Appendix A1. Summary of search queries and terms.

Database	Search Terms
Ovid Search: MEDLINE(R), ERIC, and EMBASE	(("Spinal surgery" OR "Spine procedure" OR Spine surgery) AND (("racial
	determinants" OR "social determinants" OR "healthcare disparities" OR
	"sociodemographic factor" OR social disparities gender disparities OR "social
	factors" OR "socioeconomic factors" OR racial disparities"))
PubMed	((spine surgery OR spinal surgery)) AND ((Race OR socioeconomic OR social
	disparity OR racial disparity)) AND ((readmission OR re-admission))
PubMed	((spine surgery OR spinal surgery)) AND ((non-routine discharge OR discharge
	disposition OR non routine discharge))
PubMed	((elective AND spine NOT (tumor)) AND (spinal surgery OR spine surgery)) AND
	((any complication))
Scopus	TITLE-ABS-KEY((spine surgery OR spinal surgery)) AND (Race OR
	socioeconomic OR social disparity OR racial disparity) AND (readmission OR re-
	admission))
Scopus	TITLE-ABS-KEY((spine surgery OR spinal surgery) AND (non-routine discharge
	OR discharge disposition OR non routine discharge))
Scopus	TITLE-ABS-KEY((elective AND spine NOT tumor) AND (spinal surgery OR spine
^ ^	surgery) AND (any complication))

## Appendix A2. Description of exceptions during data extraction.

Study Nume	Description of Exception
Sholasky et al. 2014	Study classified post-operative infection as surgical site infection. We extracted data as surgical site infection.
(a)Elsamadicy et al. 2021	Study did not report incidence rate if number of events was less than 10 patients. Values were approximated to 5 patients.
Macki et al. 2021	Values for "Returned to OR w/in 90 day" were counted as Re-Operation.
Lad et al. 2013	Study did not provide re-operation at 1 year. Therefore, values were not extracted.
Elsamadicy et al. 2020	Study reported discharge disposition routine, non-routine, and other. Only routine and non-routine values were extracted.
Murphy et al. 2017	Study separated white population into Hispanic vs. Non-Hispanic. Data was only extracted from the Non-Hispanic White population.
Mummaneni et al. 2021	Study split routine discharge into "Home" and "Home w/ home healthcare services". These values were grouped under routine discharge for analysis.
Ogura et al. 2020	Study reported "Home, self-care" and "Home, health service" as separate subcategories for discharge disposition. These values were grouped under routine discharge for analysis.
Engler et al. 2022	Cerebrovascular outcomes were counted as Stroke.

Study Name Description of Exception

Study	Newcastle-Ottawa Score	Study	Newcastle-Ottawa Score
Adogwa et al. 2016	7	Lee et al. 2018	8
Aladdin et al. 2020	8	Macki et al. 2021	7
Arena et al. 2020	8	Malik et al. 2018	6
Baek et al. 2019	7	Marquez-Lara et al. 2014	7
Cook et al. 2018	7	Mohanty et al. 2022	9
De la Garza-Ramos et al. 2016	/	Mummaneni et al. 2021	8
Dial et al. 2020	7	Murphy et al. 2017	8
Diai ