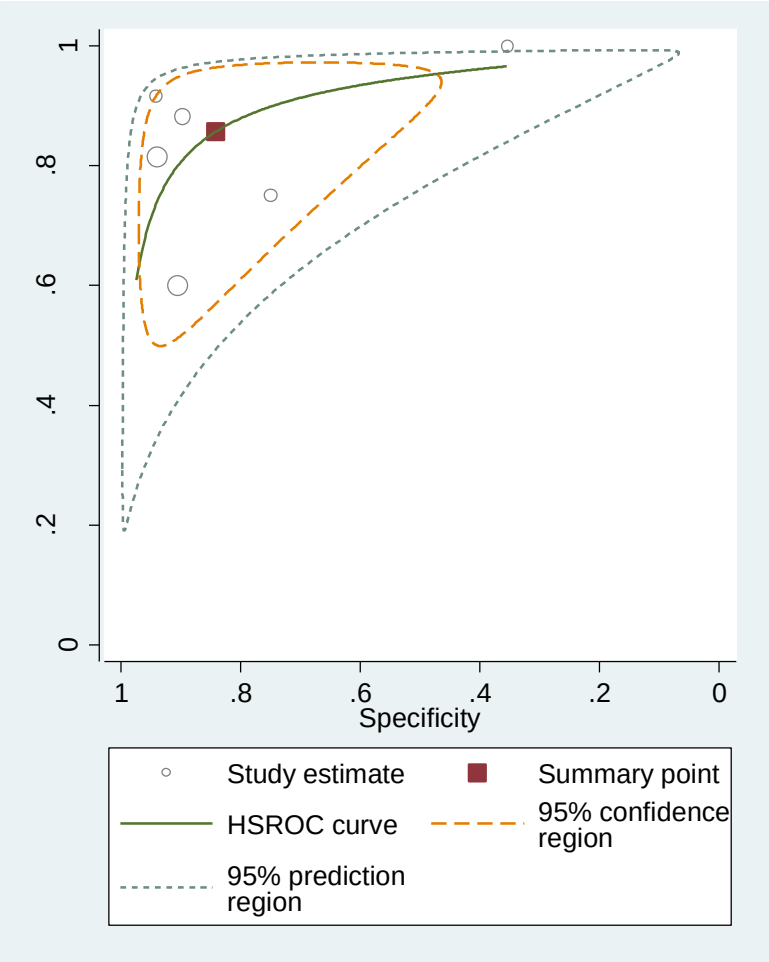


Table 1: Meta-analysis – Hip - Imaging vs. to Culture/Histology

Meta-analysis of diagnostic accuracy

Log likelihood = -27.12214 Number of studies = 6

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Bivariate						
E(logitSe)	1.787733	.4807223			.8455346	2.729931
E(logitSp)	1.673888	.4876683			.7180752	2.6297
Var(logitSe)	.5217473	.8489963			.0214966	12.6634
Var(logitSp)	1.09299	.8139742			.2539263	4.704625
Corr(logits)	-.9290956	.3824917			-.9999987	.999056
HSROC						
Lambda	3.542111	.4355339			2.688481	4.395742
Theta	.379703	.7065483			-1.005106	1.764512
beta	.3697447	.826794	0.45	0.655	-1.250742	1.990231
s2alpha	.1070881	.597888			1.89e-06	6055.06
s2theta	.7283867	.6965724			.1117736	4.746625
Summary pt.						
Se	.8566491	.0590334			.6996296	.9387699
Sp	.8420934	.0648463			.672183	.9327487
DOR	31.86858	14.82437			12.80583	79.30814
LR+	5.425038	2.050839			2.585957	11.3811
LR-	.1702316	.064003			.0814721	.3556898
1/LR-	5.874351	2.208614			2.811439	12.27414

Covariance between estimates of E(logitSe) & E(logitSp) -.1262647

Figure 2: Summary of Findings Table Key

	LR +	LR -	
●	≥10	≤0.1	In **"STRONG"** agreement with the reference standard
◕	≥5 but <10	>0.1 but ≤0.2	In **"MODERATE"** agreement with the reference standard
◔	>2 and <5	>0.2 but <0.5	In "**WEAK**" agreement with the reference standard
○	≤2	≥0.5	In **"POOR"** agreement with the reference standard

Summary of Findings: Table 2: Hip - High Quality- Imaging Vs. Reference Standard

Index Test	Values	High Quality				
		Chacko,T.K., 2002	Chryssikos,T., 2008	Nijhof,M.W., 1997	Scher,D.M., 2000	Simonsen,L., 2007
111 In-oxine or 99MTc-HMPAO bone scan	Rule In					●
	Rule Out					◕
99M Tc-HDP bone scan (3 Phase; 2 Hrs Post Iv) and Leukocyte Scan (Indium-111-oxine; 24 hrs post IV)	Rule In				◕	
	Rule Out				◔	
FDG-PET scan (2)	Rule In	●	●			
	Rule Out	●	◕			
FDG-PET scan 2	Rule In	○				
	Rule Out	●				
Bone scan (In-111-Igg; 4Hr, 18-24Hr, And 42-48 Hrs Post Iv) 1	Rule In			◕		
	Rule Out			●		
Bone scan (In-111-Igg; 4Hr, 18-24Hr, And 42-48 Hrs Post Iv) 2	Rule In			●		
	Rule Out			●		

Table 3: Hip- High Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Scher,D.M., 2000	High Quality	91	BS (99m Tc-HDP; 3 phase; 2 hrs post IV) and leukocyte scan (indium-111-oxine; 24 hrs post IV)	Intraoperative culture, histology, purulence	7	0.60|0.93	8.10|0.43	**MODERATE**	WEAK
Chacko,T.K., 2002	High Quality	29	PET (FDG; 60 min post IV)	Histology, culture, clinical	8	0.92|0.94	15.58|0.09	**STRONG**	**STRONG**
Chacko,T.K., 2002	High Quality	29	PET (FDG; 60 min post IV)	Histology, culture, clinical	8	1.00|0.35	1.55|.	POOR	**STRONG**
Chryssikos,T., 2008	High Quality	127	PET (FDG)	Histology, culture, ESR, CRP, CBC	8	0.85|0.93	11.39|0.16	**STRONG**	**MODERATE**
Simonsen,L., 2007	High Quality	76	BS (111 In-oxine or 99mTc-HMPAO)	Culture, Histology, clinical	8	0.81|0.94	13.31|0.20	**STRONG**	**MODERATE**
Nijhof,M.W., 1997	High Quality	85	BS (In-111-IgG; 4hr, 18-24hr, and 42-48 hrs post IV)	Bacteriology, histology, surgery pathology, aspiration	7	1.00|0.82	5.42|.	**MODERATE**	**STRONG**
Nijhof,M.W., 1997	High Quality	64	BS (In-111-IgG; 4hr, 18-24hr, and 42-48 hrs post IV)	Bacteriology, histology, surgery pathology, aspiration	7	1.00|0.93	15.00|.	**STRONG**	**STRONG**

Summary of Findings: Table 4: Hip - Moderate Quality- Imaging Vs. Reference Standard

Index Test	Values	Moderate Quality						
		Battaglia,M., 2011	Glithero,P.R., 1993	Kim,H.O., 2014	Kobayashi,N., 2011	Love,C., 2004	Pons,M., 1999	Nagoya,S., 2008
History, Bone Scan, Aspiration, Histology	Rule In							
	Rule Out							
Tc-99m-labelled disphosphonate BS (triple phase)	Rule In							
	Rule Out							
99M Tc-Hmpao Leukocyte Scan (Planar Image Only)	Rule In							
	Rule Out							
99M Tc-Hmpao Leukocyte Scan (Planar Image) and Spect	Rule In							
	Rule Out							
99M Tc-Hmpao Leukocyte Scan (Planar Image) and Spect/Ct	Rule In							
	Rule Out							
Tc99m granulocyte	Rule In							
	Rule Out							
Tc99m scintigraphy	Rule In							
	Rule Out							
F-18 fluoride PET 1	Rule In							
	Rule Out							
F-18 fluoride PET 2	Rule In							
	Rule Out							
F-18 fluoride PET 3	Rule In							
	Rule Out							
F-18 fluoride PET (1 hr post IV) 1	Rule In							
	Rule Out							
F-18 fluoride PET (1 hr post IV) 2	Rule In							
	Rule Out							
F-18 fluoride PET (1 hr post IV) 3	Rule In							
	Rule Out							
F-18 fluoride PET (1 hr post IV) and Leukocyte bone scan w/ 111In-Oxine (24 hr post IV) 1	Rule In							
	Rule Out							
Leukocyte bone scan w/ 111In-Oxine	Rule In							
	Rule Out							
Tc-HMPAO bone scan (4 hours post IV) or In-oxine bone scan (16 hrs post IV)	Rule In							
	Rule Out							

Table 5: Hip- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Kobayashi,N., 2011	Moderate Quality	65	PET (F-18 FDG)	Tissue Exam, radiology, serology	6	0.95|0.98	41.90|0.05	**STRONG**	**STRONG**
Kobayashi,N., 2011	Moderate Quality	65	PET (F-18 FDG)	Tissue Exam, radiology, serology	6	0.81|0.80	3.96|0.24	WEAK	WEAK
Kobayashi,N., 2011	Moderate Quality	38	PET (F-18 FDG)	Tissue Exam, radiology, serology	6	0.95|0.94	16.19|0.05	**STRONG**	**STRONG**
Nagoya,S., 2008	Moderate Quality	46	Tc-99m-labelled disphosphonate BS (triple phase)	Trampuz criteria (histology, culture, microbiology)	6	0.88|0.90	8.53|0.13	**MODERATE**	**MODERATE**
Pons,M., 1999	Moderate Quality	78	BS (Tc-99m MDP and Tc-99m-HMPAO white blood cells)	Histology, microbiology, culture	8	0.60|0.90	6.30|0.44	**MODERATE**	WEAK
Battaglia,M., 2011	Moderate Quality	60	Tc99m granulocyte	Culture	4	0.79|0.85	5.16|0.24	**MODERATE**	WEAK
Battaglia,M., 2011	Moderate Quality	60	Tc99m scintigraphy	Culture	4	0.91|0.41	1.53|0.22	POOR	WEAK
Glithero,P.R., 1993	Moderate Quality	45	BS (Tc-HMPAO; 4 hours post IV) or BS (In-oxine; 16 hrs post IV)	Biopsy	4	0.23|1.00	23.08|.	**STRONG**	**STRONG**
Kim,H.O., 2014	Moderate Quality	71	99m Tc-HMPAO leukocyte scan (planar image only)	Pathology, bacteriology, clinical	6	0.73|0.93	10.96|0.29	**STRONG**	WEAK

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Kim,H.O., 2014	Moderate Quality	71	99m Tc-HMPAO leukocyte scan (planar image) and SPECT	Pathology, bacteriology, clinical	6	0.81|0.93	12.12|0.21	**STRONG**	WEAK
Kim,H.O., 2014	Moderate Quality	71	99m Tc-HMPAO leukocyte scan (planar image) and SPECT/CT	Pathology, bacteriology, clinical	6	0.88|1.00	88.46|.	**STRONG**	**STRONG**
Love,C., 2004	Moderate Quality	40	PET (18F-FDG; 1 hr post IV)	Histology and Microbiology	5	1.00|0.12	1.13|.	POOR	**STRONG**
Love,C., 2004	Moderate Quality	40	PET (18F-FDG; 1 hr post IV) and BS (leukocytes w/ 111In-oxine; 24 hr post IV)	Histology and Microbiology	5	0.93|0.46	1.72|0.15	POOR	**MODERATE**
Love,C., 2004	Moderate Quality	40	PET (18F-FDG; 1 hr post IV)	Histology and Microbiology	5	0.57|0.46	1.06|0.93	POOR	POOR
Love,C., 2004	Moderate Quality	40	PET (18F-FDG; 1 hr post IV)	Histology and Microbiology	5	0.43|0.96	11.14|0.59	**STRONG**	POOR
Love,C., 2004	Moderate Quality	40	BS (leukocytes w/ 111In-oxine; 24 hr post IV)	Histology and Microbiology	5	1.00|0.88	8.67|.	**MODERATE**	**STRONG**

Summary of Findings: Table 6: Hip & Knee - High Quality- Imaging Vs. Reference Standard

Index Test	Values	High Quality				
		Aksoy,S.Y., 2014	Joseph,T.N., 2001	Pelosi,E., 2004	Scher,D.M., 2000	Vicente,A.G., 2004
99M Tc-HDP bone scan (3 Phase; 2 Hrs Post Iv) and Leukocyte Scan (Indium-111-oxine; 24 hrs post IV)	Rule In				◕	
	Rule Out				◔	
99M Tc-Hmpao-Leukocyte	Rule In			◔		
	Rule Out			◔		
Leukocyte Scan (Tc-99M Sulfur Colloid And Indium-111)	Rule In		●			
	Rule Out		●			
Leukocyte Scan (Tc-99M Sulfur Colloid And Indium-111) and blood pooling and flow phase	Rule In		●			
	Rule Out		◔			
PET/CT (FDG PET; CT w/o contrast)	Rule In	○				
	Rule Out	●				
PET/CT (FDG-labelled leucocyte PET; CT w/o contrast)	Rule In	●				
	Rule Out	●				
Tc-99M-Sulesomab bone scan (3-4 and 7-8 Hrs Post Iv)	Rule In					●
	Rule Out					◔
Tc-99M-Sulesomab bone scan (3-4 and 7-8 Hrs Post Iv)	Rule In					◕
	Rule Out					◔

Table 7: Hip & Knee- High Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Pelosi,E., 2004	High Quality	95	BS (99m Tc-HMPAO-leukocyte)	Surgery pathology, histology, bacteriology, clinical	7	0.85|0.69	2.77|0.22	WEAK	WEAK
Scher,D.M., 2000	High Quality	147	BS (99m Tc-HDP; 3 phase; 2 hrs post IV) and leukocyte scan (indium-111-oxine; 24 hrs post IV)	Intraoperative culture, histology, purulence	7	0.77|0.86	5.48|0.27	**MODERATE**	WEAK
Joseph,T.N., 2001	High Quality	58	leukocyte scan (Tc-99m sulfur colloid and indium-111) and blood pooling and flow phase	Culture, Histology, purulence	8	0.67|0.98	28.67|0.34	**STRONG**	WEAK
Joseph,T.N., 2001	High Quality	58	leukocyte scan (Tc-99m sulfur colloid and indium-111)	Culture, Histology, purulence	8	0.47|1.00	46.67|.	**STRONG**	**STRONG**
Aksoy,S.Y., 2014	High Quality	54	PET/CT (FDG-labelled leucocyte PET; CT w/o contrast)	Histopathology, microbiology, culture, clinical	9	0.93|0.97	36.40|0.07	**STRONG**	**STRONG**
Aksoy,S.Y., 2014	High Quality	54.1	PET/CT (FDG PET; CT w/o contrast)	Histopathology, microbiology, culture, clinical	9	0.99|0.00	0.99|.	POOR	**STRONG**
Vicente,A.G., 2004	High Quality	37	BS (Tc-99m-sulesomab; 3-4 and 7-8 hrs post IV)	Biopsy and culture	7	0.75|0.95	15.75|0.26	**STRONG**	WEAK

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Vicente,A.G., 2004	High Quality	81	BS (Tc-99m-sulesomab; 3-4 and 7-8 hrs post IV)	Biopsy and culture	7	0.80|0.89	7.54|0.22	**MODERATE**	WEAK

Summary of Findings: Table 8: Hip & Knee - Moderate Quality- Imaging Vs. Reference Standard

Index Test	Values	Moderate Quality							
		Bernard,L., 2004	Chik,K.K., 1996	Demirkol,M.O., 1997	El Espera,I, 2004	Glithero,P.R., 1993	Kim,H.O., 2014	Love,C., 2004	Segura,A.B., 2004
99M Tc-Hmpao Leukocyte Scan (Planar Image Only)	Rule In						◕		
	Rule Out						◕		
99M Tc-Hmpao Leukocyte Scan (Planar Image) and Spect	Rule In						◕		
	Rule Out						●		
99M Tc-Hmpao Leukocyte Scan (Planar Image) and Spect/Ct	Rule In						●		
	Rule Out						●		
99Mtc-HMPAO WBC scan (30 min and 2-3 hr post IV)	Rule In								○
	Rule Out								◕
99Tc-MDP bone scan (5 min and 2-3 hr post IV)	Rule In								○
	Rule Out								●
99Tc-MDP bone scan (5 min post IV)	Rule In								○
	Rule Out								◔
Bone scan (MDP), WBC (HMPAO), and Bone Marrow Scan (Stannous Microcolloid)	Rule In								●
	Rule Out								●
Bone Scans (Tc and Leukocyte)	Rule In		●						
	Rule Out		●						
Radiography	Rule In	○							
	Rule Out	○							
Sctingraphy (radiolabelled immunoglobulin-G or leukocytes)	Rule In	◔							
	Rule Out	◔							
Tc bone scan (6 hr post IV)	Rule In			○					
	Rule Out			●					
Tc-HMPAO bone scan (4 hours post IV)	Rule In					●			
	Rule Out					●			
WBC Scan (99MTc-HMPAO; 30 Min and 2-3 hr Post Iv) and 99MTc-MDP bone scan; 5 min and 2-3 hr post IV)	Rule In								○
	Rule Out								◕
WBC Scan (HMPAO; 30 min and 2-3 hr) and Bone Marrow Scan (Stannous Microcolloid; 30 min)	Rule In								●
	Rule Out								●
F-18 fluoride PET (1 hr post IV) 1	Rule In							○	
	Rule Out							●	
F-18 fluoride PET (1 hr post IV) 2	Rule In							○	
	Rule Out							○	
F-18 fluoride PET (1 hr post IV) 3	Rule In							●	
	Rule Out							○	
F-18 fluoride PET (1 hr post IV) and Leukocyte bone scan w/ 111In-Oxine (24 hr post IV) 2	Rule In							○	
	Rule Out							◕	
Leukocyte bone scan w/ 111In-Oxine	Rule In							●	
	Rule Out							●	
Leukocyte scan (111 In granulocytes; 20 hr) and bone marrow scan 1	Rule In				●				
	Rule Out				◔				
Leukocyte scan (111 In granulocytes; 20 hr) and bone marrow scan 2	Rule In				●				
	Rule Out				◔				
Tc-HMPAO bone scan (4 hours post IV) or In-oxine bone scan (16 hrs post IV)	Rule In					●			
	Rule Out					●			

Table 9: Hip & Knee- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Glithero,P.R., 1993	Moderate Quality	31	BS (Tc-HMPAO; 4 hours post IV)	Biopsy	4	0.50|1.00	50.00|.	**STRONG**	**STRONG**
Glithero,P.R., 1993	Moderate Quality	56	BS (Tc-HMPAO; 4 hours post IV) or BS (In-oxine; 16 hrs post IV)	Biopsy	4	0.44|1.00	44.44|.	**STRONG**	**STRONG**
Segura,A.B., 2004	Moderate Quality	77	BS (MDP), WBC (HMPAO), and bone marrow scan (stannous microcolloid)	Culture	4	0.93|0.98	45.50|0.07	**STRONG**	**STRONG**
Segura,A.B., 2004	Moderate Quality	77	WBC scan (99mTc-HMPAO; 30 min and 2-3 hr post IV) and BS (99mTc-MDP; 5 min and 2-3 hr post IV)	Culture	4	0.96|0.31	1.39|0.12	POOR	**MODERATE**
Segura,A.B., 2004	Moderate Quality	77	WBC scan (HMPAO; 30 min and 2-3 hr) and bone marrow scan (stannous microcolloid; 30 min)	Culture	4	0.93|0.98	45.50|0.07	**STRONG**	**STRONG**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Segura,A.B., 2004	Moderate Quality	77.1	BS (99Tc-MDP; 5 min and 2-3 hr post IV)	Culture	4	1.00|0.00	1.00|.	POOR	**STRONG**
Segura,A.B., 2004	Moderate Quality	77	WBC scan (99mTc-HMPAO; 30 min and 2-3 hr post IV)	Culture	4	0.96|0.31	1.39|0.12	POOR	**MODERATE**
Segura,A.B., 2004	Moderate Quality	77	BS (99Tc-MDP; 5 min post IV)	Culture	4	0.82|0.39	1.34|0.46	POOR	WEAK
Bernard,L., 2004	Moderate Quality	98	sctingraphy (radiolabelled immunoglobulin-G or leukocytes)	Culture, purulence	5	0.74|0.76	3.11|0.34	WEAK	WEAK
Bernard,L., 2004	Moderate Quality	179	radiography	Culture, purulence	5	0.73|0.24	0.96|1.14	POOR	POOR
Chik,K.K., 1996	Moderate Quality	40	leukocyte scan (Tc-99m stannous colloid; 3 hrs post IV)	Culture, clinical	5	0.70|1.00	70.00|.	**STRONG**	**STRONG**
Demirkol,M.O., 1997	Moderate Quality	29	BS (99m Tc-HIG; 6 hrs post IV)	Culture, clinical	5	1.00|0.41	1.70|.	POOR	**STRONG**
El Espera,I, 2004	Moderate Quality	43	leukocyte scan (111 In granulocytes; 20 hr) and bone marrow scan (sulfur colloid; 5 min)	Culture, clinical	5	0.80|0.94	13.20|0.21	**STRONG**	WEAK

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
El Espera,I, 2004	Moderate Quality	73	leukocyte scan (111 In granulocytes; 20 hr) and bone marrow scan (sulfur colloid; 5 min)	Culture, clinical	5	0.69|0.97	20.77|0.32	**STRONG**	WEAK
Love,C., 2004	Moderate Quality	59	PET (18F-FDG; 1 hr post IV)	Histology and Microbiology	5	1.00|0.09	1.10|.	POOR	**STRONG**
Love,C., 2004	Moderate Quality	59	PET (18F-FDG; 1 hr post IV) and BS (leukocytes w/ 111In-oxine; 24 hr post IV)	Histology and Microbiology	5	0.96|0.35	1.48|0.11	POOR	**MODERATE**
Love,C., 2004	Moderate Quality	59	PET (18F-FDG; 1 hr post IV)	Histology and Microbiology	5	0.52|0.44	0.93|1.09	POOR	POOR
Love,C., 2004	Moderate Quality	59	PET (18F-FDG; 1 hr post IV)	Histology and Microbiology	5	0.36|0.97	12.24|0.66	**STRONG**	POOR
Love,C., 2004	Moderate Quality	59	BS (leukocytes w/ 111In-oxine; 24 hr post IV)	Histology and Microbiology	5	1.00|0.91	11.33|.	**STRONG**	**STRONG**
Kim,H.O., 2014	Moderate Quality	164	99m Tc-HMPAO leukocyte scan (planar image only)	Pathology, bacteriology, clinical	6	0.82|0.88	6.84|0.20	**MODERATE**	**MODERATE**
Kim,H.O., 2014	Moderate Quality	164	99m Tc-HMPAO leukocyte scan (planar image) and SPECT	Pathology, bacteriology, clinical	6	0.91|0.88	7.58|0.10	**MODERATE**	**STRONG**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Kim,H.O., 2014	Moderate Quality	164	99m Tc-HMPAO leukocyte scan (planar image) and SPECT/CT	Pathology, bacteriology, clinical	6	0.93|0.93	13.99|0.07	**STRONG**	**STRONG**

Summary of Findings: Table 10: Knee - High Quality- Imaging Vs. Reference Standard

Index Test	Values	High Quality		
		Rand,J.A., 1990	Romano,C.L., 2013	Scher,D.M., 2000
99M Tc-HDP bone scan (3 Phase; 2 Hrs Post Iv) and Leukocyte Scan (Indium-111-oxine; 24 hrs post IV)	Rule In			
	Rule Out			
Leukocyte Scan (111-In)	Rule In			
	Rule Out			
Telethermography 1	Rule In			
	Rule Out			
Telethermography 2	Rule In			
	Rule Out			

Table 11: Knee- High Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Rand,J.A., 1990	High Quality	38	leukocyte scan (111-In)	Culture, Histology, clinical (2 of 3 needed)	7	0.83|0.85	5.56|0.20	**MODERATE**	**MODERATE**
Scher,D.M., 2000	High Quality	40	BS (99m Tc-HDP; 3 phase; 2 hrs post IV) and leukocyte scan (indium-111-oxine; 24 hrs post IV)	Intraoperative culture, histology, purulence	7	0.88|0.78	4.06|0.15	WEAK	**MODERATE**
Romano,C.L., 2013	High Quality	70	telethermography	Sinus draining, culture, sonication, histology	9	0.92|0.85	6.23|0.10	**MODERATE**	**STRONG**
Romano,C.L., 2013	High Quality	70	telethermography	Sinus draining, culture, sonication, histology	9	0.89|0.91	10.07|0.12	**STRONG**	**MODERATE**

Summary of Findings: Table 12: Knee - Moderate Quality- Imaging Vs. Reference Standard

Index Test	Values	Moderate Quality			
		Kim,H.O., 2014	Klett,R., 2003	Li,A.E., 2016	Plodkowski,A.J., 2013
MRI	Rule In				
	Rule Out				
99M Tc-Hmpao Leukocyte Scan (Planar Image Only)	Rule In				
	Rule Out				
99M Tc-Hmpao Leukocyte Scan (Planar Image) and Spect	Rule In				
	Rule Out				
99M Tc-Hmpao Leukocyte Scan (Planar Image) and Spect/Ct	Rule In				
	Rule Out				
Tc bonescan (pertechnetate monoclonal antibody BW 250/183)	Rule In				
	Rule Out				
MRI (1.5T) within 1 year prior of revision surgery 1	Rule In				
	Rule Out				
MRI (1.5T) within 1 year prior of revision surgery 2	Rule In				
	Rule Out				
MRI (1.5T) within 1 year prior of revision surgery 3	Rule In				
	Rule Out				

Table 13: Knee- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Li,A.E., 2016	Moderate Quality	35	MRI (1.5T) within 1 year prior of revision surgery	Microbiology report	3	0.50|0.96	12.50|0.52	**STRONG**	POOR
Li,A.E., 2016	Moderate Quality	108	MRI (1.5T) within 1 year prior of revision surgery	Microbiology report	3	0.74|0.99	62.83|0.26	**STRONG**	WEAK
Li,A.E., 2016	Moderate Quality	73	MRI (1.5T) within 1 year prior of revision surgery	Microbiology report	3	0.92|1.00	92.31|.	**STRONG**	**STRONG**
Klett,R., 2003	Moderate Quality	28	BS (99m Tc-pertechnetate monoclonal antibody BW 250/183; 4-6 hr and 23-25 hr post IV)	Histology	4	1.00|0.80	5.00|.	**MODERATE**	**STRONG**
Plodkowski,A.J., 2013	Moderate Quality	56	MRI (1.5 T; non-fat suppressed axial images only)	Culture, Histopathology	7	0.89|0.86	6.25|0.13	**MODERATE**	**MODERATE**
Kim,H.O., 2014	Moderate Quality	93	99m Tc-HMPAO leukocyte scan (planar image only)	Pathology, bacteriology, clinical	6	0.86|0.80	4.29|0.18	WEAK	**MODERATE**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Kim,H.O., 2014	Moderate Quality	93	99m Tc-HMPAO leukocyte scan (planar image) and SPECT	Pathology, bacteriology, clinical	6	0.95|0.80	4.76|0.06	WEAK	**STRONG**
Kim,H.O., 2014	Moderate Quality	93	99m Tc-HMPAO leukocyte scan (planar image) and SPECT/CT	Pathology, bacteriology, clinical	6	0.95|0.83	5.71|0.06	**MODERATE**	**STRONG**

Summary of Findings: Table 14: Multi-Site - Moderate Quality- Imaging Vs. Reference Standard

Index Test	Values	Moderate Quality						
		Fuster,D., 2011	Iyengar,K.P., 2005	Rubello,D., 2004	Wenter,V., 2015	Wenter,V., 2017	Wolf,G., 2003	Yapar,Z., 2001
99mTc-Ciprofloxacin scintigraphy (1hr post IV)	Rule In	○						
	Rule Out	◕						
99mTc-Ciprofloxacin scintigraphy (24hr post IV)	Rule In	◔						
	Rule Out	◕						
99mTc-Ciprofloxacin scintigraphy (4hr post IV)	Rule In	○						
	Rule Out	◔						
99mTc-hexamethylpropoyleneamine oxime-leukocyte and 99mTc-colloid	Rule In	◕						
	Rule Out	◔						
Leukocyte Scintigraphy (99Mtc-Hmpao; 4.5 Hrs Post Iv)	Rule In						●	
	Rule Out						●	
MTc bone scan (Sulesomab)	Rule In		◔					
	Rule Out		◕					
Nca-90 Epitope bone scan (3 Phase) and Leukoscan (Igg1 K Isotype; 4 hr early and 18-24 hr delayed images)	Rule In			◕				
	Rule Out			◕				
Nca-90 Epitope bone scan (3 Phase) and Leukoscan (Igg1 K Isotype; 4 hr early images)	Rule In			◔				
	Rule Out			◔				
Pet (Fdg)	Rule In				○			
	Rule Out				◔			
Pet/Ct (Fdg Pet; Ct w/ Contrast)	Rule In				◔			
	Rule Out				◕			
PET/CT (FDG PET; CT w/o contrast)	Rule In				◕			
	Rule Out				◔			
Infecton Imaging (Tc 99M-Ciprofloxacin; 1Hr And 4Hrs Post Iv) 1	Rule In							○
	Rule Out							◔
Infecton Imaging (Tc 99M-Ciprofloxacin; 1Hr And 4Hrs Post Iv) 2	Rule In							●
	Rule Out							◕
Pet (Fdg) w/ or w/o CT or Conventional X-Ray 1	Rule In					◔		
	Rule Out					◔		
Pet (Fdg) w/ or w/o CT or Conventional X-Ray 2	Rule In					◕		
	Rule Out					◔		
Pet (Fdg) w/ or w/o CT or Conventional X-Ray 3	Rule In					◔		
	Rule Out					◔		
Pet (Fdg) w/ or w/o CT or Conventional X-Ray 4	Rule In					○		
	Rule Out					◕		

Table 15: Multi-Site- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Fuster,D., 2011	Moderate Quality	40	99mTc-hexamethylpropoyleneamine oxime-leukocyte and 99mTc-colloid bone marrow scintigraphy (LS-MS)	Culture, purulence	5	0.75|0.92	9.00|0.27	**MODERATE**	WEAK
Fuster,D., 2011	Moderate Quality	40	99mTc-Ciprofloxacin scintigraphy (4hr post IV)	Culture, purulence	5	0.88|0.50	1.75|0.25	POOR	WEAK
Fuster,D., 2011	Moderate Quality	40	99mTc-Ciprofloxacin scintigraphy (24hr post IV)	Culture, purulence	5	0.88|0.71	3.00|0.18	WEAK	**MODERATE**
Fuster,D., 2011	Moderate Quality	40	99mTc-Ciprofloxacin scintigraphy (1hr post IV)	Culture, purulence	5	0.94|0.46	1.73|0.14	POOR	**MODERATE**
Rubello,D., 2004	Moderate Quality	78	BS (NCA-90 epitope; 3 phase) and LeukoScan (IgG1 k isotype; 4 hr early images)	Microbiology, laboratory, CT/MRI, clinical	5	0.84|0.76	3.54|0.21	WEAK	WEAK

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Rubello,D., 2004	Moderate Quality	78	BS (NCA-90 epitope; 3 phase) and LeukoScan (IgG1 k isotype; 4 hr early and 18-24 hr delayed images)	Microbiology, laboratory, CT/MRI, clinical	5	0.84|0.86	5.89|0.18	**MODERATE**	**MODERATE**
Wenter,V., 2015	Moderate Quality	25	PET/CT (FDG PET; CT w/o contrast)	Culture, clinical	5	0.80|0.87	6.00|0.23	**MODERATE**	WEAK
Wenter,V., 2015	Moderate Quality	84	PET (FDG)	Culture, clinical	5	0.83|0.51	1.70|0.33	POOR	WEAK
Wenter,V., 2015	Moderate Quality	106	PET/CT (FDG PET; CT w/ contrast)	Culture, clinical	5	0.90|0.73	3.36|0.14	WEAK	**MODERATE**
Wenter,V., 2017	Moderate Quality	25	PET (FDG) w/ or w/o CT or conventional x-ray	Culture, clinical	5	0.85|0.75	3.38|0.21	WEAK	WEAK
Wenter,V., 2017	Moderate Quality	35	PET (FDG) w/ or w/o CT or conventional x-ray	Culture, clinical	5	0.62|0.91	6.77|0.42	**MODERATE**	WEAK
Wenter,V., 2017	Moderate Quality	35	PET (FDG) w/ or w/o CT or conventional x-ray	Culture, clinical	5	0.69|0.77	3.05|0.40	WEAK	WEAK
Wenter,V., 2017	Moderate Quality	35	PET (FDG) w/ or w/o CT or conventional x-ray	Culture, clinical	5	0.92|0.41	1.56|0.19	POOR	**MODERATE**

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
Yapar,Z., 2001	Moderate Quality	26	Infecton imaging (Tc 99m-ciprofloxacin; 1hr and 4hrs post IV)	Microbiological, Histology, or Purulence	6	0.92|0.23	1.20|0.33	POOR	WEAK
Yapar,Z., 2001	Moderate Quality	26	Infecton imaging (Tc 99m-ciprofloxacin; 1hr and 4hrs post IV)	Microbiological, Histology, or Purulence	6	0.85|0.92	11.00|0.17	**STRONG**	**MODERATE**
Iyengar,K.P., 2005	Moderate Quality	38	BS (99mTc Sulesomab)	ESR, CRP, CT/MRI, Culture/Histology, Microbiology	9	0.91|0.81	4.91|0.11	WEAK	**MODERATE**
Wolf,G., 2003	Moderate Quality	67	leukocyte scintigraphy (99mTc-HMPAO; 4.5 hrs post IV)	Histology, Surgery Pathology, Biopsy, clinical	9	0.98|1.00	97.73|.	**STRONG**	**STRONG**

Summary of Findings: Table 16: Shoulder - Imaging Vs. Reference Standard

No evidence available

Summary of Findings: Table 17: Spine - High Quality- Imaging Vs. Reference Standard

Index Test	Values	High Quality
		De,Winter F., 2003
FDG-PET scan 1	Rule In	
	Rule Out	
FDG-PET scan 2	Rule In	
	Rule Out	
FDG-PET scan 3	Rule In	
	Rule Out	

Table 18: Spine- High Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
De,Winter F., 2003	High Quality	26	PET (FDG; 60-90 min post IV)	Histolopathology/Microbiology/Physician Opinion	6	1.00|0.94	16.00|.	**STRONG**	**STRONG**
De,Winter F., 2003	High Quality	27	PET (FDG; 60-90 min post IV)	Histolopathology/Microbiology/Physician Opinion	6	1.00|0.65	2.83|.	WEAK	**STRONG**
De,Winter F., 2003	High Quality	26	PET (FDG; 60-90 min post IV)	Histolopathology/Microbiology/Physician Opinion	6	1.00|0.94	16.00|.	**STRONG**	**STRONG**

Summary of Findings: Table 19: Spine - Moderate Quality- Imaging Vs. Reference Standard

Index Test	Values	Moderate Quality
		De,Winter F., 2004
Planar Tc bone scan (3hr post IV)	Rule In	
	Rule Out	
SPET Tc bone scan (3hr post IV)	Rule In	
	Rule Out	
Planar Tc bone scan (1 hr post IV) 1	Rule In	
	Rule Out	
Planar Tc bone scan (1 hr post IV) 2	Rule In	
	Rule Out	

Table 20: Spine- Moderate Quality

Reference Title	Quality	N	Index Test	Reference Standard	RS Strength	Sens|Spec	LR+|LR-	Rule In Test	Rule Out Test
De,Winter F., 2004	Moderate Quality	48	planar BS (99mTc-Ciprofloxacin; 1 hr post IV)	Microbiology, clinical	5	0.54|0.71	1.88|0.65	POOR	POOR
De,Winter F., 2004	Moderate Quality	46	planar BS (99mTc-Ciprofloxacin; 24 hr post IV)	Microbiology, clinical	5	0.42|0.91	4.72|0.64	WEAK	POOR
De,Winter F., 2004	Moderate Quality	48	SPET BS (99mTc-Ciprofloxacin; 3 hr post IV)	Microbiology, clinical	5	1.00|0.74	3.89|.	WEAK	**STRONG**
De,Winter F., 2004	Moderate Quality	48	planar BS (99mTc-Ciprofloxacin; 3 hr post IV)	Microbiology, clinical	5	0.62|0.77	2.69|0.50	WEAK	POOR

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Quality Evaluation Table 1: Pico 2 Prognostic

Study	Representative Population	Reason for Follow Up Loss	Prognostic Factor Measured	Outcome Measurement	Confounders	Appropriate Statistical Analysis	Inclusion	Strength
Abdel-Salam,A., 1995	●	●	●	●	○	○	Include	Low Quality
Adhikary,S.D., 2016	●	●	◑	●	●	●	Include	High Quality
Aldebeyan,S., 2017	●	●	◑	●	●	●	Include	High Quality
Alvi,H.M., 2015	●	●	◑	●	●	●	Include	High Quality
Anakwenze,O., 2017	●	●	◑	●	●	●	Include	High Quality
Basques,B.A., 2016	●	●	◑	●	●	●	Include	High Quality
Bhandari,M., 2015	●	●	◑	●	●	●	Include	High Quality
Blomfeldt,R., 2015	●	●	◑	●	●	●	Include	High Quality
Boehm,T.D., 2005	●	●	●	●	○	○	Include	Low Quality
Bohl,D.D., 2016	●	●	◑	●	●	●	Include	High Quality
Boylan,M.R., 2015	●	●	◑	●	●	●	Include	High Quality
Bozic,K.J., 2014	●	●	◑	●	●	●	Include	High Quality
Breier,A.C., 2011	●	●	●	●	◑	●	Include	High Quality
Buttaro,M.A., 2015	●	●	●	●	○	○	Include	Low Quality
Calderwood,M.S., 2017	●	●	◑	●	●	●	Include	High Quality
Cancienne,J.M., 2017	●	●	◑	●	●	●	Include	High Quality
Cavanaugh,P.K., 2015	●	●	◑	●	●	●	Include	High Quality
Cavanaugh,P.K., 2015	●	●	◑	●	●	●	Include	High Quality
Chawla,H., 2016	●	●	◑	●	●	●	Include	High Quality
Chen,A.T., 2016	●	●	◑	●	●	●	Include	High Quality
Chiu,F.Y., 2009	●	●	●	●	◑	◑	Include	Moderate Quality
Chrastil,J., 2015	●	●	◑	●	●	●	Include	High Quality
Croft,L.D., 2015	●	●	◑	●	●	●	Include	High Quality
da Cunha,B.M., 2011	●	●	◑	●	●	●	Include	High Quality
Dahl,A., 2006	●	●	●	●	●	●	Include	High Quality
Dale,H., 2009	●	●	◑	●	●	●	Include	High Quality
Dale,H., 2011	●	●	●	●	●	●	Include	High Quality
de Boer,A.S., 1999	●	●	◑	●	●	●	Include	High Quality
de Boer,A.S., 2001	●	●	◑	●	●	●	Include	High Quality

Study	Representative Population	Reason for Follow Up Loss	Prognostic Factor Measured	Outcome Measurement	Confounders	Appropriate Statistical Analysis	Inclusion	Strength
Deleuran,T., 2015	●	●	◑	●	●	●	Include	High Quality
Devin,C.J., 2015	●	●	●	●	◑	◑	Include	Moderate Quality
Dowsey,M.M., 2009	●	●	◑	●	●	●	Include	High Quality
Edwards,M.R., 2015	●	●	●	●	●	●	Include	High Quality
Elward,A., 2015	◑	●	◑	●	◑	◑	Include	Moderate Quality
Engesaeter,L.B., 2003	●	◑	◑	●	●	●	Include	High Quality
Engesaeter,L.B., 2006	●	●	◑	●	●	●	Include	High Quality
Engesaeter,L.B., 2011	●	●	◑	●	●	●	Include	High Quality
Ercolano,L.B., 2013	●	◑	○	●	●	●	Include	Moderate Quality
Fukuda,H., 2016	◑	●	◑	●	●	●	Include	High Quality
Gandhi,R., 2009	●	●	●	●	●	●	Include	High Quality
Garcia-Alvarez,F., 2010	●	●	●	●	●	◑	Include	High Quality
George,M.D., 2017	●	●	◑	●	●	●	Include	High Quality
Giles,J.T., 2006	●	●	●	●	◑	●	Include	High Quality
Grammatico-Guillon,L., 2015	●	●	●	●	●	●	Include	High Quality
Greenky,M., 2012	●	●	●	●	◑	●	Include	High Quality
Gruskay,J.A., 2014	●	●	◑	●	●	●	Include	High Quality
Guerado,E., 2015	●	●	◑	●	●	●	Include	High Quality
Haddad,S., 2016	●	●	◑	●	●	●	Include	High Quality
Hatta,T., 2017	●	●	◑	●	●	●	Include	High Quality
Helito,C.P., 2014	●	●	●	●	◑	◑	Include	Moderate Quality
Hoh,D.J., 2015	●	●	◑	●	●	●	Include	High Quality
Hort,K.R., 2002	●	●	●	●	○	○	Include	Low Quality
Hunter,J.G., 2016	●	●	●	●	◑	◑	Include	Moderate Quality
Huotari,K., 2007	●	●	●	●	●	●	Include	High Quality
Hutter,G., 2014	●	●	●	●	○	○	Include	Low Quality
Inacio,M.C., 2015	●	●	◑	●	●	●	Include	High Quality
Jain,R.K., 2015	●	●	◑	●	●	●	Include	High Quality
Jamsen,E., 2009	●	●	◑	●	●	●	Include	High Quality
Johnson,D.P., 1993	●	●	○	●	◑	●	Include	Moderate Quality
Kasahara,Y., 2013	●	●	◑	●	●	●	Include	High Quality

Study	Representative Population	Reason for Follow Up Loss	Prognostic Factor Measured	Outcome Measurement	Confounders	Appropriate Statistical Analysis	Inclusion	Strength
Kourbatova,E.V., 2005	●	●	◑	●	◑	◑	Include	Moderate Quality
Kurtz,S.M., 2010	●	●	●	●	●	●	Include	High Quality
Kurtz,S.M., 2012	●	●	◑	●	●	●	Include	High Quality
LÃƒ?Ã‚Â¼bbeke,A., 2016	●	●	●	●	●	●	Include	High Quality
Lai,K., 2007	●	●	◑	●	●	●	Include	High Quality
Lee,F.H., 2015	●	●	◑	●	●	●	Include	High Quality
Lee,Q.J., 2015	●	●	◑	●	●	●	Include	High Quality
Lewallen,L.W., 2014	●	●	◑	●	●	●	Include	High Quality
Li,Z., 2016	●	●	◑	●	●	●	Include	High Quality
Lim,S., 2013	●	●	◑	●	●	●	Include	High Quality
Malizos,K., 2017	●	●	●	●	○	○	Include	Low Quality
Maradit,Kremers H., 2015	●	●	◑	●	●	●	Include	High Quality
Massin,P., 2015	●	●	◑	●	●	●	Include	High Quality
Matson,A.P., 2016	●	●	◑	●	●	●	Include	High Quality
Menendez,M.E., 2015	●	●	◑	●	●	●	Include	High Quality
Meyer,E., 2011	●	●	●	●	●	◑	Include	High Quality
Miric,A., 2014	●	●	◑	●	●	●	Include	High Quality
Molina,C.S., 2015	●	●	◑	●	●	●	Include	High Quality
Momohara,S., 2011	●	●	●	●	●	●	Include	High Quality
Morey,V.M., 2016	●	●	◑	●	●	●	Include	High Quality
Morrison,T.N., 2016	●	●	●	●	○	○	Include	Low Quality
Mortazavi,S.M., 2010	●	●	◑	●	●	●	Include	High Quality
Mortazavi,S.M., 2011	●	●	●	●	●	◑	Include	High Quality
Mudd,C.D., 2014	●	●	●	●	◑	◑	Include	Moderate Quality
Muilwijk,J., 2006	●	●	◑	●	●	●	Include	High Quality
Murphy,M.V., 2016	●	●	◑	●	●	●	Include	High Quality
Nakano,N., 2015	●	◑	●	●	◑	●	Include	High Quality
Namba,R.S., 2009	●	●	◑	●	●	●	Include	High Quality
Namba,R.S., 2013	●	●	◑	●	●	●	Include	High Quality
Naranje,S., 2015	●	●	◑	●	●	●	Include	High Quality
Omeis,I.A., 2011	●	●	◑	●	●	●	Include	High Quality

Study	Representative Population	Reason for Follow Up Loss	Prognostic Factor Measured	Outcome Measurement	Confounders	Appropriate Statistical Analysis	Inclusion	Strength
Ong,K.L., 2009	●	●	◑	●	●	●	Include	High Quality
Ovaska,M.T., 2013	●	●	◑	●	●	●	Include	High Quality
Parkkinen,M., 2016	●	●	◑	●	◑	●	Include	Moderate Quality
Pauzenberger,L., 2017	●	●	◑	●	●	●	Include	High Quality
Pedersen,A.B., 2010	●	●	●	●	◑	●	Include	High Quality
Poultsides,L.A., 2013	●	●	◑	●	●	●	Include	High Quality
Prakasam,S., 2016	●	●	◑	●	●	●	Include	High Quality
Puvanesarajah,V., 2016	●	●	◑	●	●	●	Include	High Quality
Puvanesarajah,V., 2016	●	●	◑	●	●	●	Include	High Quality
Rasouli,M.R., 2013	●	●	◑	●	●	●	Include	High Quality
Ravi,B., 2014	●	●	◑	●	●	●	Include	High Quality
ReÃƒ?Ã‚¡tegui,D., 2017	●	●	●	●	◑	●	Include	High Quality
Reategui,D., 2017	●	●	●	●	◑	●	Include	High Quality
Ren,T., 2015	●	●	◑	●	◑	●	Include	Moderate Quality
Richards,J., 2014	●	●	◑	●	●	●	Include	High Quality
Salt,E., 2017	●	●	◑	●	●	●	Include	High Quality
Schairer,W.W., 2016	●	●	◑	●	●	●	Include	High Quality
Schepers,T., 2011	●	●	◑	●	●	●	Include	High Quality
Schnaser,E.A., 2015	●	●	◑	●	●	●	Include	High Quality
Schrama,J.C., 2015	●	●	◑	●	●	●	Include	High Quality
Singh,J.A., 2015	●	●	●	●	●	●	Include	High Quality
Siqueira,M.B., 2015	●	●	◑	●	●	●	Include	High Quality
Soriano,A., 2008	●	●	●	●	○	○	Include	Low Quality
Stall,A., 2013	●	●	●	●	◑	◑	Include	Moderate Quality
Street,J.T., 2016	●	●	◑	●	●	●	Include	High Quality
Takemoto,R.C., 2017	●	●	●	●	●	●	Include	High Quality
Tayton,E.R., 2016	●	●	●	●	◑	●	Include	High Quality
Thakar,C., 2010	●	●	●	●	●	◑	Include	High Quality
Tischler,E.H., 2017	●	●	◑	●	●	●	Include	High Quality
Tomov,M., 2015	●	●	◑	●	◑	◑	Include	Moderate Quality
Tornero,E., 2014	●	●	○	●	●	◑	Include	Moderate Quality

Study	Representative Population	Reason for Follow Up Loss	Prognostic Factor Measured	Outcome Measurement	Confounders	Appropriate Statistical Analysis	Inclusion	Strength
Tornero,E., 2015	●	●	◑	●	●	●	Include	High Quality
Tornero,E., 2015	●	●	●	●	●	●	Include	High Quality
Triantafyllopoulos,G.K., 2016	●	●	◑	●	●	●	Include	High Quality
Tsuda,Y., 2015	●	●	◑	●	●	●	Include	High Quality
van Kasteren,M.E., 2007	●	●	●	●	●	●	Include	High Quality
Wallace,G., 2014	●	●	◑	●	●	●	Include	High Quality
Wang,Z., 2014	●	●	●	●	●	●	Include	High Quality
Watanabe,M., 2010	●	●	●	●	●	●	Include	High Quality
Werner,B.C., 2017	●	●	◑	●	●	●	Include	High Quality
Westberg,M., 2013	●	●	◑	●	●	●	Include	High Quality
Willis-Owen,C.A., 2010	●	●	●	●	●	●	Include	High Quality
Wimmer,M.D., 2016	●	●	●	●	●	●	Include	High Quality
Wu,C., 2014	●	●	●	●	●	●	Include	High Quality
Wu,C.T., 2016	●	●	◑	●	◑	◑	Include	Moderate Quality
Yano,K., 2009	●	●	●	●	●	●	Include	High Quality
Zgonis,T., 2004	●	●	◑	●	◑	●	Include	Moderate Quality
Zhou,Z.Y., 2015	●	●	◑	●	●	●	Include	High Quality

Quality Evaluation Table 2: Pico 2 Observational

Study	Design	Participant Recruitment	Allocation	Confounding Variables	Follow-Up Length	Other Bias? (If retrospective comparative, mark Yes)	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Choi,H.R., 2012	○	●	●	●	●	○	●	●	●	Include	Low Quality
Engesaeter,L.B., 2006	○	●	◑	●	●	○	●	●	●	Include	Low Quality
Engesaeter,L.B., 2011	○	●	●	●	●	◑	●	●	●	Include	Low Quality
Gandhi,R., 2009	○	●	◑	●	●	●	●	●	●	Include	Very Low Quality
Khoshbin,A., 2015	○	●	●	●	●	○	●	●	●	Include	Low Quality
Massin,P., 2015	○	●	●	●	●	○	●	●	●	Include	Low Quality
Schepers,T., 2011	○	●	◑	●	●	○	●	●	●	Include	Low Quality
Siqueira,M.B., 2015	○	●	●	●	●	○	●	●	●	Include	Low Quality
Tornero,E., 2015	○	●	●	●	●	●	●	●	●	Include	Low Quality

Quality Evaluation Table 3: Pico 2 Randomized

Study	Random Sequence Generation	Allocation Concealment	Blinding	Incomplete Outcome Data	Selective Reporting	Other Bias	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Abdel-Salam,A., 1995	◑	◑	◑	●	●	◑	●	●	●	Include	Moderate Quality
Bhandari,M., 2015	●	◑	●	●	●	◑	●	●	●	Include	High Quality
Boehm,T.D., 2005	●	●	●	●	●	◑	●	●	●	Include	High Quality
Buttaro,M.A., 2015	●	◑	◑	●	●	●	●	●	●	Include	High Quality
Cheng,M.T., 2005	●	●	●	●	●	●	●	●	●	Include	High Quality
Chiu,F.Y., 2009	○	●	○	●	●	●	●	●	●	Include	Moderate Quality
Helito,C.P., 2014	●	●	◑	●	●	●	●	●	●	Include	High Quality
Hort,K.R., 2002	◑	◑	●	●	●	◑	●	●	●	Include	High Quality
Hunter,J.G., 2016	●	●	◑	●	●	●	●	●	●	Include	High Quality
Hutter,G., 2014	●	◑	●	◑	●	◑	●	●	●	Include	High Quality
Malizos,K., 2017	●	◑	◑	●	●	◑	●	●	●	Include	High Quality
McKee,M.D., 2010	●	◑	◑	●	●	◑	●	●	●	Include	High Quality
Morrison,T.N., 2016	◑	●	●	●	●	●	●	●	●	Include	High Quality
Mudd,C.D., 2014	●	◑	●	●	●	◑	●	●	●	Include	High Quality
Ovadia,D., 1997	◑	●	◑	●	●	●	●	●	●	Include	High Quality
Westberg,M., 2015	●	●	◑	●	●	●	●	●	●	Include	High Quality
Wright,N.M., 2015	●	●	○	●	●	◑	●	●	●	Include	High Quality

PICO 2: Modifiable Risk Factors, Part 1: Anemia

Summary of Findings Table 1: Anemia

	High Quality							
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant	Gruskay,J.A., 2014	Bozic,K.J., 2014	Wu,C., 2014	Lee,Q.J., 2015	Inacio,M.C., 2015	Cavanaugh,P.K., 2015	Schairer,W.W., 2016	Greenky,M., 2012
INFECTION	↓							
INFECTION(periprosthetic joint infection)		●	●	↓			↓	↓
INFECTION(infection within 90 postoperative days)					●			
INFECTION(surgical site infection)						↓		

Table 1 1: Anemia

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Bozic,K.J., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	587	(primary total hip arthroplasty)	Anemia	Age, Gender, Race	Multivariate Cox regression; adjusted hazard ratio (95% CI), p value	0.62 (0.194, 1.97), 0.4179	NS
Cavanaugh,P.K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Blood loss anemia	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	1.43 (1.27, 1.62), < 0.0001	Blood loss anemia is an independent risk factor for developing SSI
Cavanaugh,P.K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Deficiency anemia	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	1.68 (1.6, 1.76), < 0.0001	Deficiency anemia is an independent risk factor for developing SSI
Greenky,M., 2012	High Quality	INFECTION (periprosthetic joint infection)	Baseline	389	(total joint arthroplasty)	Preoperative anemia	Sex, Race, Age, Time In Operating Room, Surgery Type (Primary Or Revision Of Hip Or Knee), Atrial Fibrillation, Congestive Heart Failure, Coronary Artery Disease, Hypercholesterolemia, Hypertension, Pneumoia, Tuberculosis, Renal Failure, Renal Transplant, Cerebrovascular Disease, Diabetes, Gastroesophageal Reflux Disease, Peptic Ulcer Disease, Cancer, Coagulopathies, Systemic Lupus Erythematosus, Peripheral Vascular Disease, Rheumatoid Arthritis	Logistic regression; adjusted odds ratio (95% CI), p value	1.95 (1.41, 2.69), < 0.001	Preoperative anemia is an independent risk factor for developing periprosthetic joint infection
Gruskay,J.A., 2014	High Quality	INFECTION		2164	(Anterior Cervical Discectomy and Fusion)	Anemia	ASA>3, Preoperative Anemia, Age>=65, Operative Time > 171 Min, Male Sex	Multivariate analysis; odds ratio (95% CI), p-value	2.138 (1.093–4.183), p=0.026	Anemia associated with increased risk of infection

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Inacio,M.C., 2015	High Quality	INFECTION (infection within 90 postoperative days)	Baseline	11848	(total hip arthroplasty)	Blood loss anemia	Age, Gender, Primary Diagnosis, Anticoagulation, Arrhythmia, Congestive Heart Failure, Hyperlipidemia, Ischemic Heart Disease Angina and Hypertension, Pulmonary Circulation Disorder, Gastroesophageal Reflux Disease, Rheumatoid Arthritis, Blood Loss Anemia, Deficiency Anemia, Obesity, Depression, Renal Failure, Allergies	Logistic regression analysis; odds ratio (95% CI)	1.7 (0.7, 4.4)	NS
Inacio,M.C., 2015	High Quality	INFECTION (infection within 90 postoperative days)	Baseline	11848	(total hip arthroplasty)	Deficiency anemia	Age, Gender, Primary Diagnosis, Anticoagulation, Arrhythmia, Congestive Heart Failure, Hyperlipidemia, Ischemic Heart Disease Angina and Hypertension, Pulmonary Circulation Disorder, Gastroesophageal Reflux Disease, Rheumatoid Arthritis, Blood Loss Anemia, Deficiency Anemia, Obesity, Depression, Renal Failure, Allergies	Logistic regression analysis; odds ratio (95% CI)	0.5 (0.2, 1.3)	NS
Lee,Q.J., 2015	High Quality	INFECTION (periprosthetic joint infection)	Baseline	200	(total knee arthroplasty)	Anemia	Age, Gender, BMI, Comorbidity (Diabetes, Liver Disease, Heart Disease, Anemia, Thyroid Disease, Renal Disease, Lung Disease, Stroke, Gout), Varicose Vein, Steroid Intake, Dermatitis, Acupuncture, Bilateral Tka, Same Day Surgery, Anesthesia (Spinal), Continuous Femoral Nerve Block, Operating Time, Trainee Surgeon, Drain, Intensive Care Unit Admission, Transfusion, Large Effusion, Blister, Soaked Dressing, Deep Vein Thrombosis, Acute Retention Of Urine, Foley Catheter, Invasive Procedure	Multivariable logistic regression model; odds ratio (95% CI), p value	12.4 (1.99, 77.32), 0.001	Anemia is an independent risk factor for PJI

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Schairer,W.W., 2016	High Quality	INFECTION (periprosthetic joint infection)	Baseline	173958	(total hip arthroplasty)	Blood loss anemia	Tha Timing After Injection, Greater Than 1 Injection In Prior Year, Age, Gender, Tobacco Use, Transfusion Allogenic Or Autogenic, Obesity, Diabetes, Peripheral Vascular Disease, Congestive Heart Failure, Hiv/Aids, Tumor Without Metastases, Metastatic Tumor, Cardiac Arrhythmia, Blood Loss Anemia, Deficiency Anemia, Renal Failure, Chronic Pulmonary Disease, Pulmonary Circulatory Disorder, Liver Disease, Depression	Multivariable Cox proportional hazard model; hazard ratio (95% CI), p value	1.53 (1.22, 1.92), < 0.001	Patients with blood loss anemia were more likely to develop PJI
Schairer,W.W., 2016	High Quality	INFECTION (periprosthetic joint infection)	Baseline	173958	(total hip arthroplasty)	Deficiency anemia	Tha Timing After Injection, Greater Than 1 Injection In Prior Year, Age, Gender, Tobacco Use, Transfusion Allogenic Or Autogenic, Obesity, Diabetes, Peripheral Vascular Disease, Congestive Heart Failure, Hiv/Aids, Tumor Without Metastases, Metastatic Tumor, Cardiac Arrhythmia, Blood Loss Anemia, Deficiency Anemia, Renal Failure, Chronic Pulmonary Disease, Pulmonary Circulatory Disorder, Liver Disease, Depression	Multivariable Cox proportional hazard model; hazard ratio (95% CI), p value	1.5 (1.37, 1.64), < 0.001	Patients with deficiency anemia were more likely to develop PJI
Wu,C., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	297	(total hip arthroplasty or total knee arthroplasty)	Anemia	Diabetes, Age, BMI, Place Of Residence, Alcohol Abuse, Treatment Of Diabetes, Chronic Pulmonary Disease, Hypertension, Substance Abuse, Cerebral Infarction, Dental Procedure W/ Or W/O Antibiotics, Renal Disease, Gout, Cardiovascular Event, Chronic Liver Disease, Anemia, Tobacco Use, Ankylosing Spondylitis, Tha Vs Tka, Gender, Prostatic Disease, Oncologic Disease, Neurologic Disease, History Of Tuberculosis, Rheumatoid Arthritis Vs Osteoarthritis, Femoral Head Necrosis, Developmental Hip Dysplasia, Fracture	Multivariate conditional logistic regression analysis; odds ratio (95% CI), p value	0.74 (0.17, 3.26), 0.688	NS

PICO 2 Modifiable Risk Factors: Part 2: Antibiotic Bone Cement

Summary of Findings Table 2: Antibiotic Bone Cement

	High Quality													
↑ **Better Outcomes** ↓ **Worse Outcomes** ● **Not Significant**	**Dowsey,M.M., 2009**	**Engesaeter,L.B., 2003**	**McKee,M.D., 2010**	**Tayton,E.R., 2016**	**Engesaeter,L.B., 2006**	**Gandhi,R., 2009**	**Engesaeter,L.B., 2011**	**Namba,R.S., 2013**	**Pedersen,A.B., 2010**	**Schrama,J.C., 2015**	**Dale,H., 2009**	**Jamsen,E., 2009**	**Namba,R.S., 2009**	**van Kasteren,M.E., 2007**
Infection Resolution(Infection Eradication)			↓											
INFECTION		●				●		↓						
INFECTION(surgical site infection)														●
INFECTION(PJI)	●													
INFECTION(infection within 6 months postoperative)				↓										
INFECTION(revision due to infection)					●									
INFECTION(infection)							●							
INFECTION(revision due to infection during maximum follow-up time of 14 years)									●					
INFECTION(revision for infection)										↓				
INFECTION(deep infections)											↓			
INFECTION(Reoperation because of infection)												↓		
INFECTION(deep infection)													↓	

Tayton,E.R., 2016: Antibiotic bone cement vs No antibiotic bone cement

Namba,R.S., 2013: Antibiotic-laden cement vs No antibiotic-laden cement

Schrama,J.C., 2015: Cement without antibiotics vs Antibiotic-loaded cement

Dale,H., 2009: Cemented without antibiotics vs Cemented with antibiotics, & Uncemented vs Cement with antibiotics

Jamsen,E., 2009: No antibiotic cement vs Any antiobiotic cement

Namba,R.S., 2009: Use of antibiotic loaded bone cement

McKee,M.D., 2010: Antibiotic-impregnanted polymethylmethacrylate cement beads (PMMA) vs antibiotic-impregnated bioabsorbable bone substitute (BBS)

Table 22: Antibiotic bone cement

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Dale,H., 2009	High Quality	INFECTION (deep infections)	Intra-Op	97344	(total hip arthroplasty)	Uncemented vs Cement with antibiotics	Sex, Age, Diagnosis (Osteoarthritis Vs Inflammatory Vs Other), Prosthesis (Modular Vs Monoblock), Duration Of Surgery, Operation Room Ventilation, Antibiotic Prophylaxis Systemically, Method Of Fixation (Uncemented Vs Cemented W/ Or W/O Antibotics)	Cox regression model (reverse comparison); risk ratio (95% CI), p value	1.4 (1, 1.8), 0.03	Uncemented fixation is an independent risk factor for developing deep infection
Dale,H., 2009	High Quality	INFECTION (deep infections)	Intra-Op	97344	(total hip arthroplasty)	Cemented without antibiotics vs Cemented with antibiotics	Sex, Age, Diagnosis (Osteoarthritis Vs Inflammatory Vs Other), Prosthesis (Modular Vs Monoblock), Duration Of Surgery, Operation Room Ventilation, Antibiotic Prophylaxis Systemically, Method Of Fixation (Uncemented Vs Cemented W/ Or W/O Antibotics)	Cox regression model (reverse comparison); risk ratio (95% CI), p value	1.9 (1.5, 2.3), < 0.001	Cemented without antibiotics fixation is an independent risk factor for developing deep infections
Dowsey,M.M., 2009	High Quality	INFECTION (PJI)	1 Days	1214	(Elective total knee arthroplasty)		Cardiovascular Disease, Diabetes, Respiratory Comorbidity, Smoking, Obesity (BMI 30-39 Kg/M^2), Morbid Obesity (BMI >= 40 Kg/M^2), Ra, Transfusion, Drain Tube, Antibiotic Cement, Gender, Age (65-74Yrs vs <65 Yrs), Age (>=75 Yrs vs <65 Yrs)	Multiple logistic regression; odds ratio, 95% CI, p-value	1.05 (0.35-3.11), p=0.934	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Engesaeter,L.B., 2003	High Quality	INFECTION		22170	(Total hip arthroplasty)		Gender, Age(<70, 70-75, >75Yrs), Brand Of Cement, Type Of Prosthesis, Operating Room (Laminar Air Ventilation), Duration Of Operation	Cox relative revision risk; RR, 95% CI, p-value	2.7 (0.8-8.7), p=0.1	NS
Engesaeter,L.B., 2006	High Quality	INFECTION (revision due to infection)	Intra-Op	56275	(primary total hip arthroplasty)	Antibiotic bone cement vs Uncemented	Sex, Age, Type Of Systemic Antibiotic Prophylaxis, Duration Of Systemic Prophylaxis, Type Of Operating Room, Duration Of Operation	Cox multiple regression; relative risk (95% CI), p value	1.2 (0.7, 2), 0.5	NS
Engesaeter,L.B., 2006	High Quality	INFECTION (revision due to infection)	Intra-Op	40823	(primary total hip arthroplasty with operative time of 51-110 min)	Antibiotic bone cement vs Uncemented	Sex, Age, Type Of Systemic Antibiotic Prophylaxis, Duration Of Systemic Prophylaxis, Type Of Operating Room, Duration Of Operation	Cox multiple regression; relative risk (95% CI), p value	0.8 (0.5, 1.5), 0.5	NS
Engesaeter,L.B., 2006	High Quality	INFECTION (revision due to infection)	Intra-Op	19007	(primary total hip arthroplasty with Charnley prostheses with Palacos cement and uncemented Corail stems with either Atoll or Tropic cup)	Charnley with gentamicin in cement vs Corail with Atoll or Tropic cup	Sex, Age, Type Of Systemic Antibiotic Prophylaxis, Duration Of Systemic Prophylaxis, Type Of Operating Room, Duration Of Operation	Cox multiple regression; relative risk (95% CI), p value	1.7 (0.7, 4.5), 0.3	NS
Engesaeter,L.B., 2011	High Quality	INFECTION (infection)	Intra-Op	194	(primary total hip arthroplasty)	Antibiotic loaded cement vs Uncemented prostheses	Gender, Type Of Fixation, Type Of Prosthesis (Monoblock, Modular), Age	Cox multiple regression; relative risk (95% CI), p value	1.1 (0.4, 3.1), 0.8	NS
Engesaeter,L.B., 2011	High Quality	INFECTION (infection)	Intra-Op	453	(primary total hip arthroplasty)	Antibiotic loaded cemented implants vs Uncemented implants	Gender, Type Of Fixation, Type Of Prosthesis (Monoblock, Modular), Age	Cox multiple regression; relative risk (95% CI), p value	0.98 (0.5, 1.9), 1	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Gandhi,R., 2009	High Quality	INFECTION		1625	(Total Knee Arthroplasty)	Antibiotic cement vs no Antibiotic cement	Age, BMI, Sex, Diagnosis, Education, Preoperative Womac Total Score, and Charlson Index	Multivariate linear regression modeling, Odds Ratio (95% CI), p-value	1.1 (0.4,3.1), p=0.85	NS
Jamsen,E., 2009	High Quality	INFECTION (Reoperation because of infection)		40135	(primary knee arthroplasty)	No antibiotic cement vs Any antiobiotic cement	Age, Sex, Primary Or Secondary Osteoarthritis Vs Rheumatoid Arthritis Vs Other Arthritis/Illness, Type Of Implanted Prosthesis, Patellar Component, Fixation Method, Same-Day Contralateral Arthroplasty, Bone Grafts, Iv Antibiotic Prophylaxis, Antibiotic Cement, Antibiotic Prophylaxis, Postoperative Complications, Type Of Operating Hospital, Time Since Previous Arthroplasty, Reason For Revision	Cox regression model (reverse comparison); adjusted hazard ratio (95% CI)	1.35 (1.01, 1.81)	Patients with no abx cement were more likely to develop infection
Jamsen,E., 2009	High Quality	INFECTION (Reoperation because of infection)		2166	(revision total knee arthroplasty)	No antibiotic cement vs Any antiobiotic cement	Age, Sex, Primary Or Secondary Osteoarthritis Vs Rheumatoid Arthritis Vs Other Arthritis/Illness, Type Of Implanted Prosthesis, Patellar Component, Fixation Method, Same-Day Contralateral Arthroplasty, Bone Grafts, Iv Antibiotic Prophylaxis, Antibiotic Cement, Antibiotic Prophylaxis, Postoperative Complications, Type Of Operating Hospital, Time Since Previous Arthroplasty, Reason For Revision	Cox regression model (reverse comparison); adjusted hazard ratio (95% CI)	2.10 (1.14, 3.88)	Patients with no abx cement were more likely to develop infection

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
McKee,M.D., 2010	High Quality	Infection Resolution (Infection Eradication)	3.4 weeks	.	(PMMA (antibioticimpregnated polymethylmethacrylate cement beads); antibioticimpregnated polymethylmethacrylate (PMMA) cement beads after surgical debridement)	PMMA vs. BBS	N/A		p = 0.04	There is an association between patients in PMMA group and repeat surgical procedures
McKee,M.D., 2010	High Quality	Infection Resolution (Infection Eradication)	3.4 weeks	.	(BBS (Antibiotic-Impregnated Bioabsorbable Bone Substitute); antibiotic-impregnated bioabsorbable bone substitute (BBS, tobramycin-impregnated medical-grade calcium sulfate))	PMMA vs. BBS	N/A		p = 0.04	There is an association between patients in PMMA group and repeat surgical procedures
Namba,R.S., 2009	High Quality	INFECTION (deep infection)	Intra-Op	22889	(primary total knee arthroplasty)	Use of antibiotic loaded bone cement	Age, Sex, Primary Diagnosis (Osteoarthritis Vs Other), ASA, Diabetes, Operative Time, Use Of Antibiotic Loaded Bone Cement	Multivariate stepwise logistic regression analysis; odds ratio (95% CI), p value	1.7 (1.1, 2.5), 0.12	Use of antibiotic loaded bone cement is an independent risk factor for developing deep infection
Namba,R.S., 2013	High Quality	INFECTION		56216		Antibiotic-laden cement vs No antibiotic-laden cement	Age, Sex, Race, Diabetes, BMI, ASA Score, Comorbidity, Hospital Volume, Bilateral, Infection Prophylaxis	Multivariate Cox proportional hazard regression, hazard ratio (95% CI), p-value	1.53 (1.18, 1.98), p<0.001	Abx-laden cement associated with increased risk of infection (vs. no abx-laden cement)

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Pedersen,A.B., 2010	High Quality	INFECTION (revision due to infection during maximum follow-up time of 14 years)	Intra-Op	80756	(primary total hip arthroplasty)	Cement with antibiotics vs Cementless	Sex, Age, Charlson Comorbidity Index, Diagnosis For Primary Tha (Osteoarthritis, Femoral Fracture, Non-Traumatic Avn, Inflammatory Arthritis, Other), Previous Surgery To Same Hip, Fixation Technique, Duration Of Surgery, Ossification Of Prophylactic Treatment, Type Of Anesthesia, Operating Theater, Calendar Year Of Surgery	Cox regression model; adjusted relative risk (95% CI)	1.24 (0.94, 1.62)	NS
Schrama,J.C., 2015	High Quality	INFECTION (revision for infection)	Intra-Op	11575	(total hip replacement)	Cement without antibiotics vs Antibiotic-loaded cement	Age, Sex, Diagnosis (Rheumatoid Arthritis Vs Osteoarthritis), Year Of Primary Surgery, Fixation	Cox regression (reverse comparison); relative risk (95% CI), p value	1.4 (1.2, 1.6), < 0.001	Cement without antibiotics were more likely to have revision due to infection than antibiotic loaded
Schrama,J.C., 2015	High Quality	INFECTION (revision for infection)	Intra-Op	11575	(total hip replacement)	Uncemented vs Antibiotic-loaded cement	Age, Sex, Diagnosis (Rheumatoid Arthritis Vs Osteoarthritis), Year Of Primary Surgery, Fixation	Cox regression (reverse comparison); relative risk (95% CI), p value	0.9 (0.8, 1), 0.1	NS
Tayton,E.R., 2016	High Quality	INFECTION (infection within 6 months postoperative)	Intra-Op	64566	(primary total knee arthroplasty)	Antibiotic bone cement vs No antibiotic bone cement	Age, BMI, Surgical Helmet Systems, Laminar Flow, Antibiotic Cement, Gender, Previous Surgery	Multivariate analysis; odds ratio (95% CI), p value	1.93 (1.19, 3.13), 0.008	Use of an antibiotic bone cement is associated with infection 6 months postoperatively

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
van Kasteren,M.E., 2007	High Quality	INFECTION (surgical site infection)	Intra-Op	1922	(total hip arthroplasty)	Use of antibiotic-impregnated bone cement	Antibiotic Prophylaxis (Dosage and Timing Of Administration), Use Of Antibiotic-Impregnated Bone Cement, Age, Sex, ASA Score, Duration Of Surgery	Multivariate logistic regression analysis; odds ratio (95% CI), p value	0.8 (0.3, 1.9), 0.57	NS

PICO 2 Modifiable Risk Factors: Part 3: Antibiotic Containing Implant

Summary of Findings Table 3: Antibiotic Containing Implant

	High Quality		
↑ **Better Outcomes** ↓ **Worse Outcomes** ● **Not Significant**	McKee,M.D., 2010	Westberg,M., 2015	Malizos,K., 2017
INFECTION(Superficial and deep SSI)		●	
INFECTION(Superficial SSI only)		●	
INFECTION(Deep SSI only)		●	
INFECTION(SSI - presence of positive clinical signs (according to CDC module), requiring unplanned abx or surg)			↑
Infection Resolution(total number of repeat surgical procedures)	↓		

McKee,M.D., 2010: Antibiotic-impregnanted polymethylmethacrylate cement beads (PMMA) vs antibiotic-impregnated bioabsorbable bone substitute (BBS)

Malizos,K., 2017: Antibiotic loaded DAC implant vs control group

Table 33: Antibiotic containing implant

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Malizos,K., 2017	High Quality	INFECTION (SSI - presence of positive clinical signs (according to CDC module), requiring unplanned abx or surg)		.	(Antibiotic loaded DAC implant)					p = 0.03
Malizos,K., 2017	High Quality	INFECTION (SSI - presence of positive clinical signs (according to CDC module), requiring unplanned abx or surg)		.	(Control)					p = 0.03
McKee,M.D., 2010	High Quality	Infection Resolution (total number of repeat surgical procedures)	Intra-Op	30	(surgical debridement)	Antibiotic-impregnanted polymethylmethacrylate cement beads (PMMA) vs antibiotic-impregnated bioabsorbable bone substitute (BBS)		Pearson chi square test; p value	0.04	There is an association between patientsin PMMA group and repeat surgical procedures
Westberg,M., 2015	High Quality	INFECTION (Superficial and deep SSI)	Post-Op	.	(Routine IV abx prophylaxis and gentamicin-containing collagen sponge (130mg gentamicin sulfate))					NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Westberg,M., 2015	High Quality	INFECTION (Superficial SSI only)	Post-Op	.	(Routine IV abx prophylaxis and gentamicin-containing collagen sponge (130mg gentamicin sulfate))					NS
Westberg,M., 2015	High Quality	INFECTION (Deep SSI only)	Post-Op	.	(Routine IV abx prophylaxis and gentamicin-containing collagen sponge (130mg gentamicin sulfate))					NS
Westberg,M., 2015	High Quality	INFECTION (Superficial and deep SSI)	Post-Op	.	(Routine IV abx prophylaxis)					NS
Westberg,M., 2015	High Quality	INFECTION (Superficial SSI only)	Post-Op	.	(Routine IV abx prophylaxis)					NS
Westberg,M., 2015	High Quality	INFECTION (Deep SSI only)	Post-Op	.	(Routine IV abx prophylaxis)					NS

PICO 2 Modifiable Risk Factors: Part 4: Irrigation

Summary of Findings Table 4: Antibiotic Irrigation

	High Quality	
↑ **Better Outcomes** ↓ **Worse Outcomes** ● **Not Significant**	Namba,R.S., 2013	Cheng,M.T., 2005
INFECTION(deep infection)	↑	↑
INFECTION(superficial infection)		●
INFECTION(overall infection)		↑

Namba,R.S., 2013: Antibiotic irrigation vs No Antibiotic irrigation

Cheng,M.T., 2005: Postoperative irrigation w/ dilute povidoneiodine solution for 3 min, then 2L saline vs 2L saline alone

Table 44: Antibiotic irrigation

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Cheng,M.T., 2005	High Quality	INFECTION (superficial infection)	Post-Op	414	(spinal surgery)	Postoperative irrigation w/ dilute povidoneiodine solution for 3 min, then 2L saline vs 2L saline alone		Chi square test or fisher exact test; infection rate of beta group, infection rate of saline only group; p value	0, 0.5; 0.4976	NS
Cheng,M.T., 2005	High Quality	INFECTION (deep infection)	Post-Op	414	(spinal surgery)	Postoperative irrigation w/ dilute povidoneiodine solution for 3 min, then 2L saline vs 2L saline alone		Chi square test or fisher exact test; infection rate of beta group, infection rate of saline only group; p value	0, 2.9; 0.0146	Patients receiving diluted betadine irrigation were less likely to develop deep infection
Cheng,M.T., 2005	High Quality	INFECTION (overall infection)	Post-Op	414	(spinal surgery)	Postoperative irrigation w/ dilute povidoneiodine solution for 3 min, then 2L saline vs 2L saline alone		Chi square test or fisher exact test; infection rate of beta group, infection rate of saline only group; p value	0, 3.4; 0.0072	Patients receiving diluted betadine irrigation were less likely to develop overall infections

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Namba,R.S., 2013	High Quality	INFECTION		56216		Antibiotic irrigation vs No Antibiotic irrigation	Age, Sex, Race, Diabetes, BMI, ASA Score, Comorbidity, Hospital Volume, Bilateral, Infection Prophylaxis	Multivariate Cox proportional hazard regression, hazard ratio (95% CI), p-value	0.67 (0.48, 0.92), p=0.014	Abx irrigation associated with lower risk of deep SSI

PICO 2 Modifiable Risk Factors: Part 5: Bilateral Vs. Unilateral

Summary of Findings Table 5: Bilateral Vs. Unilateral

	High Quality				
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant	Lee,Q.J., 2015	Namba,R.S., 2013	Jamsen,E., 2009	Tischler,E.H., 2017	Poultsides,L.A., 2013
INFECTION					↓
INFECTION(periprosthetic joint infection)	●				
INFECTION(deep)		↑			
INFECTION(Reoperation because of infection)			●		
INFECTION(90-day septic reoperation)				●	

Namba,R.S., 2013: Bilateral vs Non-bilateral

Poultsides,L.A., 2013: Unilateral TKA vs simultaneous BTKA

Table 55: Bilateral/unilateral procedure

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Jamsen,E., 2009	High Quality	INFECTION (Reoperation because of infection)		40135	(primary knee arthroplasty)	Same-day contralateral arthroplasty yes vs no	Age, Sex, Primary Or Secondary Osteoarthritis Vs Rheumatoid Arthritis Vs Other Arthritis/Illness, Type Of Implanted Prosthesis, Patellar Component, Fixation Method, Same-Day Contralateral Arthroplasty, Bone Grafts, Iv Antibiotic Prophylaxis, Antibiotic Cement, Antibiotic Prophylaxis, Postoperative Complications, Type Of Operating Hospital, Time Since Previous Arthroplasty, Reason For Revision	Cox regression model; adjusted hazard ratio (95% CI)	0.68 (0.42, 1.10)	NS
Lee,Q.J., 2015	High Quality	INFECTION (periprosthetic joint infection)	Intra-Op	200	(total knee arthroplasty)	Bilateral total knee arthroplasty vs non-bilateral	Age, Gender, BMI, Comorbidity (Diabetes, Liver Disease, Heart Disease, Anemia, Thyroid Disease, Renal Disease, Lung Disease, Stroke, Gout), Varicose Vein, Steroid Intake, Dermatitis, Acupuncture, Bilateral Tka, Same Day Surgery, Anesthesia (Spinal), Continuous Femoral Nerve Block, Operating Time, Trainee Surgeon, Drain, Intensive Care Unit Admission, Transfusion, Large Effusion, Blister, Soaked Dressing, Deep Vein Thrombosis, Acute Retention Of Urine, Foley Catheter, Invasive Procedure	Multivariable logistic regression model; odds ratio (95% CI), p value	3.76 (0.41, 34.82), 0.215	NS
Namba,R.S., 2013	High Quality	INFECTION		56216		Bilateral vs Non-bilateral	Age, Sex, Race, Diabetes, BMI, ASA Score, Comorbidity, Hospital Volume, Bilateral, Infection Prophylaxis	Multivariate Cox proportional hazard regression, hazard ratio (95% CI), p-value	0.51 (0.31, 0.83), p=0.007	Bilateral surgery associated with lower risk of deep SSI

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Poultsides,L.A., 2013	High Quality	INFECTION	Baseline	17959	(total knee arthroplasty)	Unilateral TKA vs simultaneous BTKA	Age, Gender, Charlson-Deyo Comorbidity Index, Unilateral Vs Simultaneous Bilateral Vs Staged Bilateral, Hospital Stay	Multivariable logistic regression model (reverse comparison); odds ratio (95% CI)	2.46 (1.19, 5.06)	UTKA patients are 2.5 times more likely to develop in hospital infection compared to SBTKA patients
Tischler,E.H., 2017	High Quality	INFECTION (90-day septic reoperation)	Intra-Op	17394	(primary total hip or total knee arthroplasty)	Simultaneous bilateral total joint arthroplasty	Simultaneous Bilateral Joint Arthroplasty, Staged Bilateral Total Joint Arthroplasty, Total Knee Vs Total Hip Arthroplasty, Age, BMI, Gender, Former Smoker Vs Nonsmoker, Current Smoker Vs Nonsmoker, Packs Per Decade, Charlson Comorbidity Index Score	Multivariate analysis; odds ratio (95% CI), p value	0.85 (0.45, 1.61), 0.62	NS
Tischler,E.H., 2017	High Quality	INFECTION (90-day septic reoperation)	Intra-Op	17394	(primary total hip or total knee arthroplasty)	Staged bilateral total joint arthroplasty	Simultaneous Bilateral Joint Arthroplasty, Staged Bilateral Total Joint Arthroplasty, Total Knee Vs Total Hip Arthroplasty, Age, BMI, Gender, Former Smoker Vs Nonsmoker, Current Smoker Vs Nonsmoker, Packs Per Decade, Charlson Comorbidity Index Score	Multivariate analysis; odds ratio (95% CI), p value	0.83 (0.54, 1.29), 0.41	NS

PICO 2 Modifiable Risk Factors: Part 6: Blood Loss

Summary of Findings Table 6: Blood Loss

	High Quality		
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant	Takemoto,R.C., 2017	Croft,L.D., 2015	Watanabe,M., 2010
INFECTION(surgical site infection)	●	↓	●

Croft,L.D., 2015: Increasing blood loss in mL

Table 66: Blood loss

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Croft,L.D., 2015	High Quality	INFECTION (surgical site infection)	Intra-Op	66	(spinal procedures)	Blood loss in mL	Allograft (Allograft In Combination With Autografts Or Synthetic Grafts) Or Blood Loss; Adjusted For The Clustering Effects Of Matched Case Patients and Controls	Multivariable conditional logistic regression; odds ratio (95% CI), p value	1 (1, 1), 0.039	Increased blood loss is a significant risk factor for SSI
Takemoto,R.C., 2017	High Quality	INFECTION (surgical site infection)	Intra-Op	314	(thoracic and/or lumbar spinal surgery)	Blood loss	Age, Sex, Transfusion, Duration Of Antibiotics, Malnourished, Steroid Use, Diabetes, Smoking, Illicit Drug Use, Alcohol Use, Revision Surgery, Body Mass Index, Number Of Levels Fused, Implant, Graft, Operating Room Time, Blood Loss, Duration Of Drain Use, Drain Output Per Day	Multivariate logistic regression; estimated odds ratio, p value	1, 0.769	NS
Watanabe,M., 2010	High Quality	INFECTION (surgical site infection)	Intra-Op	223	(spinal operations)	Estimated blood loss > 300 g vs 300 g or less	Sex, Age, Smoking History, Diabetes, Obesity, Trauma Or Elective Spine Surgery, Use Of Instrumentation, Long Duration Of Operation, High Estimated Intraoperative Blood Loss, Sufficient Irrigation Of Surgical Site	Multivariate logistic regression analysis; odds ratio (95% CI), p value	0.61 (0.14, 2.61), 0.5	NS

PICO 2 Modifiable Risk Factors: Part 7: Coagulopathy

Summary of Findings Table 7: Coagulopathy

↑ Better Outcomes ↓ Worse Outcomes ● Not Significant	High Quality			
	Bozic,K.J., 2014	Inacio,M.C., 2015	Cavanaugh,P.K., 2015	Wang,Z., 2014
INFECTION(periprosthetic joint infection)	●			
INFECTION(infection within 90 postoperative days)		●		
INFECTION(surgical site infection)			↓	
INFECTION(superficial surgical site infection)				↓

Cavanaugh,P.K., 2015: Coagulopathy

Wang,Z., 2014: VTE prophylactics; low molecular weight heparin vs Warfarin

Table 77: Coagulopathy

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Bozic,K.J., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	587	(primary total hip arthroplasty)	Coagulopathy	Age, Gender, Race	Multivariate Cox regression; adjusted hazard ratio (95% CI), p value	1.58 (0.5, 4.97), 0.4371	NS
Cavanaugh,P.K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Coagulopathy	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	1.1 (1, 1.22), 0.05	Coagulopathy is an independent risk factor for developing SSI
Inacio,M.C., 2015	High Quality	INFECTION (infection within 90 postoperative days)	Baseline	11848	(total hip arthroplasty)	Anticoagulation	Age, Gender, Primary Diagnosis, Anticoagulation, Arrhythmia, Congestive Heart Failure, Hyperlipidemia, Ischemic Heart Disease Angina and Hypertension, Pulmonary Circulation Disorder, Gastroesophageal Reflux Disease, Rheumatoid Arthritis, Blood Loss Anemia, Deficiency Anemia, Obesity, Depression, Renal Failure, Allergies	Logistic regression analysis; odds ratio (95% CI)	1.2 (0.9, 1.5)	NS
Wang,Z., 2014	High Quality	INFECTION (superficial surgical site infection)	Post-Op	3755	(primary total hip or knee arthroplasty)	VTE prophylactics; low molecular weight heparin vs Warfarin	Length Of Stay, General Complications (Cardiac, Medical Or Surgical), Symptomatic Venous Thromboembolism, Blood Transfusion, Bleeding Complications, Surgical Site Infection, Reoperation Due To Infection; Adjusted With Propensity Score Weighting, Scores Generated From Multivariate Logistic Regression Using Age, Sex, BMI, Year Of Surgery, Type Of Surgery, Antibiotic Use, Length Of Surgery, Co-Morbid Conditions and ASA Score Variables;	Multivariate analysis; odds ratio (95% CI), p value	3.47 (1.53, 7.84), 0.003	Patients receiving low molecular weight heparin were more likely to develop superficial SSIs

PICO 2 Modifiable Risk Factors: Part 8: Diabetes

Summary of Findings Table 8: Diabetes

↑ Better Outcomes ↓ Worse Outcomes ● Not Significant	High Quality																								
	Bozic,K.J., 2014	Wu,C., 2014	Lee,Q.J., 2015	Cavanaugh,P.K., 2015	Schairer,W.W., 2016	Dowsey,M.M., 2009	Namba,R.S., 2013	Namba,R.S., 2009	Takemoto,R.C., 2017	Watanabe,M., 2010	Menendez,M.E., 2015	Maradit,Kremers H., 2015	Jain,R.K., 2015	Lewallen,L.W., 2014	Kurtz,S.M., 2012	Momohara,S., 2011	Molina,C.S., 2015	Hatta,T., 2017	Lee,F.H., 2015	Thakar,C., 2010	Street,J.T., 2016	Chawla,H., 2016	Salt,E., 2017	Grammatico-Guillon,L., 2015	Lai,K., 2007	Matson,A.P., 2016
INFECTION(PJI (Hip or knee arthroplasty infection))																								●		
INFECTION							↓				●		↓												↓	
INFECTION(periprosthetic joint infection)	●	↓	↓		↓																					
INFECTION(surgical site infection)				↓					●	↓											●					
INFECTION(PJI)						↓						●														
INFECTION(deep infection)								●																		
INFECTION(superficial infection)																				↓						
INFECTION(superficial and deep)														↓	●											
INFECTION(postoperative surgical-site infection)																●										
INFECTION(deep surgical site infection)																	●									
INFECTION(periprosthetic infection)																		●								
INFECTION(post-operative bone infection)																			↓							
INFECTION(wound infection)																						●				
INFECTION(postoperative infection)																							↓			
INFECTION(postoperative wound complication/infection)																										●

Table 88: Diabetes

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Bozic,K.J., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	587	(primary total hip arthroplasty)	Diabetes	Age, Gender, Race	Multivariate Cox regression; adjusted hazard ratio (95% CI), p value	1.11 (0.53, 2.3), 0.7873	NS
Cavanaugh,P.K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Diabetes (complicated)	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	1.57 (1.4, 1.76), < 0.0001	Complicated diabetes is an independent risk factor for developing SSI
Cavanaugh,P.K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Diabetes (Uncomplicated)	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	1.15 (1.09, 1.2), < 0.0001	Uncomplicated diabetes is an independent risk factor for developing SSI
Chawla,H., 2016	High Quality	INFECTION (wound infection)	Baseline	693	(unicompartmental knee arthroplasty)	Diabetes	Age, Gender, Body Mass Index, Smoking, Diabetes, Renal Insufficiency, Immunosuppressed Or Immunocompromised, Operative Time, Barbed Suture	Binary logistic regression; odds ratio (95%CI), p value	2.422 (0.239, 13.902), 0.3182	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Dowsey,M.M., 2009	High Quality	INFECTION (PJI)	1 Days	1214	(Elective total knee arthroplasty)		Cardiovascular Disease, Diabetes, Respiratory Comorbidity, Smoking, Obesity (BMI 30-39 Kg/M^2), Morbid Obesity (BMI >= 40 Kg/M^2), Ra, Transfusion, Drain Tube, Antibiotic Cement, Gender, Age (65-74Yrs vs <65 Yrs), Age (>=75 Yrs vs <65 Yrs)	Multiple logistic regression; odds ratio, 95% CI, p-value	6.87 (2.42-19.56), p<0.001	diabetes associated with increased risk of infection
Grammatico-Guillon,L., 2015	High Quality	INFECTION (PJI (Hip or knee arthroplasty infection))		32582	(Initially not infected)	Diabetes	Age, Sex, Year Of Replacement, Diabetes, Ulcer Sore, Cardiologic Device, Chronic Renal Failure, Urinary Tract Disorders, Cancer, Chronic Liver Diseases, Alcohol Abuse, Tobacco, Hypertension, Drug Abuse, Obesity	Multivariate Cox proportional hazard model, hazard ratio (95% CI), p-value	0.90 (0.71, 1.14), p=.37	NS
Hatta,T., 2017	High Quality	INFECTION (periprosthetic infection)	Baseline	1834	(primary shoulder arthroplasty)		Smoking Status, Sex, Age At Surgery, BMI, Total Vs Reverse Shoulder Arthroplasty, Rheumatoid Arthritis, Diabetes Mellitus	Multivariable Cox regression; hazard ratio (95% CI), p value	0.87 (0.23, 2.65), 0.821	NS
Jain,R.K., 2015	High Quality	INFECTION		459	(Mixed orthopaedic surgeries)		Age, Sex, Duration Of Surgery, Number Of Days In Hospital, Diabetes, Smoke,, Hypertension, Alcohol	Multinomial logistic regression, odds ratio, 95% CI, p-value	3.593 (1.664-9.390), p=0.002	diabetes associated with SSI

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Kurtz,S.M., 2012	High Quality	INFECTION (superficial and deep)	1.4 weeks	15674	(Instrumented lumbar spine fusion)		Sex, Age, Race, Hx Smoking, Diabetes, Obesity, Cci, State Buy-In Of Medicare Premium, Census Region, Previous Spine Surgery, Allograft Use, No. Segments Fused, Op Approach, Transfusion, Yr Of Index Procedure	Multivariate Cox regression; p-value	p=0.2010	NS
Lai,K., 2007	High Quality	INFECTION		51	(Primary hip & knee arthroplasties)	Diabetes	Genitourinary, Diabetes	Multiple logistic regression; odds ratio (95% CI), p-value	3.91 (1.06-14.44), p=.041	Diabetes associated with increased risk of infection
Lee,F.H., 2015	High Quality	INFECTION (post-operative bone infection)	Baseline	1303347	(primary bone grafting)		Age, Gender, Low Income, Diabetes Mellitus, Tuberculosis, Aids, Length Of Hospital Stay, Nonunion, Delayed Union, Type Of Graft (Graft Autograft, Alloplast/Allograft, Combined), Type Of Hospital (Medical Center, Regional Hospital, District Hospital, Local Clinic)	Multivariate analysis; odds ratio (95% CI), p value	1.306 (1.257, 1.358), <0.001	Patients more easily developed surgical site infections if they had diabetes

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Lee,Q.J., 2015	High Quality	INFECTION (periprosthetic joint infection)	Baseline	200	(total knee arthroplasty)	Diabetes mellitus	Age, Gender, BMI, Comorbidity (Diabetes, Liver Disease, Heart Disease, Anemia, Thyroid Disease, Renal Disease, Lung Disease, Stroke, Gout), Varicose Vein, Steroid Intake, Dermatitis, Acupuncture, Bilateral Tka, Same Day Surgery, Anesthesia (Spinal), Continuous Femoral Nerve Block, Operating Time, Trainee Surgeon, Drain, Intensive Care Unit Admission, Transfusion, Large Effusion, Blister, Soaked Dressing, Deep Vein Thrombosis, Acute Retention Of Urine, Foley Catheter, Invasive Procedure	Multivariable logistic regression model; odds ratio (95% CI), p value	6.07 (1.43, 25.75), 0.006	Diabetes is an independent risk factor for PJI
Lewallen,L.W., 2014	High Quality	INFECTION (superficial and deep)	1 Days	10869	(Hip replacement procedures)		Age, Gender, General Anesthesia, ASA Score, Operative Time, Surgery Type (Revision vs Primary), Trauma,	Multivariate logistic regression, odds ratio, 95% CI, p-value	1.53 (1.09-2.16), p=0.014	diabetes associated with SSI risk
Lewallen,L.W., 2014	High Quality	INFECTION (superficial and deep)	1 Days	11072	(Knee replacement procedures)		Age, Gender, General Anesthesia, ASA Score, Operative Time, Surgery Type (Revision vs Primary), Trauma,	Multivariate logistic regression, odds ratio, 95% CI, p-value	0.78 (0.54-1.12), p=0.184	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Maradit,Kremers H., 2015	High Quality			20171	(Hip & knee arthroplasties)		Age, Gender, BMI, Type Of Surgery, ASA, Operative Time	Cox proportional hazard regression, ratio, 95 % CI	1.23 (0.87,1.74)	NS
Matson,A.P., 2016	High Quality	INFECTION (postoperative wound complication/infection)	Baseline	242	(open reduction and internal fixation (ORIF))	Diabetes mellitus	Gender, Age, Diabetes Mellitus, Tobacco Usage, Obesity, Low-Energy Mechanism, Delay Of Definitive Management	Multivariate logistic regression; odds ratios (95% CI), p value	0.411 (0.112, 1.517), 0.18	NS
Menendez,M.E., 2015	High Quality	INFECTION		44305	(Hand surgery (mixed procedures))		Age, Sex, Insurance Status (Medicare, Medicaid, Private, Other), Patient Location (Urban, Rural), Smoking, Obesity, Diabetes	Multivariate logistic regression; odds ratio, 95% CI	1.12 (0.68-1.82)	NS
Molina,C.S., 2015	High Quality	INFECTION (deep surgical site infection)	Baseline	355	(ORIF)		Age, Race, Sex, Hypertension, Diabetes, Active Smoker, Open Fracture, Ao/Ota 43C3	Multivariate regression analysis; odds ratio (95% CI); p value	1.36 (0.55, 3.3); 0.67	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Momohara,S., 2011	High Quality	INFECTION (postoperative surgical-site infection)	Baseline	420	(total hip or knee arthroplasty)		Sex, Age, BMI, Diabetes Mellitus, Smoking, Past History Of Surgery, Operative Duration, Disease Duration, Preoperative C-Reactive Protein, Preoperative Hemoglobin, Preoperative White Blood Cell, Revision Vs Primary, Tka Vs Tha, Biologic Dmards, Nonbiologic Dmards, Prednisone Dose	Multivariate logistic regression analysis; odds ratio (95% CI), p value	0 (0, inf), 0.99	NS
Namba,R.S., 2009	High Quality	INFECTION (deep infection)	Baseline	22889	(primary total knee arthroplasty)	Diabetes	Age, Sex, Primary Diagnosis (Osteoarthritis Vs Other), ASA, Diabetes, Operative Time, Use Of Antibiotic Loaded Bone Cement	Multivariate stepwise logistic regression analysis; odds ratio (95% CI), p value	0.9 (0.6, 1.4), 0.658	NS
Namba,R.S., 2013	High Quality	INFECTION		56216		Diabetes	Age, Sex, Race, Diabetes, BMI, ASA Score, Comorbidity, Hospital Volume, Bilateral, Infection Prophylaxis	Multivariate Cox proportional hazard regression, hazard ratio (95% CI), p-value	1.28 (1.03, 1.60), p=0.025	Diabetes associated with increased risk of infection

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Salt,E., 2017	High Quality	INFECTION (postoperative infection)	Baseline	2212	(total joint (hip, knee, or shoulder) arthroplasty)	Diabetes	Gender, Race, Replacement Surgery Location, Days For Follow-Up, Cancer, Lupus, Immunodeficiency Condition, Hiv/Aids, Diabetes, Obesity, Gout, Perioperative Prednisone Use, Perioperative Immunosuppressive Medication Use, Rheumatoid Arthritis Vs Osteoarthritis	Multiple logistic regression; estimated odds ratio (95% CI), p value	1.38 (1.14, 1.68), 0.001	Patients with diabetes are more likely to develop postoperative infection
Schairer,W.W., 2016	High Quality	INFECTION (periprosthetic joint infection)	Baseline	173958	(total hip arthroplasty)	Diabetes	Tha Timing After Injection, Greater Than 1 Injection In Prior Year, Age, Gender, Tobacco Use, Transfusion Allogenic Or Autogenic, Obesity, Diabetes, Peripheral Vascular Disease, Congestive Heart Failure, Hiv/Aids, Tumor Without Metastases, Metastatic Tumor, Cardiac Arrhythmia, Blood Loss Anemia, Deficiency Anemia, Renal Failure, Chronic Pulmonary Disease, Pulmonary Circulatory Disorder, Liver Disease, Depression	Multivariable Cox proportional hazard model; hazard ratio (95% CI), p value	1.42 (1.29, 1.57), < 0.001	Patients with diabetes were more likely to develop PJI

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Street,J.T., 2016	High Quality	INFECTION (surgical site infection)	Baseline	358	(1 or 2 level posterior instrumented interbody lumbar spinal fusions (Wiltse or midline approach))	Diabetes	Wiltse Vs Midline, Gender, Age, Recorded Comorbidity, 2 Index Procedure Vertebral Levels Vs 3 and 4 Levels, 2 Index Procedure Instrumented Vertebral Levels Vs 3 Levels, Recoded Index Procedure Bone Graft (Autograft Only, Autograft and Synthetic, Autograft and Bmp)	Logistic regression; odds ratio (95% CI)	0.55 (0.21, 1.41)	NS
Takemoto,R.C., 2017	High Quality	INFECTION (surgical site infection)	Baseline	314	(thoracic and/or lumbar spinal surgery)	Diabetes	Age, Sex, Transfusion, Duration Of Antibiotics, Malnourished, Steroid Use, Diabetes, Smoking, Illicit Drug Use, Alcohol Use, Revision Surgery, Body Mass Index, Number Of Levels Fused, Implant, Graft, Operating Room Time, Blood Loss, Duration Of Drain Use, Drain Output Per Day	Multivariate logistic regression; estimated odds ratio, p value	0.41, 0.138	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Thakar,C., 2010	High Quality	INFECTION (superficial infection)	Baseline	2360	(initial surgical fixation)	Diabetes	Cardiovascular Disease, Stroke, Respiratory Disease, Renal Disease, Diabetes, Rheumatoid Disease, Dementia, Parkinson'S Disease, Malignancy, Smoking, Enternal Steroids, Warfarin, Consultant As Surgeon, Transfused Preoperatively, Transfused Postoperatively	Direct logistical regression; odds ratio (95% CI), p value	28.42 (1.27, 634.17), 0.04	Diabetes is an independent risk factor for developing superficial infection
Watanabe,M., 2010	High Quality	INFECTION (surgical site infection)	Baseline	223	(spinal operations)	Diabetes	Sex, Age, Smoking History, Diabetes, Obesity, Trauma Or Elective Spine Surgery, Use Of Instrumentation, Long Duration Of Operation, High Estimated Intraoperative Blood Loss, Sufficient Irrigation Of Surgical Site	Multivariate logistic regression analysis; odds ratio (95% CI), p value	4.88 (1.01, 23.51), 0.048	Diabetes is a significant independent risk factor for patients developing SSI

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Wu,C., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	297	(total hip arthroplasty or total knee arthroplasty)	Diabetes	Diabetes, Age, BMI, Place Of Residence, Alcohol Abuse, Treatment Of Diabetes, Chronic Pulmonary Disease, Hypertension, Substance Abuse, Cerebral Infarction, Dental Procedure W/ Or W/O Antibiotics, Renal Disease, Gout, Cardiovascular Event, Chronic Liver Disease, Anemia, Tobacco Use, Ankylosing Spondylitis, Tha Vs Tka, Gender, Prostatic Disease, Oncologic Disease, Neurologic Disease, History Of Tuberculosis, Rheumatoid Arthritis Vs Osteoarthritis, Femoral Head Necrosis, Developmental Hip Dysplasia, Fracture	Multivariate conditional logistic regression analysis; odds ratio (95% CI), p value	5.47 (1.77, 16.97), 0.003	Patients more easily developed surgical site infections if they had diabetes

PICO 2 Modifiable Risk Factors: Part 9: Experience of Surgical Team

Summary of Findings Table 9: Experience of Surgical Team

↑ Better Outcomes ↓ Worse Outcomes ● Not Significant	High Quality				
	Lee,Q.J., 2015	Blomfeldt,R., 2015	Kurtz,S.M., 2010	Schepers,T., 2011	Guerado,E., 2015
INFECTION					●
INFECTION(periprosthetic joint infection)	●				
INFECTION(PJI)		●	●		
INFECTION(superficial and deep)				●	

Table 99: Experience of Surgical Team

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Blomfeldt,R., 2015	High Quality			3807	(Hip arthroplasties)		Age, Gender, Prosthesis Type, Surgeon Experience	Multivariable Cox regression, CI, p-value	1.5 (0.7-3.3), 0.3	NS
Guerado,E., 2015	High Quality	INFECTION	1 Days	814	(Hip osteosynthesis or hip joint replacement)	Hip surgery specialist vs General orthopaedic surgeon	Age, Gender, Charlson Index, Preoperative Length Of Stay, Hip Unit Surgeon	Multiple logistic regression, OR, 95% CI, wald p-value, LR-test p-value	0.5 (0.18-1.43) wald p=0.196, LR-test p=0.211	NS
Kurtz,S.M., 2010	High Quality	INFECTION (PJI)		69663	(TKA)	(Teaching status)	Age, Race, Gender, Medicare Buy-In Status, Census Region, Procedure Duration, Hospital Location, Hospital Teaching Status, Hospital Size, Hospital Ownership	Multvariate regression p-value	p=0.106	NS
Lee,Q.J., 2015	High Quality	INFECTION (periprosthetic joint infection)	Baseline	200	(total knee arthroplasty)	Trainee surgeon	Age, Gender, BMI, Comorbidity (Diabetes, Liver Disease, Heart Disease, Anemia, Thyroid Disease, Renal Disease, Lung Disease, Stroke, Gout), Varicose Vein, Steroid Intake, Dermatitis, Acupuncture, Bilateral Tka, Same Day Surgery, Anesthesia (Spinal), Continuous Femoral Nerve Block, Operating Time, Trainee Surgeon, Drain, Intensive Care Unit Admission, Transfusion, Large Effusion, Blister, Soaked Dressing, Deep Vein Thrombosis, Acute Retention Of Urine, Foley Catheter, Invasive Procedure	Multivariable logistic regression model; odds ratio (95% CI), p value	1.6 (0.37, 6.95), 0.507	NS
Schepers,T., 2011	High Quality	INFECTION (superficial and deep)		205	(plating of fibula in closed ankle fracture)	Attending vs resident surgeon	Gender, Age, Fracture Type, Delay To Surgery, Tourniquet Use, Plate Length, Use Of Titanium, Attending Resident Or Surgeon, Smoking, Diabetes, Locking Compression Plate Use	Logistic regression	not significant	NS

PICO 2 Modifiable Risk Factors: Part 10: **Hospital Stay Duration**

*Summary of Findings Table 10: **Hospital Stay Duration***

	High Quality									
↑ **Better Outcomes** ↓ **Worse Outcomes** ● **Not Significant**	Poultsides,L.A., 2013	Omeis,I.A., 2011	Jain,R.K., 2015	Lee,F.H., 2015	Guerado,E., 2015	de Boer,A.S., 2001	Dahl,A., 2006	de Boer,A.S., 1999	Muilwijk,J., 2006	Westberg,M., 2013
INFECTION	↓		↓		●	●				
INFECTION(surgical site infection)		↓						↓		
INFECTION(PJI)										↓
INFECTION(superficial surgical site infection)									↓	
INFECTION(deep surgical site infection)									↓	
INFECTION(post-operative bone infection)				↓						
INFECTION(positive bacterial culture)							●			
INFECTION(positive staph aureus culture)							↑			

Poultsides,L.A., 2013: Each additional hospital day

Omeis,I.A., 2011: Duration of hospital stay in days

Jain,R.K., 2015: Number of days in hospital

Lee,F.H., 2015:Length of hospital stay in days

Dahl,A., 2006: Hospital stay of 2 or more days (significant for staph culture only, not any bacterial culture)

de Boer,A.S., 1999: Preoperative stay > 4 days vs 0-4 days (2 separate populations used, both are significant)

Muilwijk,J., 2006: Preoperative stay of 2+ days vs 2 or less days

Westberg,M., 2013: Time from admission to surgery (per hr)

Table 1010: Hospital Stay Duration

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Dahl,A., 2006	High Quality	INFECTION (positive staph aureus culture)	Baseline	106	(hemicallotasis osteotomy)	Hospital stay of 2 or more days	Gender, Age, BMI, Dosage and Time Of Infection Prophylaxis, Hospital Stay, Smoking	Multivariate regression; odds ratio (95% CI)	0.2 (0.08, 0.8)	Patients who stayed for 1 day at the hospital are at risk for presence of S. aureus
Dahl,A., 2006	High Quality	INFECTION (positive bacterial culture)	Baseline	106	(hemicallotasis osteotomy)	Hospital stay of 2 or more days	Gender, Age, BMI, Dosage and Time Of Infection Prophylaxis, Hospital Stay, Smoking	Multivariate regression; odds ratio (95% CI)	0.7 (0.3, 1.8)	NS
de Boer,A.S., 2001	High Quality	INFECTION		5339	(Total hip prostheses)	ASA score 1+2, stay >2 days vs <=2days	Sex, Age, Wound Contamination, ASA Score*Preoperative Stay, Surgery Duration, Abx Prophylaxis, Type Of Admission, Multiple Surgery, Post Discharge Surveillance	Multiple logistic regression, risk ratio, 95% CI	0.2 (0.0-1.3)	NS
de Boer,A.S., 2001	High Quality	INFECTION		5339	(Total hip prostheses)	ASA score 3+4+5, stay >2 days vs <=2days	Sex, Age, Wound Contamination, ASA Score*Preoperative Stay, Surgery Duration, Abx Prophylaxis, Type Of Admission, Multiple Surgery, Post Discharge Surveillance	Multiple logistic regression, risk ratio, 95% CI	1.8 (0.9-3.6)	NS
de Boer,A.S., 1999	High Quality	INFECTION (surgical site infection)	Baseline	4872	(orthopedic surgery)	Preoperative stay > 4 days vs 0-4 days	Age, Gender, Preoperative Stay, Number Of Operations, Other Hospital Acquired Infections	Multivariate analysis; adjusted odds ratio (95% CI)	3 (2.2, 3.7)	Preoperative stay > 4 days is an independent risk factor for developing SSI
de Boer,A.S., 1999	High Quality	INFECTION (surgical site infection)	Baseline	6437	(orthopedic surgery)	Preoperative stay > 4 days vs 0-4 days	Age, Gender, Preoperative Stay, Number Of Operations, Prophylactic Antibiotics, Acute Surgery, Wound Class,	Multivariate analysis; adjusted odds ratio (95% CI)	1.6 (1.1, 2.1)	Preoperative stay > 4 days is an independent risk factor for developing SSI
Guerado,E., 2015	High Quality	INFECTION	1 Days	814	(Hip osteosynthesis or hip joint replacement)	Number of days elapsed from hospital admission to discharge	Age, Gender, Charlson Index, Preoperative Length Of Stay, Hip Unit Surgeon	Multiple logistic regression, OR, 95% CI	1.03 (0.92-1.15) wald p=0.571, LR-test p=0.594	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Jain,R.K., 2015	High Quality	INFECTION		459	(Mixed orthopaedic surgeries)	Number of days in hospital	Age, Sex, Duration Of Surgery, Number Of Days In Hospital, Diabetes, Smoke,, Hypertension, Alcohol	Multinomial logistic regression, odds ratio, 95% CI, p-value	1.023 (1.007-1.039), p=0.004	hospital stay duration associated with SSI
Lee,F.H., 2015	High Quality	INFECTION (post-operative bone infection)	Baseline	1303347	(primary bone grafting)	Length of hospital stay in days	Age, Gender, Low Income, Diabetes Mellitus, Tuberculosis, Aids, Length Of Hospital Stay, Nonunion, Delayed Union, Type Of Graft (Graft Autograft, Alloplast/Allograft, Combined), Type Of Hospital (Medical Center, Regional Hospital, District Hospital, Local Clinic)	Multivariate analysis; odds ratio (95% CI), p value	1.054 (1.053, 1.055), <0.001	Patients more easily developed surgical site infections if they had a longer hospital stay
Muilwijk,J., 2006	High Quality	INFECTION (superficial surgical site infection)	Baseline	24307	(total hip arthroplasty)	Preoperative stay of 2+ days vs 2 or less days	Sex, Age, Emergency Surgery, NNIS Risk Index, Preoperative Stay, Hospital Type	Multivariate analysis; adjusted odds ratio (95% CI)	1.6 (1.1, 2.3)	Preoperative stay > 2 days is an independent risk factor for developing superficial SSI
Muilwijk,J., 2006	High Quality	INFECTION (superficial surgical site infection)	Baseline	64598	(all orthopedic surgeries)	Preoperative stay of 2+ days vs 2 or less days	Sex, Age, Emergency Surgery, NNIS Risk Index, Preoperative Stay, Hospital Type	Multivariate analysis; adjusted odds ratio (95% CI)	1.7 (1.4, 2)	Preoperative stay > 2 days is an independent risk factor for developing superficial SSI
Muilwijk,J., 2006	High Quality	INFECTION (deep surgical site infection)		24307	(total hip arthroplasty)	Preoperative stay of 2+ days vs 2 or less days	Sex, Age, Emergency Surgery, NNIS Risk Index, Preoperative Stay, Hospital Type	Multivariate analysis; adjusted odds ratio (95% CI)	1.9 (1.2, 3)	Preoperative stay > 2 days is an independent risk factor for developing deep SSI
Muilwijk,J., 2006	High Quality	INFECTION (deep surgical site infection)		64598	(all orthopedic surgeries)	Preoperative stay of 2+ days vs 2 or less days	Sex, Age, Emergency Surgery, NNIS Risk Index, Preoperative Stay, Hospital Type	Multivariate analysis; adjusted odds ratio (95% CI)	2 (1.6, 2.4)	Preoperative stay > 2 days is an independent risk factor for developing deep SSI

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Omeis,I.A., 2011	High Quality	INFECTION (surgical site infection)	Baseline	227	(spinal tumor surgery)	Duration of hospital stay in days	Men, Increasing Age, Previous Surgery, Complex Plastic Closure, Use Of Drain In Primary Surgery, Blood Transfusions In Primary Surgery, Increasing Number Of Comorbidities, Hospital Acquired Infection During Primary Surgery, Preoperative Radiotherapy, Use Of Allograft, Increasing Number Of Levels Fused, Duration Of Hospital Stay, Posterolateral Fusion	Multivariate logistic regression; adjusted odds ratios (95% CI), p value	1.05 (1.01, 1.11), 0.022	Increasing duration of hospital stay increases likelihood of postoperative SSIs
Poultsides,L.A., 2013	High Quality	INFECTION	Baseline	17959	(total knee arthroplasty)	Each additional hospital day	Age, Gender, Charlson-Deyo Comorbidity Index, Unilateral Vs Simultaneous Bilateral Vs Staged Bilateral, Hospital Stay	Multivariable logistic regression model; odds ratio (95% CI)	1.11 (1.06, 1.17)	Each additional hospital day increased the risk of late infection by 11.3%
Westberg,M., 2013	High Quality	INFECTION (PJI)	Baseline	184	(primary arthroplasty after femoral neck fracture)	Time from admission to surgery (per hr)	Age, Sex, ASA, Cognitive Failure, Diabetes, Obesity, Malignancy, Previous Infection In Contralateral Hip, Renal Failure, Urinary Tract Infection, Alcohol Abuse, Chronic Lower Leg Ulcer, Use Of Steroids and Other Immunosuppressants, 1 Or More/2 Or More Of Above Risk Factors	Logistic regression analysis; odds ratio (95% CI), p value	1.0 per hour, (1.0 - 1.1), 0.02	time from admission to surgery remained a significant predictor of infection (per hour units)

PICO 2 Modifiable Risk Factors: Part 11: **Hospital Volume**

*Summary of Findings Table 11: **Hospital Volume***

	High Quality											
↑ **Better Outcomes** ↓ **Worse Outcomes** ● **Not Significant**	**Namba,R.S., 2013**	**Kurtz,S.M., 2010**	**Ravi,B., 2014**	**Calderwood,M.S., 2017**	**Meyer,E., 2011 (1)**	**Meyer,E., 2011 (2)**	**Rasouli,M.R., 2013**	**Prakasam,S., 2016**	**Haddad,S., 2016**	**Hoh,D.J., 2015 (1)**	**Hoh,D.J., 2015 (2)**	**Basques,B.A., 2016**	**George,M.D., 2017**
INFECTION(Sepsis)										↓	↑		
INFECTION	↓												
INFECTION(surgical site infection)				↓	↓	↑			↓			↓	
INFECTION(PJI)		●											
INFECTION(infection within 2 years of TKA)			●										
INFECTION(SSI)							↓						
INFECTION(bacterial infections)								●					
INFECTION(infection within 30 postoperative days)													↑

Namba,R.S., 2013: <100 vs >=200 cases/yr

Calderwood,M.S., 2017: 100-199 annual hip arthroplasty procedures vs 200+

Meyer,E., 2011 (1): Department with 50 or less procedures/year vs 50-100 procedures/year (arthroscopy or primary knee prosthesis)

Meyer,E., 2011 (2): Department with > 100 procedures/year vs 50-100 procedures/year (primary hip prosthesis)

Rasouli,M.R., 2013: Medium sized vs small sized

Haddad,S., 2016: Medium vs small hospital size

Hoh,D.J., 2015 (1): Patients with SCI; OR linear with hospital size (i.e. small = 1.3, medium = 2.6, large = 3.9)

Hoh,D.J., 2015 (2): Patients without SCI; medium vs large hospital size

Basques,B.A., 2016: Surgeon volume < 25th percentile vs 25-74th percentile

George,M.D., 2017: Surgeon volume highest vs lowest tertile

Table 1111: Hospital volume

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Basques,B.A., 2016	High Quality	INFECTION (surgical site infection)	Baseline	419212	(anterior cervical fusion)	Surgeon volume < 25th percentile vs 25-74th percentile	Age, Sex, Elixhauser Comorbidity Index, Insurance Status	Multivariate logistic regression (reverse comparison); odds ratio (95% CI), p value	4 (1.5, 10.3), 0.005	Surgeon volume <25th percentile is an independent risk factor for developing SSI
Basques,B.A., 2016	High Quality	INFECTION (surgical site infection)	Baseline	419212	(anterior cervical fusion)	Surgeon volume 75th+ percentile vs 25-74th percentile	Age, Sex, Elixhauser Comorbidity Index, Insurance Status	Multivariate logistic regression; odds ratio (95% CI), p value	0.9 (0.5, 1.6), 0.687	NS
Calderwood,M.S., 2017	High Quality	INFECTION (surgical site infection)	Baseline	3115	(hip arthroplasty)	100-199 annual hip arthroplasty procedures vs 200+	Age, Sex, and Coded Co-Morbidities	Logistic regression mixed effects model (reverse comparison); adjusted odds ratio (95% CI)	1.14 (1.07, 1.21)	Patients more easily developed SSI if procedure was done in a 100-199 annual procedures hospital
Calderwood,M.S., 2017	High Quality	INFECTION (surgical site infection)	Baseline	3115	(hip arthroplasty)	1-24 annual hip arthroplasty procedures vs 200+	Age, Sex, and Coded Co-Morbidities	Logistic regression mixed effects model (reverse comparison); adjusted odds ratio (95% CI)	1.58 (1.47, 1.69)	Patients more easily developed SSI if procedure was done in a 1-24 annual procedures hospital

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Calderwood,M.S., 2017	High Quality	INFECTION (surgical site infection)	Baseline	3115	(hip arthroplasty)	25-49 annual hip arthroplasty procedures vs 200+	Age, Sex, and Coded Co-Morbidities	Logistic regression mixed effects model (reverse comparison); adjusted odds ratio (95% CI)	1.34 (1.26, 1.44)	Patients more easily developed SSI if procedure was done in a 25-49 annual procedures hospital
Calderwood,M.S., 2017	High Quality	INFECTION (surgical site infection)	Baseline	3115	(hip arthroplasty)	50-99 annual hip arthroplasty procedures vs 200+	Age, Sex, and Coded Co-Morbidities	Logistic regression mixed effects model (reverse comparison); adjusted odds ratio (95% CI)	1.22 (1.15, 1.3)	Patients more easily developed SSI if procedure was done in a 50-99 annual procedures hospital
George,M.D., 2017	High Quality	INFECTION (infection within 30 postoperative days)	Baseline	3863	(hip or knee arthroplasty)	Surgeon volume middle vs lowest tertile	Infliximab Preoperative Stop Timing, Glucocorticoid Dose, Non-Biologic Dmard Use, Age, Disease Type (Inflammatory Bowel Disease, Psa/Pso/As Vs Ra), Charlson Score, Past Year Hospitalizations, Outpatient Visits Past Year, Calendar Year, Surgeon Volume, Sex, Region, Inflammatory Disease Type	Multivariable logistic regression; odds ratio (95% CI)	0.77 (0.57, 1.04)	NS
George,M.D., 2017	High Quality	INFECTION (infection within 30 postoperative days)	Baseline	3863	(hip or knee arthroplasty)	Surgeon volume highest vs lowest tertile	Infliximab Preoperative Stop Timing, Glucocorticoid Dose, Non-Biologic Dmard Use, Age, Disease Type (Inflammatory Bowel Disease, Psa/Pso/As Vs Ra), Charlson Score, Past Year Hospitalizations, Outpatient Visits Past Year, Calendar Year, Surgeon Volume, Sex, Region, Inflammatory Disease Type	Multivariable logistic regression; odds ratio (95% CI)	0.62 (0.46, 0.85)	Highest tertile surgeon volume is associated with decreased risk of developing infection in 30 days

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Haddad,S., 2016	High Quality	INFECTION (surgical site infection)	Baseline	1872327	(primary cervical spinal surgery)	Medium vs small hospital size	Age, Gender, Race, Payer Vs Medicare, Hospital Size, Hospital Type, Hospital Region, Calendar Year, Surgical Approach, Traumatic Diagnosis, Neurologic Injury (Spinal Cord Injury Vs Myelopathy)	Multivariate analysis; odds ratio (95% CI), p value	1.41 (1.15, 1.73), 0.001086913	Medium hospital size is an independent risk factor for developing SSI
Hoh,D.J., 2015	High Quality	INFECTION (Sepsis)		10669	(Not initially infected)	Patients with SCI ; OR considered linear with hospital size (i.e. small = 1.3, medium = 2.6, large = 3.9)	Age, Gender, Comorbidity Score, Injury Severity Score, Hospital Type, Hospital Size	Odds ratio (CI), p-value	1.3 (1.05, 1.59), p-value=0.0175	Patients with SCI; Size was linearly correlated with hospital size by a factor of 1.3 for each size increase (i.e. small = 1.3, medium = 2.6, large = 3.9)
Hoh,D.J., 2015	High Quality	INFECTION (Sepsis)		41708	(Not initially infected)	Patients without SCI; medium vs large hospital size	Age, Gender, Comorbidity Score, Injury Severity Score, Hospital Type, Hospital Size	Odds ratio (CI), p-value	0.73 (0.551, 0.976), p=0.0334	Patients without SCI; medium (vs large hospital size) associated with lower risk of sepsis
Hoh,D.J., 2015	High Quality	INFECTION (Sepsis)		41708	(Not initially infected)	Patients without SCI; small vs large hospital size	Age, Gender, Comorbidity Score, Injury Severity Score, Hospital Type, Hospital Size	P-value	$p > 0.05$	NS
Hoh,D.J., 2015	High Quality	INFECTION (Sepsis)		41708	(Not initially infected)	Patients without SCI; small vs medium hospital size	Age, Gender, Comorbidity Score, Injury Severity Score, Hospital Type, Hospital Size	P-value	$p > 0.05$	NS
Kurtz,S.M., 2010	High Quality	INFECTION (PJI)		69663	(TKA)		Age, Race, Gender, Medicare Buy-In Status, Census Region, Procedure Duration, Hospital Location, Hospital Teaching Status, Hospital Size, Hospital Ownership	Multvariate regression p-value	p=0.573	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Meyer,E., 2011	High Quality	INFECTION (surgical site infection)	Baseline	14339	(arthroscopy)	Department with > 100 procedures/year vs 50-100 procedures/year	Sex, Age, NNIS Risk Index Score, Frequency Of Operative Procedure	Multivariate logistic regression; adjusted odds ratio	1.1741	NS
Meyer,E., 2011	High Quality	INFECTION (surgical site infection)	Baseline	43180	(primary knee prosthesis)	Department with > 100 procedures/year vs 50-100 procedures/year	Sex, Age, NNIS Risk Index Score, Frequency Of Operative Procedure	Multivariate logistic regression; adjusted odds ratio	1.1376	NS
Meyer,E., 2011	High Quality	INFECTION (surgical site infection)	Baseline	63045	(primary hip prosthesis)	Department with > 100 procedures/year vs 50-100 procedures/year	Sex, Age, NNIS Risk Index Score, Frequency Of Operative Procedure	Multivariate logistic regression; adjusted odds ratio	0.6159	Department with >100 procedures/year is a protective factor for developing SSI
Meyer,E., 2011	High Quality	INFECTION (surgical site infection)	Baseline	14339	(arthroscopy)	Department with 50 or less procedures/year vs 50-100 procedures/year	Sex, Age, NNIS Risk Index Score, Frequency Of Operative Procedure	Multivariate logistic regression (reverse comparison); adjusted odds ratio	6.9671	Department with 50 or less procedures/year is an independent risk factor for developing SSI
Meyer,E., 2011	High Quality	INFECTION (surgical site infection)	Baseline	43180	(primary knee prosthesis)	Department with 50 or less procedures/year vs 50-100 procedures/year	Sex, Age, NNIS Risk Index Score, Frequency Of Operative Procedure	Multivariate logistic regression (reverse comparison); adjusted odds ratio	2.3254	Department with 50 or less procedures/year is an independent risk factor for developing SSI
Meyer,E., 2011	High Quality	INFECTION (surgical site infection)	Baseline	63045	(primary hip prosthesis)	Department with 50 or less procedures/year vs 50-100 procedures/year	Sex, Age, NNIS Risk Index Score, Frequency Of Operative Procedure	Multivariate logistic regression; adjusted odds ratio	0.811	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Namba,R.S., 2013	High Quality	INFECTION		56216		<100 vs >=200 cases/yr	Age, Sex, Race, Diabetes, BMI, ASA Score, Comorbidity, Hospital Volume, Bilateral, Infection Prophylaxis	Multivariate Cox proportional hazard regression, hazard ratio (95% CI), p-value	0.33 (0.12, 0.90), p=0.030	<100 cases/yr associated with worse outcome (compared to >= 200 cases/yr)
Namba,R.S., 2013	High Quality	INFECTION		56216		100-199 vs >=200 cases/yr	Age, Sex, Race, Diabetes, BMI, ASA Score, Comorbidity, Hospital Volume, Bilateral, Infection Prophylaxis	Multivariate Cox proportional hazard regression, hazard ratio (95% CI), p-value	1.19 (0.92, 1.53), p=0.187	NS
Prakasam,S., 2016	High Quality	INFECTION (bacterial infections)	Baseline	26373	(facial reconstructive surgery)	Large vs small/medium hospital bed size	Age, Sex, Race, Type Of Admission, Insurance Status, Teaching Status, Hospital Region, Hospital Bed Size, Primary Diagnosis	Multivariable logistic regression; odds ratio (95% CI)	1.07 (0.71, 1.6)	NS
Rasouli,M.R., 2013	High Quality	INFECTION (SSI)		.	(Pimary and revision TKA and THA)	Large sized vs small sized	Age, Elixhauser Comorbidity Index, Female, Hospital Size, Hospital Type, Geographic Region, Ethnicity, Type Of Arthroplasty, Insurance	Multivariate analysis, odds ratio, (95% CI), p-value	Not reported, Not reported, not significant	NS
Rasouli,M.R., 2013	High Quality	INFECTION (SSI)		.	(Pimary and revision TKA and THA)	Medium sized vs small sized	Age, Elixhauser Comorbidity Index, Female, Hospital Size, Hospital Type, Geographic Region, Ethnicity, Type Of Arthroplasty, Insurance	Multivariate analysis, odds ratio, (95% CI), p-value	1.12 (1.01–1.24), p=0.04	Medium hospital size (vs. small) associated with worse outcome
Ravi,B., 2014	High Quality	INFECTION (infection within 2 years of TKA)	Baseline	71793	(primary total knee arthroplasty)		Age, Sex, Income Quintile, Rural, Frail, Charlson Comorbidity Index Score, Hospital Volume, Surgeon Volume, Teaching Hospital, Arthritis Type, Rheumatois Arthritis Vs Osteoarthritis	Cox proportional hazard model; adjusted hazard ratio (95% CI), p value	1.04 (0.65, 1.68), 0.87	NS

PICO 2 Modifiable Risk Factors: Part 12: **Immune Suppressing Medication**

*Summary of Findings Table 12: **Immune Suppressing Medication***

↑ Better Outcomes ↓ Worse Outcomes ● Not Significant	High Quality Wu,C., 2014	Lee,Q.J., 2015	Takemoto,R.C., 2017	Momohara,S., 2011	Salt,E., 2017	Westberg,M., 2013	George,M.D., 2017	Cancienne,J.M., 2017	Murphy,M.V., 2016	Giles,J.T., 2006
INFECTION(periprosthetic joint infection)	●	●								
INFECTION(surgical site infection)			●							
INFECTION(PJI)						↓				
INFECTION(deep infection)									↓	
INFECTION(postoperative surgical-site infection)				↓						
INFECTION(postoperative infection)					↓			↓		↓
INFECTION(infection within 30 postoperative days)							↓			
INFECTION(prosthetic joint infection within first postoperative year)							↓			

Momohara,S., 2011: Biologic disease-modifying antirheumatic drugs (IFX, ETN, ADA, TCZ)

Salt,E., 2017: Perioperative prednisone use vs no use

Westberg,M., 2013: Use of steroids and other immunosuppressants

George,M.D., 2017: Glucocorticoid dose >10 mg/day vs none; Glucocorticoid dose 5 mg/day or less vs none; Glucocorticoid dose 5-10 mg/day vs none

Cancienne,J.M., 2017: 0-3 month preoperative cervical epidural steroid injection; 3-6 month preoperative cervical epidural steroid injection

Murphy,M.V., 2016: Immune suppressive medications

Giles,J.T., 2006: Prescription of TNF inhibitor

Table 1212: Immune Suppressing Medications

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Cancienne,J.M., 2017	High Quality	INFECTION (postoperative infection)	Baseline	402	(posterior cervical fusion)	0-3 month preoperative cervical epidural steroid injection	Age, Gender, Diabetes, Smoking, Epidural Spinal Injection	Multivariate binomial logistic regression analysis; odds ratio (95% CI), p value	2.21 (1.8, 2.7), <0.0001	0-3month preoperative cervical epidural steroid injection is associated with postoperative infection
Cancienne,J.M., 2017	High Quality	INFECTION (postoperative infection)	Baseline	4354	(anterior cervical discectomy and fusion (ACDF))	0-3 month preoperative cervical epidural steroid injection	Age, Gender, Diabetes, Smoking, Epidural Spinal Injection	Multivariate binomial logistic regression analysis; odds ratio (95% CI), p value	1.83 (1.7, 2), <0.0001	0-3month preoperative cervical epidural steroid injection is associated with postoperative infection
Cancienne,J.M., 2017	High Quality	INFECTION (postoperative infection)	Baseline	586	(posterior cervical fusion)	3-6 month preoperative cervical epidural steroid injection	Age, Gender, Diabetes, Smoking, Epidural Spinal Injection	Multivariate binomial logistic regression analysis; odds ratio (95% CI), p value	1.95 (1.6, 2.3), 0.0002	3-6month preoperative cervical epidural steroid injection is associated with postoperative infection
Cancienne,J.M., 2017	High Quality	INFECTION (postoperative infection)	Baseline	5183	(anterior cervical discectomy and fusion (ACDF))	3-6 month preoperative cervical epidural steroid injection	Age, Gender, Diabetes, Smoking, Epidural Spinal Injection	Multivariate binomial logistic regression analysis; odds ratio (95% CI), p value	1.22 (1, 1.5), 0.084	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Cancienne,J.M., 2017	High Quality	INFECTION (postoperative infection)	Baseline	629	(posterior cervical fusion)	6-12 month preoperative cervical epidural steroid injection	Age, Gender, Diabetes, Smoking, Epidural Spinal Injection	Multivariate binomial logistic regression analysis; odds ratio (95% CI), p value	0.89 (0.7, 1.1), 0.612	NS
Cancienne,J.M., 2017	High Quality	INFECTION (postoperative infection)	Baseline	3648	(anterior cervical discectomy and fusion (ACDF))	6-12 month preoperative cervical epidural steroid injection	Age, Gender, Diabetes, Smoking, Epidural Spinal Injection	Multivariate binomial logistic regression analysis; odds ratio (95% CI), p value	1.01 (0.9, 1.2), 0.958	NS
George,M.D., 2017	High Quality	INFECTION (infection within 30 postoperative days)	Baseline	3863	(hip or knee arthroplasty)	Glucocorticoid dose > 10 mg/day vs none	Infliximab Preoperative Stop Timing, Glucocorticoid Dose, Non-Biologic Dmard Use, Age, Disease Type (Inflammatory Bowel Disease, Psa/Pso/As Vs Ra), Charlson Score, Past Year Hospitalizations, Outpatient Visits Past Year, Calendar Year, Surgeon Volume, Sex, Region, Inflammatory Disease Type	Multivariable logistic regression; odds ratio (95% CI)	2.11 (1.3, 3.4)	Glucocorticoid dose > 10mg/day is an independent risk factor for developing infection within 30 days
George,M.D., 2017	High Quality	INFECTION (prosthetic joint infection within first postoperative year)	Baseline	3867	(hip or knee arthroplasty)	Glucocorticoid dose > 10 mg/day vs none	Infliximab Preoperative Stop Timing, Glucocorticoid Dose, Previous Non-Infliximab Biologic Dmard, Age, Past Year Hospitalizations, Calendar Year, Surgeon Volume, Sex, Skilled Nursing Facility	Multivariable logistic regression; odds ratio (95% CI)	2.7 (1.3, 5.6)	Glucocorticoid dose > 10mg/day is an independent risk factor for prosthetic joint infection
George,M.D., 2017	High Quality	INFECTION (infection within 30 postoperative days)	Baseline	3863	(hip or knee arthroplasty)	Glucocorticoid dose 5 mg/day or less vs none	Infliximab Preoperative Stop Timing, Glucocorticoid Dose, Non-Biologic Dmard Use, Age, Disease Type (Inflammatory Bowel Disease, Psa/Pso/As Vs Ra), Charlson Score, Past Year Hospitalizations, Outpatient Visits Past Year, Calendar Year, Surgeon Volume, Sex, Region, Inflammatory Disease Type	Multivariable logistic regression; odds ratio (95% CI)	0.98 (0.67, 1.44)	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
George,M.D., 2017	High Quality	INFECTION (prosthetic joint infection within first postoperative year)	Baseline	3867	(hip or knee arthroplasty)	Glucocorticoid dose 5 mg/day or less vs none	Infliximab Preoperative Stop Timing, Glucocorticoid Dose, Previous Non-Infliximab Biologic Dmard, Age, Past Year Hospitalizations, Calendar Year, Surgeon Volume, Sex, Skilled Nursing Facility	Multivariable logistic regression; odds ratio (95% CI)	1.9 (1.14, 3.18)	Glucocorticoid dose of 5 mg/day or less is an independent risk factor for prosthetic joint infection
George,M.D., 2017	High Quality	INFECTION (infection within 30 postoperative days)	Baseline	3863	(hip or knee arthroplasty)	Glucocorticoid dose 5-10 mg/day vs none	Infliximab Preoperative Stop Timing, Glucocorticoid Dose, Non-Biologic Dmard Use, Age, Disease Type (Inflammatory Bowel Disease, Psa/Pso/As Vs Ra), Charlson Score, Past Year Hospitalizations, Outpatient Visits Past Year, Calendar Year, Surgeon Volume, Sex, Region, Inflammatory Disease Type	Multivariable logistic regression; odds ratio (95% CI)	1.13 (0.76, 1.67)	
George,M.D., 2017	High Quality	INFECTION (prosthetic joint infection within first postoperative year)	Baseline	3867	(hip or knee arthroplasty)	Glucocorticoid dose 5-10 mg/day vs none	Infliximab Preoperative Stop Timing, Glucocorticoid Dose, Previous Non-Infliximab Biologic Dmard, Age, Past Year Hospitalizations, Calendar Year, Surgeon Volume, Sex, Skilled Nursing Facility	Multivariable logistic regression; odds ratio (95% CI)	1.93 (1.13, 3.31)	Glucocorticoid dose of 5-10 mg/day is an independent risk factor for prosthetic joint infection
George,M.D., 2017	High Quality	INFECTION (prosthetic joint infection within first postoperative year)	Baseline	3867	(hip or knee arthroplasty)	Infliximab preoperative stop timing < 4 weeks vs 8-12 weeks	Infliximab Preoperative Stop Timing, Glucocorticoid Dose, Previous Non-Infliximab Biologic Dmard, Age, Past Year Hospitalizations, Calendar Year, Surgeon Volume, Sex, Skilled Nursing Facility	Multivariable logistic regression; odds ratio (95% CI)	1.02 (0.56, 1.83)	NS
George,M.D., 2017	High Quality	INFECTION (infection within 30 postoperative days)	Baseline	3863	(hip or knee arthroplasty)	Infliximab preoperative stop timing < 4 weeks vs 8-12 weeks	Infliximab Preoperative Stop Timing, Glucocorticoid Dose, Non-Biologic Dmard Use, Age, Disease Type (Inflammatory Bowel Disease, Psa/Pso/As Vs Ra), Charlson Score, Past Year Hospitalizations, Outpatient Visits Past Year, Calendar Year, Surgeon Volume, Sex, Region, Inflammatory Disease Type	Multivariable logistic regression; odds ratio (95% CI)	0.81 (0.55, 1.18)	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
George,M.D., 2017	High Quality	INFECTION (infection within 30 postoperative days)	Baseline	3863	(hip or knee arthroplasty)	Infliximab preoperative stop timing 12-16 weeks vs 8-12 weeks	Infliximab Preoperative Stop Timing, Glucocorticoid Dose, Non-Biologic Dmard Use, Age, Disease Type (Inflammatory Bowel Disease, Psa/Pso/As Vs Ra), Charlson Score, Past Year Hospitalizations, Outpatient Visits Past Year, Calendar Year, Surgeon Volume, Sex, Region, Inflammatory Disease Type	Multivariable logistic regression; odds ratio (95% CI)	0.84 (0.44, 1.58)	NS
George,M.D., 2017	High Quality	INFECTION (prosthetic joint infection within first postoperative year)	Baseline	3867	(hip or knee arthroplasty)	Infliximab preoperative stop timing 12-16 weeks vs 8-12 weeks	Infliximab Preoperative Stop Timing, Glucocorticoid Dose, Previous Non-Infliximab Biologic Dmard, Age, Past Year Hospitalizations, Calendar Year, Surgeon Volume, Sex, Skilled Nursing Facility	Multivariable logistic regression; odds ratio (95% CI)	1.31 (0.55, 3.11)	NS
George,M.D., 2017	High Quality	INFECTION (infection within 30 postoperative days)	Baseline	3863	(hip or knee arthroplasty)	Infliximab preoperative stop timing 16+ weeks vs 8-12 weeks	Infliximab Preoperative Stop Timing, Glucocorticoid Dose, Non-Biologic Dmard Use, Age, Disease Type (Inflammatory Bowel Disease, Psa/Pso/As Vs Ra), Charlson Score, Past Year Hospitalizations, Outpatient Visits Past Year, Calendar Year, Surgeon Volume, Sex, Region, Inflammatory Disease Type	Multivariable logistic regression; odds ratio (95% CI)	0.95 (0.52, 1.7)	NS
George,M.D., 2017	High Quality	INFECTION (prosthetic joint infection within first postoperative year)	Baseline	3863	(hip or knee arthroplasty)	Infliximab preoperative stop timing 16+ weeks vs 8-12 weeks	Infliximab Preoperative Stop Timing, Glucocorticoid Dose, Previous Non-Infliximab Biologic Dmard, Age, Past Year Hospitalizations, Calendar Year, Surgeon Volume, Sex, Skilled Nursing Facility	Multivariable logistic regression; odds ratio (95% CI)	0.6 (0.17, 2.06)	NS
George,M.D., 2017	High Quality	INFECTION (infection within 30 postoperative days)	Baseline	3863	(hip or knee arthroplasty)	Infliximab preoperative stop timing 4-8 weeks vs 8-12 weeks	Infliximab Preoperative Stop Timing, Glucocorticoid Dose, Non-Biologic Dmard Use, Age, Disease Type (Inflammatory Bowel Disease, Psa/Pso/As Vs Ra), Charlson Score, Past Year Hospitalizations, Outpatient Visits Past Year, Calendar Year, Surgeon Volume, Sex, Region, Inflammatory Disease Type	Multivariable logistic regression; odds ratio (95% CI)	0.88 (0.62, 1.24)	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
George,M.D., 2017	High Quality	INFECTION (prosthetic joint infection within first postoperative year)	Baseline	3867	(hip or knee arthroplasty)	Infliximab preoperative stop timing 4-8 weeks vs 8-12 weeks	Infliximab Preoperative Stop Timing, Glucocorticoid Dose, Previous Non-Infliximab Biologic Dmard, Age, Past Year Hospitalizations, Calendar Year, Surgeon Volume, Sex, Skilled Nursing Facility	Multivariable logistic regression; odds ratio (95% CI)	0.97 (0.56, 1.66)	NS
George,M.D., 2017	High Quality	INFECTION (infection within 30 postoperative days)	Baseline	3863	(hip or knee arthroplasty)	Nonbiologic DMARD use	Infliximab Preoperative Stop Timing, Glucocorticoid Dose, Non-Biologic Dmard Use, Age, Disease Type (Inflammatory Bowel Disease, Psa/Pso/As Vs Ra), Charlson Score, Past Year Hospitalizations, Outpatient Visits Past Year, Calendar Year, Surgeon Volume, Sex, Region, Inflammatory Disease Type	Multivariable logistic regression; odds ratio (95% CI)	1.05 (0.8, 1.38)	NS
George,M.D., 2017	High Quality	INFECTION (prosthetic joint infection within first postoperative year)	Baseline	3867	(hip or knee arthroplasty)	Previous non-infliximab biologic DMARD	Infliximab Preoperative Stop Timing, Glucocorticoid Dose, Previous Non-Infliximab Biologic Dmard, Age, Past Year Hospitalizations, Calendar Year, Surgeon Volume, Sex, Skilled Nursing Facility	Multivariable logistic regression; odds ratio (95% CI)	0.44 (0.2, 0.98)	Use of previous non-infliximab biologic DMARD is associated with lower risk of PJI
Giles,J.T., 2006	High Quality	INFECTION (postoperative infection)	Baseline	91	(orthopedic surgery)	Prescription of TNF inhibitor	Age, Sex, Disease Duration, Prednisone Use, Diabetes, Rheumatoid Factor Status	Multivariate analysis; odds ratio (95% CI)	5.3 (1.1, 24.9)	Prescription of TNF inhibitor is an independent risk factor for developing postoperative infection

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Lee,Q.J., 2015	High Quality	INFECTION (periprosthetic joint infection)	Baseline	200	(total knee arthroplasty)	Steroid intake	Age, Gender, BMI, Comorbidity (Diabetes, Liver Disease, Heart Disease, Anemia, Thyroid Disease, Renal Disease, Lung Disease, Stroke, Gout), Varicose Vein, Steroid Intake, Dermatitis, Acupuncture, Bilateral Tka, Same Day Surgery, Anesthesia (Spinal), Continuous Femoral Nerve Block, Operating Time, Trainee Surgeon, Drain, Intensive Care Unit Admission, Transfusion, Large Effusion, Blister, Soaked Dressing, Deep Vein Thrombosis, Acute Retention Of Urine, Foley Catheter, Invasive Procedure	Multivariable logistic regression model; odds ratio (95% CI), p value	5.31 (0.55, 51.74), 0.111	NS
Momohara,S., 2011	High Quality	INFECTION (postoperative surgical-site infection)	Baseline	420	(total hip or knee arthroplasty)	Predisone dose (mg/day)	Sex, Age, BMI, Diabetes Mellitus, Smoking, Past History Of Surgery, Operative Duration, Disease Duration, Preoperative C-Reactive Protein, Preoperative Hemoglobin, Preoperative White Blood Cell, Revision Vs Primary, Tka Vs Tha, Biologic Dmards, Nonbiologic Dmards, Prednisone Dose	Multivariate logistic regression analysis; odds ratio (95% CI), p value	1.09 (0.93, 1.28), 0.27	NS
Momohara,S., 2011	High Quality	INFECTION (postoperative surgical-site infection)	Baseline	420	(total hip or knee arthroplasty)	Nonbiologic disease-modifying antirheumatic drugs (MTX, leflunomide, tacrolimus, mizoribine, cyclophosphamide, salazosulfapyridine, bucillamine, minocycline, actarit, auranofin, gold sodium thiomalate, D-penicillamine)	Sex, Age, BMI, Diabetes Mellitus, Smoking, Past History Of Surgery, Operative Duration, Disease Duration, Preoperative C-Reactive Protein, Preoperative Hemoglobin, Preoperative White Blood Cell, Revision Vs Primary, Tka Vs Tha, Biologic Dmards, Nonbiologic Dmards, Prednisone Dose	Multivariate logistic regression analysis; odds ratio (95% CI), p value	1.02 (0.25, 4.06), 0.98	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Momohara,S., 2011	High Quality	INFECTION (postoperative surgical-site infection)	Baseline	420	(total hip or knee arthroplasty)	Biologic disease-modifying antirheumatic drugs (IFX, ETN, ADA, TCZ)	Sex, Age, BMI, Diabetes Mellitus, Smoking, Past History Of Surgery, Operative Duration, Disease Duration, Preoperative C-Reactive Protein, Preoperative Hemoglobin, Preoperative White Blood Cell, Revision Vs Primary, Tka Vs Tha, Biologic Dmards, Nonbiologic Dmards, Prednisone Dose	Multivariate logistic regression analysis; odds ratio (95% CI), p value	5.69 (2.07, 15.61), 0.0007	Patients more easily developed surgical site infections if they were taking biologic DMARDs
Murphy,M.V., 2016	High Quality	INFECTION (deep infection)	Baseline	1452	(anterior cruciate ligament reconstruction)	Immune suppressive medications	Age, Sex, Graft Type (Allograft, Bptb Autograft, Hamstring Autograft), Comorbidities	Multivariate analysis; odds ratio (95% CI), p value	6.7 (1.3, 34.8), 0.02	Immune suppressive medications are an independent risk factor for developing deep infection
Salt,E., 2017	High Quality	INFECTION (postoperative infection)	Peri-Op	2212	(total joint (hip, knee, or shoulder) arthroplasty)	Perioperative immunosuppressive mediation use vs no use	Gender, Race, Replacement Surgery Location, Days For Follow-Up, Cancer, Lupus, Immunodeficiency Condition, Hiv/Aids, Diabetes, Obesity, Gout, Perioperative Prednisone Use, Perioperative Immunosuppressive Medication Use, Rheumatoid Arthritis Vs Osteoarthritis	Multiple logistic regression; estimated odds ratio (95% CI), p value	1.12 (0.84, 1.5), 0.44	NS
Salt,E., 2017	High Quality	INFECTION (postoperative infection)	Peri-Op	2212	(total joint (hip, knee, or shoulder) arthroplasty)	Perioperative prednisone use vs no use	Gender, Race, Replacement Surgery Location, Days For Follow-Up, Cancer, Lupus, Immunodeficiency Condition, Hiv/Aids, Diabetes, Obesity, Gout, Perioperative Prednisone Use, Perioperative Immunosuppressive Medication Use, Rheumatoid Arthritis Vs Osteoarthritis	Multiple logistic regression; estimated odds ratio (95% CI), p value	1.59 (1.28, 1.97), <0.001	Patients with perioperative prednisone usage are more likely to develop postoperative infection

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Takemoto,R.C., 2017	High Quality	INFECTION (surgical site infection)	Baseline	314	(thoracic and/or lumbar spinal surgery)	Steroid use	Age, Sex, Transfusion, Duration Of Antibiotics, Malnourished, Steroid Use, Diabetes, Smoking, Illicit Drug Use, Alcohol Use, Revision Surgery, Body Mass Index, Number Of Levels Fused, Implant, Graft, Operating Room Time, Blood Loss, Duration Of Drain Use, Drain Output Per Day	Multivariate logistic regression; estimated odds ratio, p value	1.06, 0.91	NS
Westberg,M., 2013	High Quality	INFECTION (PJI)	Baseline	184	(primary arthroplasty after femoral neck fracture)	Use of steroids and other immunosuppressants	Age, Sex, ASA, Cognitive Failure, Diabetes, Obesity, Malignancy, Previous Infection In Contralateral Hip, Renal Failure, Urinary Tract Infection, Alcohol Abuse, Chronic Lower Leg Ulcer, Use Of Steroids and Other Immunosuppressants, 1 Or More/2 Or More Of Above Risk Factors	Logistic regression analysis; odds ratio (95% CI), p value	6 (0.9, 42), 0.07	Use of steroids and other immunosuppressive medications yielded significant increase in infection
Wu,C., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	297	(total hip arthroplasty or total knee arthroplasty)	Dental procedure with antibiotics	Diabetes, Age, BMI, Place Of Residence, Alcohol Abuse, Treatment Of Diabetes, Chronic Pulmonary Disease, Hypertension, Substance Abuse, Cerebral Infarction, Dental Procedure W/ Or W/O Antibiotics, Renal Disease, Gout, Cardiovascular Event, Chronic Liver Disease, Anemia, Tobacco Use, Ankylosing Spondylitis, Tha Vs Tka, Gender, Prostatic Disease, Oncologic Disease, Neurologic Disease, History Of Tuberculosis, Rheumatoid Arthritis Vs Osteoarthritis, Femoral Head Necrosis, Developmental Hip Dysplasia, Fracture	Multivariate conditional logistic regression analysis; odds ratio (95% CI), p value	1.38 (0.2, 9.54), 0.743	NS

PICO 2 Modifiable Risk Factors: Part 13: **Irrigation and Debridement**

*Summary of Findings Table 13: **Irrigation and Debridement***

	High Quality	
↑ **Better Outcomes** ↓ **Worse Outcomes** ● **Not Significant**	Watanabe,M., 2010	Bhandari,M., 2015
INFECTION(surgical site infection)	↑	
INFECTION(irrigation and debridement for wound infection)		●
INFECTION(wound-coverage procedure for infected or necrotic wound)		●
INFECTION(nonoperatively treated infection at wound site)		●

Watanabe,M., 2010: Sufficient irrigation of surgical site > 2000 mL/hr vs < 1000 mL/hr

Table 1313: Irrigation and Debridement

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Bhandari,M., 2015	High Quality	INFECTION (irrigation and debridement for wound infection)	Intra-Op	2447	(operative fixation for open extremity fracture)	Irrigation with high pressure (>20 psi) vs very low pressure (1-2 psi)	Age, Injury (Upper Extremity Vs Lower Extremity), Fracture Gap (<1Cm Vs 1+Cm), Type Of Internal Fixation (Intramedullary Nail, External Fixator, Plate, Other Internal Fixation, Other Fixation, Or None), Severity Of Wound Contamination (Mild Vs Moderate Vs Severe)	Cox regression; unadjusted hazard ratio (95% CI)	1.11 (0.76, 1.62)	NS
Bhandari,M., 2015	High Quality	INFECTION (wound-coverage procedure for infected or necrotic wound)	Intra-Op	2447	(operative fixation for open extremity fracture)	Irrigation with high pressure (>20 psi) vs very low pressure (1-2 psi)	Age, Injury (Upper Extremity Vs Lower Extremity), Fracture Gap (<1Cm Vs 1+Cm), Type Of Internal Fixation (Intramedullary Nail, External Fixator, Plate, Other Internal Fixation, Other Fixation, Or None), Severity Of Wound Contamination (Mild Vs Moderate Vs Severe)	Cox regression; unadjusted hazard ratio (95% CI)	0.74 (0.43, 1.3)	NS
Bhandari,M., 2015	High Quality	INFECTION (nonoperatively treated infection at wound site)	Intra-Op	2447	(operative fixation for open extremity fracture)	Irrigation with high pressure (>20 psi) vs very low pressure (1-2 psi)	Age, Injury (Upper Extremity Vs Lower Extremity), Fracture Gap (<1Cm Vs 1+Cm), Type Of Internal Fixation (Intramedullary Nail, External Fixator, Plate, Other Internal Fixation, Other Fixation, Or None), Severity Of Wound Contamination (Mild Vs Moderate Vs Severe)	Cox regression; unadjusted hazard ratio (95% CI)	0.69 (0.48, 1)	NS
Bhandari,M., 2015	High Quality	INFECTION (irrigation and debridement for wound infection)	Intra-Op	2447	(operative fixation for open extremity fracture)	Irrigation with low pressure (5-10 psi) vs high pressure (>20 psi)	Age, Injury (Upper Extremity Vs Lower Extremity), Fracture Gap (<1Cm Vs 1+Cm), Type Of Internal Fixation (Intramedullary Nail, External Fixator, Plate, Other Internal Fixation, Other Fixation, Or None), Severity Of Wound Contamination (Mild Vs Moderate Vs Severe)	Cox regression; unadjusted hazard ratio (95% CI)	0.95 (0.66, 1.38)	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Bhandari,M., 2015	High Quality	INFECTION (wound-coverage procedure for infected or necrotic wound)	Intra-Op	2447	(operative fixation for open extremity fracture)	Irrigation with low pressure (5-10 psi) vs high pressure (>20 psi)	Age, Injury (Upper Extremity Vs Lower Extremity), Fracture Gap (<1Cm Vs 1+Cm), Type Of Internal Fixation (Intramedullary Nail, External Fixator, Plate, Other Internal Fixation, Other Fixation, Or None), Severity Of Wound Contamination (Mild Vs Moderate Vs Severe)	Cox regression; unadjusted hazard ratio (95% CI)	1.24 (0.7, 2.17)	NS
Bhandari,M., 2015	High Quality	INFECTION (nonoperatively treated infection at wound site)	Intra-Op	2447	(operative fixation for open extremity fracture)	Irrigation with low pressure (5-10 psi) vs high pressure (>20 psi)	Age, Injury (Upper Extremity Vs Lower Extremity), Fracture Gap (<1Cm Vs 1+Cm), Type Of Internal Fixation (Intramedullary Nail, External Fixator, Plate, Other Internal Fixation, Other Fixation, Or None), Severity Of Wound Contamination (Mild Vs Moderate Vs Severe)	Cox regression; unadjusted hazard ratio (95% CI)	1.08 (0.73, 1.6)	NS
Bhandari,M., 2015	High Quality	INFECTION (irrigation and debridement for wound infection)	Intra-Op	2447	(operative fixation for open extremity fracture)	Irrigation with low pressure (5-10 psi) vs very low pressure (1-2 psi)	Age, Injury (Upper Extremity Vs Lower Extremity), Fracture Gap (<1Cm Vs 1+Cm), Type Of Internal Fixation (Intramedullary Nail, External Fixator, Plate, Other Internal Fixation, Other Fixation, Or None), Severity Of Wound Contamination (Mild Vs Moderate Vs Severe)	Cox regression; unadjusted hazard ratio (95% CI)	1.06 (0.72, 1.54)	NS
Bhandari,M., 2015	High Quality	INFECTION (wound-coverage procedure for infected or necrotic wound)	Intra-Op	2447	(operative fixation for open extremity fracture)	Irrigation with low pressure (5-10 psi) vs very low pressure (1-2 psi)	Age, Injury (Upper Extremity Vs Lower Extremity), Fracture Gap (<1Cm Vs 1+Cm), Type Of Internal Fixation (Intramedullary Nail, External Fixator, Plate, Other Internal Fixation, Other Fixation, Or None), Severity Of Wound Contamination (Mild Vs Moderate Vs Severe)	Cox regression; unadjusted hazard ratio (95% CI)	0.92 (0.55, 1.55)	NS
Bhandari,M., 2015	High Quality	INFECTION (nonoperatively treated infection at wound site)	Intra-Op	2447	(operative fixation for open extremity fracture)	Irrigation with low pressure (5-10 psi) vs very low pressure (1-2 psi)	Age, Injury (Upper Extremity Vs Lower Extremity), Fracture Gap (<1Cm Vs 1+Cm), Type Of Internal Fixation (Intramedullary Nail, External Fixator, Plate, Other Internal Fixation, Other Fixation, Or None), Severity Of Wound Contamination (Mild Vs Moderate Vs Severe)	Cox regression; unadjusted hazard ratio (95% CI)	0.75 (0.52, 1.07)	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Bhandari,M., 2015	High Quality	INFECTION (irrigation and debridement for wound infection)	Intra-Op	2447	(operative fixation for open extremity fracture)	Irrigation with soap vs with saline	Age, Injury (Upper Extremity Vs Lower Extremity), Fracture Gap (<1Cm Vs 1+Cm), Type Of Internal Fixation (Intramedullary Nail, External Fixator, Plate, Other Internal Fixation, Other Fixation, Or None), Severity Of Wound Contamination (Mild Vs Moderate Vs Severe)	Cox regression; unadjusted hazard ratio (95% CI), p value	1.11 (0.81, 1.51), 0.53	NS
Bhandari,M., 2015	High Quality	INFECTION (wound-coverage procedure for infected or necrotic wound)	Intra-Op	2447	(operative fixation for open extremity fracture)	Irrigation with soap vs with saline	Age, Injury (Upper Extremity Vs Lower Extremity), Fracture Gap (<1Cm Vs 1+Cm), Type Of Internal Fixation (Intramedullary Nail, External Fixator, Plate, Other Internal Fixation, Other Fixation, Or None), Severity Of Wound Contamination (Mild Vs Moderate Vs Severe)	Cox regression; unadjusted hazard ratio (95% CI), p value	1.33 (0.85, 2.08), 0.22	NS
Bhandari,M., 2015	High Quality	INFECTION (nonoperatively treated infection at wound site)	Intra-Op	2447	(operative fixation for open extremity fracture)	Irrigation with soap vs with saline	Age, Injury (Upper Extremity Vs Lower Extremity), Fracture Gap (<1Cm Vs 1+Cm), Type Of Internal Fixation (Intramedullary Nail, External Fixator, Plate, Other Internal Fixation, Other Fixation, Or None), Severity Of Wound Contamination (Mild Vs Moderate Vs Severe)	Cox regression; unadjusted hazard ratio (95% CI), p value	0.97 (0.71, 1.31), 0.82	NS
Watanabe,M., 2010	High Quality	INFECTION (surgical site infection)	Intra-Op	223	(spinal operations)	Sufficient irrigation of surgical site > 2000 mL/hr vs < 1000 mL/hr	Sex, Age, Smoking History, Diabetes, Obesity, Trauma Or Elective Spine Surgery, Use Of Instrumentation, Long Duration Of Operation, High Estimated Intraoperative Blood Loss, Sufficient Irrigation Of Surgical Site	Multivariate logistic regression analysis; odds ratio (95% CI), p value	0.08 (0.01, 0.61), 0.015	Patients are less likely to develop SSI with irrigation of surgical site at rate of >2000mL/hr
Watanabe,M., 2010	High Quality	INFECTION (surgical site infection)	Intra-Op	223	(spinal operations)	Sufficient irrigation of surgical site 1000-2000 mL/hr vs < 1000 mL/hr	Sex, Age, Smoking History, Diabetes, Obesity, Trauma Or Elective Spine Surgery, Use Of Instrumentation, Long Duration Of Operation, High Estimated Intraoperative Blood Loss, Sufficient Irrigation Of Surgical Site	Multivariate logistic regression analysis; odds ratio (95% CI), p value	0.31 (0.06, 1.5), 0.314	NS

PICO 2 Modifiable Risk Factors: Part 14: **Ischemia**

*Summary of Findings Table 14: **Ischemia***

	Low Quality
	Soriano,A., 2008
↑ **Better Outcomes** ↓ **Worse Outcomes** ● **Not Significant**	
INFECTION(deep tissue infection during 3 months follow-up)	●
INFECTION(deep tissue infection during 12 months follow-up)	●

Table 1414: Ischemia

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Soriano,A., 2008	Low Quality	INFECTION (deep tissue infection during 3 months follow-up)	Intra-Op	908	(primary total knee arthroplasty performed during ischemia)	Standard arm (1.5 g of cefurozime 10-30min before inflation of tourniquet and placebo 10 min before release of tourniquet) vs experimental arm (placebo 10-30 min before inflation of tourniquet and 1.5 g cefuroxime 10 min before release of tourniquet)	N/A	Chi square test; p value	0.21	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Soriano,A., 2008	Low Quality	INFECTION (deep tissue infection during 12 months follow-up)	Intra-Op	908	(primary total knee arthroplasty performed during ischemia)	Standard arm (1.5 g of cefurozime 10-30min before inflation of tourniquet and placebo 10 min before release of tourniquet) vs experimental arm (placebo 10-30 min before inflation of tourniquet and 1.5 g cefuroxime 10 min before release of tourniquet)	N/A	Chi square test; p value	0.44	NS

PICO 2 Modifiable Risk Factors: Part 15: **Medical Comorbidities**

*Summary of Findings Table 15: **Medical Comorbidities***

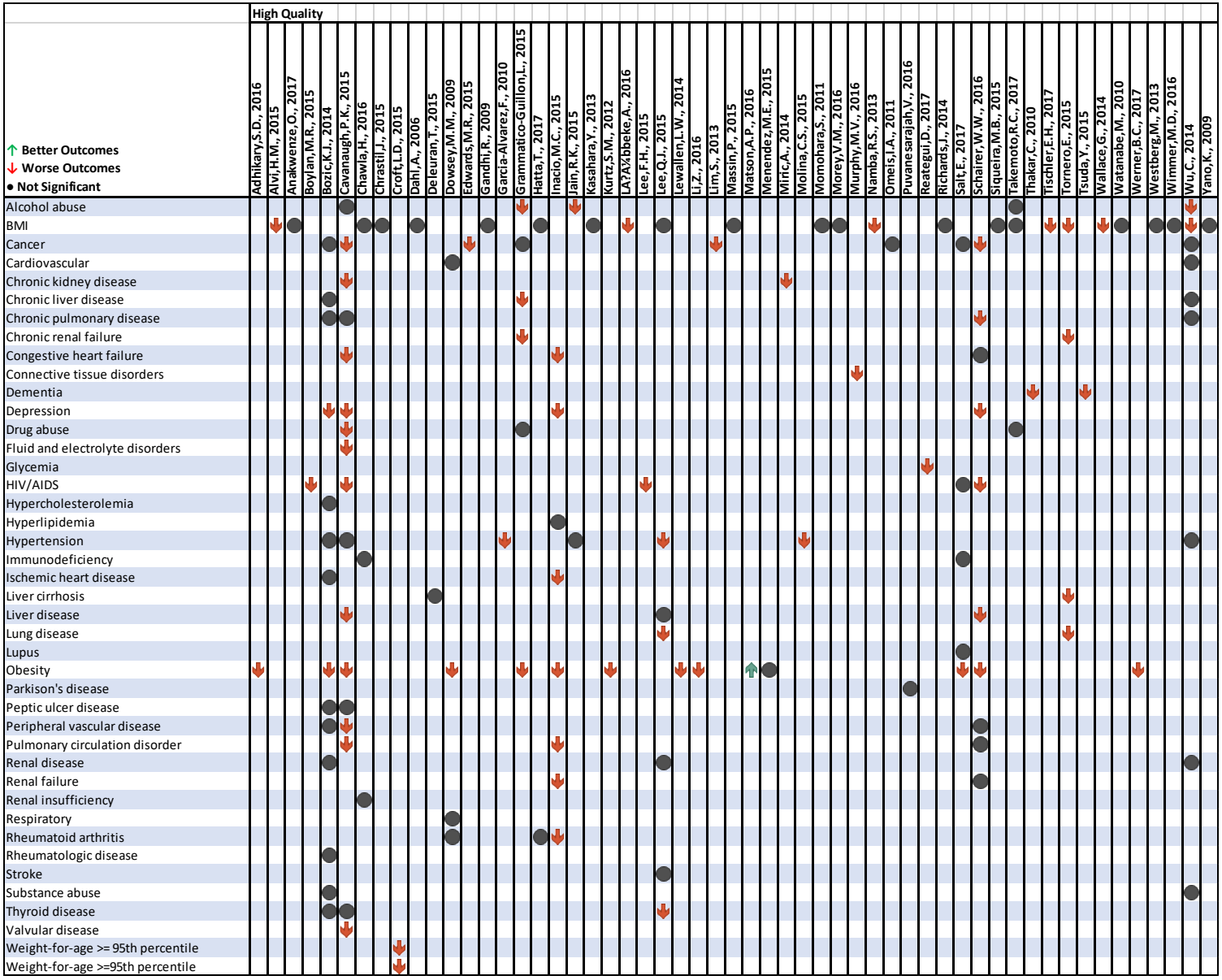


Table 1515: Medical Comorbidities

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Adhikary,S.D., 2016	High Quality	INFECTION (wound infection)	Baseline	77785	(primary total knee arthroplasty)	Obesity (morbid; BMI of 45 or more)	BMI, Age, Gender, Race, Charlson Score, ASA Class, Operation Year	Logistic regression analysis; odds ratio, p value	1.7257, < 0.0001	Morbid obesity is an independent risk factor for wound infection
Adhikary,S.D., 2016	High Quality	INFECTION (wound infection)	Baseline	49475	(primary total hip arthroplasty)	Obesity (morbid; BMI of 45 or more)	BMI, Age, Gender, Race, Charlson Score, ASA Class, Operation Year	Logistic regression analysis; odds ratio, p value	2.2313, < 0.0001	Morbid obesity is an independent risk factor for wound infection
Alvi,H.M., 2015	High Quality	INFECTION (Superficial wound infection)	1 months	6016	(Hip or knee arthroplasties)	BMI 25-30 vs 18.5-25	ASA Class, Age, Gender, Race, Smoking, Steroid Use, Hypertension Medication, History Of Copd, Type Of Anesthesia Used, Pre-Operative Platelet Count, White Blood Cell Count, Hematocrit Levels, and CPT Levels	Logistic regression; odds ratio, 95% CI	0.76 (0.34-1.69)	NS
Alvi,H.M., 2015	High Quality	INFECTION (Deep incision wound infection)	1 months	6016	(Hip or knee arthroplasties)	BMI 25-30 vs 18.5-25	ASA Class, Age, Gender, Race, Smoking, Steroid Use, Hypertension Medication, History Of Copd, Type Of Anesthesia Used, Pre-Operative Platelet Count, White Blood Cell Count, Hematocrit Levels, and CPT Levels	Logistic regression; odds ratio, 95% CI	0.73 (0.23-2.27)	NS
Alvi,H.M., 2015	High Quality	INFECTION (Superficial wound infection)	1 months	6016	(Hip or knee arthroplasties)	BMI 30-35 vs 18.5-25	ASA Class, Age, Gender, Race, Smoking, Steroid Use, Hypertension Medication, History Of Copd, Type Of Anesthesia Used, Pre-Operative Platelet Count, White Blood Cell Count, Hematocrit Levels, and CPT Levels	Logistic regression; odds ratio, 95% CI	1.37 (0.71-2.66)	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Alvi,H.M., 2015	High Quality	INFECTION (Deep incision wound infection)	1 months	6016	(Hip or knee arthroplasties)	BMI 30-35 vs 18.5-25	ASA Class, Age, Gender, Race, Smoking, Steroid Use, Hypertension Medication, History Of Copd, Type Of Anesthesia Used, Pre-Operative Platelet Count, White Blood Cell Count, Hematocrit Levels, and CPT Levels	Logistic regression; odds ratio, 95% CI	1.06 (0.38-2.97)	NS
Alvi,H.M., 2015	High Quality	INFECTION (Superficial wound infection)	1 months	6016	(Hip or knee arthroplasties)	BMI 35-40 vs 18.5-25	ASA Class, Age, Gender, Race, Smoking, Steroid Use, Hypertension Medication, History Of Copd, Type Of Anesthesia Used, Pre-Operative Platelet Count, White Blood Cell Count, Hematocrit Levels, and CPT Levels	Logistic regression; odds ratio, 95% CI	1.68 (0.83-3.40)	NS
Alvi,H.M., 2015	High Quality	INFECTION (Deep incision wound infection)	1 months	6016	(Hip or knee arthroplasties)	BMI 35-40 vs 18.5-25	ASA Class, Age, Gender, Race, Smoking, Steroid Use, Hypertension Medication, History Of Copd, Type Of Anesthesia Used, Pre-Operative Platelet Count, White Blood Cell Count, Hematocrit Levels, and CPT Levels	Logistic regression; odds ratio, 95% CI	1.40 (0.52-3.73)	NS
Alvi,H.M., 2015	High Quality	INFECTION (Superficial wound infection)	1 months	6016	(Hip or knee arthroplasties)	BMI 40+ vs 18.5-25	ASA Class, Age, Gender, Race, Smoking, Steroid Use, Hypertension Medication, History Of Copd, Type Of Anesthesia Used, Pre-Operative Platelet Count, White Blood Cell Count, Hematocrit Levels, and CPT Levels	Logistic regression; odds ratio, 95% CI	2.29 (1.14-4.61)	BMI >40 associated with higher risk of infection
Alvi,H.M., 2015	High Quality	INFECTION (Deep incision wound infection)	1 months	6016	(Hip or knee arthroplasties)	BMI 40+ vs 18.5-25	ASA Class, Age, Gender, Race, Smoking, Steroid Use, Hypertension Medication, History Of Copd, Type Of Anesthesia Used, Pre-Operative Platelet Count, White Blood Cell Count, Hematocrit Levels, and CPT Levels	Logistic regression; odds ratio, 95% CI	3.22 (1.34-7.72)	BMI >40 associated with higher risk of infection

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Anakwenze,O., 2017	High Quality	INFECTION (3-year postoperative deep surgical site infection)	Baseline	4630	(total shoulder arthroscopy or reverse total shoulder arthroscopy)	BMI in 5 kg/m2 increments	Age, Gender, Diabetes, ASA Status, BMI	Cox regression model; odds ratio (95% CI), p value	0.83 (0.61, 1.13), 0.243	NS
Anakwenze,O., 2017	High Quality	INFECTION (3-year postoperative deep surgical site infection)	Baseline	3483	(total shoulder arthroscopy)	BMI in 5 kg/m2 increments	Age, Gender, Diabetes, ASA Status, BMI	Cox regression model; odds ratio (95% CI), p value	0.98 (0.61, 1.56), 0.927	NS
Anakwenze,O., 2017	High Quality	INFECTION (3-year postoperative deep surgical site infection)	Baseline	1147	(reverse total shoulder arthroscopy)	BMI in 5 kg/m2 increments	Age, Gender, Diabetes, ASA Status, BMI	Cox regression model; odds ratio (95% CI), p value	0.62 (0.38, 1.03), 0.064	NS
Boylan,M.R., 2015	High Quality	INFECTION (wound infection)	Baseline	5675086	(total knee arthroplasty)	HIV	Age, Sex, Race, Insurance, Deyo Comorbidity Score, Any Complication, Medical Complication, Surgical Complication, Wound Infection, Length Of Stay Estimate	Multivariate analysis; odds ratio (95% CI), p value	2.78 (1.15, 6.72), 0.024	Patients with HIV were more likely to have wound infection compared with patients without HIV

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Bozic,K.J., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	587	(primary total hip arthroplasty)	Depression	Age, Gender, Race	Multivariate Cox regression; adjusted hazard ratio (95% CI), p value	1.96 (1.1, 3.49), 0.022	Patients with depression more easily developed periprosthetic joint infections
Bozic,K.J., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	587	(primary total hip arthroplasty)	Hypercholesterolemia	Age, Gender, Race	Multivariate Cox regression; adjusted hazard ratio (95% CI), p value	0.83 (0.45, 1.53), 0.3548	NS
Bozic,K.J., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	587	(primary total hip arthroplasty)	Hypertension	Age, Gender, Race	Multivariate Cox regression; adjusted hazard ratio (95% CI), p value	0.74 (0.38, 1.46), 0.3858	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Bozic,K.J., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	587	(primary total hip arthroplasty)	Ischemic heart disease	Age, Gender, Race	Multivariate Cox regression; adjusted hazard ratio (95% CI), p value	0.71 (0.31, 0.64), 0.4239	NS
Bozic,K.J., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	587	(primary total hip arthroplasty)	Obesity	Age, Gender, Race	Multivariate Cox regression; adjusted hazard ratio (95% CI), p value	2.12 (1.08, 4.16), 0.0292	Patients with obesity more easily developed periprosthetic joint infections
Bozic,K.J., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	587	(primary total hip arthroplasty)	Cancer (malignancy)	Age, Gender, Race	Multivariate Cox regression; adjusted hazard ratio (95% CI), p value	1.45 (0.58, 3.6), 0.4241	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Bozic,K.J., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	587	(primary total hip arthroplasty)	Chronic liver disease	Age, Gender, Race	Multivariate Cox regression; adjusted hazard ratio (95% CI), p value	1.02 (0.29, 3.74), 0.9756	NS
Bozic,K.J., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	587	(primary total hip arthroplasty)	Chronic pulmonary disease	Age, Gender, Race	Multivariate Cox regression; adjusted hazard ratio (95% CI), p value	0.7 (0.28, 1.74), 0.4357	NS
Bozic,K.J., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	587	(primary total hip arthroplasty)	Peptic ulcer disease	Age, Gender, Race	Multivariate Cox regression; adjusted hazard ratio (95% CI), p value	1.34 (0.52, 3.48), 0.5461	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Bozic,K.J., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	587	(primary total hip arthroplasty)	Peripheral vascular disease	Age, Gender, Race	Multivariate Cox regression; adjusted hazard ratio (95% CI), p value	2.3 (0.63, 8.4), 0.2077	NS
Bozic,K.J., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	587	(primary total hip arthroplasty)	Renal disease	Age, Gender, Race	Multivariate Cox regression; adjusted hazard ratio (95% CI), p value	0.25 (0.06, 1.1), 0.0735	NS
Bozic,K.J., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	587	(primary total hip arthroplasty)	Rheumatologic disease	Age, Gender, Race	Multivariate Cox regression; adjusted hazard ratio (95% CI), p value	1.37 (0.57, 2.39), 0.4785	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Bozic,K.J., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	587	(primary total hip arthroplasty)	Substance abuse	Age, Gender, Race	Multivariate Cox regression; adjusted hazard ratio (95% CI), p value	0.57 (0.21, 1.5), 0.2706	NS
Bozic,K.J., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	587	(primary total hip arthroplasty)	Thyroid disease (hypothyroidism)	Age, Gender, Race	Multivariate Cox regression; adjusted hazard ratio (95% CI), p value	1.19 (0.56, 2.52), 0.6484	NS
Cavanaugh,P.K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	AIDS/HIV	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	2.06 (1.31, 3.26), 0.002	AIDS/HIV is an independent risk factors for developing SSI
Cavanaugh,P.K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Alcohol abuse	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	0.98 (0.85, 1.14), 0.83	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Cavanaugh,P. K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Cancer (lymphoma)	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	2.11 (1.68, 2.65), < 0.0001	Lymphoma is an independent risk factor for developing SSI
Cavanaugh,P. K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Cancer (metastatic)	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	2.32 (1.78, 3.02), < 0.0001	Metastatic cancer is an independent risk factor for developing SSI
Cavanaugh,P. K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Cancer (tumor without metastasis)	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	1.41 (1.13, 1.76), 0.002	Tumor without metastasis is an independent risk factor for developing SSI
Cavanaugh,P. K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Chronic kidney disease/ End stage renal disease (dialysis-dependent) patients vs patients without CKD/ESRD	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	4.06 (2.55, 6.47), < 0.0001	Dialysis-dependent CKD/ESRD patients are more likely to develop SSI than non-CKD/ESRD patients

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Cavanaugh,P. K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Chronic kidney disease/ End stage renal disease (non-dialysis-dependent) patients vs patients without CKD/ESRD	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	1.4 (1.25, 1.45), < 0.001	Non-dialysis-dependent CKD/ESRD patients are more likely to develop SSI than non-CKD/ESRD patients
Cavanaugh,P. K., 2015	High Quality	INFECTION (surgical site infection)		1016686	(lower extremity total joint arthroplasty)	Chronic pulmonary disease	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	0.99 (0.94, 1.04), 0.6	NS
Cavanaugh,P. K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Congestive heart failure	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	1.57 (1.45, 1.7), < 0.0001	Congestive heart failure is an independent risk factor for developing SSI

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Cavanaugh,P. K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Depression	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	1.15 (1.09, 1.21), < 0.0001	Depression is an independent risk factor for developing SSI
Cavanaugh,P. K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Drug abuse	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	1.74 (1.48, 2.03), < 0.0001	Drug abuse is an independent risk factor for developing SSI
Cavanaugh,P. K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Fluid and electrolyte disorders	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	1.9 (1.81, 2.01), < 0.0001	Fluid and electrolyte disorders are independent risk factors for developing SSI
Cavanaugh,P. K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Hypertension	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	0.99 (0.95, 1.03), 0.62	NS
Cavanaugh,P. K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Liver disease	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	2.07 (1.82, 2.34), < 0.0001	Liver disease is an independent risk factor for developing SSI

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Cavanaugh,P. K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Obesity	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	1.11 (1.06, 1.17), < 0.0001	Obesity is an independent risk factor for developing SSI
Cavanaugh,P. K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Peptic ulcer disease	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	1.13 (0.44, 2.92), 0.8	NS
Cavanaugh,P. K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Peripheral vascular disease	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	1.16 (1.04, 1.29), 0.01	Peripheral vascular disorders are independent risk factors for developing SSI
Cavanaugh,P. K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Pulmonary circulation disorder	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	1.31 (1.14, 1.51), 0.0002	Pulmonary circulation disorders are independent risk factors for developing SSI
Cavanaugh,P. K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Thyroid disease (hypothyroidism)	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	0.99 (0.94, 1.05), 0.8	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Cavanaugh,P. K., 2015	High Quality	INFECTION (surgical site infection)	Baseline	1016686	(lower extremity total joint arthroplasty)	Valvular disease	Age, Sex, Race, Comorbidities, Hospital Region/Setting/Size, Year Of Surgery, Type Of Tja (Primary Vs Revision), Type Of Joint (Hip Vs Knee)	Multivariate analysis; odds ratio (95% CI), p value	1.1 (1.01, 1.21), 0.03	Valvular disease is an independent risk factor for developing SSI
Chawla,H., 2016	High Quality	INFECTION (wound infection)	Baseline	693	(unicompartmental knee arthroplasty)	BMI	Age, Gender, Body Mass Index, Smoking, Diabetes, Renal Insufficiency, Immunosuppressed Or Immunocompromised, Operative Time, Barbed Suture	Binary logistic regression; odds ratio (95%CI), p value	0.981 (0.826, 1.119), 0.7667	NS
Chawla,H., 2016	High Quality	INFECTION (wound infection)	Baseline	693	(unicompartmental knee arthroplasty)	Immunosuppressed or immunocompromised	Age, Gender, Body Mass Index, Smoking, Diabetes, Renal Insufficiency, Immunosuppressed Or Immunocompromised, Operative Time, Barbed Suture	Binary logistic regression; odds ratio (95%CI), p value	1.835 (0.199, 9.316), 0.4728	NS
Chawla,H., 2016	High Quality	INFECTION (wound infection)	Baseline	693	(unicompartmental knee arthroplasty)	Renal insufficiency	Age, Gender, Body Mass Index, Smoking, Diabetes, Renal Insufficiency, Immunosuppressed Or Immunocompromised, Operative Time, Barbed Suture	Binary logistic regression; odds ratio (95%CI), p value	9.026 (0.051, 231.022), 0.213	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Chrastil,J., 2015	High Quality	INFECTION (periprosthetic joint infection)	Baseline	13272	(primary total joint arthroplasty)	BMI > = 30 vs < 30	Preoperative Hba1C, Preoperative Glucose, Age, Gender, Body Mass Index, Cci Per Point, Joint Arthroplasty, Total Hip Vs Knee Arthroplasty, Diabetic Complications, Smoking Status	Multivariable Cox proportional hazard model; hazard ratios (95% CI), p value	0.992 (0.713, 1.381), 0.962	NS
Croft,L.D., 2015	High Quality	INFECTION (surgical site infection)	Baseline	66	(spinal procedures)	Weight-for-age >= 95th percentile	Neuromuscular Scoliosis, Weight-For-Age >=95Th Percentile; Adjusted For The Clustering Effects Of Matched Case Patients and Controls	Multivariable conditional logistic regression; odds ratio (95% CI), p value	8.6 (1.2, 124.9), 0.02	Patients with weight-for-age in or above 95th percentile are more likely to develop SSI
Croft,L.D., 2015	High Quality	INFECTION (surgical site infection)	Peri-Op	66	(spinal procedures)	Weight-for-age >=95th percentile	Weight-For-Age >=95Th Percentile, ASA Score >=3, Operation Duration In Minutes; Adjusted For The Clustering Effects Of Matched Case Patients and Controls	Multivariable conditional logistic regression; odds ratio (95% CI), p value	4 (1.4-inf), 0.037	Patients with weight-for-age in or above 95th percentile are more likely to develop SSI

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Dahl,A., 2006	High Quality	INFECTION (positive bacterial culture)	Baseline	106	(hemicallotasis osteotomy)	BMI > = 30 vs < 30	Gender, Age, BMI, Dosage and Time Of Infection Prophylaxis, Hospital Stay, Smoking	Multivariate regression; odds ratio (95% CI)	1.4 (0.4, 4.5)	NS
Dahl,A., 2006	High Quality	INFECTION (positive staph aureus culture)	Baseline	106	(hemicallotasis osteotomy)	BMI > = 30 vs < 30	Gender, Age, BMI, Dosage and Time Of Infection Prophylaxis, Hospital Stay, Smoking	Multivariate regression; odds ratio (95% CI)	1 (0.3, 4.2)	NS
Dahl,A., 2006	High Quality	INFECTION (positive bacterial culture)	Baseline	106	(hemicallotasis osteotomy)	BMI 25-29	Gender, Age, BMI, Dosage and Time Of Infection Prophylaxis, Hospital Stay, Smoking	Multivariate regression; odds ratio (95% CI)	2.3 (0.7, 7.7)	NS
Dahl,A., 2006	High Quality	INFECTION (positive staph aureus culture)	Baseline	106	(hemicallotasis osteotomy)	BMI 25-29	Gender, Age, BMI, Dosage and Time Of Infection Prophylaxis, Hospital Stay, Smoking	Multivariate regression; odds ratio (95% CI)	1 (0.2, 3.9)	NS
Deleuran,T., 2015	High Quality	INFECTION	Baseline	9256	(total hip or total knee arthroplasty)	Liver cirrhosis	Age, Gender, Cci, Operation (Hip Vs Knee), Anesthesia (General Vs Regional), Number Of Inpatient Hospitalizations In The Year Preceding First Hip Or Knee Replacement	Logistic regression; odds ratios (95% CI)	1.8 (0.8, 4.2)	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Dowsey,M.M., 2009	High Quality	INFECTION (PJI)	1 Days	1214	(Elective total knee arthroplasty)	Cardiovascular disease	Cardiovascular Disease, Diabetes, Respiratory Comorbidity, Smoking, Obesity (BMI 30-39 Kg/M^2), Morbid Obesity (BMI >= 40 Kg/M^2), Ra, Transfusion, Drain Tube, Antibiotic Cement, Gender, Age (65-74Yrs vs <65 Yrs), Age (>=75 Yrs vs <65 Yrs)	Multiple logistic regression; Odds ratio, 95% CI, p-value	1.92 (0.40-9.19), p=0.413	NS
Dowsey,M.M., 2009	High Quality	INFECTION (PJI)	1 Days	1214	(Elective total knee arthroplasty)	Obesity (BMI 30-39 kg/m^2 vs BMI <30 kg/m^2)	Cardiovascular Disease, Diabetes, Respiratory Comorbidity, Smoking, Obesity (BMI 30-39 Kg/M^2), Morbid Obesity (BMI >= 40 Kg/M^2), Ra, Transfusion, Drain Tube, Antibiotic Cement, Gender, Age (65-74Yrs vs <65 Yrs), Age (>=75 Yrs vs <65 Yrs)	Multiple logistic regression; odds ratio, 95% CI, p-value	2.29 (0.64-8.14), p=0.201	NS
Dowsey,M.M., 2009	High Quality	INFECTION (PJI)	1 Days	1214	(Elective total knee arthroplasty)	Obesity (morbid; BMI >= 40 kg/m^2 vs BMI <30 kg/m^2)	Cardiovascular Disease, Diabetes, Respiratory Comorbidity, Smoking, Obesity (BMI 30-39 Kg/M^2), Morbid Obesity (BMI >= 40 Kg/M^2), Ra, Transfusion, Drain Tube, Antibiotic Cement, Gender, Age (65-74Yrs vs <65 Yrs), Age (>=75 Yrs vs <65 Yrs)	Multiple logistic regression; odds ratio, 95% CI, p-value	8.96 (1.59-50.63), p=0.013	morbid obesity associated with increased risk of infection
Dowsey,M.M., 2009	High Quality	INFECTION (PJI)	1 Days	1214	(Elective total knee arthroplasty)	Respiratory	Cardiovascular Disease, Diabetes, Respiratory Comorbidity, Smoking, Obesity (BMI 30-39 Kg/M^2), Morbid Obesity (BMI >= 40 Kg/M^2), Ra, Transfusion, Drain Tube, Antibiotic Cement, Gender, Age (65-74Yrs vs <65 Yrs), Age (>=75 Yrs vs <65 Yrs)	Multiple logistic regression; odds ratio, 95% CI, p-value	0.89 (0.22-3.51), p=0.864	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Dowsey,M.M., 2009	High Quality	INFECTION (PJI)	1 Days	1214	(Elective total knee arthroplasty)	Rheumatoid arthritis	Cardiovascular Disease, Diabetes, Respiratory Comorbidity, Smoking, Obesity (BMI 30-39 Kg/M^2), Morbid Obesity (BMI >= 40 Kg/M^2), Ra, Transfusion, Drain Tube, Antibiotic Cement, Gender, Age (65-74Yrs vs <65 Yrs), Age (>=75 Yrs vs <65 Yrs)	Multiple logistic regression; odds ratio, 95% CI, p-value	3.81 (0.82-17.76), p=0.088)	NS
Edwards,M.R., 2015	High Quality	INFECTION (infectious complications)	Baseline	745	(elective orthopaedic joint arthroplasty)	Preoperative lymphopenia (< 20% white cell count)	Age, Gender	Fisher's exact test; relative risk (95% CI), p value	1.5 (1.1, 2), 0.008	Preopative lymphopenia is associated with higher risk of infectious complications
Gandhi,R., 2009	High Quality	INFECTION		1625	(Total Knee Arthroplasty)	BMI (continuous)	Age, BMI, Sex, Diagnosis, Education, Preoperative Womac Total Score, and Charlson Index	Multivariate linear regression modeling, odds Ratio (95% CI), p-value	1.0 (0.9,1.1), p=.50	NS
Garcia-Alvarez,F., 2010	High Quality	INFECTION (deep surgical infection)	Baseline	289	(Thompson arthroplasty)	Hypertension	Age, Gender, High Blood Pressure, Diabetes, Dementia, Urinary Sondage, Preop Blood Leukocytes, Surgery Time, Fever, Transfusion, Transfused Units, Death In < 1 Year, Cultures Of Surgical Samples (Skin Vs Muscle Vs Articulation Vs Drainages)	Multifactorial logistic regression model; odds ratio (95% CI), p value	5.14 (1.09, 24.22), < 0.05	Patients more easily developed deep surgical infections if they had high blood pressure

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Grammatico-Guillon,L., 2015	High Quality	INFECTION (PJI (Hip or knee arthroplasty infection))		32582	(Initially not infected)	Alcohol abuse	Age, Sex, Year Of Replacement, Diabetes, Ulcer Sore, Cardiologic Device, Chronic Renal Failure, Urinary Tract Disorders, Cancer, Chronic Liver Diseases, Alcohol Abuse, Tobacco, Hypertension, Drug Abuse, Obesity	Multivariate Cox proportional hazard model, hazard ratio (95% CI), p-value	2.47 (1.67, 3.63), p<.001	Alcohol abuse associated with increased risk of infection
Grammatico-Guillon,L., 2015	High Quality	INFECTION (PJI (Hip or knee arthroplasty infection))		32582	(Initially not infected)	Cancer	Age, Sex, Year Of Replacement, Diabetes, Ulcer Sore, Cardiologic Device, Chronic Renal Failure, Urinary Tract Disorders, Cancer, Chronic Liver Diseases, Alcohol Abuse, Tobacco, Hypertension, Drug Abuse, Obesity	Multivariate Cox proportional hazard model, hazard ratio (95% CI), p-value	1.02 (0.74, 1.41), p=.89	NS
Grammatico-Guillon,L., 2015	High Quality	INFECTION (PJI (Hip or knee arthroplasty infection))		32582	(Initially not infected)	Chronic liver disease	Age, Sex, Year Of Replacement, Diabetes, Ulcer Sore, Cardiologic Device, Chronic Renal Failure, Urinary Tract Disorders, Cancer, Chronic Liver Diseases, Alcohol Abuse, Tobacco, Hypertension, Drug Abuse, Obesity	Multivariate Cox proportional hazard model, hazard ratio (95% CI), p-value	2.88 (1.88, 4.42), p<.001	Chronic liver disease associated with increased risk of infection

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Grammatico-Guillon,L., 2015	High Quality	INFECTION (PJI (Hip or knee arthroplasty infection))		32582	(Initially not infected)	Chronic renal failure	Age, Sex, Year Of Replacement, Diabetes, Ulcer Sore, Cardiologic Device, Chronic Renal Failure, Urinary Tract Disorders, Cancer, Chronic Liver Diseases, Alcohol Abuse, Tobacco, Hypertension, Drug Abuse, Obesity	Multivariate Cox proportional hazard model, hazard ratio (95% CI), p-value	1.53 (1.11, 2.10), p=.01	Chronic renal failure associated with increased risk of infection
Grammatico-Guillon,L., 2015	High Quality	INFECTION (PJI (Hip or knee arthroplasty infection))		32582	(Initially not infected)	Drug abuse	Age, Sex, Year Of Replacement, Diabetes, Ulcer Sore, Cardiologic Device, Chronic Renal Failure, Urinary Tract Disorders, Cancer, Chronic Liver Diseases, Alcohol Abuse, Tobacco, Hypertension, Drug Abuse, Obesity	Multivariate Cox proportional hazard model, hazard ratio (95% CI), p-value	3.43 (0.84, 13.94), p=.08	NS
Grammatico-Guillon,L., 2015	High Quality	INFECTION (PJI (Hip or knee arthroplasty infection))		32582	(Initially not infected)	Obesity	Age, Sex, Year Of Replacement, Diabetes, Ulcer Sore, Cardiologic Device, Chronic Renal Failure, Urinary Tract Disorders, Cancer, Chronic Liver Diseases, Alcohol Abuse, Tobacco, Hypertension, Drug Abuse, Obesity	Multivariate Cox proportional hazard model; hazard ratio (95% CI), p-value	1.70 (1.38, 2.80), p<.001	Obesity associated with increased risk of infection

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Hatta,T., 2017	High Quality	INFECTION (periprosthetic infection)	Baseline	1834	(primary shoulder arthroplasty)	BMI	Smoking Status, Sex, Age At Surgery, BMI, Total Vs Reverse Shoulder Arthroplasty, Rheumatoid Arthritis, Diabetes Mellitus	Multivariable Cox regression; hazard ratio (95% CI), p value	0.99 (0.92, 1.06), 0.852	NS
Hatta,T., 2017	High Quality	INFECTION (periprosthetic infection)	Baseline	1834	(primary shoulder arthroplasty)	Rheumatoid arthritis	Smoking Status, Sex, Age At Surgery, BMI, Total Vs Reverse Shoulder Arthroplasty, Rheumatoid Arthritis, Diabetes Mellitus	Multivariable Cox regression; hazard ratio (95% CI), p value	0.95 (0.13, 3.3), 0.941	NS
Inacio,M.C., 2015	High Quality	INFECTION (infection within 90 postoperative days)	Baseline	11848	(total hip arthroplasty)	Congestive heart failure	Age, Gender, Primary Diagnosis, Anticoagulation, Arrhythmia, Congestive Heart Failure, Hyperlipidemia, Ischemic Heart Disease Angina and Hypertension, Pulmonary Circulation Disorder, Gastroesophageal Reflux Disease, Rheumatoid Arthritis, Blood Loss Anemia, Deficiency Anemia, Obesity, Depression, Renal Failure, Allergies	Logistic regression analysis; odds ratio (95% CI)	1.5 (1.1, 1.9)	Congestive heart failure is a risk factor for developing infection

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Inacio,M.C., 2015	High Quality	INFECTION (infection within 90 postoperative days)	Baseline	11848	(total hip arthroplasty)	Depression	Age, Gender, Primary Diagnosis, Anticoagulation, Arrhythmia, Congestive Heart Failure, Hyperlipidemia, Ischemic Heart Disease Angina and Hypertension, Pulmonary Circulation Disorder, Gastroesophageal Reflux Disease, Rheumatoid Arthritis, Blood Loss Anemia, Deficiency Anemia, Obesity, Depression, Renal Failure, Allergies	Logistic regression analysis; odds ratio (95% CI)	1.4 (1.1, 1.8)	Depression is a risk factor for developing infection
Inacio,M.C., 2015	High Quality	INFECTION (infection within 90 postoperative days)	Baseline	11848	(total hip arthroplasty)	Hyperlipidemia	Age, Gender, Primary Diagnosis, Anticoagulation, Arrhythmia, Congestive Heart Failure, Hyperlipidemia, Ischemic Heart Disease Angina and Hypertension, Pulmonary Circulation Disorder, Gastroesophageal Reflux Disease, Rheumatoid Arthritis, Blood Loss Anemia, Deficiency Anemia, Obesity, Depression, Renal Failure, Allergies	Logistic regression analysis; odds ratio (95% CI)	0.8 (0.7, 1.1)	NS
Inacio,M.C., 2015	High Quality	INFECTION (infection within 90 postoperative days)	Baseline	11848	(total hip arthroplasty)	Ischemic heart disease, angina	Age, Gender, Primary Diagnosis, Anticoagulation, Arrhythmia, Congestive Heart Failure, Hyperlipidemia, Ischemic Heart Disease Angina and Hypertension, Pulmonary Circulation Disorder, Gastroesophageal Reflux Disease, Rheumatoid Arthritis, Blood Loss Anemia, Deficiency Anemia, Obesity, Depression, Renal Failure, Allergies	Logistic regression analysis; odds ratio (95% CI)	0.8 (0.6, 1.1)	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Inacio,M.C., 2015	High Quality	INFECTION (infection within 90 postoperative days)	Baseline	11848	(total hip arthroplasty)	Ischemic heart disease, hypertension	Age, Gender, Primary Diagnosis, Anticoagulation, Arrhythmia, Congestive Heart Failure, Hyperlipidemia, Ischemic Heart Disease Angina and Hypertension, Pulmonary Circulation Disorder, Gastroesophageal Reflux Disease, Rheumatoid Arthritis, Blood Loss Anemia, Deficiency Anemia, Obesity, Depression, Renal Failure, Allergies	Logistic regression analysis; odds ratio (95% CI)	1.3 (1, 1.6)	Ischemic heart disease hypertension is a risk factor for developing infection
Inacio,M.C., 2015	High Quality	INFECTION (infection within 90 postoperative days)	Baseline	11848	(total hip arthroplasty)	Obesity	Age, Gender, Primary Diagnosis, Anticoagulation, Arrhythmia, Congestive Heart Failure, Hyperlipidemia, Ischemic Heart Disease Angina and Hypertension, Pulmonary Circulation Disorder, Gastroesophageal Reflux Disease, Rheumatoid Arthritis, Blood Loss Anemia, Deficiency Anemia, Obesity, Depression, Renal Failure, Allergies	Logistic regression analysis; odds ratio (95% CI)	2.2 (1.2, 3.9)	Obesity is a risk factor for developing infection
Inacio,M.C., 2015	High Quality	INFECTION (infection within 90 postoperative days)	Baseline	11848	(total hip arthroplasty)	Pulmonary circulation disorder	Age, Gender, Primary Diagnosis, Anticoagulation, Arrhythmia, Congestive Heart Failure, Hyperlipidemia, Ischemic Heart Disease Angina and Hypertension, Pulmonary Circulation Disorder, Gastroesophageal Reflux Disease, Rheumatoid Arthritis, Blood Loss Anemia, Deficiency Anemia, Obesity, Depression, Renal Failure, Allergies	Logistic regression analysis; odds ratio (95% CI)	1.9 (1, 3.8)	Pulmonary circulation disorder is a risk factor for developing infection

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Inacio,M.C., 2015	High Quality	INFECTION (infection within 90 postoperative days)	Baseline	11848	(total hip arthroplasty)	Renal failure	Age, Gender, Primary Diagnosis, Anticoagulation, Arrhythmia, Congestive Heart Failure, Hyperlipidemia, Ischemic Heart Disease Angina and Hypertension, Pulmonary Circulation Disorder, Gastroesophageal Reflux Disease, Rheumatoid Arthritis, Blood Loss Anemia, Deficiency Anemia, Obesity, Depression, Renal Failure, Allergies	Logistic regression analysis; odds ratio (95% CI)	1.5 (1, 2.2)	Renal failure is a risk factor for developing infection
Inacio,M.C., 2015	High Quality	INFECTION (infection within 90 postoperative days)	Baseline	11848	(total hip arthroplasty)	Rheumatoid arthritis	Age, Gender, Primary Diagnosis, Anticoagulation, Arrhythmia, Congestive Heart Failure, Hyperlipidemia, Ischemic Heart Disease Angina and Hypertension, Pulmonary Circulation Disorder, Gastroesophageal Reflux Disease, Rheumatoid Arthritis, Blood Loss Anemia, Deficiency Anemia, Obesity, Depression, Renal Failure, Allergies	Logistic regression analysis; odds ratio (95% CI)	2 (1.1, 3.6)	Rheumatoid arthritis is a risk factor for developing infection
Jain,R.K., 2015	High Quality	INFECTION		459	(Mixed orthopaedic surgeries)	Alcohol abuse	Age, Sex, Duration Of Surgery, Number Of Days In Hospital, Diabetes, Smoke,, Hypertension, Alcohol	Multinomial logistic regression, odds ratio, 95% CI, p-value	0.107 (0.043-0.268), p=0.000	alcohol associated with SSI

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Jain,R.K., 2015	High Quality	INFECTION		459	(Mixed orthopaedic surgeries)	Hypertension	Age, Sex, Duration Of Surgery, Number Of Days In Hospital, Diabetes, Smoke,, Hypertension, Alcohol	Multinomial logistic regression, odds ratio, 95% CI, p-value	1.602 (0.694-3.695), p=0.269	NS
Kasahara,Y., 2013	High Quality	INFECTION		140	(Revision TKA)	BMI	Age, Sex, Diagnosis, and Bm	Multivariate logistic regression, Odds ratio, CI, p-value	1.07 (0.96-1.18), 0.22	NS
Kurtz,S.M., 2012	High Quality	INFECTION (superficial and deep)	1.4 weeks	15674	(Instrumented lumbar spine fusion)	Obesity	Sex, Age, Race, Hx Smoking, Diabetes, Obesity, Cci, State Buy-In Of Medicare Premium, Census Region, Previous Spine Surgery, Allograft Use, No. Segments Fused, Op Approach, Transfusion, Yr Of Index Procedure	Multivariate Cox regression; p-value	p < 0.001	obesity is associated with risk of SSI
LÃ?Â¼bbeke, A., 2016	High Quality	INFECTION (prosthetic joint infection)	Baseline	9061	(primary total joint arthroplasty)	BMI 25-29.9 vs < 25	BMI, Age, Sex, ASA Score, Presence Of Diabetes, Smoking Status, Etiology Of Oa (Primary Vs Secondary), Site Of Arthroplasty, Use Of Antibiotic-Laden Cement, Length Of Operation	Cox regression; adjusted incidence rate ratio (95% CI)	1 (0.6, 1.7)	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
LÃ?Â¼bbeke, A., 2016	High Quality	INFECTION (prosthetic joint infection)	Baseline	9061	(primary total joint arthroplasty)	BMI 30-34.9 vs <25	BMI, Age, Sex, ASA Score, Presence Of Diabetes, Smoking Status, Etiology Of Oa (Primary Vs Secondary), Site Of Arthroplasty, Use Of Antibiotic-Laden Cement, Length Of Operation	Cox regression; adjusted incidence rate ratio (95% CI)	1 (0.6, 1.8)	NS
LÃ?Â¼bbeke, A., 2016	High Quality	INFECTION (prosthetic joint infection)	Baseline	9061	(primary total joint arthroplasty)	BMI 35-39.9 vs < 25	BMI, Age, Sex, ASA Score, Presence Of Diabetes, Smoking Status, Etiology Of Oa (Primary Vs Secondary), Site Of Arthroplasty, Use Of Antibiotic-Laden Cement, Length Of Operation	Cox regression; adjusted incidence rate ratio (95% CI)	2.1 (1.1, 4.3)	BMI 35-39.9 is an independent risk factor for developing prosthetic joint infection
LÃ?Â¼bbeke, A., 2016	High Quality	INFECTION (prosthetic joint infection)	Baseline	9061	(primary total joint arthroplasty)	BMI 40+ vs < 25	BMI, Age, Sex, ASA Score, Presence Of Diabetes, Smoking Status, Etiology Of Oa (Primary Vs Secondary), Site Of Arthroplasty, Use Of Antibiotic-Laden Cement, Length Of Operation	Cox regression; adjusted incidence rate ratio (95% CI)	4.2 (1.8, 9.7)	BMI of 40 or more is an independent risk factor for developing prosthetic joint infection
Lee,F.H., 2015	High Quality	INFECTION (post-operative bone infection)	Baseline	1303347	(primary bone grafting)	AIDS	Age, Gender, Low Income, Diabetes Mellitus, Tuberculosis, Aids, Length Of Hospital Stay, Nonunion, Delayed Union, Type Of Graft (Graft Autograft, Alloplast/Allograft, Combined), Type Of Hospital (Medical Center, Regional Hospital, District Hospital, Local Clinic)	Multivariate analysis; odds ratio (95% CI), p value	6.945 (2.405, 20.054), <0.001	Patients more easily developed surgical site infections if they had AIDS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Lee,Q.J., 2015	High Quality	INFECTION (periprosthetic joint infection)	Baseline	200	(total knee arthroplasty)	BMI	Age, Gender, BMI, Comorbidity (Diabetes, Liver Disease, Heart Disease, Anemia, Thyroid Disease, Renal Disease, Lung Disease, Stroke, Gout), Varicose Vein, Steroid Intake, Dermatitis, Acupuncture, Bilateral Tka, Same Day Surgery, Anesthesia (Spinal), Continuous Femoral Nerve Block, Operating Time, Trainee Surgeon, Drain, Intensive Care Unit Admission, Transfusion, Large Effusion, Blister, Soaked Dressing, Deep Vein Thrombosis, Acute Retention Of Urine, Foley Catheter, Invasive Procedure	Multivariable logistic regression model; p value	0.367	NS
Lee,Q.J., 2015	High Quality	INFECTION (periprosthetic joint infection)	Baseline	200	(total knee arthroplasty)	Hypertension	Age, Gender, BMI, Comorbidity (Diabetes, Liver Disease, Heart Disease, Anemia, Thyroid Disease, Renal Disease, Lung Disease, Stroke, Gout), Varicose Vein, Steroid Intake, Dermatitis, Acupuncture, Bilateral Tka, Same Day Surgery, Anesthesia (Spinal), Continuous Femoral Nerve Block, Operating Time, Trainee Surgeon, Drain, Intensive Care Unit Admission, Transfusion, Large Effusion, Blister, Soaked Dressing, Deep Vein Thrombosis, Acute Retention Of Urine, Foley Catheter, Invasive Procedure	Multivariable logistic regression model; odds ratio (95% CI), p value	5.13 (1.14, 23.1), 0.02	Heart disease is an independent risk factor for PJI

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Lee,Q.J., 2015	High Quality	INFECTION (periprosthetic joint infection)	Baseline	200	(total knee arthroplasty)	Liver disease	Age, Gender, BMI, Comorbidity (Diabetes, Liver Disease, Heart Disease, Anemia, Thyroid Disease, Renal Disease, Lung Disease, Stroke, Gout), Varicose Vein, Steroid Intake, Dermatitis, Acupuncture, Bilateral Tka, Same Day Surgery, Anesthesia (Spinal), Continuous Femoral Nerve Block, Operating Time, Trainee Surgeon, Drain, Intensive Care Unit Admission, Transfusion, Large Effusion, Blister, Soaked Dressing, Deep Vein Thrombosis, Acute Retention Of Urine, Foley Catheter, Invasive Procedure	Multivariable logistic regression model; odds ratio (95% CI), p value	3.27 (0.36, 29.84), 0.268	NS
Lee,Q.J., 2015	High Quality	INFECTION (periprosthetic joint infection)	Baseline	200	(total knee arthroplasty)	Lung disease	Age, Gender, BMI, Comorbidity (Diabetes, Liver Disease, Heart Disease, Anemia, Thyroid Disease, Renal Disease, Lung Disease, Stroke, Gout), Varicose Vein, Steroid Intake, Dermatitis, Acupuncture, Bilateral Tka, Same Day Surgery, Anesthesia (Spinal), Continuous Femoral Nerve Block, Operating Time, Trainee Surgeon, Drain, Intensive Care Unit Admission, Transfusion, Large Effusion, Blister, Soaked Dressing, Deep Vein Thrombosis, Acute Retention Of Urine, Foley Catheter, Invasive Procedure	Multivariable logistic regression model; odds ratio (95% CI), p value	6.03 (1.08, 33.78), 0.022	Lung disease is an independent risk factor for PJI

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Lee,Q.J., 2015	High Quality	INFECTION (periprosthetic joint infection)	Baseline	200	(total knee arthroplasty)	Renal disease	Age, Gender, BMI, Comorbidity (Diabetes, Liver Disease, Heart Disease, Anemia, Thyroid Disease, Renal Disease, Lung Disease, Stroke, Gout), Varicose Vein, Steroid Intake, Dermatitis, Acupuncture, Bilateral Tka, Same Day Surgery, Anesthesia (Spinal), Continuous Femoral Nerve Block, Operating Time, Trainee Surgeon, Drain, Intensive Care Unit Admission, Transfusion, Large Effusion, Blister, Soaked Dressing, Deep Vein Thrombosis, Acute Retention Of Urine, Foley Catheter, Invasive Procedure	Multivariable logistic regression model; p value	0.444	NS
Lee,Q.J., 2015	High Quality	INFECTION (periprosthetic joint infection)	Baseline	200	(total knee arthroplasty)	Stroke	Age, Gender, BMI, Comorbidity (Diabetes, Liver Disease, Heart Disease, Anemia, Thyroid Disease, Renal Disease, Lung Disease, Stroke, Gout), Varicose Vein, Steroid Intake, Dermatitis, Acupuncture, Bilateral Tka, Same Day Surgery, Anesthesia (Spinal), Continuous Femoral Nerve Block, Operating Time, Trainee Surgeon, Drain, Intensive Care Unit Admission, Transfusion, Large Effusion, Blister, Soaked Dressing, Deep Vein Thrombosis, Acute Retention Of Urine, Foley Catheter, Invasive Procedure	Multivariable logistic regression model; p value	0.463	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Lee,Q.J., 2015	High Quality	INFECTION (periprosthetic joint infection)	Baseline	200	(total knee arthroplasty)	Thyroid disease	Age, Gender, BMI, Comorbidity (Diabetes, Liver Disease, Heart Disease, Anemia, Thyroid Disease, Renal Disease, Lung Disease, Stroke, Gout), Varicose Vein, Steroid Intake, Dermatitis, Acupuncture, Bilateral Tka, Same Day Surgery, Anesthesia (Spinal), Continuous Femoral Nerve Block, Operating Time, Trainee Surgeon, Drain, Intensive Care Unit Admission, Transfusion, Large Effusion, Blister, Soaked Dressing, Deep Vein Thrombosis, Acute Retention Of Urine, Foley Catheter, Invasive Procedure	Multivariable logistic regression model; odds ratio (95% CI), p value	8.76 (1.49, 51.41), 0.005	Thyroid disease is an independent risk factor for PJI
Lewallen,L.W., 2014	High Quality	INFECTION (superficial and deep)	1 Days	10869	(Hip replacement procedures)	Obesity	Age, Gender, General Anesthesia, ASA Score, Operative Time, Surgery Type (Revision vs Primary), Trauma,	Multivariate logistic regression, odds ratio, 95% CI, p-value	1.92 (1.20-3.06), p=0.006	Obesity associated with SSI risk
Lewallen,L.W., 2014	High Quality	INFECTION (superficial and deep)	1 Days	11072	(Knee replacement procedures)	Obesity	Age, Gender, General Anesthesia, ASA Score, Operative Time, Surgery Type (Revision vs Primary), Trauma,	Multivariate logistic regression; odds ratio, 95% CI, p-value	1.96 (1.33-2.87), p<0.001	Obesity associated with SSI risk

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Li,Z., 2016	High Quality	INFECTION (multidrug-resistant bacteria infection)	Baseline	933	(rigid internal fixation of mandibular fracture)	Obesity	Mean Age, Gender, Smoking, Obesity, Polytrauma, Preoperative Infection, Comminuted Fracture, Open Fractures, Accompanied By Other Facial Fractures, Tooth On Fracture Line	Multivariate logistic regression; odds ratios (95% CI), p value	6.26 (1.69, 23.21), 0.006	Obesity is an independent risk factor for multidrug resistant bacterial infection
Lim,S., 2013	High Quality	INFECTION (superficial surgical site infection)	Baseline	32562	(total knee arthroplasty; total hip arthroplasty; open treatment of femoral fracture, proximal end, neck, internal fixation; treatment of intertrochanteric, peritrochanteric, or subtrochanteric femoral fracture; arthroplasty, knee, condyle and plateau, medial or lateral component; laminotomy/hemilaminectomy, with decrompression of nerve roots; laminectomy, facetectomy, and foraminotomy)	Preoperative myocardial infarction	Age, Sex, Race, BMI, Clinical Characteristics, Comorbidities, Preoperative Mi,	Logistic regression analysis; odds ratio (95% CI), p value, HL-value, C-value	3.6 (1.1, 11.8), 0.034, 0.701, 0.663	Patients with preoperative MI were more likely to develop superficial SSIs
Massin,P., 2015	High Quality	INFECTION (Infection recurrence)		285	(One- and two-stage exchange)	BMI >= 35 vs BMI < 35	Age, Gender, BMI, Previous Prosthesis-Joint Infection, Current Surgery Performed, Pre-Operative Skin Aspect, Infection Classification	Multivariate analysis, OR, 95% CI, p-value	2.0, 0.9-4.4, >0.05	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Matson,A.P., 2016	High Quality	INFECTION (postoperative wound complication/infection)	Baseline	242	(open reduction and internal fixation (ORIF))	Obesity	Gender, Age, Diabetes Mellitus, Tobacco Usage, Obesity, Low-Energy Mechanism, Delay Of Definitive Management	Multivariate logistic regression; odds ratios (95% CI), p value	0.267 (0.087, 0.822), 0.022	Obesity was associated with a significantly lower risk of developing a wound complication/infection
Menendez,M.E., 2015	High Quality	INFECTION		44305	(Hand surgery (mixed procedures))	Obesity	Age, Sex, Insurance Status (Medicare, Medicaid, Private, Other), Patient Location (Urban, Rural), Smoking, Obesity, Diabetes	Multivariate logistic regression; odds ratio, 95% CI	1.10 (0.66-1.84)	NS
Miric,A., 2014	High Quality			41852		Chronic kidney disease-Surgical site infection (deep)	Adjusted For Age, Sex, Race/Ethnicity, American Society Of Anaesthesiologists Scores, Surgery Indication (Osteoarthritis vs Other Diagnosis), and Comorbidities (Diabetes, Heart Failure, Valvular Disease, Peripheral Vascu- Lar Disease, Alcohol Abuse, and Hypertension).	Odds ratio – Not time-dependent (95% CI), p-value	1.01 (0.65–1.58), p-value =1.0	NS
Miric,A., 2014	High Quality			41852		Chronic kidney disease-Surgical site infection (superficial)	Adjusted For Age, Sex, Race/Ethnicity, American Society Of Anaesthesiologists Scores, Surgery Indication (Osteoarthritis vs Other Diagnosis), and Comorbidities (Diabetes, Heart Failure, Valvular Disease, Peripheral Vascu- Lar Disease, Alcohol Abuse, and Hypertension).	Odds ratio – Not time-dependent (95% CI), p-value	1.92 (1.05–3.50), p-value =0.04	Chronic kidney disease is associated with an increased risk of superficial infection

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Molina,C.S., 2015	High Quality	INFECTION (deep surgical site infection)	Baseline	355	(ORIF)	Hypertension	Age, Race, Sex, Hypertension, Diabetes, Active Smoker, Open Fracture, Ao/Ota 43C3	Multivariate regression analysis; odds ratio (95% CI); p value	2.29 (1.09, 4.82); 0.03	Patients more easily developed surgical site infections if they had hypertension
Momohara,S., 2011	High Quality	INFECTION (postoperative surgical-site infection)	Baseline	420	(total hip or knee arthroplasty)	BMI	Sex, Age, BMI, Diabetes Mellitus, Smoking, Past History Of Surgery, Operative Duration, Disease Duration, Preoperative C-Reactive Protein, Preoperative Hemoglobin, Preoperative White Blood Cell, Revision Vs Primary, Tka Vs Tha, Biologic Dmards, Nonbiologic Dmards, Prednisone Dose	Multivariate logistic regression analysis; odds ratio (95% CI), p value	1.05 (0.92, 1.19), 0.49	NS
Morey,V.M., 2016	High Quality	INFECTION (wound complications)	Baseline	3169	(total knee arthroplasty)	BMI	Age, Gender, BMI, Hba1C, Hemoglobin, Operation Time, Malnutrition	Multivariate logistic regression; odds ratios (95% CI), p value	1.15 (0.94, 1.41), 0.175	NS
Murphy,M.V., 2016	High Quality	INFECTION (deep infection)	Baseline	1452	(anterior cruciate ligament reconstruction)	Connective tissue disorders	Age, Sex, Graft Type (Allograft, Bptb Autograft, Hamstring Autograft), Comorbidities	Multivariate analysis; odds ratio (95% CI), p value	21.7 (3.7, 126.3), 0.001	Connective tissue disorders are an independent risk factor for developing deep infection

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Namba,R.S., 2013	High Quality	INFECTION		56216		BMI >=35 vs <35 kg/m2	Age, Sex, Race, Diabetes, BMI, ASA Score, Comorbidity, Hospital Volume, Bilateral, Infection Prophylaxis	Multivariate Cox proportional hazard Regression, hazard Ratio (95% CI), p-value	1.47 (1.17, 1.85), p=0.001	BMI >=35 is associated with increased risk of infection
Omeis,I.A., 2011	High Quality	INFECTION (surgical site infection)	Baseline	227	(spinal tumor surgery)	Preoperative radiotherapy	Men, Increasing Age, Previous Surgery, Complex Plastic Closure, Use Of Drain In Primary Surgery, Blood Transfusions In Primary Surgery, Increasing Number Of Comorbidities, Hospital Acquired Infection During Primary Surgery, Preoperative Radiotherapy, Use Of Allograft, Increasing Number Of Levels Fused, Duration Of Hospital Stay, Posterolateral Fusion	Multivariate logistic regression; adjusted odds ratios (95% CI), p value	0.85 (0.31, 2.33), 0.752	NS
Puvanesarajah, V., 2016	High Quality	INFECTION (postoperative infection)	Baseline	285518	(elective thoracolumbar spine fusion surgery)	Parkison's disease	Age, Gender, Smoking, Obesity, Diabetes Mellitus, Chronic Pulmonary Disease, Chronic Kidney Disease, Congestive Heart Failure, Peripheral Vascular Disease, Number Of Fusion Levels	Multivariate analysis; p value	0.0247	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
ReÃ?Â¡tegui, D., 2017	High Quality	INFECTION (surgical site infection)	Baseline	193	(total knee arthroplasty)	Glycemia of 126 mg/dl or more attended by PCP vs Glycemia less than 126 mg/dl	Age, Gender, Hypertension, Chronic Renal Failure, Dyslipidemia, Ischemic Heart Disease, Liver Disease, Chronic Obstructive Pulmonary Disease, Rheumatoid Arthritis, Hypothyroidism, Malignancy, Depression, BMI, Type Of Prosthesis, Glycaemia Level With Or Without Attended By Pcp	Stepwise forward logistic regression; odds ratio (95% CI), p value	2.83 (0.72, 11.1), 0.136	NS
ReÃ?Â¡tegui, D., 2017	High Quality	INFECTION (surgical site infection)	Baseline	193	(total knee arthroplasty)	Glycemia of 126 mg/dl or more not attended by PCP vs Glycemia less than 126 mg/dl	Age, Gender, Hypertension, Chronic Renal Failure, Dyslipidemia, Ischemic Heart Disease, Liver Disease, Chronic Obstructive Pulmonary Disease, Rheumatoid Arthritis, Hypothyroidism, Malignancy, Depression, BMI, Type Of Prosthesis, Glycaemia Level With Or Without Attended By Pcp	Stepwise forward logistic regression; odds ratio (95% CI), p value	4.14 (1.15, 15), 0.03	Glycaemia of 126 or more mg/dl not attended by PCP is an independent risk factor for developing SSI
Richards,J., 2014	High Quality	INFECTION (Deep Infection)		4528		BMI >= 35 versus < 30	Age, Sex, ASA Class, BMI, Procedure Type	Adjusted hazard ratio (95% CI), p-value	0.63 (0.21–1.91), 0.416	NS
Richards,J., 2014	High Quality	INFECTION (Deep Infection)		4528		BMI 30–34 versus < 30	Age, Sex, ASA Class, BMI, Procedure Type	Adjusted hazard ratio (95% CI), p-value	1.88 (0.95–3.73), 0.081	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Salt,E., 2017	High Quality	INFECTION (postoperative infection)	Baseline	2212	(total joint (hip, knee, or shoulder) arthroplasty)	Cancer	Gender, Race, Replacement Surgery Location, Days For Follow-Up, Cancer, Lupus, Immunodeficiency Condition, Hiv/Aids, Diabetes, Obesity, Gout, Perioperative Prednisone Use, Perioperative Immunosuppressive Medication Use, Rheumatoid Arthritis Vs Osteoarthritis	Multiple logistic regression; estimated odds ratio (95% CI), p value	1.34 (0.76, 2.36), 0.31	NS
Salt,E., 2017	High Quality	INFECTION (postoperative infection)	Baseline	2212	(total joint (hip, knee, or shoulder) arthroplasty)	HIV/AIDS	Gender, Race, Replacement Surgery Location, Days For Follow-Up, Cancer, Lupus, Immunodeficiency Condition, Hiv/Aids, Diabetes, Obesity, Gout, Perioperative Prednisone Use, Perioperative Immunosuppressive Medication Use, Rheumatoid Arthritis Vs Osteoarthritis	Multiple logistic regression; estimated odds ratio (95% CI), p value	1.24 (0.32, 4.82), 0.76	NS
Salt,E., 2017	High Quality	INFECTION (postoperative infection)	Baseline	2212	(total joint (hip, knee, or shoulder) arthroplasty)	Immunodeficiency condition	Gender, Race, Replacement Surgery Location, Days For Follow-Up, Cancer, Lupus, Immunodeficiency Condition, Hiv/Aids, Diabetes, Obesity, Gout, Perioperative Prednisone Use, Perioperative Immunosuppressive Medication Use, Rheumatoid Arthritis Vs Osteoarthritis	Multiple logistic regression; estimated odds ratio (95% CI), p value	1.78 (0.69, 4.57), 0.23	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Salt,E., 2017	High Quality	INFECTION (postoperative infection)	Baseline	2212	(total joint (hip, knee, or shoulder) arthroplasty)	Lupus	Gender, Race, Replacement Surgery Location, Days For Follow-Up, Cancer, Lupus, Immunodeficiency Condition, Hiv/Aids, Diabetes, Obesity, Gout, Perioperative Prednisone Use, Perioperative Immunosuppressive Medication Use, Rheumatoid Arthritis Vs Osteoarthritis	Multiple logistic regression; estimated odds ratio (95% CI), p value	1.65 (0.9, 3.04), 0.11	NS
Salt,E., 2017	High Quality	INFECTION (postoperative infection)	Baseline	2212	(total joint (hip, knee, or shoulder) arthroplasty)	Obesity	Gender, Race, Replacement Surgery Location, Days For Follow-Up, Cancer, Lupus, Immunodeficiency Condition, Hiv/Aids, Diabetes, Obesity, Gout, Perioperative Prednisone Use, Perioperative Immunosuppressive Medication Use, Rheumatoid Arthritis Vs Osteoarthritis	Multiple logistic regression; estimated odds ratio (95% CI), p value	1.66 (1.37, 2.02), <0.001	Patients with obesity are more likely to develop postoperative infection
Schairer,W.W., 2016	High Quality	INFECTION (periprosthetic joint infection)	Baseline	173958	(total hip arthroplasty)	Cancer (metastatic tumor)	Tha Timing After Injection, Greater Than 1 Injection In Prior Year, Age, Gender, Tobacco Use, Transfusion Allogenic Or Autogenic, Obesity, Diabetes, Peripheral Vascular Disease, Congestive Heart Failure, Hiv/Aids, Tumor Without Metastases, Metastatic Tumor, Cardiac Arrhythmia, Blood Loss Anemia, Deficiency Anemia, Renal Failure, Chronic Pulmonary Disease, Pulmonary Circulatory Disorder, Liver Disease, Depression	Multivariable Cox proportional hazard model; hazard ratio (95% CI), p value	1.07 (0.66, 1.72), 0.787	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Schairer,W.W., 2016	High Quality	INFECTION (periprosthetic joint infection)	Baseline	173958	(total hip arthroplasty)	Cancer (tumor without metastases)	Tha Timing After Injection, Greater Than 1 Injection In Prior Year, Age, Gender, Tobacco Use, Transfusion Allogenic Or Autogenic, Obesity, Diabetes, Peripheral Vascular Disease, Congestive Heart Failure, Hiv/Aids, Tumor Without Metastases, Metastatic Tumor, Cardiac Arrhythmia, Blood Loss Anemia, Deficiency Anemia, Renal Failure, Chronic Pulmonary Disease, Pulmonary Circulatory Disorder, Liver Disease, Depression	Multivariable Cox proportional hazard model; hazard ratio (95% CI), p value	0.53 (0.36, 0.76), 0.001	Patients with a tumor without metastases were more likely to develop PJI
Schairer,W.W., 2016	High Quality	INFECTION (periprosthetic joint infection)	Baseline	173958	(total hip arthroplasty)	Chronic pulmonary disease	Tha Timing After Injection, Greater Than 1 Injection In Prior Year, Age, Gender, Tobacco Use, Transfusion Allogenic Or Autogenic, Obesity, Diabetes, Peripheral Vascular Disease, Congestive Heart Failure, Hiv/Aids, Tumor Without Metastases, Metastatic Tumor, Cardiac Arrhythmia, Blood Loss Anemia, Deficiency Anemia, Renal Failure, Chronic Pulmonary Disease, Pulmonary Circulatory Disorder, Liver Disease, Depression	Multivariable Cox proportional hazard model; hazard ratio (95% CI), p value	1.13 (1.02, 1.26), 0.02	Patients with chronic pulmonary disease were more likely to develop PJI
Schairer,W.W., 2016	High Quality	INFECTION (periprosthetic joint infection)	Baseline	173958	(total hip arthroplasty)	Congestive heart failure	Tha Timing After Injection, Greater Than 1 Injection In Prior Year, Age, Gender, Tobacco Use, Transfusion Allogenic Or Autogenic, Obesity, Diabetes, Peripheral Vascular Disease, Congestive Heart Failure, Hiv/Aids, Tumor Without Metastases, Metastatic Tumor, Cardiac Arrhythmia, Blood Loss Anemia, Deficiency Anemia, Renal Failure, Chronic Pulmonary Disease, Pulmonary Circulatory Disorder, Liver Disease, Depression	Multivariable Cox proportional hazard model; hazard ratio (95% CI), p value	1.16 (0.97, 1.39), 0.108	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Schairer,W.W., 2016	High Quality	INFECTION (periprosthetic joint infection)	Baseline	173958	(total hip arthroplasty)	Depression	Tha Timing After Injection, Greater Than 1 Injection In Prior Year, Age, Gender, Tobacco Use, Transfusion Allogenic Or Autogenic, Obesity, Diabetes, Peripheral Vascular Disease, Congestive Heart Failure, Hiv/Aids, Tumor Without Metastases, Metastatic Tumor, Cardiac Arrhythmia, Blood Loss Anemia, Deficiency Anemia, Renal Failure, Chronic Pulmonary Disease, Pulmonary Circulatory Disorder, Liver Disease, Depression	Multivariable Cox proportional hazard model; hazard ratio (95% CI), p value	1.4 (1.25, 1.58), < 0.001	Patients with depression were more likely to develop PJI
Schairer,W.W., 2016	High Quality	INFECTION (periprosthetic joint infection)	Baseline	173958	(total hip arthroplasty)	HIV/AIDS	Tha Timing After Injection, Greater Than 1 Injection In Prior Year, Age, Gender, Tobacco Use, Transfusion Allogenic Or Autogenic, Obesity, Diabetes, Peripheral Vascular Disease, Congestive Heart Failure, Hiv/Aids, Tumor Without Metastases, Metastatic Tumor, Cardiac Arrhythmia, Blood Loss Anemia, Deficiency Anemia, Renal Failure, Chronic Pulmonary Disease, Pulmonary Circulatory Disorder, Liver Disease, Depression	Multivariable Cox proportional hazard model; hazard ratio (95% CI), p value	2.06 (1.31, 3.26), 0.002	Patients with HIV/AIDS were more likely to develop PJI
Schairer,W.W., 2016	High Quality	INFECTION (periprosthetic joint infection)	Baseline	173958	(total hip arthroplasty)	Liver disease	Tha Timing After Injection, Greater Than 1 Injection In Prior Year, Age, Gender, Tobacco Use, Transfusion Allogenic Or Autogenic, Obesity, Diabetes, Peripheral Vascular Disease, Congestive Heart Failure, Hiv/Aids, Tumor Without Metastases, Metastatic Tumor, Cardiac Arrhythmia, Blood Loss Anemia, Deficiency Anemia, Renal Failure, Chronic Pulmonary Disease, Pulmonary Circulatory Disorder, Liver Disease, Depression	Multivariable Cox proportional hazard model; hazard ratio (95% CI), p value	1.65 (1.31, 2.08), < 0.001	Patients with liver disease were more likely to develop PJI

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Schairer,W.W., 2016	High Quality	INFECTION (periprosthetic joint infection)	Baseline	173958	(total hip arthroplasty)	Obesity	Tha Timing After Injection, Greater Than 1 Injection In Prior Year, Age, Gender, Tobacco Use, Transfusion Allogenic Or Autogenic, Obesity, Diabetes, Peripheral Vascular Disease, Congestive Heart Failure, Hiv/Aids, Tumor Without Metastases, Metastatic Tumor, Cardiac Arrhythmia, Blood Loss Anemia, Deficiency Anemia, Renal Failure, Chronic Pulmonary Disease, Pulmonary Circulatory Disorder, Liver Disease, Depression	Multivariable Cox proportional hazard model; hazard ratio (95% CI), p value	1.65 (1.49, 1.82), <0.001	Obese patients were more likely to develop PJI
Schairer,W.W., 2016	High Quality	INFECTION (periprosthetic joint infection)	Baseline	173958	(total hip arthroplasty)	Peripheral vascular disease	Tha Timing After Injection, Greater Than 1 Injection In Prior Year, Age, Gender, Tobacco Use, Transfusion Allogenic Or Autogenic, Obesity, Diabetes, Peripheral Vascular Disease, Congestive Heart Failure, Hiv/Aids, Tumor Without Metastases, Metastatic Tumor, Cardiac Arrhythmia, Blood Loss Anemia, Deficiency Anemia, Renal Failure, Chronic Pulmonary Disease, Pulmonary Circulatory Disorder, Liver Disease, Depression	Multivariable Cox proportional hazard model; hazard ratio (95% CI), p value	1.09 (0.89, 1.34), 0.382	NS
Schairer,W.W., 2016	High Quality	INFECTION (periprosthetic joint infection)	Baseline	173958	(total hip arthroplasty)	Pulmonary circulation disorder	Tha Timing After Injection, Greater Than 1 Injection In Prior Year, Age, Gender, Tobacco Use, Transfusion Allogenic Or Autogenic, Obesity, Diabetes, Peripheral Vascular Disease, Congestive Heart Failure, Hiv/Aids, Tumor Without Metastases, Metastatic Tumor, Cardiac Arrhythmia, Blood Loss Anemia, Deficiency Anemia, Renal Failure, Chronic Pulmonary Disease, Pulmonary Circulatory Disorder, Liver Disease, Depression	Multivariable Cox proportional hazard model; hazard ratio (95% CI), p value	0.85 (0.62, 1.17), 0.318	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Schairer,W.W., 2016	High Quality	INFECTION (periprosthetic joint infection)	Baseline	173958	(total hip arthroplasty)	Renal failure	Tha Timing After Injection, Greater Than 1 Injection In Prior Year, Age, Gender, Tobacco Use, Transfusion Allogenic Or Autogenic, Obesity, Diabetes, Peripheral Vascular Disease, Congestive Heart Failure, Hiv/Aids, Tumor Without Metastases, Metastatic Tumor, Cardiac Arrhythmia, Blood Loss Anemia, Deficiency Anemia, Renal Failure, Chronic Pulmonary Disease, Pulmonary Circulatory Disorder, Liver Disease, Depression	Multivariable Cox proportional hazard model; hazard ratio (95% CI), p value	1.14 (0.98, 1.33), 0.098	NS
Siqueira,M.B., 2015	High Quality	Infection Resolution (Infection free prosthetic survival)		655	(I&D and 2-stage procedures)	BMI per index point	Age, Sex, Cci, Number Of Previous Operations, Affected Joint, Type Of Surgery Preceding Antibiotic Suppression, Infecting Organism, Chronic Suppressive Antibiotics	Cox proportional hazard, HR, 95% CI, p-value	1.00, 0.99-1.02, 0.92	NS
Takemoto,R.C., 2017	High Quality	INFECTION (surgical site infection)	Baseline	314	(thoracic and/or lumbar spinal surgery)	BMI	Age, Sex, Transfusion, Duration Of Antibiotics, Malnourished, Steroid Use, Diabetes, Smoking, Illicit Drug Use, Alcohol Use, Revision Surgery, Body Mass Index, Number Of Levels Fused, Implant, Graft, Operating Room Time, Blood Loss, Duration Of Drain Use, Drain Output Per Day	Multivariate logistic regression; estimated odds ratio, p value	1.02, 0.597	NS
Takemoto,R.C., 2017	High Quality	INFECTION (surgical site infection)	Baseline	314	(thoracic and/or lumbar spinal surgery)	Drug abuse	Age, Sex, Transfusion, Duration Of Antibiotics, Malnourished, Steroid Use, Diabetes, Smoking, Illicit Drug Use, Alcohol Use, Revision Surgery, Body Mass Index, Number Of Levels Fused, Implant, Graft, Operating Room Time, Blood Loss, Duration Of Drain Use, Drain Output Per Day	Multivariate logistic regression; estimated odds ratio, p value	0.18, 0.073	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Takemoto,R.C., 2017	High Quality	INFECTION (surgical site infection)	Baseline	314	(thoracic and/or lumbar spinal surgery)	Alcohol abuse	Age, Sex, Transfusion, Duration Of Antibiotics, Malnourished, Steroid Use, Diabetes, Smoking, Illicit Drug Use, Alcohol Use, Revision Surgery, Body Mass Index, Number Of Levels Fused, Implant, Graft, Operating Room Time, Blood Loss, Duration Of Drain Use, Drain Output Per Day	Multivariate logistic regression; estimated odds ratio, p value	0.49, 0.063	NS
Thakar,C., 2010	High Quality	INFECTION (deep infection)	Baseline	2360	(initial surgical fixation)	Dementia	Cardiovascular Disease, Stroke, Respiratory Disease, Renal Disease, Diabetes, Rheumatoid Disease, Dementia, Parkinson'S Disease, Malignancy, Smoking, Enternal Steroids, Warfarin, Consultant As Surgeon, Transfused Preoperatively, Transfused Postoperatively	Direct logistical regression; odds ratio (95% CI), p value	6.72 (1.16, 38.8), 0.03	Dementia is an independent risk factor for developing deep infection
Tischler,E.H., 2017	High Quality	INFECTION (90-day septic reoperation)	Baseline	17394	(primary total hip or total knee arthroplasty)	BMI	Simultaneous Bilateral Joint Arthroplasty, Staged Bilateral Total Joint Arthroplasty, Total Knee Vs Total Hip Arthroplasty, Age, BMI, Gender, Former Smoker Vs Nonsmoker, Current Smoker Vs Nonsmoker, Packs Per Decade, Charlson Comorbidity Index Score	Multivariate analysis; odds ratio (95% CI), p value	1.06 (1.04, 1.1), <0.001	Increased BMI are more likely to undergo septic reoperation within 90 days
Tornero,E., 2015	High Quality	INFECTION		1896	(Primary hip & knee arthroplasty)	BMI >=35 kg/m2 vs <30 kg/m2	Age, Male Sex, BMI, ASA Classification Of Iii Or Iv, Hypertension, Diabetes Mellitus, Malignancy, Liver Disease, Lung Disease, Chronic Renal Failure, Left Side, Duration Of Surgery, Site, Red Blood Cell Transfusion, and Prophylaxis Group	Stepwise forward Cox regression model; hazard ratio (95% CI), p-value	2.932 (1.370–6.275), 0.006	BMI >= 35 was associated with increased risk of infection

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Tornero,E., 2015	High Quality	INFECTION		1896	(Primary hip & knee arthroplasty)	BMI 30–35 kg/m2 vs <30 kg/m2	Age, Male Sex, BMI, ASA Classification Of Iii Or Iv, Hypertension, Diabetes Mellitus, Malignancy, Liver Disease, Lung Disease, Chronic Renal Failure, Left Side, Duration Of Surgery, Site, Red Blood Cell Transfusion, and Prophylaxis Group	Stepwise forward Cox regression model hazard ratio (95% CI), p-value	1.266 (0.628–2.554), p=0.510	NS
Tornero,E., 2015	High Quality	INFECTION (early PJI (within first 90 postop days) and without signs of prosthesis loosening)	Baseline	222	(hip or knee arthroplasty)	Chronic renal failure	Age, Gender, Comorbidities, Indication For Previous Surgery, Laterality, Type Of Cementation, Site Of Arthroplasty, Age Of Prosthesis Until Debridement, Days Between Diagnosis and Debridement, Polyethylene Exchange During Debridement, Need Flap For Skin Coverage, Clinical Signs, Leucocyte Count, Crp, Creatinine, Glycaemia, Percentage Of Positive Cultures, Polymicrobial Infection, Presence Of Microorganism	Stepwise forward logistic regression; odds ratio (95% CI)	5.92 (1.47, 23.85)	Chronic renal failure is an independent risk factor for developing early PJI
Tornero,E., 2015	High Quality	INFECTION (early PJI (within first 90 postop days) and without signs of prosthesis loosening)	Baseline	222	(hip or knee arthroplasty)	Liver cirrhosis	Age, Gender, Comorbidities, Indication For Previous Surgery, Laterality, Type Of Cementation, Site Of Arthroplasty, Age Of Prosthesis Until Debridement, Days Between Diagnosis and Debridement, Polyethylene Exchange During Debridement, Need Flap For Skin Coverage, Clinical Signs, Leucocyte Count, Crp, Creatinine, Glycaemia, Percentage Of Positive Cultures, Polymicrobial Infection, Presence Of Microorganism	Stepwise forward logistic regression; odds ratio (95% CI)	4.46 (1.15, 17.24)	Liver cirrhosis is an independent risk factor for developing early PJI

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Tornero,E., 2015	High Quality	INFECTION		1896	(Primary hip & knee arthroplasty)	Lung disease	Age, Male Sex, BMI, ASA Classification Of Iii Or Iv, Hypertension, Diabetes Mellitus, Malignancy, Liver Disease, Lung Disease, Chronic Renal Failure, Left Side, Duration Of Surgery, Site, Red Blood Cell Transfusion, and Prophylaxis Group	Stepwise forward Cox regression model; hazard ratio (95% CI), p-value	2.463 (1.178–5.151), p=0.017	Lung disease is associated with increased risk of infection
Tsuda,Y., 2015	High Quality	INFECTION		87645	(Hip fracture surgery)	Dementia	Age, Sex, Comorbidities Other Than Dementia, Mode Of Anesthesia, Type Of Surgery, Need For Transfusion	Multivariate logistic regression fitted with generalized estimating equations; Odds Ratio, 95% CI, p-value	1.58 (1.14-2.02); p=0.004	those with dementia had higher risk of SSI
Wallace,G., 2014	High Quality	INFECTION (wound infection 6 months postop)	Baseline	30553	(total hip replacement)	BMI < 18.5 vs 18.5-25	Age, Gender, Drinking, Smoking, Ses, Year Of Surgery, Previous Occurrence Of Outcome, Prior Use Of Statins, Antihypertensives, Aspirin, Antidepressants, Anticoagulants, Antibiotics, Previous Diagnosis Of Diabetes, Hypertension, Chronic Obstructive Pulmonary Disease, Atrial Fibrillation, Ischemic Heart Disease	Logistic regression; adjusted odds ratio (95% CI), p value	1.03 (0.48, 2.19), 0.941	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Wallace,G., 2014	High Quality	INFECTION (wound infection 6 months postop)	Baseline	31356	(total knee replacement)	BMI < 18.5 vs 18.5-25	Age, Gender, Drinking, Smoking, Ses, Year Of Surgery, Previous Occurrence Of Outcome, Prior Use Of Statins, Antihypertensives, Aspirin, Antidepressants, Anticoagulants, Antibiotics, Previous Diagnosis Of Diabetes, Hypertension, Chronic Obstructive Pulmonary Disease, Atrial Fibrillation, Ischemic Heart Disease	Logistic regression; adjusted odds ratio (95% CI), p value	0.97 (0.36, 2.67), 0.96	NS
Wallace,G., 2014	High Quality	INFECTION (wound infection 6 months postop)	Baseline	30553	(total hip replacement)	BMI 25-30 vs 18.5-25	Age, Gender, Drinking, Smoking, Ses, Year Of Surgery, Previous Occurrence Of Outcome, Prior Use Of Statins, Antihypertensives, Aspirin, Antidepressants, Anticoagulants, Antibiotics, Previous Diagnosis Of Diabetes, Hypertension, Chronic Obstructive Pulmonary Disease, Atrial Fibrillation, Ischemic Heart Disease	Logistic regression; adjusted odds ratio (95% CI), p value	1.34 (1.09, 1.64), 0.006	BMI 25-30 is a risk factor for developing wound infection after 6 months postop
Wallace,G., 2014	High Quality	INFECTION (wound infection 6 months postop)	Baseline	31356	(total knee replacement)	BMI 25-30 vs 18.5-25	Age, Gender, Drinking, Smoking, Ses, Year Of Surgery, Previous Occurrence Of Outcome, Prior Use Of Statins, Antihypertensives, Aspirin, Antidepressants, Anticoagulants, Antibiotics, Previous Diagnosis Of Diabetes, Hypertension, Chronic Obstructive Pulmonary Disease, Atrial Fibrillation, Ischemic Heart Disease	Logistic regression; adjusted odds ratio (95% CI), p value	0.98 (0.81, 1.19), 0.836	NS
Wallace,G., 2014	High Quality	INFECTION (wound infection 6 months postop)	Baseline	30553	(total hip replacement)	BMI 30-35 vs 18.5-25	Age, Gender, Drinking, Smoking, Ses, Year Of Surgery, Previous Occurrence Of Outcome, Prior Use Of Statins, Antihypertensives, Aspirin, Antidepressants, Anticoagulants, Antibiotics, Previous Diagnosis Of Diabetes, Hypertension, Chronic Obstructive Pulmonary Disease, Atrial Fibrillation, Ischemic Heart Disease	Logistic regression; adjusted odds ratio (95% CI), p value	1.52 (1.21, 1.9), < 0.001	BMI 30-35 is a risk factor for developing wound infection after 6 months postop

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Wallace,G., 2014	High Quality	INFECTION (wound infection 6 months postop)	Baseline	31356	(total knee replacement)	BMI 30-35 vs 18.5-25	Age, Gender, Drinking, Smoking, Ses, Year Of Surgery, Previous Occurrence Of Outcome, Prior Use Of Statins, Antihypertensives, Aspirin, Antidepressants, Anticoagulants, Antibiotics, Previous Diagnosis Of Diabetes, Hypertension, Chronic Obstructive Pulmonary Disease, Atrial Fibrillation, Ischemic Heart Disease	Logistic regression; adjusted odds ratio (95% CI), p value	1.23 (1.01, 1.5), 0.042	BMI 30-35 is a risk factor for developing wound infection after 6 months postop
Wallace,G., 2014	High Quality	INFECTION (wound infection 6 months postop)	Baseline	30553	(total hip replacement)	BMI 35+ vs 18.5-25	Age, Gender, Drinking, Smoking, Ses, Year Of Surgery, Previous Occurrence Of Outcome, Prior Use Of Statins, Antihypertensives, Aspirin, Antidepressants, Anticoagulants, Antibiotics, Previous Diagnosis Of Diabetes, Hypertension, Chronic Obstructive Pulmonary Disease, Atrial Fibrillation, Ischemic Heart Disease	Logistic regression; adjusted odds ratio (95% CI), p value	2.18 (1.67, 2.86), < 0.001	BMI 35+ is a risk factor for developing wound infection after 6 months postop
Wallace,G., 2014	High Quality	INFECTION (wound infection 6 months postop)	Baseline	31356	(total knee replacement)	BMI 35+ vs 18.5-25	Age, Gender, Drinking, Smoking, Ses, Year Of Surgery, Previous Occurrence Of Outcome, Prior Use Of Statins, Antihypertensives, Aspirin, Antidepressants, Anticoagulants, Antibiotics, Previous Diagnosis Of Diabetes, Hypertension, Chronic Obstructive Pulmonary Disease, Atrial Fibrillation, Ischemic Heart Disease	Logistic regression; adjusted odds ratio (95% CI), p value	1.39 (1.11, 1.72), 0.003	BMI 35+ is a risk factor for developing wound infection after 6 months postop
Watanabe,M., 2010	High Quality	INFECTION (surgical site infection)	Baseline	223	(spinal operations)	BMI > 25 vs BMI of 25 or less	Sex, Age, Smoking History, Diabetes, Obesity, Trauma Or Elective Spine Surgery, Use Of Instrumentation, Long Duration Of Operation, High Estimated Intraoperative Blood Loss, Sufficient Irrigation Of Surgical Site	Multivariate logistic regression analysis; odds ratio (95% CI), p value	2.25 (0.55, 9.17), 0.258	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Werner,B.C., 2017	High Quality	INFECTION (infection)	Baseline	1033918	(total hip arthroplasty)	Obesity (super; BMI 50+) vs Nonobese (BMI < 30)	Age, Gender, Tobacco Use, Alcohol Abuse, Inflammatory Arthritis, Depression, Hypercoagulable State, Dm, Hld, Htn, Pvd, Chf, Cad, Ckd, Use Of Hemodialysis, Chronic Lung Disease, Cld, and Hypothyroidism	Multivariate binomial logistic regression analysis; odds ratio (95% CI), p value	12.2 (11.3, 13.1), <0.0001	Super obese patients are more likely than nonobese patients to develop infection
Werner,B.C., 2017	High Quality	INFECTION (infection)	Baseline	1033918	(total hip arthroplasty)	Obesity (super; BMI 50+) vs Obesity (BMI 30-39.9)	Age, Gender, Tobacco Use, Alcohol Abuse, Inflammatory Arthritis, Depression, Hypercoagulable State, Dm, Hld, Htn, Pvd, Chf, Cad, Ckd, Use Of Hemodialysis, Chronic Lung Disease, Cld, and Hypothyroidism	Multivariate binomial logistic regression analysis; odds ratio (95% CI), p value	3.8 (3.5, 4), <0.0001	Super obese patients are more likely than obese patients to develop infection
Werner,B.C., 2017	High Quality	INFECTION (infection)	Baseline	1033918	(total hip arthroplasty)	Obesity (super; BMI 50+) vs Obesity (morbid; BMI 40-49.9)	Age, Gender, Tobacco Use, Alcohol Abuse, Inflammatory Arthritis, Depression, Hypercoagulable State, Dm, Hld, Htn, Pvd, Chf, Cad, Ckd, Use Of Hemodialysis, Chronic Lung Disease, Cld, and Hypothyroidism	Multivariate binomial logistic regression analysis; odds ratio (95% CI), p value	1.7 (1.6, 1.8), <0.0001	Super obese patients are more likely than morbidly obese patients to develop infection

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Werner,B.C., 2017	High Quality	INFECTION (infection)	Baseline	1033918	(total hip arthroplasty)	Obesity (super; BMI 50+; primary THA) vs Obesity (non-super; BMI <40 kg/m2; revision THA)	Age, Gender, Tobacco Use, Alcohol Abuse, Inflammatory Arthritis, Depression, Hypercoagulable State, Dm, Hld, Htn, Pvd, Chf, Cad, Ckd, Use Of Hemodialysis, Chronic Lung Disease, Cld, and Hypothyroidism	Multivariate binomial logistic regression analysis; odds ratio (95% CI), p value	1.5 (1.4, 1.6), <0.0001	Super obese patients are more likely than revision THA patients to develop infection
Westberg,M., 2013	High Quality	INFECTION (PJI)		184	(primary arthroplasty after femoral neck fracture)	BMI > 30	Age, Sex, ASA, Cognitive Failure, Diabetes, Obesity, Malignancy, Previous Infection In Contralateral Hip, Renal Failure, Urinary Tract Infection, Alcohol Abuse, Chronic Lower Leg Ulcer, Use Of Steroids and Other Immunosuppressants, 1 Or More/2 Or More Of Above Risk Factors	Logistic regression analysis; p value	>0.05	NS
Wimmer,M.D., 2016	High Quality	Infection Resolution (definitely free of infection minimum follow-up of 2 years)	Baseline	120	(revision total hip or total knee arthroplasty)	BMI	Age, Gender, BMI	Multivariate generalized logistic regression; p value	0.948	NS
Wimmer,M.D., 2016	High Quality	Infection Resolution (laboratory infection resolution)	Baseline	120	(revision total hip or total knee arthroplasty)	BMI	Age, Gender, BMI	Multivariate generalized logistic regression; p value	0.469	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Wimmer,M.D., 2016	High Quality	Infection Resolution (clinical infection resolution)	Baseline	120	(revision total hip or total knee arthroplasty)	BMI	Age, Gender, BMI	Multivariate generalized logistic regression; p value	0.781	NS
Wu,C., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	297	(total hip arthroplasty or total knee arthroplasty)	Alcohol abuse	Diabetes, Age, BMI, Place Of Residence, Alcohol Abuse, Treatment Of Diabetes, Chronic Pulmonary Disease, Hypertension, Substance Abuse, Cerebral Infarction, Dental Procedure W/ Or W/O Antibiotics, Renal Disease, Gout, Cardiovascular Event, Chronic Liver Disease, Anemia, Tobacco Use, Ankylosing Spondylitis, Tha Vs Tka, Gender, Prostatic Disease, Oncologic Disease, Neurologic Disease, History Of Tuberculosis, Rheumatoid Arthritis Vs Osteoarthritis, Femoral Head Necrosis, Developmental Hip Dysplasia, Fracture	Multivariate conditional logistic regression analysis; odds ratio (95% CI), p value	2.95 (1.06, 8.23), 0.039	Patients more easily developed surgical site infections if they had a history of alcohol abuse

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Wu,C., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	297	(total hip arthroplasty or total knee arthroplasty)	BMI < 18.5 vs 18.5-28	Diabetes, Age, BMI, Place Of Residence, Alcohol Abuse, Treatment Of Diabetes, Chronic Pulmonary Disease, Hypertension, Substance Abuse, Cerebral Infarction, Dental Procedure W/ Or W/O Antibiotics, Renal Disease, Gout, Cardiovascular Event, Chronic Liver Disease, Anemia, Tobacco Use, Ankylosing Spondylitis, Tha Vs Tka, Gender, Prostatic Disease, Oncologic Disease, Neurologic Disease, History Of Tuberculosis, Rheumatoid Arthritis Vs Osteoarthritis, Femoral Head Necrosis, Developmental Hip Dysplasia, Fracture	Multivariate conditional logistic regression analysis; odds ratio (95% CI), p value	1.55 (0.12, 20.16), 0.74	NS
Wu,C., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	297	(total hip arthroplasty or total knee arthroplasty)	BMI >= 28 vs 18.5-28	Diabetes, Age, BMI, Place Of Residence, Alcohol Abuse, Treatment Of Diabetes, Chronic Pulmonary Disease, Hypertension, Substance Abuse, Cerebral Infarction, Dental Procedure W/ Or W/O Antibiotics, Renal Disease, Gout, Cardiovascular Event, Chronic Liver Disease, Anemia, Tobacco Use, Ankylosing Spondylitis, Tha Vs Tka, Gender, Prostatic Disease, Oncologic Disease, Neurologic Disease, History Of Tuberculosis, Rheumatoid Arthritis Vs Osteoarthritis, Femoral Head Necrosis, Developmental Hip Dysplasia, Fracture	Multivariate conditional logistic regression analysis; odds ratio (95% CI), p value	2.77 (1.2, 6.4), 0.017	Patients more easily developed surgical site infections if they had a BMI of 28 kg/m2 or more

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Wu,C., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	297	(total hip arthroplasty or total knee arthroplasty)	Cancer (oncologic disease)	Diabetes, Age, BMI, Place Of Residence, Alcohol Abuse, Treatment Of Diabetes, Chronic Pulmonary Disease, Hypertension, Substance Abuse, Cerebral Infarction, Dental Procedure W/ Or W/O Antibiotics, Renal Disease, Gout, Cardiovascular Event, Chronic Liver Disease, Anemia, Tobacco Use, Ankylosing Spondylitis, Tha Vs Tka, Gender, Prostatic Disease, Oncologic Disease, Neurologic Disease, History Of Tuberculosis, Rheumatoid Arthritis Vs Osteoarthritis, Femoral Head Necrosis, Developmental Hip Dysplasia, Fracture	Multivariate conditional logistic regression analysis; odds ratio (95% CI), p value	0.9 (0.08, 10.69), 0.936	NS
Wu,C., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	297	(total hip arthroplasty or total knee arthroplasty)	Cardiovascular event	Diabetes, Age, BMI, Place Of Residence, Alcohol Abuse, Treatment Of Diabetes, Chronic Pulmonary Disease, Hypertension, Substance Abuse, Cerebral Infarction, Dental Procedure W/ Or W/O Antibiotics, Renal Disease, Gout, Cardiovascular Event, Chronic Liver Disease, Anemia, Tobacco Use, Ankylosing Spondylitis, Tha Vs Tka, Gender, Prostatic Disease, Oncologic Disease, Neurologic Disease, History Of Tuberculosis, Rheumatoid Arthritis Vs Osteoarthritis, Femoral Head Necrosis, Developmental Hip Dysplasia, Fracture	Multivariate conditional logistic regression analysis; odds ratio (95% CI), p value	1.32 (0.39, 4.52), 0.654	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Wu,C., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	297	(total hip arthroplasty or total knee arthroplasty)	Chronic liver disease	Diabetes, Age, BMI, Place Of Residence, Alcohol Abuse, Treatment Of Diabetes, Chronic Pulmonary Disease, Hypertension, Substance Abuse, Cerebral Infarction, Dental Procedure W/ Or W/O Antibiotics, Renal Disease, Gout, Cardiovascular Event, Chronic Liver Disease, Anemia, Tobacco Use, Ankylosing Spondylitis, Tha Vs Tka, Gender, Prostatic Disease, Oncologic Disease, Neurologic Disease, History Of Tuberculosis, Rheumatoid Arthritis Vs Osteoarthritis, Femoral Head Necrosis, Developmental Hip Dysplasia, Fracture	Multivariate conditional logistic regression analysis; odds ratio (95% CI), p value	1.34 (0.36, 5.04), 0.663	NS
Wu,C., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	297	(total hip arthroplasty or total knee arthroplasty)	Chronic pulmonary disease	Diabetes, Age, BMI, Place Of Residence, Alcohol Abuse, Treatment Of Diabetes, Chronic Pulmonary Disease, Hypertension, Substance Abuse, Cerebral Infarction, Dental Procedure W/ Or W/O Antibiotics, Renal Disease, Gout, Cardiovascular Event, Chronic Liver Disease, Anemia, Tobacco Use, Ankylosing Spondylitis, Tha Vs Tka, Gender, Prostatic Disease, Oncologic Disease, Neurologic Disease, History Of Tuberculosis, Rheumatoid Arthritis Vs Osteoarthritis, Femoral Head Necrosis, Developmental Hip Dysplasia, Fracture	Multivariate conditional logistic regression analysis; odds ratio (95% CI), p value	2.35 (0.68, 8.15), 0.177	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Wu,C., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	297	(total hip arthroplasty or total knee arthroplasty)	Hypertension	Diabetes, Age, BMI, Place Of Residence, Alcohol Abuse, Treatment Of Diabetes, Chronic Pulmonary Disease, Hypertension, Substance Abuse, Cerebral Infarction, Dental Procedure W/ Or W/O Antibiotics, Renal Disease, Gout, Cardiovascular Event, Chronic Liver Disease, Anemia, Tobacco Use, Ankylosing Spondylitis, Tha Vs Tka, Gender, Prostatic Disease, Oncologic Disease, Neurologic Disease, History Of Tuberculosis, Rheumatoid Arthritis Vs Osteoarthritis, Femoral Head Necrosis, Developmental Hip Dysplasia, Fracture	Multivariate conditional logistic regression analysis; odds ratio (95% CI), p value	0.55 (0.19, 1.61), 0.279	NS
Wu,C., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	297	(total hip arthroplasty or total knee arthroplasty)	Renal disease	Diabetes, Age, BMI, Place Of Residence, Alcohol Abuse, Treatment Of Diabetes, Chronic Pulmonary Disease, Hypertension, Substance Abuse, Cerebral Infarction, Dental Procedure W/ Or W/O Antibiotics, Renal Disease, Gout, Cardiovascular Event, Chronic Liver Disease, Anemia, Tobacco Use, Ankylosing Spondylitis, Tha Vs Tka, Gender, Prostatic Disease, Oncologic Disease, Neurologic Disease, History Of Tuberculosis, Rheumatoid Arthritis Vs Osteoarthritis, Femoral Head Necrosis, Developmental Hip Dysplasia, Fracture	Multivariate conditional logistic regression analysis; odds ratio (95% CI), p value	1.43 (0.43, 4.8), 0.559	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Wu,C., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	297	(total hip arthroplasty or total knee arthroplasty)	Substance abuse	Diabetes, Age, BMI, Place Of Residence, Alcohol Abuse, Treatment Of Diabetes, Chronic Pulmonary Disease, Hypertension, Substance Abuse, Cerebral Infarction, Dental Procedure W/ Or W/O Antibiotics, Renal Disease, Gout, Cardiovascular Event, Chronic Liver Disease, Anemia, Tobacco Use, Ankylosing Spondylitis, Tha Vs Tka, Gender, Prostatic Disease, Oncologic Disease, Neurologic Disease, History Of Tuberculosis, Rheumatoid Arthritis Vs Osteoarthritis, Femoral Head Necrosis, Developmental Hip Dysplasia, Fracture	Multivariate conditional logistic regression analysis; odds ratio (95% CI), p value	1.8 (0.45, 7.21), 0.408	NS
Yano,K., 2009	High Quality	INFECTION (surgical site infection)	Baseline	2423	(orthopedic surgery)	BMI	Culture Of NASAl Mrsa, Sex, Age, Length Of Surgical Procedure, ASA Class, BMI, Usage Of Prosthesis, Site Of Infection, Open Fracture, History Of Diabetes Mellitus, History Of Rheumatoid Arthritis	Multivariate logistic regression; odds ratio (95% CI), p value	1 (0.9, 1.1), 0.8	NS

PICO 2 Modifiable Risk Factors: Part 16: **Number of Personnel in Theatre**

*Summary of Findings Table 16: **Number of Personnel in Theatre***

	Moderate Quality		
↑ **Better Outcomes** ↓ **Worse Outcomes** ● **Not Significant**	Muilwijk,J., 2007	Salvati,E.A., 1982	Koutsoumbelis,S., 2011
INFECTION			↓
INFECTION(SSI)	↑		
INFECTION(postoperative wound infection)		↓	

Salvati,E.A., 1982: Number of operating-room personnel

Koutsoumbelis,S., 2011: Number of personnel in theatre (>=10) vs Number of personnel in theatre (<10)

Muilwijk, J., 2007: High surgeon volume vs. low surgeon volume (knee arthroplasty only; all other comparisons not significant)

Table 1616: Number of Personnel in Theatre

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Koutsoumbelis,S., 2011	Moderate Quality	INFECTION		3218	(Posterior Lumbar Instrumented Arthrodesis)	Number of personnel in theatre (>=10) vs Number of personnel in theatre (<10)	Sex, Obesity, Comorbidity (Diabetes, Chronic Obstructive Pulmonary Disease, Osteoporosis, Coronary Heart Disease), Blood Loss, Dural Tear, >= 10 People In Operating Room	Multivariate logistic regression, odds ratio (95% CI), p-value	2.44 (1.20, 4.96), p=0.014	>=10 personnel in theater associated with increased risk of infection (vs. <10)
Muilwijk,J., 2007	Moderate Quality	INFECTION (SSI)		2154	(Partial hip arthroplasty, total hip arthroplasty, or revision of hip arthroplasty)	Moderate vs. low; High vs. low	None		0.91 (0.45-1.83); 0.79 (0.43-1.46); 0.71 (0.40-1.26); 0.75 (0.42-1.33); 0.89 (0.37-2.15); 1.10 (0.48-2.52)	NS
Muilwijk,J., 2007	Moderate Quality	INFECTION (SSI)		2154	(Knee arthroplasty)	High vs low; Moderate vs. low	None	Multilevel logistic regression, odds ratio (95% CI)	0.43 (0.23-0.80); 0.58 (0.30-1.11)	High surgeon volume associated with lower risk of infection
Salvati,E.A., 1982	Moderate Quality	INFECTION (postoperative wound infection)	Intra-Op	3175	(total hip or total knee arthroplasties)	Number of operating-room personnel	Unclear	Multivariate analysis; correlation, p value	0.03, < 0.03	Number of operating-room personnel showed significant correlation with postoperative infection rate

PICO 2 Modifiable Risk Factors: Part 17: Nutrition

Summary of Findings Table 17: Nutrition

	High Quality					
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant	Takemoto,R.C., 2017	Grammatico-Guillon,L., 2015	Morey,V.M., 2016	Aldebeyan,S., 2017	Bohl,D.D., 2016	Puvanesarajah,V., 2016
INFECTION(PJI (Hip or knee arthroplasty infection))		↓				
INFECTION(surgical site infection)	●					
INFECTION(superficial surgical site infection)				●		
INFECTION(deep surgical site infection)				●		
INFECTION(wound complications)			●			
INFECTION(surgical site infection within first 30 postoperative days)					↓	
INFECTION(increased infection)						↓
INFECTION(wound dehiscence)						↓

Grammatico-Guillon,L., 2015: Malnutrition vs no Malnutrition

Bohl,D.D., 2016: Hypoalbuminemia vs normal albumin

Puvanesarajah,V., 2016: Malnutrition vs no Malnutrition

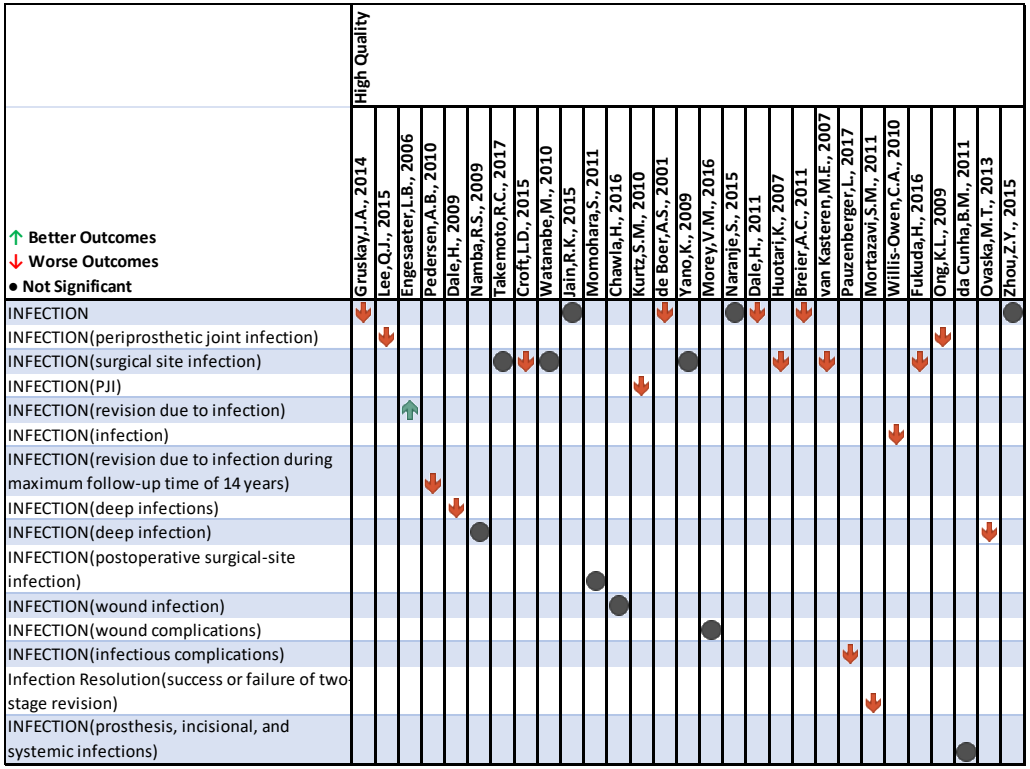
Table 1717: Nutrition

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Aldebeyan,S., 2017	High Quality	INFECTION (deep surgical site infection)	Baseline	10117	(open surgical fixation for hip fracture)	Albumin of 3.5 or more vs less than 3.5	Age, Gender, Race, BMI, Diabetes, Dyspnea, Copd, Smoking, Chf, Dialysis, Renal Failure, Hypertension, Bleeding Disease, Steroids, ASA Class	Multivariate logistic regression; odds ratios (95% CI), p value	1.91 (0.91, 3.91), 0.11	NS
Aldebeyan,S., 2017	High Quality	INFECTION (superficial surgical site infection)	Baseline	10117	(open surgical fixation for hip fracture)	Albumin of 3.5 or more vs less than 3.5	Age, Gender, Race, BMI, Diabetes, Dyspnea, Copd, Smoking, Chf, Dialysis, Renal Failure, Hypertension, Bleeding Disease, Steroids, ASA Class	Multivariate logistic regression; odds ratios (95% CI), p value	0.8 (0.51, 1.3), 0.4	NS
Bohl,D.D., 2016	High Quality	INFECTION (surgical site infection within first 30 postoperative days)	Baseline	4310	(posterior lumbar spinal fusion surgery)	Hypoalbuminemia vs normal albumin	Age, Sex, BMI, Diabetes, Dyspnea On Exertion, Hypertension, Copd, Current Smoker, Anemia, Number Of Levels	Multivariate Poisson regression; adjusted relative risk (95% CI), p value	2.3 (1.2, 4.4), 0.01	Hypoalbuminemia is an independent risk factor for developing SSI
Grammatico-Guillon,L., 2015	High Quality	INFECTION (PJI (Hip or knee arthroplasty infection))		32582	(Initially not infected)	Malnutrition vs no Malnutrition	Age, Sex, Year Of Replacement, Diabetes, Ulcer Sore, Cardiologic Device, Chronic Renal Failure, Urinary Tract Disorders, Cancer, Chronic Liver Diseases, Alcohol Abuse, Tobacco, Hypertension, Drug Abuse, Obesity	Multivariate Cox proportional hazard model, hazard ratio (95% CI), p-value	1.59 (1.16, 2.20), p=.01	Malnutrition associated with increased risk of infection
Morey,V.M., 2016	High Quality	INFECTION (wound complications)	Baseline	3169	(total knee arthroplasty)	Malnutrition	Age, Gender, BMI, Hba1C, Hemoglobin, Operation Time, Malnutrition	Multivariate logistic regression; odds ratios (95% CI), p value	1.38 (0.3, 6.36), 0.676	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Puvanesarajah,V., 2016	High Quality	INFECTION (increased infection)	Baseline	147278	(posterior lumbar spinal fusion surgery)	Malnutrition	Malnutrition, Age (Dichotomized As Either 65-74 Years Or 75-84 Years), Gender, Smoking History, Obesity, Diabetes, Chronic Kidney Disease, Chronic Pulmonary Disease	Multivariate analysis; odds ratio (95% CI), p value	2.27 (1.7, 3.04), < 0.001	Malnutrition is an independent risk factor for increased infection
Puvanesarajah,V., 2016	High Quality	INFECTION (wound dehiscence)	Baseline	147278	(posterior lumbar spinal fusion surgery)	Malnutrition	Malnutrition, Age (Dichotomized As Either 65-74 Years Or 75-84 Years), Gender, Smoking History, Obesity, Diabetes, Chronic Kidney Disease, Chronic Pulmonary Disease	Multivariate analysis; odds ratio (95% CI), p value	2.52 (1.64, 3.88), <0.001	Malnutrition is an independent risk factor for wound dehiscence
Takemoto,R.C., 2017	High Quality	INFECTION (surgical site infection)	Baseline	314	(thoracic and/or lumbar spinal surgery)	Malnourished	Age, Sex, Transfusion, Duration Of Antibiotics, Malnourished, Steroid Use, Diabetes, Smoking, Illicit Drug Use, Alcohol Use, Revision Surgery, Body Mass Index, Number Of Levels Fused, Implant, Graft, Operating Room Time, Blood Loss, Duration Of Drain Use, Drain Output Per Day	Multivariate logistic regression; estimated odds ratio, p value	1, 0.999	NS

PICO 2 Modifiable Risk Factors: Part 18: **Operative Time/Surgery Duration**

*Summary of Findings Table 18: **Operative Time/Surgery Duration***



Gruskay,J.A., 2014: Operative time >171 min vs Operative time <171 min

Lee,Q.J., 2015: Increasing operating time in minutes

Engesaeter,L.B., 2006: Duration of 51-110 min vs increased length of precedure; Operative time of 51-70 min vs 71-90 min

Pedersen,A.B., 2010: Duration of surgery 121 + min vs < 60

Dale,H., 2009: Duration of surgery 100-129 min vs 70-99 min; Duration of surgery 130 min or more vs 70-99 min

Croft,L.D., 2015: Increasing operation duration in minutes

Kurtz,S.M., 2010: 210+ minutes vs less than 120 minutes

de Boer,A.S., 2001: >118 min vs <=118 min

Dale,H., 2011: < 60 min vs 60-89 min

Huotari,K., 2007: Increasing duration of operation

Breier,A.C., 2011: Duration of operation >75th percentile

van Kasteren,M.E., 2007: Duration of surgery > 75th percentile

Pauzenberger,L., 2017: Duration of surgery over 90 min vs under 90 min

Mortazavi,S.M., 2011: Increased operative time at reimplantation

Willis-Owen,C.A., 2010: Longer operative time

Fukuda,H., 2016: Operation duration > 110 min vs 45 min or less; Operation duration > 45 min vs 45 min or less

Ong,K.L., 2009: Procedure lasting longer than 210 minutes vs 120 minutes

Ovaska,M.T., 2013: Operative duration >90 min vs. duration <90 min

Table 1818: Operative time/surgery duration

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Breier,A.C., 2011	High Quality	INFECTION		33463	(Hip prosthesis procedure due to arthrosis)	Duration of operation >75th percentile	Sex, Age, Duration Of Operation, ASA Score, Laf Ventilation	Multiple logistic regression, OR, 95% CI, p-value	1.68 (1.29-2.19), <0.001	Duration of surgery associated with SSI risk
Breier,A.C., 2011	High Quality	INFECTION		7749	(Hip prosthesis procedure due to fracture)	Duration of operation >75th percentile	Sex, Age, Duration Of Operation, ASA Score, Laf Ventilation	Multiple logistic regression, OR, 95% CI, p-value	1.28 (0.97-1.70), p=0.105	NS
Breier,A.C., 2011	High Quality	INFECTION		20554	(Knee prosthesis procedure)	Duration of operation >75th percentile	Sex, Age, Duration Of Operation, ASA Score, Laf Ventilation	Multiple logistic regression, OR, 95% CI, p-value	1.35 (0.94-1.94), p=0.120	NS
Chawla,H., 2016	High Quality	INFECTION (wound infection)	Intra-Op	693	(unicompartmental knee arthroplasty)	Operative time	Age, Gender, Body Mass Index, Smoking, Diabetes, Renal Insufficiency, Immunosuppressed Or Immunocompromised, Operative Time, Barbed Suture	Binary logistic regression; odds ratio (95%CI), p value	0.999 (0.998, 1), 0.0502	NS
Croft,L.D., 2015	High Quality	INFECTION (surgical site infection)	Peri-Op	66	(spinal procedures)	Operation duration in minutes	Weight-For-Age >=95Th Percentile, ASA Score >=3, Operation Duration In Minutes; Adjusted For The Clustering Effects Of Matched Case Patients and Controls	Multivariable conditional logistic regression; odds ratio (95% CI), p value	1 (1,1), 0.004	Longer operation duration is a significant risk factor for SSI
da Cunha,B.M., 2011	High Quality	INFECTION (prosthesis, incisional, and systemic infections)	Intra-Op	124	(total hip or total knee arthroplasty)	Surgery duration	Gender, Age, Educational Level, ASA Classification, Surgery Duration	Multiple logistic regression; p value	> 0.10	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Dale,H., 2009	High Quality	INFECTION (deep infections)	Intra-Op	97344	(total hip arthroplasty)	Duration of surgery < 70 min vs 70-99 min	Sex, Age, Diagnosis (Osteoarthritis Vs Inflammatory Vs Other), Prosthesis (Modular Vs Monoblock), Duration Of Surgery, Operation Room Ventilation, Antibiotic Prophylaxis Systemically, Method Of Fixation (Uncemented Vs Cemented W/ Or W/O Antibotics)	Cox regression model (reverse comparison); risk ratio (95% CI), p value	0.9 (0.7, 1.2), 0.5	NS
Dale,H., 2009	High Quality	INFECTION (deep infections)	Intra-Op	97344	(total hip arthroplasty)	Duration of surgery 100-129 min vs 70-99 min	Sex, Age, Diagnosis (Osteoarthritis Vs Inflammatory Vs Other), Prosthesis (Modular Vs Monoblock), Duration Of Surgery, Operation Room Ventilation, Antibiotic Prophylaxis Systemically, Method Of Fixation (Uncemented Vs Cemented W/ Or W/O Antibotics)	Cox regression model; risk ratio (95% CI), p value	1.3 (1, 1.5), 0.01	Duration of surgery 100-129 min is an independent risk factor for developing deep infections
Dale,H., 2009	High Quality	INFECTION (deep infections)	Intra-Op	97344	(total hip arthroplasty)	Duration of surgery 130 min or more vs 70-99 min	Sex, Age, Diagnosis (Osteoarthritis Vs Inflammatory Vs Other), Prosthesis (Modular Vs Monoblock), Duration Of Surgery, Operation Room Ventilation, Antibiotic Prophylaxis Systemically, Method Of Fixation (Uncemented Vs Cemented W/ Or W/O Antibotics)	Cox regression model; risk ratio (95% CI), p value	1.5 (1.2, 1.9), 0.001	Duration of surgery 130 min or more is an independent risk factor for developing deep infections
Dale,H., 2011	High Quality	INFECTION	Intra-Op	5540	(total hip arthroplasty)	< 60 min vs 60-89 min	Age, Sex, ASA Score, Duration Of Surgery, Emergency Vs Planned Surgery, Method Of Fixation, NNIS Index	Cox regression analysis (reverse comparison); adjusted risk (95% CI); p value	2.4 (1.4, 4); 0.001	Patients more easily developed infection if their duration of surgery time was less than 60 minutes

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Dale,H., 2011	High Quality	INFECTION	Intra-Op	31086	(total hip arthroplasty)	< 60 min vs 60-89 min	Age, Sex, ASA Score, Duration Of Surgery, Emergency Vs Planned Surgery, Method Of Fixation, NNIS Index	Cox regression analysis (reverse comparison); adjusted risk (95% CI); p value	1 (0.6, 1.8); 0.9	NS
Dale,H., 2011	High Quality	INFECTION	Intra-Op	10972	(hemiarthroplasty)	< 60 min vs 60-89 min	Age, Sex, ASA Score, Duration Of Surgery, Emergency Vs Planned Surgery, Method Of Fixation, NNIS Index	Cox regression analysis (reverse comparison); adjusted risk (95% CI); p value	1.4 (0.9, 2); 0.1	NS
Dale,H., 2011	High Quality	INFECTION	Intra-Op	1416	(hemiarthroplasty)	< 60 min vs 90-119 min	Age, Sex, ASA Score, Duration Of Surgery, Emergency Vs Planned Surgery, Method Of Fixation, NNIS Index	Cox regression analysis (reverse comparison); adjusted risk (95% CI); p value	1.9 (1, 3.9); 0.06	NS
Dale,H., 2011	High Quality	INFECTION	Intra-Op	5540	(total hip arthroplasty)	>=120 min vs 60-89 min	Age, Sex, ASA Score, Duration Of Surgery, Emergency Vs Planned Surgery, Method Of Fixation, NNIS Index	Cox regression analysis; adjusted risk (95% CI); p value	1.2 (0.8, 1.9); 0.4	NS
Dale,H., 2011	High Quality	INFECTION	Intra-Op	31086	(total hip arthroplasty)	>=120 min vs 60-89 min	Age, Sex, ASA Score, Duration Of Surgery, Emergency Vs Planned Surgery, Method Of Fixation, NNIS Index	Cox regression analysis; adjusted risk (95% CI); p value	1.3 (0.9, 1.8); 0.2	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Dale,H., 2011	High Quality	INFECTION	Intra-Op	10972	(hemiarthroplasty)	>=120 min vs 60-89 min	Age, Sex, ASA Score, Duration Of Surgery, Emergency Vs Planned Surgery, Method Of Fixation, NNIS Index	Cox regression analysis; adjusted risk (95% CI); p value	0.9 (0.5, 1.7); 0.7	NS
Dale,H., 2011	High Quality	INFECTION	Intra-Op	1416	(hemiarthroplasty)	>=120 min vs 90-119	Age, Sex, ASA Score, Duration Of Surgery, Emergency Vs Planned Surgery, Method Of Fixation, NNIS Index	Cox regression analysis; adjusted risk (95% CI); p value	2.2 (1, 4.9); 0.06	NS
Dale,H., 2011	High Quality	INFECTION	Intra-Op	1416	(hemiarthroplasty)	60-89 min vs 90-119	Age, Sex, ASA Score, Duration Of Surgery, Emergency Vs Planned Surgery, Method Of Fixation, NNIS Index	Cox regression analysis (reverse comparison); adjusted risk (95% CI); p value	1.7 (0.9, 3.2); 0.08	NS
Dale,H., 2011	High Quality	INFECTION	Intra-Op	5540	(total hip arthroplasty)	90-119 min vs 60-89 min	Age, Sex, ASA Score, Duration Of Surgery, Emergency Vs Planned Surgery, Method Of Fixation, NNIS Index	Cox regression analysis; adjusted risk (95% CI); p value	1.3 (0.9, 1.9); 0.1	NS
Dale,H., 2011	High Quality	INFECTION	Intra-Op	31086	(total hip arthroplasty)	90-119 min vs 60-89 min	Age, Sex, ASA Score, Duration Of Surgery, Emergency Vs Planned Surgery, Method Of Fixation, NNIS Index	Cox regression analysis; adjusted risk (95% CI); p value	1.1 (0.8, 1.5); 0.5	NS
Dale,H., 2011	High Quality	INFECTION	Intra-Op	10972	(hemiarthroplasty)	90-119 min vs 60-89 min	Age, Sex, ASA Score, Duration Of Surgery, Emergency Vs Planned Surgery, Method Of Fixation, NNIS Index	Cox regression analysis; adjusted risk (95% CI); p value	0.8 (0.5, 1.2); 0.2	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
de Boer,A.S., 2001	High Quality	INFECTION		5339	(Total hip prostheses)	>105 min vs <=105 minutes	Sex, Age, Wound Contamination, ASA Score*Preoperative Stay, Surgery Duration, Abx Prophylaxis, Type Of Admission, Multiple Surgery, Post Discharge Surveillance	Multiple logistic regression, risk ratio, 95% CI	1.2 (0.9-1.8)	NS
de Boer,A.S., 2001	High Quality	INFECTION		1744	(Total knee prostheses)	>118 min vs <=118 min	Age, Duration Of Surgery, Multiple Surgery, Post-Discharge Surveillance	Multiple logistic regression, risk ratio, 95% CI	0.1 (0.0-0.8)	surery duration associated with risk of SSI
Engesaeter,L.B., 2006	High Quality	INFECTION (revision due to infection)		56275	(primary total hip arthroplasty)	Duration of 51-110 min vs increased length of precedure	Sex, Age, Type Of Systemic Antibiotic Prophylaxis, Duration Of Systemic Prophylaxis, Type Of Operating Room, Duration Of Operation	Cox multiple regression; p value	p = 0.001	Operative duration of 51-110 minutes associated with reduced risk of infection
Engesaeter,L.B., 2006	High Quality	INFECTION (revision due to infection)	Intra-Op	27836	(primary total hip arthroplasty with operative time of 51-110 min)	Operative time of 51-70 min vs 71-90 min	Sex, Age, Type Of Systemic Antibiotic Prophylaxis, Duration Of Systemic Prophylaxis, Type Of Operating Room, Duration Of Operation	Cox multiple regression; relative risk, p value	0.5, 0.04	Operative time of 51-70 had reduced risk of revision due to infection compared to 71-90 min group
Engesaeter,L.B., 2006	High Quality	INFECTION (revision due to infection)	Intra-Op	21528	(primary total hip arthroplasty with operative time of 51-110 min)	Operative time of 51-70 min vs 91-110 min	Sex, Age, Type Of Systemic Antibiotic Prophylaxis, Duration Of Systemic Prophylaxis, Type Of Operating Room, Duration Of Operation	Cox multiple regression; relative risk, p value	1.4, 0.3	NS
Fukuda,H., 2016	High Quality	INFECTION (surgical site infection)	Intra-Op	23848	(open reduction of long bone fracture)	Operation duration > 110 min vs 45 min or less	Intercept, Wound Class, ASA, Operation Duration, Age, Gender	Parasimonious model with forward selection; odds ratio (95% CI), p value	4.78 (3.01, 7.58), < 0.001	Operation duration > 110 min is an independent risk factor for developing SSI

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Fukuda,H., 2016	High Quality	INFECTION (surgical site infection)	Intra-Op	23848	(open reduction of long bone fracture)	Operation duration > 45 min vs 45 min or less	Intercept, Wound Class, ASA, Operation Duration, Age, Gender	Parasimonious model with forward selection; odds ratio (95% CI), p value	2.12 (1.33, 3.39), 0.002	Operation duration >45 min is an independent risk factor for developing SSI
Gruskay,J.A., 2014	High Quality	INFECTION		2164	(Anterior Cervical Discectomy and Fusion)	Operative time >171 min vs Operative time <171 min	ASA>3, Preoperative Anemia, Age>=65, Operative Time > 171 Min, Male Sex	Multivariate analysis Odds ratio (95% CI), p-value	2.095 (1.237–3.548), p=0.006	Operative time off >171 min associated with increased risk of infection (compared to <171 min)
Huotari,K., 2007	High Quality	INFECTION (surgical site infection)	Intra-Op	5614	(total hip arthroplasty)	Duration of operation	Age, Sex, Hospital, ASA 3+, Duration Of Operation, Revision, and Simultaneous Bilateral Operation	Multivariate logistic regression analysis with forward selection process; adjusted odds ratio (95% CI), p value	1.007 (1.001, 1.013), 0.008	Duration of surgery is an independent risk factor for SSIs after THA
Huotari,K., 2007	High Quality	INFECTION (surgical site infection)	Intra-Op	4217	(total knee arthroplasty)	Duration of operation	Age, Sex, Hospital, ASA 3+, Duration Of Operation, Revision, and Simultaneous Bilateral Operation	Multivariate logistic regression analysis with forward selection process; adjusted odds ratio (95% CI), p value	1.008 (1.002, 1.014), 0.008	Duration of surgery is an independent risk factor for SSIs after TKA
Jain,R.K., 2015	High Quality	INFECTION		459	(Mixed orthopaedic surgeries)		Age, Sex, Duration Of Surgery, Number Of Days In Hospital, Diabetes, Smoke,, Hypertension, Alcohol	Multinomial logistic regression, Odds ratio, 95% CI, p-value	1.0 (0.994-1.005), p=0.906	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Kurtz,S.M., 2010	High Quality	INFECTION (PJI)		69663	(TKA)	Adjusted hazard ratio for 210+ minutes as compared with less than 120 minutes	Age, Race, Gender, Medicare Buy-In Status, Census Region, Procedure Duration, Hospital Location, Hospital Teaching Status, Hospital Size, Hospital Ownership	Multivariate regression; hazard ratio, p-value	1.59, p<0.0001	Duration of 210+ min associated with increased risk of infection (vs <120 min)
Lee,Q.J., 2015	High Quality	INFECTION (periprosthetic joint infection)	Intra-Op	200	(total knee arthroplasty)	Operating time in minutes	Age, Gender, BMI, Comorbidity (Diabetes, Liver Disease, Heart Disease, Anemia, Thyroid Disease, Renal Disease, Lung Disease, Stroke, Gout), Varicose Vein, Steroid Intake, Dermatitis, Acupuncture, Bilateral Tka, Same Day Surgery, Anesthesia (Spinal), Continuous Femoral Nerve Block, Operating Time, Trainee Surgeon, Drain, Intensive Care Unit Admission, Transfusion, Large Effusion, Blister, Soaked Dressing, Deep Vein Thrombosis, Acute Retention Of Urine, Foley Catheter, Invasive Procedure	Multivariable logistic regression model; p value	0.003	Operating time is an independent risk factor for PJI
Momohara,S., 2011	High Quality	INFECTION (postoperative surgical-site infection)	Baseline	420	(total hip or knee arthroplasty)	Duration of operation in minutes	Sex, Age, BMI, Diabetes Mellitus, Smoking, Past History Of Surgery, Operative Duration, Disease Duration, Preoperative C-Reactive Protein, Preoperative Hemoglobin, Preoperative White Blood Cell, Revision Vs Primary, Tka Vs Tha, Biologic Dmards, Nonbiologic Dmards, Prednisone Dose	Multivariate logistic regression analysis; odds ratio (95% CI), p value	1.01 (1, 1.03), 0.07	NS
Morey,V.M., 2016	High Quality	INFECTION (wound complications)	Intra-Op	3169	(total knee arthroplasty)	Operation time	Age, Gender, BMI, Hba1C, Hemoglobin, Operation Time, Malnutrition	Multivariate logistic regression; odds ratios (95% CI), p value	1.19 (0.24, 5.82), 0.83	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Mortazavi,S.M., 2011	High Quality	Infection Resolution (success or failure of two-stage revision)	Intra-Op	117	(two-stage exchange knee arthroplasty)	Increased operative time at reimplantation	Age, Gender, BMI, Charlson Index, ASA Score, History Of Smoking, Previous 2-Stage, History Of Irrigation and Debridement For Pji In Affected Joint, Operative Time, Results Of Tissue Culture, Infecting Organism Resistance, Surgical Appearance, Irrigation and Debridement Performed, Serology, Joint Aspirate, Time To Reimplantation	Multivariate logistic regression; odds ratio (95% CI), p value	1.01 (1, 1.03), 0.05	Increase operative time at reimplantation resulted in increased risk of failure
Namba,R.S., 2009	High Quality	INFECTION (deep infection)	Intra-Op	22889	(primary total knee arthroplasty)	Operative time of 2 hrs or less vs more than 2 hrs	Age, Sex, Primary Diagnosis (Osteoarthritis Vs Other), ASA, Diabetes, Operative Time, Use Of Antibiotic Loaded Bone Cement	Multivariate stepwise logistic regression analysis (reverse comparison); odds ratio (95% CI), p value	0.7 (0.5, 1), 0.11	NS
Naranje,S., 2015	High Quality	INFECTION		9973	(Primary Total Knee Arthroplasty)	*15 minute increased operative time	Age, Sex	Cox proportional hazard regression, % increase, 95% CI, p-value	15.6% (0.00%-34.0%), p=0.053	NS
Ong,K.L., 2009	High Quality	INFECTION (periprosthetic joint infection)	Intra-Op	39929	(primary total hip arthroplasty (elective and non-elective))	Procedure lasting longer than 210 minutes vs 120 minutes	Age, Sex, Medicare Premium Buy-In Status, Urban Vs Rural Hospital Location, Hospital Teaching Status, Bed Size, Ownership, Procedure Duration, Charlson Index	Cox regression; adjusted odds ratio (95% CI), p value	1.78 (1.4, 2.26), < 0.0001	Infection risk for procedures lasting longer than 210 min was elevated by 78% compared to 120 min

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Ovaska,M.T., 2013	High Quality	INFECTION (deep)		1923	(Ankle fracture treatment)	Surgery duration (>90 min) vs Surgery duration (<90 min)	Tobacco Use, Surgery Duration (>90 Minutes), Application Of Plaster Cast In Operating Room	Multivariable conditional logistic regression analysis; odds Ratio, (95% CI)	2.5 (1.1, 5.7)	Duration of surgery >90 minutes associated with increased risk of infection
Pauzenberger,L., 2017	High Quality	INFECTION (infectious complications)	Intra-Op	3294	(arthroscopic rotator cuff reconstruction)	Duration of surgery over 90 min vs under 90 min	Age, Gender, Duration Of Surgery, Perioperative Antibiotic Prophylaxis	Multivariate regression analysis; odds ratio (95% CI), p value	2.27 (1.01, 5.13), 0.049	Duration of surgery over 90 min significantly associated with higher risk for infection
Pedersen,A.B., 2010	High Quality	INFECTION (revision due to infection during maximum follow-up time of 14 years)	Intra-Op	80756	(primary total hip arthroplasty)	Duration of surgery 121 + min vs < 60	Sex, Age, Charlson Comorbidity Index, Diagnosis For Primary Tha (Osteoarthritis, Femoral Fracture, Non-Traumatic Avn, Inflammatory Arthritis, Other), Previous Surgery To Same Hip, Fixation Technique, Duration Of Surgery, Ossification Of Prophylactic Treatment, Type Of Anesthesia, Operating Theater, Calendar Year Of Surgery	Cox regression model; adjusted relative risk (95% CI)	2.02 (1.49, 2.75)	Duration of surgery 121+ min had an increased risk for revision
Pedersen,A.B., 2010	High Quality	INFECTION (revision due to infection during maximum follow-up time of 14 years)	Intra-Op	80756	(primary total hip arthroplasty)	Duration of surgery 61-90 min vs < 60	Sex, Age, Charlson Comorbidity Index, Diagnosis For Primary Tha (Osteoarthritis, Femoral Fracture, Non-Traumatic Avn, Inflammatory Arthritis, Other), Previous Surgery To Same Hip, Fixation Technique, Duration Of Surgery, Ossification Of Prophylactic Treatment, Type Of Anesthesia, Operating Theater, Calendar Year Of Surgery	Cox regression model; adjusted relative risk (95% CI)	1.14 (0.91, 1.42)	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Pedersen,A.B., 2010	High Quality	INFECTION (revision due to infection during maximum follow-up time of 14 years)	Intra-Op	80756	(primary total hip arthroplasty)	Duration of surgery 91-120 min vs < 60	Sex, Age, Charlson Comorbidity Index, Diagnosis For Primary Tha (Osteoarthritis, Femoral Fracture, Non-Traumatic Avn, Inflammatory Arthritis, Other), Previous Surgery To Same Hip, Fixation Technique, Duration Of Surgery, Ossification Of Prophylactic Treatment, Type Of Anesthesia, Operating Theater, Calendar Year Of Surgery	Cox regression model; adjusted relative risk (95% CI)	1.09 (0.83, 1.44)	NS
Takemoto,R.C., 2017	High Quality	INFECTION (surgical site infection)	Intra-Op	314	(thoracic and/or lumbar spinal surgery)	Operating room time	Age, Sex, Transfusion, Duration Of Antibiotics, Malnourished, Steroid Use, Diabetes, Smoking, Illicit Drug Use, Alcohol Use, Revision Surgery, Body Mass Index, Number Of Levels Fused, Implant, Graft, Operating Room Time, Blood Loss, Duration Of Drain Use, Drain Output Per Day	Multivariate logistic regression; estimated odds ratio, p value	1, 0.129	NS
van Kasteren,M.E., 2007	High Quality	INFECTION (surgical site infection)	Intra-Op	1922	(total hip arthroplasty)	Duration of surgery > 75th percentile	Antibiotic Prophylaxis (Dosage and Timing Of Administration), Use Of Antibiotic-Impregnated Bone Cement, Age, Sex, ASA Score, Duration Of Surgery	Multivariate logistic regression analysis; odds ratio (95% CI), p value	2.5 (1.1, 5.8), 0.04	Patients with surgery duration > 75th percentile were more likely to develop SSIs
Watanabe,M., 2010	High Quality	INFECTION (surgical site infection)	Intra-Op	223	(spinal operations)	Operation duration > 3 hrs vs operation duration of 3 hrs or less	Sex, Age, Smoking History, Diabetes, Obesity, Trauma Or Elective Spine Surgery, Use Of Instrumentation, Long Duration Of Operation, High Estimated Intraoperative Blood Loss, Sufficient Irrigation Of Surgical Site	Multivariate logistic regression analysis; odds ratio (95% CI), p value	0.74 (0.13, 4.28), 0.734	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Willis-Owen,C.A., 2010	High Quality	INFECTION (infection)	Intra-Op	5277	(primary hip and knee replacement)	Longer operative time	Age, Gender, Surgeon, Operating Theater, Time Of Entry To The Operating Theater To The Time Of Exit, Presence Or Absence Of A Drain, Operative Procedure (Total Hip Replacement, Total Knee Replacement, Medial Unicompartmental Knee Replacement)	Generalized linear modeling; z, p value	4.325, < 0.001	Longer operating times were associated with higher incidence of infection
Yano,K., 2009	High Quality	INFECTION (surgical site infection)	Intra-Op	2423	(orthopedic surgery)	Length of surgical procedure per 10 minute increase	Culture Of NASAl Mrsa, Sex, Age, Length Of Surgical Procedure, ASA Class, BMI, Usage Of Prosthesis, Site Of Infection, Open Fracture, History Of Diabetes Mellitus, History Of Rheumatoid Arthritis	Multivariate logistic regression; odds ratio (95% CI), p value	1 (1, 1.1), 0.2	NS
Zhou,Z.Y., 2015	High Quality	INFECTION	Baseline	76	(surgical fixation for unstable ankle fractures)	VAC length of surgery (74.2-108.6min) vs SMWC length of surgery (71.3-102.5min)	Vacuum Assisted Closure Vs Standard Moist Wound Care, Age, Gender, Preoperative Fbg, BMI, Smoking, Open Vs Closed Fracture, Fracture Severity, Emergency Vs Elective Surgery, Length Of Surgery	Multivariable mixed-effects logistic regression analysis(odds ratio (95%CI))	1.078 (0.976 to 1.157)	NS

PICO 2 Modifiable Risk Factors: Part 19: **Perfusion**

*Summary of Findings Table 19: **Perfusion***

	Waikakul,S., 1999	Moderate Quality
↑ **Better Outcomes** ↓ **Worse Outcomes** ● **Not Significant**		
INFECTION(infection)	↓	

Waikakul,S., 1999: 300mg allopurinol orally after arrival in hospital and continued dose of 300mg/day for 5 days vs No allopurimol use

Table 1919: Perfusion

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Waikakul,S., 1999	Moderate Quality	INFECTION (infection)		.	(300mg allopurinol orally after arrival in hospital and continued dose of 300mg/day for 5 days) vs control					Infection less severe in control group

PICO 2 Modifiable Risk Factors: Part 20: **Post-Op Oxygenation**

*Summary of Findings Table 20: **Post-Op Oxygenation***

	High Quality	Moderate Quality			
↑ **Better Outcomes** ↓ **Worse Outcomes** ● **Not Significant**	Helito,C.P., 2014	Stall,A., 2013	Elward,A., 2015	Maragakis,L.L., 2009	Johnson,D.P., 1993
INFECTION					↓
INFECTION(surgical site infection)			●	↓	
INFECTION(deep infection)	●				
INFECTION(superficial infection)	●				
INFECTION(surgical site infection within first 12 postop weeks)		●			

Maragakis,L.L., 2009: Fraction of inspired oxygen < 50%

Johnson,D.P., 1993: Severe or prolonged wound hypoxia

Table 2020: Post-Op Oxygenation

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Elward,A., 2015	Moderate Quality	INFECTION (SSI)		36	(Craniotomy)	FIO2 fraction administered	N/A	Univariate analysis; OR, 95% CI, p-value	-0.19, (-0.5, 0.12), 0.25	NS
Elward,A., 2015	Moderate Quality	INFECTION (SSI)		40	(Spinal Fusion)	FIO2 fraction administered	N/A	Univariate analysis; OR, 95% CI, p-value	0.04, (-0.23, 0.30), 0.1	NS
Elward,A., 2015	Moderate Quality	INFECTION (SSI)		76	(Craniotomy and Spinal Fusion)	FIO2 fraction administered	N/A	Univariate analysis; OR, 95% CI, p-value	-0.07, (-0.27, 0.13), 0.5	NS
Helito,C.P., 2014	High Quality	INFECTION (superficial infection)		109	(Total knee arthroplasty)	Post-op Oxygenation vs none	Groups Did Not Differ By Gender, Age, Weight, BMI, Procedure Duration Or Crystalloid Administration	P-value (Fisher's exact test, the chi-square test or the Mann-Whitney test, authors don't specify	0.999	NS
Helito,C.P., 2014	High Quality	INFECTION (deep infection)		109	(Total knee arthroplasty)	Post-op Oxygenation vs none	Groups Did Not Differ By Gender, Age, Weight, BMI, Procedure Duration Or Crystalloid Administration		No subjects developed deep infection	NS
Johnson,D.P., 1993	Moderate Quality	INFECTION		47	(Primary knee replacement)	Severe or prolonged wound hypoxia	N/A	Contingency table; p-value	$p<0.01$	Severe or prolonged wound hypoxia associated with increased risk of infection

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Maragakis,L.L., 2009	Moderate Quality	INFECTION (surgical site infection)	Intra-Op	3894	(spinal surgery (laminectomy or spinal fusion))	Fraction of inspired oxygen < 50%	Procedure Duration, ASA Score, Lumbar-Sacral Level Of Surgery, Posterior Surgical Approach, Instrumentation, Obesity, Razor Shaving Before Surgery, Fraction Of Inspired Oxygen	Multivariate forward logistic regression; odds ratio (95% CI), p value	12 (4.5, 33), < 0.001	Fraction of inspired oxygen < 50% is an independent risk factor for developing SSI
Stall,A., 2013	Moderate Quality	INFECTION (surgical site infection within first 12 postop weeks)	Intra-Op	235	(open reduction and internal fixation)	80 % vs 30 % oxygen treatment	Age, Length Of Hospital Stay, Operative Time, Fracture Classification, BMI, ASA	Multivariate logistic regression; adjusted odds ratios (95% CI), p value	0.54 (0.22, 1.29), 0.17	NS

PICO 2 Modifiable Risk Factors: Part 21: **Pre-surgical skin Prep**

*Summary of Findings Table 21: **Pre-surgical skin Prep***

	High Quality		
↑ **Better Outcomes** ↓ **Worse Outcomes** ● **Not Significant**	Morrison,T.N., 2016	Hort,K.R., 2002	Hunter,J.G., 2016
INFECTION(wound infection)		●	
INFECTION(Superficial SSI - based on hematologic, microbiologic, and physical exam (diagnosis by surgeon))	●		
INFECTION(Deep SSI - based on hematologic, microbiologic, and physical exam)	●		
INFECTION(positive culture)			↓

Hunter,J.G., 2016: Skin prep with isopropyl alcohol (4% chlorhexidine based solution followed by 70% isopropyl alcohol) gluconate-based solution) vs chlorhexidine gluconate (70% isopropyl alchohol followed by 4% chlorhexidine

Table 2121: Pre-surgical skin prep

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Hort,K.R., 2002	High Quality	INFECTION (Wound infection)		.	(Standard surgical regimen)		N/A			NS
Hort,K.R., 2002	High Quality	INFECTION (Wound infection)		.	(Standard surgical regimen plus alcohol)		N/A			NS
Hunter,J.G., 2016	High Quality	INFECTION (positive culture)	Baseline	95	(foot and ankle orthopedic procedures)	Skin prep with isopropyl alcohol (4% chlorhexidine based solution followed by 70% isopropyl alcohol) vs chlorhexidine gluconate (70% isopropyl alchohol followed by 4% chlorhexidine gluconate-based solution)	Diabetes, Immunocompromised Patients, Obesity, Tobacco Use, Operative Procedure Duration, Solution Treatment Order	Logistic regression; odds ratio (95% CI)	4.53 (1.32, 20.96)	The odds of having a positive swab were significantly higher in the IPA group compared with CHG
Morrison,T.N., 2016	High Quality	INFECTION (Superficial SSI - based on hematologic, microbiologic, and physical exam (diagnosis by surgeon))		.	(Repeat skin antisepsis after standard draping)		N/A			NS
Morrison,T.N., 2016	High Quality	(Deep SSI - based on hematologic, microbiologic, and physical exam)		.	(Repeat skin antisepsis after standard draping)		N/A			NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Morrison,T.N., 2016	High Quality	INFECTION (Superficial SSI - based on hematologic, microbiologic, and physical exam (diagnosis by surgeon))		.	(Control - standard antisepsis)		N/A			NS
Morrison,T.N., 2016	High Quality	(Deep SSI - based on hematologic, microbiologic, and physical exam)		.	(Control - standard antisepsis)		N/A			NS

PICO 2 Modifiable Risk Factors: Part 22: SSI

Summary of Findings Table 22: SSI

	High Quality	
↑ **Better Outcomes** ↓ **Worse Outcomes** ● **Not Significant**	Tornero,E., 2015	Mortazavi,S.M., 2010
INFECTION(deep infection)		↓
INFECTION(early PJI (within first 90 postop days) and without signs of prosthesis loosening)	↓	

Tornero,E., 2015: All intraoperative cultures positive

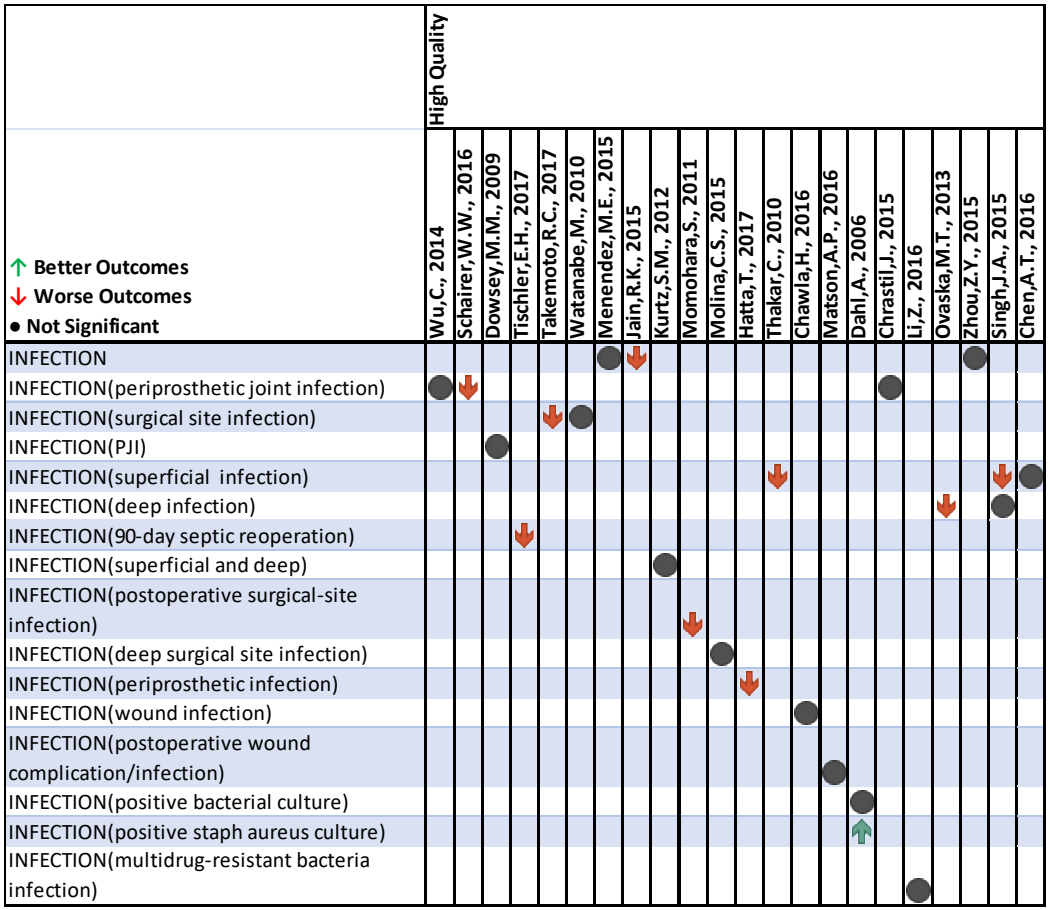
Mortazavi,S.M., 2010: Patients with septic indication for revision vs aseptic indication for revision

Table 2222: SSI

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Mortazavi,S.M., 2010	High Quality	INFECTION (deep infection)	Baseline	499	(revision total knee arthroplasty)	Patients with septic indication for revision vs aseptic indication for revision	Age, Gender, Comorbidities, Transfusion, Positive Serology	Stepwise multiple logistic regression; hazard ratio (95% CI)	2.24 (1.31, 3.82), < 0.01	Patients with septic indiciation for revision had a higher risk of developing deep infection
Tornero,E., 2015	High Quality	INFECTION (early PJI (within first 90 postop days) and without signs of prosthesis loosening)	Intra-Op	222	(hip or knee arthroplasty)	All positive intraoperative cultures	Age, Gender, Comorbidities, Indication For Previous Surgery, Laterality, Type Of Cementation, Site Of Arthroplasty, Age Of Prosthesis Until Debridement, Days Between Diagnosis and Debridement, Polyethylene Exchange During Debridement, Need Flap For Skin Coverage, Clinical Signs, Leucocyte Count, Crp, Creatinine, Glycaemia, Percentage Of Positive Cultures, Polymicrobial Infection, Presence Of Microorganism	Stepwise forward logistic regression; odds ratio (95% CI)	6.3 (1.84, 21.53)	All positive intraoperative cultures are an independent risk factor for developing early PJI

PICO 2 Modifiable Risk Factors: Part 23: **Tobacco Use**

*Summary of Findings Table 23: Tobacco **SSI***



Schairer,W.W., 2016: Tobacco use

Tischler,E.H., 2017: Current smoker vs nonsmoker; (other comparisons not significant)

Takemoto,R.C., 2017: Tobacco use

Jain,R.K., 2015: Tobacco use

Momohara,S., 2011: Tobacco use

Hatta,T., 2017: Tobacco use

Thakar,C., 2010: Tobacco use

Dahl,A., 2006: Smoker vs non-smoker (looking specifically at S. aureus infection)

Singh,J.A., 2015: (Tobacco use)

Ovaska,M.T., 2013: Tobacco use vs. no tobacco use

Table 2323: Tobacco Use

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Chawla,H., 2016	High Quality	INFECTION (wound infection)	Baseline	693	(unicompartmental knee arthroplasty)	Smoking	Age, Gender, Body Mass Index, Smoking, Diabetes, Renal Insufficiency, Immunosuppressed Or Immunocompromised, Operative Time, Barbed Suture	Binary logistic regression; odds ratio (95%CI), p value	0.658 (0.122, 2.35), 0.4959	NS
Chen,A.T., 2016	High Quality	INFECTION (deep infection)	Baseline	257	(definitive fixation, skin, or planned bone grafting)	Smoking vs no smoking	Age, Gender, Iss, Number Of Total Fractures, Number Of Open Fractures, Presence Of Gustilo Type Iii B Or C Fracture, Smoking	Multivariate regression; p value	0.097	NS
Chrastil,J., 2015	High Quality	INFECTION (periprosthetic joint infection)	Baseline	13272	(primary total joint arthroplasty)	Ever smoker vs never smoker	Preoperative Hba1C, Preoperative Glucose, Age, Gender, Body Mass Index, Cci Per Point, Joint Arthroplasty, Total Hip Vs Knee Arthroplasty, Diabetic Complications, Smoking Status	Multivariable Cox proportional hazard model; hazard ratios (95% CI), p value	1.157 (0.898, 1.491), 0.259	NS
Dahl,A., 2006	High Quality	INFECTION (positive bacterial culture)	Baseline	106	(hemicallotasis osteotomy)	Smoker vs non-smoker	Gender, Age, BMI, Dosage and Time Of Infection Prophylaxis, Hospital Stay, Smoking	Multivariate regression; odds ratio (95% CI)	0.6 (0.2, 1.8)	NS
Dahl,A., 2006	High Quality	INFECTION (positive staph aureus culture)	Baseline	106	(hemicallotasis osteotomy)	Smoker vs non-smoker	Gender, Age, BMI, Dosage and Time Of Infection Prophylaxis, Hospital Stay, Smoking	Multivariate regression; odds ratio (95% CI)	0.2 (0.05, 0.8)	Non-smoking patients are at risk for the presence of S. aureus

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Dowsey,M.M., 2009	High Quality	INFECTION (PJI)	1 Days	1214	(Elective total knee arthroplasty)		Cardiovascular Disease, Diabetes, Respiratory Comorbidity, Smoking, Obesity (BMI 30-39 Kg/M^2), Morbid Obesity (BMI >= 40 Kg/M^2), Ra, Transfusion, Drain Tube, Antibiotic Cement, Gender, Age (65-74Yrs vs <65 Yrs), Age (>=75 Yrs vs <65 Yrs)	Multiple logistic regression; Odds ratio, 95% CI, p-value	2.31 (0.44-12.14), p=0.323	NS
Hatta,T., 2017	High Quality	INFECTION (periprosthetic infection)	Baseline	1834	(primary shoulder arthroplasty)		Smoking Status, Sex, Age At Surgery, BMI, Total Vs Reverse Shoulder Arthroplasty, Rheumatoid Arthritis, Diabetes Mellitus	Multivariable Cox regression; hazard ratio (95% CI), p value	5.36 (1.91, 19.11), <0.001	smoking was significantly associated with higher risk of periprosthetic infection
Jain,R.K., 2015	High Quality	INFECTION		459	(Mixed orthopaedic surgeries)		Age, Sex, Duration Of Surgery, Number Of Days In Hospital, Diabetes, Smoke,, Hypertension, Alcohol	Multinomial logistic regression, odds ratio, 95% CI, p-value	38.319 (14.109-104.076), p=0.000	smoking associated with SSI
Kurtz,S.M., 2012	High Quality	INFECTION (superficial and deep)	1.4 weeks	15674	(Instrumented lumbar spine fusion)		Sex, Age, Race, Hx Smoking, Diabetes, Obesity, Cci, State Buy-In Of Medicare Premium, Census Region, Previous Spine Surgery, Allograft Use, No. Segments Fused, Op Approach, Transfusion, Yr Of Index Procedure	Multivariate Cox regression; p-value	p=0.2567	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Li,Z., 2016	High Quality	INFECTION (multidrug-resistant bacteria infection)	Baseline	933	(rigid internal fixation of mandibular fracture)	Smoking	Mean Age, Gender, Smoking, Obesity, Polytrauma, Preoperative Infection, Comminuted Fracture, Open Fractures, Accompanied By Other Facial Fractures, Tooth On Fracture Line	Multivariate logistic regression; odds ratios (95% CI), p value	1.49 (0.31, 7.19), 0.619	NS
Matson,A.P., 2016	High Quality	INFECTION (postoperative wound complication/infection)	Baseline	242	(open reduction and internal fixation (ORIF))	Tobacco usage vs no tobacco usage	Gender, Age, Diabetes Mellitus, Tobacco Usage, Obesity, Low-Energy Mechanism, Delay Of Definitive Management	Multivariate logistic regression; odds ratios (95% CI), p value	0.609 (0.134, 2.766), 0.517	NS
Menendez,M.E., 2015	High Quality	INFECTION		44305	(Hand surgery (mixed procedures))		Age, Sex, Insurance Status (Medicare, Medicaid, Private, Other), Patient Location (Urban, Rural), Smoking, Obesity, Diabetes	Multivariate logistic regression; odds ratio, 95% CI	1.38 (0.89-2.15)	NS
Molina,C.S., 2015	High Quality	INFECTION (deep surgical site infection)	Baseline	355	(ORIF)		Age, Race, Sex, Hypertension, Diabetes, Active Smoker, Open Fracture, Ao/Ota 43C3	Multivariate regression analysis; odds ratio (95% CI); p value	1.75 (0.94, 3.26); 0.08	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Momohara,S., 2011	High Quality	INFECTION (postoperative surgical-site infection)	Baseline	420	(total hip or knee arthroplasty)		Sex, Age, BMI, Diabetes Mellitus, Smoking, Past History Of Surgery, Operative Duration, Disease Duration, Preoperative C-Reactive Protein, Preoperative Hemoglobin, Preoperative White Blood Cell, Revision Vs Primary, Tka Vs Tha, Biologic Dmards, Nonbiologic Dmards, Prednisone Dose	Multivariate logistic regression analysis; odds ratio (95% CI), p value	0.16 (0.02, 1.37), 0.09	Patients more easily developed surgical site infections if they had a history of smoking
Ovaska,M.T., 2013	High Quality	INFECTION (deep)		1923	(Ankle fracture treatment)	Tobacco use vs no Tobacco use	Tobacco Use, Surgery Duration (>90 Minutes), Application Of Plaster Cast In Operating Room	Multivariable conditional logistic regression analysis (Odds Ratios (95% CI))	3.7 (1.6, 8.5)	Tobacco use associated with increased risk of infection

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Schairer,W.W., 2016	High Quality	INFECTION (periprosthetic joint infection)	Baseline	173958	(total hip arthroplasty)	Tobacco use	Tha Timing After Injection, Greater Than 1 Injection In Prior Year, Age, Gender, Tobacco Use, Transfusion Allogenic Or Autogenic, Obesity, Diabetes, Peripheral Vascular Disease, Congestive Heart Failure, Hiv/Aids, Tumor Without Metastases, Metastatic Tumor, Cardiac Arrhythmia, Blood Loss Anemia, Deficiency Anemia, Renal Failure, Chronic Pulmonary Disease, Pulmonary Circulatory Disorder, Liver Disease, Depression	Multivariable Cox proportional hazard model; hazard ratio (95% CI), p value	1.17 (1.02, 1.33), 0.024	Patients with tobacco use were more likely to develop PJI
Singh,J.A., 2015	High Quality			7926	(Primary THA or TKA)	(Deep infection)	Age, Sex, Tobacco Use	Multivariable-adjusted hazard ratio, 95 CI, p-value	2.37 (1.19, 4.72), 0.01	Smoking significantly increases risk for deep infection
Singh,J.A., 2015	High Quality			7926	(Primary THA or TKA)	(Superficial infection)	Age, Sex, Tobacco Use	Multivariable-adjusted hazard ratio, 95 CI, p-value	1.07 (0.37, 3.09), 0.90	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Takemoto,R.C., 2017	High Quality	INFECTION (surgical site infection)	Baseline	314	(thoracic and/or lumbar spinal surgery)	Smoking	Age, Sex, Transfusion, Duration Of Antibiotics, Malnourished, Steroid Use, Diabetes, Smoking, Illicit Drug Use, Alcohol Use, Revision Surgery, Body Mass Index, Number Of Levels Fused, Implant, Graft, Operating Room Time, Blood Loss, Duration Of Drain Use, Drain Output Per Day	Multivariate logistic regression; estimated odds ratio, p value	3.53, 0.002	Smoking is an independent risk factor for developing SSI
Thakar,C., 2010	High Quality	INFECTION (deep infection)	Baseline	2360	(initial surgical fixation)	Smoking	Cardiovascular Disease, Stroke, Respiratory Disease, Renal Disease, Diabetes, Rheumatoid Disease, Dementia, Parkinson'S Disease, Malignancy, Smoking, Enternal Steroids, Warfarin, Consultant As Surgeon, Transfused Preoperatively, Transfused Postoperatively	Direct logistical regression; odds ratio (95% CI), p value	23.3 (1.45, 373.64), 0.03	Smoking is an independent risk factor for developing deep infection

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Tischler,E.H., 2017	High Quality	INFECTION (90-day septic reoperation)	Baseline	17394	(primary total hip or total knee arthroplasty)	Current smoker vs nonsmoker	Simultaneous Bilateral Joint Arthroplasty, Staged Bilateral Total Joint Arthroplasty, Total Knee Vs Total Hip Arthroplasty, Age, BMI, Gender, Former Smoker Vs Nonsmoker, Current Smoker Vs Nonsmoker, Packs Per Decade, Charlson Comorbidity Index Score	Multivariate analysis; odds ratio (95% CI), p value	1.82 (1.03, 3.23), 0.04	current smokers are more likely than nonsmokers to undergo septic reoperation within 90 days
Tischler,E.H., 2017	High Quality	INFECTION (90-day septic reoperation)	Baseline	17394	(primary total hip or total knee arthroplasty)	Former smoker vs nonsmoker	Simultaneous Bilateral Joint Arthroplasty, Staged Bilateral Total Joint Arthroplasty, Total Knee Vs Total Hip Arthroplasty, Age, BMI, Gender, Former Smoker Vs Nonsmoker, Current Smoker Vs Nonsmoker, Packs Per Decade, Charlson Comorbidity Index Score	Multivariate analysis; odds ratio (95% CI), p value	1.11 (0.73, 1.69), 0.61	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Tischler,E.H., 2017	High Quality	INFECTION (90-day septic reoperation)	Baseline	17394	(primary total hip or total knee arthroplasty)	Packs per decade	Simultaneous Bilateral Joint Arthroplasty, Staged Bilateral Total Joint Arthroplasty, Total Knee Vs Total Hip Arthroplasty, Age, BMI, Gender, Former Smoker Vs Nonsmoker, Current Smoker Vs Nonsmoker, Packs Per Decade, Charlson Comorbidity Index Score	Multivariate analysis; odds ratio (95% CI), p value	1.02 (0.93, 1.12), 0.65	NS
Watanabe,M., 2010	High Quality	INFECTION (surgical site infection)	Baseline	223	(spinal operations)	Smoking history vs no smoking history	Sex, Age, Smoking History, Diabetes, Obesity, Trauma Or Elective Spine Surgery, Use Of Instrumentation, Long Duration Of Operation, High Estimated Intraoperative Blood Loss, Sufficient Irrigation Of Surgical Site	Multivariate logistic regression analysis; odds ratio (95% CI), p value	1.86 (0.45, 7.65), 0.39	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Wu,C., 2014	High Quality	INFECTION (periprosthetic joint infection)	Baseline	297	(total hip arthroplasty or total knee arthroplasty)	Tobacco use	Diabetes, Age, BMI, Place Of Residence, Alcohol Abuse, Treatment Of Diabetes, Chronic Pulmonary Disease, Hypertension, Substance Abuse, Cerebral Infarction, Dental Procedure W/ Or W/O Antibiotics, Renal Disease, Gout, Cardiovascular Event, Chronic Liver Disease, Anemia, Tobacco Use, Ankylosing Spondylitis, Tha Vs Tka, Gender, Prostatic Disease, Oncologic Disease, Neurologic Disease, History Of Tuberculosis, Rheumatoid Arthritis Vs Osteoarthritis, Femoral Head Necrosis, Developmental Hip Dysplasia, Fracture	Multivariate conditional logistic regression analysis; odds ratio (95% CI), p value	1.29 (0.35, 4.76), 0.703	NS
Zhou,Z.Y., 2015	High Quality	INFECTION	Baseline	76	(surgical fixation for unstable ankle fractures)	Smoker vs non-smoker	Vacuum Assisted Closure Vs Standard Moist Wound Care, Age, Gender, Preoperative Fbg, BMI, Smoking, Open Vs Closed Fracture, Fracture Severity, Emergency Vs Elective Surgery, Length Of Surgery	Multivariable mixed-effects logistic regression analysis(odds ratio (95%CI))	1.392 (0.759 to 2.449)	NS

PICO 2 Modifiable Risk Factors: Part 24: **Tourniquet**

*Summary of Findings Table 24: **Tourniquet***

	High Quality	Moderate Quality					
↑ **Better Outcomes** ↓ **Worse Outcomes** ● **Not Significant**	Willis-Owen,C.A., 2010	Chiu,F.Y., 2009	Abdel-Salam,A., 1995	Parkkinen,M., 2016	Kourbatova,E.V., 2005	Zgonis,T., 2004	Ren,T., 2015
INFECTION(surgical site infection)							●
INFECTION(PJI)					↓		
INFECTION	↓	●	●				
INFECTION(deep surgical site infection)				↑			
INFECTION(postoperative wound infection)						●	

Willis-Owen,C.A., 2010: Longer tourniquet times

Parkkinen,M., 2016: Tourniquet use

Kourbatova,E.V., 2005: Tourniquet time for TKA (OR per minute)

Table 2424: Tourniquet

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Abdel-Salam,A., 1995	Moderate Quality	INFECTION	Post-Op	.	(Tourniquet use)		N/A			Not reported
Abdel-Salam,A., 1995	Moderate Quality	INFECTION	Post-Op	.	(No tourniquet use)		N/A			Not reported
Chiu,F.Y., 2009	Moderate Quality	INFECTION		.	(Revision total knee arthroplasty)		N/A			NS
Kourbatova,E.V., 2005	Moderate Quality	INFECTION (PJI)	1 Days	34	(Total knee or total hip arthroplasty (tourniquet time may only be reported for TKA))	Tourniquet time for TKA (OR per minute)	None	Univariate analysis; odds ratio, 95% CI, p-value	1.25 (1.01-1.53) .04	tourniquet time associated with risk of SSI
Parkkinen,M., 2016	Moderate Quality	INFECTION (deep surgical site infection)	Intra-Op	170	(open reduction and plate fixation of proximal tibial fractures)	Tourniquet use	Age, ASA Grade, BMI, Tobacco Use, Alcohol Abuse, Ota/Ao-Type Fractures, Open Fracture, Compartment Syndrome, Use Of External Fixator, Use Of External Fixator For Bicondylar Fractures Only, Mean Time From Injury To Definitive Surgical Procedure, Mean Operative Time, Use Of A Tourniquet, Mean Tourniquet Time, Dual-Incision Approach, Bicondylar Plating	Univariate logistic regression; odds ratio (95% CI), p value	0.3 (0.1, 0.6), < 0.001	Use of a tourniquet is a protective factor for developing deep SSI
Parkkinen,M., 2016	Moderate Quality	INFECTION (deep surgical site infection)	Intra-Op	170	(open reduction and plate fixation of proximal tibial fractures)	Mean tourniquet time in minutes	Age, ASA Grade, BMI, Tobacco Use, Alcohol Abuse, Ota/Ao-Type Fractures, Open Fracture, Compartment Syndrome, Use Of External Fixator, Use Of External Fixator For Bicondylar Fractures Only, Mean Time From Injury To Definitive Surgical Procedure, Mean Operative Time, Use Of A Tourniquet, Mean Tourniquet Time, Dual-Incision Approach, Bicondylar Plating	Univariate logistic regression; odds ratio (95% CI), p value	1 (1, 1.1), 0.11	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Ren,T., 2015	Moderate Quality	INFECTION (surgical site infection)	Intra-Op	519	(surgical fixation of pilon fracture)	Tourniquet use	Smoking History, Fracture Grade, Ao/Otc, Duration Of Surgery, Use Of A Drain, Time From Injury To Surgery, Estimated Blood Loss, Bone Graft Use, Temporary External Fixation, Tourniquet Use, Definitive Fixation, Surgery Approach, Total Number Of Persons In The Operating Room	Univariate analysis; odds ratio, (95% CI), p value	0.63 (0.19, 2.14), 0.459	NS
Willis-Owen,C.A., 2010	High Quality	INFECTION (infection)	Intra-Op	3449	(primary knee replacement with use of tourniquet)	Longer tourniquet times	Age, Gender, Surgeon, Operating Theater, Time Of Entry To The Operating Theater To The Time Of Exit, Presence Or Absence Of A Drain, Operative Procedure (Total Hip Replacement, Total Knee Replacement, Medial Unicompartmental Knee Replacement)	Generalized linear modeling; z, p value	2.867, 0.00414	Longer tourniquet times were associated with a higher incidence of infection
Zgonis,T., 2004	Moderate Quality	INFECTION (Postoperative wound infection)		555	(Elective foot and ankle surgery)	Tourniquet use	N/A	Logistic regression; p-value	p>0.01	NS

PICO 2 Modifiable Risk Factors: Part 25: **Wound Closure**

*Summary of Findings Table 25: **Wound Closure***

	High Quality										
↑ **Better Outcomes** ↓ **Worse Outcomes** ● **Not Significant**	**Dowsey,M.M., 2009**	**Takemoto,R.C., 2017**	**Omeis,I.A., 2011**	**Chawla,H., 2016**	**Zhou,Z.Y., 2015**	**Hutter,G., 2014**	**Mudd,C.D., 2014**	**Wright,N.M., 2015**	**Boehm,T.D., 2005**	**Ovadia,D., 1997**	**Buttaro,M.A., 2015**
INFECTION(deep infection)									●		●
INFECTION(wound infection)										●	
INFECTION(meningitis or subcutaneous infection)						●					
INFECTION					↑						
INFECTION(surgical site infection)		↓	↓								
INFECTION(PJI)	↓										
INFECTION(wound infection)				↓			●				
INFECTION(postoperative surgical site infection)								●			
INFECTION(postoperative superficial surgical site infection)								●			
INFECTION(postoperative deep surgical site infection)								●			

Dowsey,M.M., 2009: Drain tube use

Takemoto,R.C., 2017: Duration of drain use

Omeis,I.A., 2011: Complex plastic closure vs without Complex plastic closure

Chawla,H., 2016: Use of barbed suture vs Conventional suture

Zhou,Z.Y., 2015: Vacuum assisted closure vs standard moist wound care

Table 2525: Wound Closure

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Boehm,T.D., 2005	High Quality	INFECTION (Deep Infection)	Post-Op	.	(Non-absorbable braided No. 3 Ethibond (0.7 mm diameter) and modified Mason-Allen technique)		N/A			Not reported
Boehm,T.D., 2005	High Quality	INFECTION (Deep Infection)	Post-Op	.	(Absorbable braided PDS cord (1.0 mm) and modified Kessler technique)		N/A			Not reported
Buttaro,M.A., 2015	High Quality	INFECTION (Deep Infection)		.	(Wound closure with skin staples)		N/A			NS
Buttaro,M.A., 2015	High Quality	INFECTION (Deep Infection)	1.5 months	.	(Wound closure with skin staples)		N/A			NS
Buttaro,M.A., 2015	High Quality	INFECTION (Deep Infection)		.	(Continuous 3.0 intradermal non-absorbable polypropylene suture)		N/A			NS
Buttaro,M.A., 2015	High Quality	INFECTION (Deep Infection)	1.5 months	.	(Continuous 3.0 intradermal non-absorbable polypropylene suture)		N/A			NS
Chawla,H., 2016	High Quality	INFECTION (wound infection)	Intra-Op	693	(unicompartmental knee arthroplasty)	Use of barbed suture	Age, Gender, Body Mass Index, Smoking, Diabetes, Renal Insufficiency, Immunosuppressed Or Immunocompromised, Operative Time, Barbed Suture	Binary logistic regression; odds ratio (95%CI), p value	22.818 (2.693, 2923.91), 0.0074	Use of barbed suture is an independent risk factor for developing wound infection

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Dowsey,M.M., 2009	High Quality	INFECTION (PJI)	1 Days	1214	(Elective total knee arthroplasty)	Drain tube	Cardiovascular Disease, Diabetes, Respiratory Comorbidity, Smoking, Obesity (BMI 30-39 Kg/M^2), Morbid Obesity (BMI >= 40 Kg/M^2), Ra, Transfusion, Drain Tube, Antibiotic Cement, Gender, Age (65-74Yrs vs <65 Yrs), Age (>=75 Yrs vs <65 Yrs)	Multiple logistic regression; odds ratio, 95% CI, p-value	0.24 (0.06-0.95), p=0.042	drain tube associated with increased risk of infection
Hutter,G., 2014	High Quality	INFECTION (meningitis or subcutaneous infection)	1 Days	.	(TachoSil plus dural suture)		N/A			NS
Hutter,G., 2014	High Quality	INFECTION (meningitis or subcutaneous infection)	1 Days	.	(Dural suture only)		N/A			NS
Mudd,C.D., 2014	High Quality	INFECTION (Wound infection)	Post-Op	.	(3-0 monocryl suture and sealed with 2-octyl cyanoacrylate (OCA))		N/A			NS
Mudd,C.D., 2014	High Quality	INFECTION (Wound infection)	Post-Op	.	(Metallic staples)		N/A			NS
Omeis,I.A., 2011	High Quality	INFECTION (surgical site infection)	Intra-Op	227	(spinal tumor surgery)	Complex plastic closure	Men, Increasing Age, Previous Surgery, Complex Plastic Closure, Use Of Drain In Primary Surgery, Blood Transfusions In Primary Surgery, Increasing Number Of Comorbidities, Hospital Acquired Infection During Primary Surgery, Preoperative Radiotherapy, Use Of Allograft, Increasing Number Of Levels Fused, Duration Of Hospital Stay, Posterolateral Fusion	Multivariate logistic regression; adjusted odds ratios (95% CI), p value	4.54 (1.08, 19.07), 0.039	Use of complex plastic closure shows an increased likelihood of developing postoperative SSI
Ovadia,D., 1997	High Quality	INFECTION (Wound infection)		.	(With wound drain)					NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Ovadia,D., 1997	High Quality	INFECTION (Wound infection)		.	(Without wound drain)		N/A			NS
Ovadia,D., 1997	High Quality	INFECTION (Wound infection)		.	(With wound drain)		N/A			0 Events; no p-value reported
Ovadia,D., 1997	High Quality	INFECTION (Wound infection)		.	(Without wound drain)		N/A			0 Events; no p-value reported
Takemoto,R.C., 2017	High Quality	INFECTION (surgical site infection)	Post-Op	314	(thoracic and/or lumbar spinal surgery)	Duration of drain use	Age, Sex, Transfusion, Duration Of Antibiotics, Malnourished, Steroid Use, Diabetes, Smoking, Illicit Drug Use, Alcohol Use, Revision Surgery, Body Mass Index, Number Of Levels Fused, Implant, Graft, Operating Room Time, Blood Loss, Duration Of Drain Use, Drain Output Per Day	Multivariate logistic regression; estimated odds ratio, p value	1.42, 0.012	Duration of drain use is an independent risk factor for developing SSI
Wright,N.M., 2015	High Quality	INFECTION (postoperative surgical site infection)	Intra-Op	97	(spinal surgery)	Spinal sealant vs standard of care control	Baseline BMI	2-sided Fischer exact test; p value	0.4	NS
Wright,N.M., 2015	High Quality	INFECTION (postoperative superficial surgical site infection)	Intra-Op	97	(spinal surgery)	Spinal sealant vs standard of care control	Baseline BMI	2-sided Fischer exact test; p value	0.64	NS
Wright,N.M., 2015	High Quality	INFECTION (postoperative deep surgical site infection)	Intra-Op	97	(spinal surgery)	Spinal sealant vs standard of care controlspinal sealant vs standard of care control	Baseline BMI	2-sided Fischer exact test; p value	0.44	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Zhou,Z.Y., 2015	High Quality	INFECTION	Baseline	76	(surgical fixation for unstable ankle fractures)	Vacuum assisted closure (BMI 22.6-29.8 group) vs Standard moist wound care (BMI 23.4-30.4 group)	Vacuum Assisted Closure Vs Standard Moist Wound Care, Age, Gender, Preoperative Fbg, BMI, Smoking, Open Vs Closed Fracture, Fracture Severity, Emergency Vs Elective Surgery, Length Of Surgery	Multivariable mixed-effects logistic regression analysis; odds ratio, (95%CI)	1.024 (0.915 to 1.179)	NS
Zhou,Z.Y., 2015	High Quality	INFECTION	Baseline	76	(surgical fixation for unstable ankle fractures)	Vacuum assisted closure vs standard moist wound care	Vacuum Assisted Closure Vs Standard Moist Wound Care, Age, Gender, Preoperative Fbg, BMI, Smoking, Open Vs Closed Fracture, Fracture Severity, Emergency Vs Elective Surgery, Length Of Surgery	Multivariable mixed-effects logistic regression analysis; odds ratio, (95%CI)	0.324 (0.092 to 0.804)	vacuum assisted closure can decrease total SSI rate compared with standard moist wound care

Surgical Site Infection: Treatment

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PICO 3 Antibiotics

Quality Evaluation Table 1: Observational

Study	Design	Participant Recruitment	Allocation	Confounding Variables	Follow-Up Length	Other Bias? (If retrospective comparative, mark Yes)	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
El Helou,O.C., 2008	○	●	●	◑	●	○	●	●	●	Include	Low Quality
El Helou,O.C., 2010	○	●	●	●	●	●	●	●	●	Include	Low Quality
Hsieh,P.H., 2009	○	●	●	◑	●	○	●	●	●	Include	Low Quality
Lizaur-Utrilla,A., 2015	○	●	●	◑	●	○	●	●	●	Include	Low Quality
Nguyen,S., 2009	○	●	●	◑	●	○	●	●	●	Include	Low Quality
Puhto,A.P., 2012	○	●	●	◑	●	○	●	●	●	Include	Low Quality
Siqueira,M.B., 2015	○	●	●	●	●	○	●	●	●	Include	Low Quality
Tornero,E., 2016	○	●	◑	◑	●	◑	●	●	●	Include	Low Quality

Quality Evaluation Table 2: Intervention - Randomized

Study	Random Sequence Generation	Allocation Concealment	Blinding	Incomplete Outcome Data	Selective Reporting	Other Bias	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Lora-Tamayo,J., 2016	◑	◑	◑	●	●	●	●	●	●	Include	High Quality
Nelson,C.L., 1993	◑	◑	◑	●	●	◑	●	●	●	Include	Moderate Quality
Zimmerli,W., 1998	●	●	●	◑	●	○	●	●	●	Include	High Quality

Summary of Findings Table 1: Pico 3 Antibiotics

	High Quality			Low Quality						
+ Favors Treament 1 **- Favors Treament 2** **o Not Significant** **| Separate Groups**	**Lora-Tamayo,J., 2016**	**Siqueira,M.B., 2015**	**Zimmerli,W., 1998**	**El Helou,O.C., 2008**	**El Helou,O.C., 2010**	**Hsieh,P.H., 2009**	**Laffer,R.R., 2006**	**Nguyen,S., 2009**	**Puhto,A.P., 2012**	**Tornero,E., 2016**
Overarching comparison										
Oral antibiotics with IV vs. no antibiotics		o								
Oral antibiotics with IV (long) vs. Oral antibiotics with IV (short)									o	
(G1) Oral antibiotic (rifampin/levofloxacin) vs. (G2) oral antibiotic (rifampin) (G1) Oral antibiotic (rifampin/levofloxacin) vs. (G3) oral antiobiotic (chronic) and antimicrobial (cefazolin or vancomycin) (G2) oral antibiotic (rifampin) vs. (G3) oral antiobiotic (chronic) and antimicrobial (cefazolin or vancomycin)					[-][-][o]					
IV and oral antibiotics (rifampicin and linezolid) vs. IV and oral antibiotics (rifampicin and cotrimoxazole)								[o]		
IV and oral antibiotic (long) vs. IV and oral antibiotic (short)						o				
Antimicrobial therapy (vancomycin with aminoglycoside therapy) vs. monotherapy ((vancomycin without aminoglycoside therapy)				o						
(G1) IV antibiotic long vs. (G2) IV antibiotic short (G1) IV antibiotic long vs. (G3) quinolone (G1) IV antibiotic long vs. (G4) combination antibiotic therapy (G2) IV antibiotic short vs. (G3) quinolone (G2) IV antibiotic short vs. (G4) combination antibiotic therapy (G3) quinolone vs. (G4) combination antibiotic therapy							[o][o][o][o][o][o]			
IV and oral antibiotics (flucloxacillin or vancomycin and rifampin) vs. placebo			+							
Oral antibiotic (long duration for 3-6 months) vs. Oral antibiotic (short duration for 8 weeks)	o									
Oral antibiotic (fluoroquinolone: levofloxacin or ciprofloxacin) vs. Oral antibiotic (ciprofloxacin)										o
(G1) Oral antibiotic (levofloxacin and rifampicin) vs. (G4) Oral antibiotic (monotherapy without rifampicin) (G2) Oral antibiotic (rifampicin and rifampicin-independent antibiotic) vs. (G1) Oral antibiotic (levofloxacin and rifampicin) (G2) Oral antibiotic (rifampicin and rifampicin-independent antibiotic) vs. (G3) Oral antibiotic (rifampicin and rifampicin-dependent antibiotic) (G2) Oral antibiotic (rifampicin and rifampicin-independent antibiotic) vs. (G4) Oral antibiotic (monotherapy without rifampicin) (G3) Oral antibiotic (rifampicin and rifampicin-dependent antibiotic) vs. (G1) Oral antibiotic (levofloxacin and rifampicin) (G3) Oral antibiotic (rifampicin and rifampicin-dependent antibiotic) vs. (G4) Oral antibiotic (monotherapy without rifampicin)										[+][o][+][+][-][+]

Data Table 1: Pico 3 Part 1- Antibiotics Compared to Antibiotics: Complications -(High Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Lora-Tamayo,J., 2016	High Quality	Infection Resolution(Cure)	Post-Op	g1 (Long schedule Tx: combination of rifampin (600mg once daily) and levofloxacin (750mg once daily)3 or6 months of abx Tx)	33	42.42%	g2 (Short schedule Tx: combination of rifampin (600mg once daily) and levofloxacin (750mg once daily);8 weeks of abx Tx)	30	26.67%	RR	1.59(0.78,3.25)	Not Significant (P-value>.05)
Siqueira,M.B., 2015	High Quality	Infection Resolution(Treatment failure)	5 years	g1 (Suppression Group: 6 mos of antibiotics given; oral antibiotics for a minimum of six months following the initial course of intravenous antibiotics)	92	34.78%	g2 (No Suppression Group: no chronic abx suppression)	276	41.67%	RR	0.83(0.61,1.14)	Not Significant (P-value>.05)
Zimmerli,W., 1998	High Quality	Infection Resolution(Cure)	2 years	g1 (Rifampin combo; during first 2 postop weeks, treated with 2 g/6 hrs IV flucloxacillin or 1g/12 hrs IV vancomycin (if methicillin resistance or penicillin allergy) in combination with 1 coated 450 mg tablet/ 12 hours PO rifampin)	12	0.00%	g2 (Placebo combo; during first 2 postop weeks, treated with 2 g/6 hrs IV flucloxacillin or 1g/12 hrs IV vancomycin (if methicillin resistance or penicillin allergy) in combination with 1 matched coated tablet/12 hrs placebo)	12	41.67%	RD	-0.42(-0.70,-0.14)	**Treatment 1 Significant (P-value<.05)**

Data Table 2: Pico 3 Part 1- Antibiotics Compared to Antibiotics: Complications -(Low Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
El Helou,O.C., 2008	Low Quality	Infection Resolution(Treatment failure)	5 years	g2 (Combination systemic antimicrobial therapy; receipt of a cell wall-active agent (vancomycin or a beta-lactam active against enterococci) in combination with aminoglycoside therapy (14 or more days of an intravenous aminoglycoside))	19	36.84%	g1 (Monotherapy; receipt of a cell wall-active agent (vacomycin or a beta-lactam active against enterococci) without aminoglycoside therapy)	31	16.13%	RR	2.28(0.84,6.18)	Not Significant (P-value>.05)
El Helou,O.C., 2010	Low Quality	Infection Resolution(Treatment Failure)	1 years	g1 (Oral rifampin/levofloxacin (Prospective); DAIR+Rifampin 900 mg daily; this was administered in divided doses given 2–3 times a day or reduced to 300 mg twice a day in cases of gastrointestinal intolerance. Levofloxacin dose was 750 mg orally daily)	14	92.86%	g2 (Rifampin (Historical Rifampin Group); DAIR+rifampin without following specific guidelines. Levofloxacin was given sporadically in the historical cohort for chronic suppression.)	31	32.26%	RR	2.88(1.69,4.89)	**Treatment 2 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
El Helou,O.C., 2010	Low Quality	Infection Resolution(Treatment Failure)	1 years	g1 (Oral rifampin/levofloxacin (Prospective); DAIR+Rifampin 900 mg daily; this was administered in divided doses given 2–3 times a day or reduced to 300 mg twice a day in cases of gastrointestinal intolerance. Levofloxacin dose was 750 mg orally daily)	14	92.86%	g3 (Non-Rifampin (Historical Non-Rifampin Group); DAIR+parenteral antimicrobial therapy (cefazolin or vancomycin), followed by chronic oral suppression not containing rifampin)	56	37.50%	RR	2.48(1.71,3.58)	**Treatment 2 Significant (P-value<.05)**
El Helou,O.C., 2010	Low Quality	Infection Resolution(Treatment Failure)	1 years	g2 (Rifampin (Historical Rifampin Group); DAIR+rifampin without following specific guidelines. Levofloxacin was given sporadically in the historical cohort for chronic suppression.)	31	32.26%	g3 (Non-Rifampin (Historical Non-Rifampin Group); DAIR+parenteral antimicrobial therapy (cefazolin or vancomycin), followed by chronic oral suppression not containing rifampin)	56	37.50%	RR	0.86(0.47,1.59)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Hsieh,P.H., 2009	Low Quality	Infection Resolution(treatment failure)	Post-Op	g1 (4-6wk antiB; following first attempt at staged exchange arthroplasty with an antibiotic-loaded cement spacer, 4 week intravenous antibiotic therapy regimen between stages. An additional 2 week oral antibiotic treatment was prescribed when an appropriate antibiotic was available in oral form)	46	8.70%	g2 (1wk antiB; following first attempt at staged exchange arthroplasty with an antibiotic-loaded cement spacer, 1 week intravenous antibiotic regimen after resection arthroplasty)	53	7.55%	RR	1.15(0.31,4.35)	Not Significant (P-value>.05)
Laffer,R.R., 2006	Low Quality	Infection Resolution(Cure)	2 years	g1 (>6mos of antimicrobial therapy; >6 months with initial intravenous administration of quinolone, beta-lactam, fusidic acid, clindamycin, linezolid, or combo therapy including rifampicin for >2 weeks (> 6 weeks in patients undergoing two-stage exchange with an 8-week interval if culture-negative at reimplantation))	23	13.04%	g2 (<6mos of antimicrobial therapy; < 6 months or initial intravenous administration of quinolone, beta-lactam, fusidic acid, clindamycin, linezolid, or combo therapy including rifampicin for <2 weeks)	11	9.09%	RR	1.43(0.17,12.27)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Laffer,R.R., 2006	Low Quality	Infection Resolution(Cure)	2 years	g1 (>6mos of antimicrobial therapy; >6 months with initial intravenous administration of quinolone, beta-lactam, fusidic acid, clindamycin, linezolid, or combo therapy including rifampicin for >2 weeks (> 6 weeks in patients undergoing two-stage exchange with an 8-week interval if culture-negative at reimplantation))	23	13.04%	g3 (Quinolone (ciprofloxacin or levofloxacin); long-term oral treatment)	20	10.00%	RR	1.30(0.24,7.04)	Not Significant (P-value>.05)
Laffer,R.R., 2006	Low Quality	Infection Resolution(Cure)	2 years	g1 (>6mos of antimicrobial therapy; >6 months with initial intravenous administration of quinolone, beta-lactam, fusidic acid, clindamycin, linezolid, or combo therapy including rifampicin for >2 weeks (> 6 weeks in patients undergoing two-stage exchange with an 8-week interval if culture-negative at reimplantation))	23	13.04%	g4 (Combination therapy including rifampin; long-term oral treatment)	23	4.35%	RR	3.00(0.34,26.76)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Laffer,R.R., 2006	Low Quality	Infection Resolution(Cure)	2 years	g2 (<6mos of antimicrobial therapy; < 6 months or initial intravenous administration of quinolone, beta-lactam, fusidic acid, clindamycin, linezolid, or combo therapy including rifampicin for <2 weeks)	11	9.09%	g3 (Quinolone (ciprofloxacin or levofloxacin); long-term oral treatment)	20	10.00%	RR	0.91(0.09,8.93)	Not Significant (P-value>.05)
Laffer,R.R., 2006	Low Quality	Infection Resolution(Cure)	2 years	g2 (<6mos of antimicrobial therapy; < 6 months or initial intravenous administration of quinolone, beta-lactam, fusidic acid, clindamycin, linezolid, or combo therapy including rifampicin for <2 weeks)	11	9.09%	g4 (Combination therapy including rifampin; long-term oral treatment)	23	4.35%	RR	2.09(0.14,30.41)	Not Significant (P-value>.05)
Laffer,R.R., 2006	Low Quality	Infection Resolution(Cure)	2 years	g4 (Combination therapy including rifampin; long-term oral treatment)	23	4.35%	g3 (Quinolone (ciprofloxacin or levofloxacin); long-term oral treatment)	20	10.00%	RR	0.43(0.04,4.44)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Nguyen,S., 2009	Low Quality	Infection Resolution(Remission of infection)	2 years	g1 (Rifampicin+Linezolid (RLC); linezolid (600 mg 2x/daily) & rifampicin (10 mg/kg 2x/daily, maximum 900 mg 2x/daily), administered i.v. for the first week and subsequently orally)	13	7.69%	g2 (Rifampicin+Cotrimoxazole (RCC); cotrimoxazole (sulfamethoxazole 40 mg/kg/day, trimethoprim 8 mg/kg/day) and rifampicin (10 mg/kg/12 h, maximum 900 mg/12 h))	10	30.00%	RR	0.26(0.03,2.11)	Not Significant (P-value>.05)
Nguyen,S., 2009	Low Quality	Infection Resolution(Remission of infection)	2 years	g2 (Rifampicin+Cotrimoxazole (RCC); cotrimoxazole (sulfamethoxazole 40 mg/kg/day, trimethoprim 8 mg/kg/day) and rifampicin (10 mg/kg/12 h, maximum 900 mg/12 h))	10	30.00%	g1 (Rifampicin+Linezolid (RLC); linezolid (600 mg 2x/daily) & rifampicin (10 mg/kg 2x/daily, maximum 900 mg 2x/daily), administered i.v. for the first week and subsequently orally)	13	7.69%	RR	3.90(0.47,32.09)	Not Significant (P-value>.05)
Puhto,A.P., 2012	Low Quality	Infection Resolution(Treatment Failure)	4.1 years	g2 (Long Antibiotic Therapy; DAIR, TKA AntiB for 6 months and THA AntiB for 3 months)	60	43.33%	g1 (Short Antibiotic Therapy; DAIR, TKA AntiB for 3mos and THA AntiB for 2 months)	72	41.67%	RR	1.04(0.70,1.55)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Tornero,E., 2016	Low Quality	Infection Resolution(failure includes infection relapse)	2 years	g1; abx regimen levofloxacin + rifampicin (levofloxacin & rifampicin; after debridement, IV vancomycin (1g/12h) & ceftazidime (2g/8h) started; oral levofloxacin (500 mg/24h) & rifampicin (600 mg/24h) started for at least 6 weeks)	54	9.26%	g4; abx regimen monotherapy without rifampicin (monotherapy without rifampicin)	11	0.00%	RD	0.09(0.02,0.17)	**Treatment 1 Significant (P-value<.05)**
Tornero,E., 2016	Low Quality	Infection Resolution(failure includes infection relapse)	2 years	g2; abx regimen rifampicin + rifampicin-independent antibiotic (rifampicin & rifampicin-independent abx; after debridement, IV vancomycin (1g/12h) & ceftazidime (2g/8h) started; oral rifampicin (600 mg/24h) & rifampicin-independent antibiotic (500 mg/24h levofloxacin, 400 mg/12h ciprofloxacin, or 1g/8h amoxicillin) started for at least 6 weeks)	61	9.84%	g1; abx regimen levofloxacin + rifampicin (levofloxacin & rifampicin; after debridement, IV vancomycin (1g/12h) & ceftazidime (2g/8h) started; oral levofloxacin (500 mg/24h) & rifampicin (600 mg/24h) started for at least 6 weeks)	54	9.26%	RR	1.06(0.34,3.28)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Tornero,E., 2016	Low Quality	Infection Resolution(failure includes infection relapse)	2 years	g2; abx regimen rifampicin + rifampicin-independent antibiotic (rifampicin & rifampicin-independent abx; after debridement, IV vancomycin (1g/12h) & ceftazidime (2g/8h) started; oral rifampicin (600 mg/24h) & rifampicin-independent antibiotic (500 mg/24h levofloxacin, 400 mg/12h ciprofloxacin, or 1g/8h amoxicillin) started for at least 6 weeks)	61	9.84%	g3; abx regimen rifampicin + rifampicin-dependent antibiotic (rifampicin & rifampicin-dependent abx; after debridement, IV vancomycin (1g/12h) & ceftazidime (2g/8h) started; oral rifampicin (600 mg/24h) & rifampicin-dependent antibiotic (600mg/12h linezolid, 1600 mg/12h co-trimoxazole, or 300 mg/8h clindamycin) started for at least 6 weeks)	21	38.10%	RR	0.26(0.10,0.66)	**Treatment 1 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Tornero,E., 2016	Low Quality	Infection Resolution(failure includes infection relapse)	2 years	g2; abx regimen rifampicin + rifampicin-independent antibiotic (rifampicin & rifampicin-independent abx; after debridement, IV vancomycin (1g/12h) & ceftazidime (2g/8h) started; oral rifampicin (600 mg/24h) & rifampicin-independent antibiotic (500 mg/24h levofloxacin, 400 mg/12h ciprofloxacin, or 1g/8h amoxicillin) started for at least 6 weeks)	61	9.84%	g4; abx regimen monotherapy without rifampicin (monotherapy without rifampicin)	11	0.00%	RD	0.10(0.02,0.17)	**Treatment 1 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Tornero,E., 2016	Low Quality	Infection Resolution(failure includes infection relapse)	2 years	g3; abx regimen rifampicin + rifampicin-dependent antibiotic (rifampicin & rifampicin-dependent abx; after debridement, IV vancomycin (1g/12h) & ceftazidime (2g/8h) started; oral rifampicin (600 mg/24h) & rifampicin-dependent antibiotic (600mg/12h linezolid, 1600 mg/12h co-trimoxazole, or 300 mg/8h clindamycin) started for at least 6 weeks)	21	38.10%	g1; abx regimen levofloxacin + rifampicin (levofloxacin & rifampicin; after debridement, IV vancomycin (1g/12h) & ceftazidime (2g/8h) started; oral levofloxacin (500 mg/24h) & rifampicin (600 mg/24h) started for at least 6 weeks)	54	9.26%	RR	4.11(1.52,11.15)	**Treatment 2 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Tornero,E., 2016	Low Quality	Infection Resolution(failure includes infection relapse)	2 years	g3; abx regimen rifampicin + rifampicin-dependent antibiotic (rifampicin & rifampicin-dependent abx; after debridement, IV vancomycin (1g/12h) & ceftazidime (2g/8h) started; oral rifampicin (600 mg/24h) & rifampicin-dependent antibiotic (600mg/12h linezolid, 1600 mg/12h co-trimoxazole, or 300 mg/8h clindamycin) started for at least 6 weeks)	21	38.10%	g4; abx regimen monotherapy without rifampicin (monotherapy without rifampicin)	11	0.00%	RD	0.38(0.17,0.59)	**Treatment 1 Significant (P-value<.05)**
Tornero,E., 2016	Low Quality	Infection Resolution( )	2 years	g6; abx regimen treatment with fluoroquinolones (fluoroquinolones; after debridement, IV vancomycin (1g/12h) & ceftazidime (2g/8h) started; oral levofloxacin (500mg/24h) or ciprofloxacin (400mg/12h) started for at least 6 weeks)	19	5.26%	g5; abx regimen ciprofloxacin (ciprofloxacin; after debridement, IV vancomycin (1g/12h) & ceftazidime (2g/8h) started; oral ciprofloxacin (400mg/12h) started for at least 6 weeks)	14	7.14%	RR	0.74(0.05,10.80)	Not Significant (P-value>.05)

Summary of Findings Table 2: Pico 3 Antibiotics

	High Quality
+ Favors Treament 1 - Favors Treament 2 o Not Significant | Separate Groups	Siqueira,M.B., 2015
Overarching comparison	
(G1)Oral antibiotics with IV vs. (G4)2-stage revision surgery (G2) No antibiotics vs. (G4) 2-stage revision surgery vs no surgery	[o][o]

Data Table 3: Pico 3 Part 2- Antibiotics Compared to Staged Surgery: Complications -(High Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Siqueira,M.B., 2015	High Quality	Infection Resolution(Treatment failure)	5 years	g1 (Suppression Group: 6 mos of antibiotics given; oral antibiotics for a minimum of six months following the initial course of intravenous antibiotics)	92	34.78%	g4 (2-stage revision)	38	34.21%	RR	1.02(0.60,1.71)	Not Significant (P-value>.05)
Siqueira,M.B., 2015	High Quality	Infection Resolution(Treatment failure)	5 years	g2 (No Suppression Group: no chronic abx suppression)	276	41.67%	g4 (2-stage revision)	38	34.21%	RR	1.22(0.77,1.93)	Not Significant (P-value>.05)

Summary of Findings Table 3: Pico 3 Antibiotics

	High Quality
+ Favors Treament 1 - Favors Treament 2 o Not Significant | Separate Groups	Siqueira,M.B., 2015
Overarching comparison	
(G1)Oral antibiotics with IV vs. (G4)2-stage revision surgery (G2) No antibiotics vs. (G4) 2-stage revision surgery vs no surgery	[o][o]

Data Table 4: Pico 3 Part 3- Antibiotics Compared to Immediate Surgery: Complications -(High Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Siqueira,M.B., 2015	High Quality	Infection Resolution(Treatment failure)	5 years	g1 (Suppression Group: 6 mos of antibiotics given; oral antibiotics for a minimum of six months following the initial course of intravenous antibiotics)	92	34.78%	g3 (Irrigation and debridement with polyethylene exchange)	54	35.19%	RR	0.99(0.63,1.56)	Not Significant (P-value>.05)
Siqueira,M.B., 2015	High Quality	Infection Resolution(Treatment failure)	5 years	g2 (No Suppression Group: no chronic abx suppression)	276	41.67%	g3 (Irrigation and debridement with polyethylene exchange)	54	35.19%	RR	1.18(0.80,1.75)	Not Significant (P-value>.05)

PICO 4 Surgical Intervention

Quality Evaluation Table 3: Pico 4 part 1 Observational

Study	Design	Participant Recruitment	Allocation	Confounding Variables	Follow-Up Length	Other Bias? (If retrospective comparative, mark Yes)	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Ascione,T., 2015	○	●	○	◑	●	●	●	●	●	Include	Low Quality
Bach,C.M., 2002	○	●	●	●	●	○	●	●	●	Include	Low Quality
Born,P., 2016	○	●	◑	◑	●	●	●	●	●	Include	Low Quality
Choi,H.R., 2012	○	●	●	●	●	○	●	●	●	Include	Low Quality
Cunningham,D.J., 2017	○	●	◑	●	●	○	●	●	●	Include	Low Quality
Dzaja,I., 2015	○	●	●	●	●	○	●	●	●	Include	Low Quality
Engesaeter,L.B., 2011	○	●	●	●	●	◑	●	●	●	Include	Low Quality
Jacquot,A., 2015	○	●	◑	●	●	○	●	●	●	Include	Low Quality
Janssen,D.M., 2016	○	●	◑	●	●	○	●	●	●	Include	Low Quality
Laffer,R.R., 2006	○	●	●	●	●	○	●	●	●	Include	Low Quality
Lange,J., 2016	○	●	●	●	●	○	●	●	●	Include	Low Quality
Legout,L., 2006	○	●	●	●	●	●	●	●	●	Include	Low Quality
Lizaur-Utrilla,A., 2015	○	●	●	◑	●	○	●	●	●	Include	Low Quality
Siqueira,M.B., 2015	○	●	●	●	●	○	●	●	●	Include	Low Quality
Tornero,E., 2014	○	●	●	●	●	○	●	●	●	Include	Low Quality
Tsai,J.C., 2015	○	●	●	●	●	○	●	●	●	Include	Low Quality
Vielgut,I., 2015	○	●	●	◑	●	○	●	●	●	Include	Low Quality
Wang,K.H., 2015	○	●	●	●	◑	●	●	●	●	Include	Low Quality
Wasielewski,R.C., 1996	○	●	◑	○	●	●	●	●	●	Include	Low Quality

Quality Evaluation Table 4: Pico 4 part 2 Observational

QE - Intervention Study	Design	Participant Recruitment	Allocation	Confounding Variables	Follow-Up Length	Other Bias? (If retrospective comparative, mark Yes)	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Achermann,Y., 2014	○	●	◑	◑	●	◑	●	●	●	Include	Low Quality
Choi,H.R., 2011	○	●	◑	●	●	○	●	●	●	Include	Low Quality
Choi,H.R., 2012	○	●	●	●	●	○	●	●	●	Include	Low Quality
Choi,H.R., 2013	○	◑	●	●	●	○	●	●	●	Include	Low Quality
Cunningham,D.J., 2017	○	●	◑	●	●	○	●	●	●	Include	Low Quality
Engesaeter,L.B., 2011	○	●	●	●	●	◑	●	●	●	Include	Low Quality
Janssen,D.M., 2016	○	●	◑	●	●	○	●	●	●	Include	Low Quality
Kessler,B., 2014	○	●	◑	●	●	◑	●	●	●	Include	Low Quality
Khoshbin,A., 2015	○	●	●	●	●	○	●	●	●	Include	Low Quality
Lindberg-Larsen,M., 2016	○	●	◑	◑	●	◑	●	●	●	Include	Low Quality
Massin,P., 2015	○	●	●	●	●	○	●	●	●	Include	Low Quality
Rodriguez,D., 2010	○	●	◑	◑	●	●	●	●	●	Include	Low Quality
Stine,I.A., 2010	○	●	●	●	●	○	●	●	●	Include	Low Quality
Tsai,J.C., 2015	○	●	●	●	●	○	●	●	●	Include	Low Quality
Wasielewski,R.C., 1996	○	●	◑	○	●	●	●	●	●	Include	Low Quality
Wolf,M., 2014	○	●	●	●	●	○	●	●	●	Include	Low Quality

Summary of Findings Table 4: Pico 4 Surgical Intervention

	Low Quality			
+ Favors Treament 1 **- Favors Treament 2** **o Not Significant** **| Separate Groups**	**Cunningham,D.J., 2017**	**Engesaeter,L.B., 2011**	**Janssen,D.M., 2016**	**Lange,J., 2016**
Overarching comparison				
(G3)1-stage revision surgery vs. (G4)Major partial 1-stage exchange (G3)1-stage revision surgery vs. (G5)Minor partial 1-stage exchange (G4)Major partial 1-stage exchange vs. (G5)Minor partial 1-stage exchange		[+][o][-]		
Resection and irrigation vs Resections alone	-			
Permanent resection vs Other intervention (1-stage, DAIR)				o
Re-implantation vs. no Re-implantation			o	

Data Table 5: Pico 4 Part 1- Immediate Surgery Compared to Immediate Surgery: Complications -(Low Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Cunningham,D.J., 2017	Low Quality	INFECTION( )		g3 (Combinations of resection and irrigation and debridement; Hip Periprosthetic Infected patients)	38	34.21%	g2 (Resections alone; (Only 1-Stage or 2-Stage Resection With or Without Antibiotic Spacer Placement With or Without Eventual Reimplantation))	42	9.52%	RR	3.59(1.28,10.07)	**Treatment 2 Significant (P-value<.05)**
Janssen,D.M., 2016	Low Quality	Infection Resolution(Healed infection at follow-up and no clinical or radiologocal signs of recurrence)	Post-Op	g3 (Short term tx with reimplantation; after 1 or more tx periods of debridements w/ 2 weeks of gentamicin beads, reconstruction with reimplantation was performed within the same hospital stay)	30	10.00%	g4 (Short term tx with no reimplantation; after 1 or more tx periods of debridements w/ 2 weeks of gentamicin beads, reconstruction without reimplantation was performed within the same hospital stay)	27	3.70%	RR	2.70(0.30,24.43)	Not Significant (P-value>.05)
Lange,J., 2016	Low Quality	Infection Resolution(Reinfection)	Post-Op	g3 (Permanent resection arthroplasty)	35	11.43%	g2 (Other intervention (1-stage, DAIR))	13	30.77%	RR	0.37(0.11,1.27)	Not Significant (P-value>.05)

Data Table 6: Pico 4 Part 1- Immediate Surgery Compared to Immediate Surgery: Composite -(Low Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Engesaeter,L.B., 2011	Low Quality	Infection Resolution(Re-revision due to infection)	2 years	g3 (1-stage revision)	94	8.51%	g4 (Major partial 1-stage exchange; exchange of the stem or cup)	87	29.89%	RR	0.28(0.14,0.59)	**Treatment 1 Significant (P-value<.05)**
Engesaeter,L.B., 2011	Low Quality	Infection Resolution(Re-revision due to infection)	2 years	g3 (1-stage revision)	94	8.51%	g5 (Minor partial 1-stage exchange; exchange of head and/or liner)	212	16.04%	RR	0.53(0.26,1.10)	Not Significant (P-value>.05)
Engesaeter,L.B., 2011	Low Quality	Infection Resolution(Re-revision due to infection)	2 years	g4 (Major partial 1-stage exchange; exchange of the stem or cup)	87	29.89%	g5 (Minor partial 1-stage exchange; exchange of head and/or liner)	212	16.04%	RR	1.86(1.19,2.91)	**Treatment 2 Significant (P-value<.05)**

Summary of Findings Table 5: Pico 4 Surgical Intervention

	Low Quality		Moderate Quality	
+ Favors Treament 1 **- Favors Treament 2** **o Not Significant** **| Separate Groups**	**Ascione,T., 2015**	**Cunningham,D.J., 2017**	**Ercolano,L.B., 2013**	**Nelson,C.L., 1993**
Overarching comparison				
2-stage surgery vs no surgery	+			
1-stage surgery vs no surgery			o	
Surgery vs no surgery				o
(G2) Resection Alone VS. (G1) Irrigation and Debridement Alone (G3) Combinations of resection and irrigation and debridement vs. (G1) Irrigation and Debridement Alone		[o][-]		

Data Table 7: Pico 4 Part 2- Immediate Surgery Compared to Non-op: Conservative Tx: Complications -(Low Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Ascione,T., 2015	Low Quality	Infection Resolution(Cure (after follow-up period))	11 months	g1; Early infection Tx (conservative; debridement, irrigation, and prosthesis retention (DAIR) followed by antibiotic treatment for 10+ weeks)	56	19.64%	g3; Delayed infection Tx (prolonged antibiotic therapy; prolonged antibiotic therapy administered for at least a 4-week period after CRP normalization for patients with delayed infection without surgery performed due to patient's refusal or severe life-threatening comorbidity)	28	71.43%	RR	0.28(0.15,0.49)	**Treatment 1 Significant (P-value<.05)**
Cunningham,D.J., 2017	Low Quality	INFECTION()	3.1 years	g2 (Resections alone; (Only 1-Stage or 2-Stage Resection With or Without Antibiotic Spacer Placement With or Without Eventual Reimplantation))	42	9.52%	g1 (Irrigation and debridement alone; (With or Without Head and/or Liner Exchange))	68	4.41%	RR	2.16(0.51,9.17)	Not Significant (P-value>.05)
Cunningham,D.J., 2017	Low Quality	INFECTION()		g3 (Combinations of resection and irrigation and debridement; Hip Periprosthetic Infected patients)	38	34.21%	g1 (Irrigation and debridement alone; (With or Without Head and/or Liner Exchange))	68	4.41%	RR	7.75(2.36,25.51)	**Treatment 2 Significant (P-value<.05)**

Data Table 8: Pico 4 Part 2- Immediate Surgery Compared to Non-op: Conservative Tx: Complications -(Moderate Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Ercolano,L.B., 2013	Moderate Quality	Infection Resolution (Treatment Failure)	Post-Op	G1 1 Stage Revision (1 stage revision)	11	54.55%	G2 Irrigation and Debridement (Irrigation and debridement)	15	60.00%	RR	0.91(0.46,1.79)	Not Significant (P-value>.05)
Nelson,C.L., 1993	Moderate Quality	INFECTION(recurrent infection)	Post-Op	g1 (Gentamicin PMMA beads; beads implanted into bone and dead space left by resection arthroplasty before wound closure and drainage by gravity)	15	13.33%	g2 (Conventional systemic antibiotic; 6 weeks of IV antibiotics based on results of antimicrobial susceptibility testing)	13	30.77%	RR	0.43(0.09,1.99)	Not Significant (P-value>.05)

Summary of Findings Table 6: Pico 4 Surgical Intervention

	Low Quality
+ Favors Treament 1 - Favors Treament 2 o Not Significant | Separate Groups	Legout,L., 2006
Overarching comparison	
Positive suction drainage culture with retention of prosthesis with further surgery vs. Negative suction drainage culture with retention of prosthesis without further surgery	o

Data Table 9: Pico 4 Part 3- Immediate Surgery Compared to Non-op: No treatment: Complications

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Legout,L., 2006	Low Quality	Infection Resolution (cure)	Post-Op	g2 (Positive suction drainage culture (SDC); initial irrigation, debridement, and retention of prosthesis performed, and further operations performed until SDC was negative)	24	8.33%	g1 (Negative suction drainage culture (SDC); initial irrigation, debridement, and retention of prosthesis performed, but no further surgery/treatment provided)	61	8.20%	RR	1.02(0.21,4.89)	Not Significant (P-value>.05)

Summary of Findings Table 7: Pico 4 Surgical Intervention

	High Quality	Low Quality						
+ Favors Treament 1 - Favors Treament 2 o Not Significant | Separate Groups	Massin,P., 2015	Choi,H.R., 2012	Choi,H.R., 2013	Kessler,B., 2014	Tattevin,P., 1999	Tornero,E., 2014	Vielgut,I., 2015	Wolf,M., 2014
Overarching comparison								
2-stage revision surgery vs. 1-stage revision surgery	o							
2-stage revision surgery (Spacer retention >11 weeks) vs. 2-stage revision surgery (Spacer retention 4-11 weeks)							-	
2-stage revision surgery vs. 1-stage revision surgery						o		
2-stage revision surgery vs. 1-stage revision surgery								+
Surgery (with retention of components) vs. surgery (with replacement of components)				+				
(G2) 2-stage revision surgery (with reimplantation) vs. (G1) 1-stage revision surgery (G2) 2-stage revision surgery (with reimplantation) vs. (G3) 2-stage revision surgery (with no reimplantation) (G3) 2-stage revision surgery (with no reimplantation) vs. (G1) 1-stage revision surgery			[o][o][o]					
2-staged exchange surgery (prosthetic spacer) vs. 2-staged exchange surgery (static spacer)		o						
2-stage surgery (with implant removal) vs. debridement (with implant retention)					+			

Data Table 10: Pico 4 Part 4- Staged Surgery Compared to Staged Surgery: Complications -(High Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Massin,P., 2015	High Quality	INFECTION(Infection recurrence)	Post-Op	g2 (2 stage revision; Anterior tibial tuberosity osteotomies)	177	31.07%	g1 (1 stage revision; Anterior tibial tuberosity osteotomies)	108	21.30%	RR	1.46(0.96,2.23)	Not Significant (P-value>.05)

Data Table 11: Pico 4 Part 4- Staged Surgery Compared to Staged Surgery: Complications -(Low Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Choi,H.R., 2012	Low Quality	Infection Resolution(UNCLEAR?)	4.8 years	g1 (Prosthetic group; 2-stage exchange technique using 14 articulating spacers using metallic and polyethylene components)	14	28.57%	g2 (Static group; static all-cement spacer)	33	33.33%	RR	0.86(0.33,2.24)	Not Significant (P-value>.05)
Choi,H.R., 2013	Low Quality	Infection Resolution(Treatment Failure)	Post-Op	g2 (2 stage revision+reimplanted; Implants removal and meticulous, thorough debridement of all foreign materials including cement, necrotic bone and soft tissues. Antibiotic-loaded cement (40 g of cement with 2.4 g of tobramycin and 1.0 g of vancomycin) was used for fixation of new implants (one-stage) or spacers (two stage)+e treated with a six-week period of organism-sensitive intravenous antibiotic therapy)	44	25.00%	g1 (1 stage revision; Implants removal and meticulous, thorough debridement of all foreign materials including cement, necrotic bone and soft tissues. Antibiotic-loaded cement (40 g of cement with 2.4 g of tobramycin and 1.0 g of vancomycin) was used for fixation of new implants (one-stage) or spacers (two stage)+e treated with a six-week period of organism-sensitive intravenous antibiotic therapy)	17	17.65%	RR	1.42(0.45,4.46)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Choi,H.R., 2013	Low Quality	Infection Resolution(Treatment Failure)	Post-Op	g2 (2 stage revision+reimplanted; Implants removal and meticulous, thorough debridement of all foreign materials including cement, necrotic bone and soft tissues. Antibiotic-loaded cement (40 g of cement with 2.4 g of tobramycin and 1.0 g of vancomycin) was used for fixation of new implants (one-stage) or spacers (two stage)+e treated with a six-week period of organism-sensitive intravenous antibiotic therapy)	44	25.00%	g3 (2 stage revision+no reimplanted; Implants removal and meticulous, thorough debridement of all foreign materials including cement, necrotic bone and soft tissues. Antibiotic-loaded cement (40 g of cement with 2.4 g of tobramycin and 1.0 g of vancomycin) was used for fixation of new implants (one-stage) or spacers (two stage)+e treated with a six-week period of organism-sensitive intravenous antibiotic therapy)	22	31.82%	RR	0.79(0.35,1.74)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Choi,H.R., 2013	Low Quality	Infection Resolution(Treatment Failure)	Post-Op	g3 (2 stage revision+no reimplanted; Implants removal and meticulous, thorough debridement of all foreign materials including cement, necrotic bone and soft tissues. Antibiotic-loaded cement (40 g of cement with 2.4 g of tobramycin and 1.0 g of vancomycin) was used for fixation of new implants (one-stage) or spacers (two stage)+e treated with a six-week period of organism-sensitive intravenous antibiotic therapy)	22	31.82%	g1 (1 stage revision; Implants removal and meticulous, thorough debridement of all foreign materials including cement, necrotic bone and soft tissues. Antibiotic-loaded cement (40 g of cement with 2.4 g of tobramycin and 1.0 g of vancomycin) was used for fixation of new implants (one-stage) or spacers (two stage)+e treated with a six-week period of organism-sensitive intravenous antibiotic therapy)	17	17.65%	RR	1.80(0.55,5.96)	Not Significant (P-value>.05)
Kessler,B., 2014	Low Quality	Infection Resolution(Infection-free survival)	2 years	g1 (Surgery w/ retention of components; UNCLEAR+Intravenous antibiotics were administered based on sensitivity test)	21	33.33%	g2 (Replacement of the components (1/2 stage procedures); UNCLEAR+Intravenous antibiotics were administered based on sensitivity test)	10	0.00%	RD	0.33(0.13,0.53)	**Treatment 1 Significant (P-value<.05)**
Tattevin,P., 1999	Low Quality	Infection Resolution(No furher surgery to control infection)	1 years	g2 (Removal of Prosthesis)	33	18.18%	g1 (Debridement with retention)	34	61.76%	RR	0.29(0.14,0.64)	**Treatment 1 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Tornero,E., 2014	Low Quality	Infection Resolution(Treatment Failure)	Post-Op	g3 (2 stage revision)	54	42.59%	g2 (1 Stage Revision)	22	22.73%	RR	1.87(0.82,4.30)	Not Significant (P-value>.05)
Vielgut,I., 2015	Low Quality	INFECTION(Reinfection)	Post-Op	g2 (Spacer retention (>11 weeks); two-stage revision surgery for periprosthetic hip joint infections with antibiotic-augmented joint spacers)	22	45.45%	g1 (Spacer retention (4-11 weeks); two-stage revision surgery for periprosthetic hip joint infections with antibiotic-augmented joint spacers)	40	10.00%	RR	4.55(1.61,12.81)	**Treatment 2 Significant (P-value<.05)**
Wolf,M., 2014	Low Quality	INFECTION(Infection Eradication)	2 years	g2 (2 Stage Revision; Same as one-step revision until the step of re-implantation of the uncemented THA. Instead of doing so, an antibiotic spacer consisting of antibiotic-augmented bone cement and a bipolar endoprosthesis is implanted)	55	5.45%	g1 (1 Stage Revision; After washing three times under sterile conditions. Intra-operatively, the infection was verified by an instantaneous section with help of the pathologist. After explantation and generous debridement, jet lavage was performed, followed by a lavage with Betaisadona. New sterile drapes were applied and a new set of sterile instruments was set out. After further jet lavage and Betaisadona baths, a new, sterile, uncemented THA system was impla)	37	43.24%	RR	0.13(0.04,0.40)	**Treatment 1 Significant (P-value<.05)**

Summary of Findings Table 8: Pico 4 Surgical Intervention

+ Favors Treament 1 - Favors Treament 2 o Not Significant | Separate Groups	High Quality	Low Quality					
	Siqueira,M.B., 2015	Ascione,T., 2015	Born,P., 2016	Engesaeter,L.B., 2011	Janssen,D.M., 2016	Lange,J., 2016	Wasielewski,R.C., 1996
Overarching comparison							
Oral antibiotics with IV vs. No antibiotics	o						
2-stage surgery vs. no surgery		o					
(G2) 2-stage revision surgery vs. (G3) 1-stage revision surgery (G2) 2-stage revision surgery vs. (G4) Major partial 1-stage exchange (G2) 2-stage revision surgery vs. (G5) Minor partial 1-stage exchange				[o][+][+]			
2-stage surgery vs. irrigation/debridement							-
2-stage revision surgery vs. 1-stage revision surgery			o				
(G1) 2-stage revision surgery vs. (G2) 1-stage revision surgery (G1) 2-stage revision surgery vs. (G3) Non-2-stage surgery (permanent resection arthroplasty)						[o][o]	
(G1) Long-term treatment (with reimplantation) vs. (G3) Short-term treatment (with reimplantation) (G1) Long-term treatment (with reimplantation) vs. (G4) Short-term treatment (with no reimplantation)					[o][o]		

Data Table 12: Pico 4 Part 5- Staged Surgery Compared to Immediate Surgery: Complications -(High Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Siqueira,M.B., 2015	High Quality	Infection Resolution(Treatment failure)	5 years	g4 (2-stage revision)	38	34.21%	g3 (Irrigation and debridement with polyethylene exchange)	54	35.19%	RR	0.97(0.55,1.72)	Not Significant (P-value>.05)

Data Table 13: Pico 4 Part 5- Staged Surgery Compared to Immediate Surgery: Complications -(Low Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Ascione,T., 2015	Low Quality	Infection Resolution(Cure (after follow-up period))	11 months	g2; Delayed infection Tx (two-stage exchange; infected implant removal and spacer placement followed by an antibiotic treatment course between 10-12 weeks prior to prosthetic implant replacement)	75	14.67%	g1; Early infection Tx (conservative; debridement, irrigation, and prosthesis retention (DAIR) followed by antibiotic treatment for 10+ weeks)	56	19.64%	RR	0.75(0.35,1.60)	Not Significant (P-value>.05)
Born,P., 2016	Low Quality	Infection Resolution(Relapse, persistent or new infection)	Post-Op	g2 (2-stage exchange; hand-made spacper inserted in hips using standard gentamicin cement, temporary Girdlestone procedure w/ soft-tissue extension performed, some hipes had spacer secondarily removed and converted to a Girdlestone situation, difficult-to-treat micro-organisms were managed with 2-stage exchange w/ a long interval (>8 weeks) and a 6-week IV antibiotic treatment)	53	5.66%	g1 (1-stage exchange; old scars excised, all foreign material was removed, thorough synovectomy performed without removal of vital bone and soft tissue, wound was rinsed with 3-5 L of polyhexanide and antibiotic therapy started according to micrbiological results, drapes and instruments were not changed after removal of the infected implant)	28	0.00%	RD	0.06(-0.01,0.12)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Engesaeter,L.B., 2011	Low Quality	Infection Resolution(Re-revision due to infection)	2 years	g2 (2-stage revision)	173	5.20%	g3 (1-stage revision)	94	8.51%	RR	0.61(0.24,1.53)	Not Significant (P-value>.05)
Engesaeter,L.B., 2011	Low Quality	Infection Resolution(Re-revision due to infection)	2 years	g2 (2-stage revision)	173	5.20%	g4 (Major partial 1-stage exchange; exchange of the stem or cup)	87	29.89%	RR	0.17(0.09,0.36)	**Treatment 1 Significant (P-value<.05)**
Engesaeter,L.B., 2011	Low Quality	Infection Resolution(Re-revision due to infection)	2 years	g2 (2-stage revision)	173	5.20%	g5 (Minor partial 1-stage exchange; exchange of head and/or liner)	212	16.04%	RR	0.32(0.16,0.66)	**Treatment 1 Significant (P-value<.05)**
Janssen,D.M., 2016	Low Quality	Infection Resolution(Healed infection at follow-up and no clinical or radiologocal signs of recurrence)	Post-Op	g1 (Long-term tx with reimplantation; after extraction of prosthesis, debridements, and initial antibiotic therapy, patient discharged home for median 5.5 months with spacer and no prosthesis. Completed outpatient abx treatment and monitored for recurrence of infection for at least 2 weeks w/o abx usage. Patients were then readmitted for spacer removal, deep tissue culture, preparation for reconstruction and then reimplantation performed)	34	17.65%	g3 (Short term tx with reimplantation; after 1 or more tx periods of debridements w/ 2 weeks of gentamicin beads, reconstruction with reimplantation was performed within the same hospital stay)	30	10.00%	RR	1.76(0.48,6.45)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Janssen,D.M., 2016	Low Quality	Infection Resolution(Healed infection at follow-up and no clinical or radiologocal signs of recurrence)	Post-Op	g1 (Long-term tx with reimplantation; after extraction of prosthesis, debridements, and initial antibiotic therapy, patient discharged home for median 5.5 months with spacer and no prosthesis. Completed outpatient abx treatment and monitored for recurrence of infection for at least 2 weeks w/o abx usage. Patients were then readmitted for spacer removal, deep tissue culture, preparation for reconstruction and then reimplantation performed)	34	17.65%	g4 (Short term tx with no reimplantation; after 1 or more tx periods of debridements w/ 2 weeks of gentamicin beads, reconstruction without reimplantation was performed within the same hospital stay)	27	3.70%	RR	4.76(0.61,37.23)	Not Significant (P-value>.05)
Lange,J., 2016	Low Quality	Infection Resolution(Reinfection)	Post-Op	g1 (Re-implantation in a 2-stage procedure)	82	21.95%	g2 (Other intervention (1-stage, DAIR))	13	30.77%	RR	0.71(0.29,1.78)	Not Significant (P-value>.05)
Lange,J., 2016	Low Quality	Infection Resolution(Reinfection)	Post-Op	g1 (Re-implantation in a 2-stage procedure)	82	21.95%	g3 (Permanent resection arthroplasty)	35	11.43%	RR	1.92(0.70,5.27)	Not Significant (P-value>.05)
Wasielewski,R.C., 1996	Low Quality	Infection Resolution(Infection Eradication)	2 years	g1 (2 stage revision; irrigation, debridement, and component removal with delayed reimplantation)	44	9.09%	g2 (Arthrodesis; irrigation, debridement, and component removal with knee fusion)	10	0.00%	RD	0.09(0.01,0.18)	**Treatment 2 Significant (P-value<.05)**

Summary of Findings Table 9: Pico 4 Surgical Intervention

	Low Quality						Moderate Quality
+ Favors Treament 1 - Favors Treament 2 o Not Significant | Separate Groups	Achermann,Y., 2014	Ascione,T., 2015	Dzaja,I., 2015	Jacquot,A., 2015	Lizaur-Utrilla,A., 2015	Tsai,J.C., 2015	Rodriguez,D., 2010
Overarching comparison							
2-stage revision surgery vs. irrigation/debridement			+				
2-stage revision surgery vs. irrigation/debridement				o			
2-stage revision surgery vs. debridement					+		
(G2) 2-stage revision surgery vs. (G1) Debridement (with implant retention) (G2) 2-stage revision surgery vs. (G4) Conservative Treatment						[+][o]	
2-stage exchange vs. no surgery (prolonged antibiotic therapy)		+					
Implant removal vs. implant retention	o						
Implant removal vs. implant retention							o

Data Table 14: Pico 4 Part 6- Staged Surgery Compared to Non-op: Conservative Tx: Complications -(Moderate Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Rodriguez,D., 2010	Moderate Quality	Infection Resolution(Treatment Failure)	2 years	2 stage revision (Non-Conservative Surgical Approach) (Non-conservative; removal of all components of the implant+antiB for 8wks according to susceptibility testing)	15	6.67%	Debridement and Irrigation (Conservative Surgical Approach) (Conservative; retention of the prosthesis+antiB for 8wks according to susceptibility testing)	33	42.42%	RR	0.16(0.02,1.09)	Not Significant (P-value>.05)

Data Table15: Pico 4 Part 6- Staged Surgery Compared to Non-op: Conservative Tx: Complications -(Low Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Achermann,Y., 2014	Low Quality	Infection Resolution(Successful Response)	2 years	g2 (2 stage revision; As the initial surgical approach or Within 20 days after initial DAIR)	19	5.26%	g1 (DAIR; debridement, antiB, implant retention; Exchange of polyethylene inlay or exchange of a part of the prosthesis)	50	8.00%	RR	0.66(0.08,5.52)	Not Significant (P-value>.05)
Ascione,T., 2015	Low Quality	Infection Resolution(Cure (after follow-up period))	11 months	g2; Delayed infection Tx (two-stage exchange; infected implant removal and spacer placement followed by an antibiotic treatment course between 10-12 weeks prior to prosthetic implant replacement)	75	14.67%	g3; Delayed infection Tx (prolonged antibiotic therapy; prolonged antibiotic therapy administered for at least a 4-week period after CRP normalization for patients with delayed infection without surgery performed due to patient's refusal or severe life-threatening comorbidity)	28	71.43%	RR	0.21(0.11,0.37)	**Treatment 1 Significant (P-value<.05)**
Dzaja,I., 2015	Low Quality	Infection Resolution(Infection Eradication)	Post-Op	g1 (2 stage revision)	91	13.19%	g2 (Irrigation/debridement w/ polyethylene exchange (IDPE))	54	61.11%	RR	0.22(0.12,0.38)	**Treatment 1 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Jacquot,A., 2015	Low Quality	Infection Resolution(Healed (wound aspect, biology, and radiography were normal))	3 years	g1 (2-stage revision)	14	35.71%	g2 (Debridement)	13	46.15%	RR	0.77(0.31,1.93)	Not Significant (P-value>.05)
Lizaur-Utrilla,A., 2015	Low Quality	Infection Resolution(procedure failure rate)	4 years	g2 (two-stage revision (2SR)-comparing pico 3c vs 4a; removing all prosthetic components, debridement, and irrigation. An articulating antibiotic-loaded cement spacer was inserted. For the spacer, 1 g of gentamicin was mixed with 40 g of cement)	25	12.00%	g1 (DPRA (cemented AntiB and debridement)-comparing pico 3c vs 4a; open arthrotomy,implant retention after checking of its stability, exchange of the polyethylene insert, thorough debridement, and irrigation with sterile normal saline)	39	61.54%	RR	0.20(0.07,0.58)	**Treatment 1 Significant (P-value<.05)**
Tsai,J.C., 2015	Low Quality	Infection Resolution(Treatment Failure)	2 years	g2 (2 stage revision)	43	30.23%	g1 (Debridement w/ implant retention)	25	76.00%	RR	0.40(0.24,0.66)	**Treatment 1 Significant (P-value<.05)**
Tsai,J.C., 2015	Low Quality	Infection Resolution(Treatment Failure)	2 years	g2 (2 stage revision)	43	30.23%	g4 (Medical Tx only)	13	53.85%	RR	0.56(0.29,1.11)	Not Significant (P-value>.05)

Summary of Findings Table 10: Pico 4 Surgical Intervention

	Low Quality
+ Favors Treament 1 - Favors Treament 2 o Not Significant | Separate Groups	Tsai,J.C., 2015
Overarching comparison	
2-stage revision surgery vs. Debridement (with implant removal)	+

Data Table 16: Pico 4 Part 7- Staged Surgery Compared to Staged implant removal: Complications -(Low Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Tsai,J.C., 2015	Low Quality	Infection Resolution(Treatment Failure)	2 years	g2 (2 stage revision)	43	30.23%	g3 (Debridement w/ implant removal)	10	70.00%	RR	0.43(0.23,0.79)	**Treatment 1 Significant (P-value<.05)**

Summary of Findings Table 11: Pico 4 Surgical Intervention

	Low Quality
+ Favors Treament 1 - Favors Treament 2 o Not Significant | Separate Groups	Khoshbin,A., 2015
Overarching comparison	
Implant removal vs. implant retention	o

Data Table 17: Pico 4 Part 8- Immediate implant removal Compared to Non-op: Conservative Tx: -(Low Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Khoshbin,A., 2015	Low Quality	Infection Resolution(Infection Eradication)	Post-Op	Implant removal (Implant removal)	21	0.00%	Implant retention (Implant retention)	14	0.00%	RD	0.00(0.00,0.00)	Not Significant (P-value>.05)

Summary of Findings Table 12: Pico 4 Surgical Intervention

	Low Quality
+ **Favors Treament 1** - **Favors Treament 2** o **Not Significant** | **Separate Groups**	**Cunningham,D.J., 2017**
Overarching comparison	
(G4) Resection alone vs. (G6) Irrigation & Debridement alone (G5) Irrigation & Debridement (with resection) vs. (G4) Resection alone (G5) Irrigation & Debridement (with resection) vs. (G6) Irrigation & Debridement alone	[o][-][-]

Data Table 18: Pico 4 Part 9- Immediate implant removal Compared to Immediate implant removal: Complications -(Low Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Cunningham,D.J., 2017	Low Quality	Infection Resolution( )	Post-Op	g4 (Resection(s) alone)	42	9.52%	g6 (I&D(s) alone)	68	4.41%	RR	2.16(0.51,9.17)	Not Significant (P-value>.05)
Cunningham,D.J., 2017	Low Quality	Infection Resolution( )	Post-Op	g5 (I&D and Resection)	38	34.21%	g4 (Resection(s) alone)	42	9.52%	RR	3.59(1.28,10.07)	**Treatment 2 Significant (P-value<.05)**
Cunningham,D.J., 2017	Low Quality	Infection Resolution( )	Post-Op	g5 (I&D and Resection)	38	34.21%	g6 (I&D(s) alone)	68	4.41%	RR	7.75(2.36,25.51)	**Treatment 2 Significant (P-value<.05)**

Summary of Findings Table 13: Pico 4 Surgical Intervention

	Low Quality
+ Favors Treament 1 - Favors Treament 2 o Not Significant | Separate Groups	Stine,I.A., 2010
Overarching comparison	
Reimplantation vs implant removal	o

Data Table 19: Pico 4 Part 10- Staged implant removal Compared to Staged implant removal: Complications -(Low Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Stine,I.A., 2010	Low Quality	Infection Resolution(Infection Eradication)	2 years	g2 (Reimplantation; Patients elect to undergo reimplantation)	12	0.00%	g1 (Keep Spacer; Spacer as permanent prosthesis)	15	0.00%	RD	0.00(0.00,0.00)	Not Significant (P-value>.05)

Summary of Findings Table 14: Pico 4 Surgical Intervention

	Low Quality				
+ Favors Treament 1 **- Favors Treament 2** **o Not Significant** **| Separate Groups**	**Choi,H.R., 2011**	**Choi,H.R., 2012**	**Laffer,R.R., 2006**	**Tsai,J.C., 2015**	**Wang,K.H., 2015**
Overarching comparison					
2-stage surgery vs. no surgery					o
(G3) Implant Removal vs. (G1) Implant retention (G3) Implant Removal vs. (G4) No Surgery				[o][o]	
Implant removal vs. implant retention		+			
Implant removal vs implant retention	+				
(G5) 2-stage exchange surgery vs. (G6) implant retention (with debridement)			o		

Data Table 20: Pico 4 Part 11- Staged implant removal Compared to Non-op: Conservative Tx: Complications -(Low Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Choi,H.R., 2011	Low Quality	Infection Resolution(Treatment Failure)	Post-Op	Removal and 2 stage revision (Removal and 2-stage revision; removal of all components with thorough de´bridement, irrigation, and placement of an antibiotic-loaded cement spacer. For the spacer, 1.0 g of vancomycin and 2.4 g of tobramycin were mixed with 40 g of cement. A static spacer was inserted in 27 knees and an articulating spacer was inserted in five knees)	32	40.63%	Debridement+retention (Retention; A complete synovectomy was performed as part of debridement in all cases)	32	68.75%	RR	0.59(0.37,0.95)	**Treatment 1 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Choi,H.R., 2012	Low Quality	Infection Resolution(Infection Control)	Post-Op	Staged Revision (Removal) (All components and foreign materials were removed and then thorough debridement and irrigation were performed. An articulating spacer was inserted in 40 hips and nonarticulating spacer block or beads were used in 11 hips. For the spacer, 1.0 g of vancomycin and 2.4 g of tobramycin were mixed to 40 g of cement. Fourteen hips were treated by resection arthroplasty without any spacer+Organism-specific intravenous antibiotics were administrated for six weeks after surgery)	65	21.54%	Debridement + implant retention (Retention) (In the retention group, the hip was explored, debrided, and irrigated with saline. We tried to clarify the rationale behind the surgeons' decision to changed the head and liner in some cases and not in others, but could not identify any specific and consequent strategy+Organism-specific intravenous antibiotics were administrated for six weeks after surgery)	28	50.00%	RR	0.43(0.24,0.78)	**Treatment 1 Significant (P-value<.05)**
Laffer,R.R., 2006	Low Quality	Infection Resolution(Absence of clinical signs and symptoms of infection)	2 years	g5 (Two-stage exchange)	13	15.38%	g6 (Debridement and retention)	21	4.76%	RR	3.23(0.32,32.18)	Not Significant (P-value>.05)
Tsai,J.C., 2015	Low Quality	Infection Resolution(Treatment Failure)	2 years	g3 (Debridement w/ implant removal)	10	70.00%	g1 (Debridement w/ implant retention)	25	76.00%	RR	0.92(0.58,1.46)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Tsai,J.C., 2015	Low Quality	Infection Resolution(Treatment Failure)	2 years	g3 (Debridement w/ implant removal)	10	70.00%	g4 (Medical Tx only)	13	53.85%	RR	1.30(0.68,2.48)	Not Significant (P-value>.05)
Wang,K.H., 2015	Low Quality	Infection Resolution(Treatment Failure)	4 years	g1 (2 stage revision and Reimplantation; temporary antibiotic spacers (static or articulating) for 3 to 12 weeks prior to reimplantation)	13	23.08%	g2 (Debridement and Irrigation; synovectomy, copious irrigation and debridement (9 L of NS delivered by pulsatile lavage) dilute betadine soak and wash, exchange of the modular components, and closing the arthrotomy over a drain. The drain was removed post-operatively when the output was less than 10 cc per 8 h shift. Each patient was then discharged and received 6 weeks of targeted IV antibiotic therapy followed by oral antibiotic suppression for at least 1 year)	16	12.50%	RR	1.85(0.36,9.45)	Not Significant (P-value>.05)

Summary of Findings Table 15: Pico 4 Surgical Intervention

	Low Quality
+ Favors Treament 1 - Favors Treament 2 o Not Significant | Separate Groups	Lindberg-Larsen,M., 2016
Overarching comparison	
2-stage exchange surgery vs. partial revision	+

Data Table 21: Pico 4 Part 12- Staged implant removal Compared to Immediate implant removal: Complications -(Low Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Lindberg-Larsen,M., 2016	Low Quality	Infection Resolution(Re-revision due to infection)	3 months	g1 (2-stage exchange; 2-stage exchange (prosthesis removal, insertion of abx spacer and removal of spacer and secondary insertion of a revision knee)	215	30.23%	g2 (Partial revision (open debridement and exchange of tibial insert))	105	42.86%	RR	0.71(0.52,0.95)	**Treatment 1 Significant (P-value<.05)**

PICO 5 Adjunctive Treatment

Quality Evaluation Table 5: Randomized Trial

Study	Random Sequence Generation	Allocation Concealment	Blinding	Incomplete Outcome Data	Selective Reporting	Other Bias	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Munoz-Mahamud,E., 2011	◑	◑	◑	●	●	◑	●	●	●	Include	Moderate Quality

Summary of Findings Table 16: Pico 5 Adjunctive Techniques

	Moderate Quality	
'+Favors Treament 1 - Favors Treament 2 • Not Significant | Separate Follow-ups	Luo,S., 2016	Munoz-Mahamud,E., 2011
Overarching Comparison		
Pulsatile lavage (high pressure) vs pulsatile lavage (low pressure)		o
Local delivery (vancomycin-loaded CaSO4 & vancomycin-loaded PMMA) vs local delivery (vancomycin-loaded PMMA spacers group w/ gentamicin sulphate)	+	

Data Table 22: Pico 5 Part 1- Irrigation/Debridement Compared to Irrigation/Debridement: Complications -(Moderate Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Munoz-Mahamud,E., 2011	Moderate Quality	Infection Resolution(Treatment Failure)	Post-Op	g1 (High pressure pulsatile lavage; Necrotic tissue was excised and the wound was washed out with 10 L of saline serum using the high-pressure jet system aided by a ‘‘trumpet-ending’’ device (InterPulse System, Stryker))	42	19.05%	g2 (Low pressure pulsatile lavage; Necrotic tissue was excised and the wound was washed out with 10 L of saline serum using the high-pressure jet system aided by the conventional low-pressure system using bottles of 500 mL, according to randomization.)	37	13.51%	RR	1.41(0.51,3.93)	Not Significant (P-value>.05)

Data Table 23: Pico 5 Part 1- Other Conservative Tx Compared to Other Conservative Tx: Complications -(Moderate Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Luo,S., 2016	Moderate Quality	INFECTION(Persistent or Recurrent Infection)	2 years	g1 (Vancomycin-loaded CaSO4 & vancomycin-loaded PMMA; The combination therapy with vancomycin-loaded calcium sulfate and vancomycin-loaded PMMA spacers group (with the addition of gentamicin sulphate) placed in dead space during surgery.)	26	7.69%	g2 (Vancomycin-loaded PMMA spacers group (with the addition of gentamicin sulphate); PMMA spacer placed in dead space during surger)	25	36.00%	RR	0.21(0.05,0.89)	**Treatment 1 Significant (P-value<.05)**

PICO 6 Optimal Team for SSI Management

Quality Evaluation Table 6: Randomized Trial

Study	Design	Participant Recruitment	Allocation	Confounding Variables	Follow-Up Length	Other Bias? (If retrospective comparative, mark Yes)	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Bauer,S., 2012	○	●	●	◑	●	○	●	●	●	Include	Low Quality

Summary of Findings Table 17: Pico 6 Optimal Team for SSI Management

	Low Quality
+ Favors Treament 1 **- Favors Treament 2** **o Not Significant** **| Separate Groups**	**Bauer,S., 2012**
Overarching comparison	
Multidisciplinary care vs. no multidisciplinary care	o

Data Table 24: Pico 6 Part 1- Non-multidisciplinary Compared to Multidisciplinary: Complications -(Low Quality)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	effect measure	Result (95% CI)	Favored Treatment
Bauer,S., 2012	Low Quality	Infection Resolution( )	5.9 months	g1 (Before Multidisciplinary Staff Meeting (MSM); Non-Orthopedic surgeons, infectious diseases specialists, a bacteriologist, and the referent pharmacist)	28	46.43%	g2 (After Multidisciplinary Staff Meeting (MSM); Orthopedic surgeons, infectious diseases specialists, a bacteriologist, and the referent pharmacist usually participated in this weekly meeting)	25	36.00%	RR	1.29(0.67,2.49)	Not Significant (P-value>.05)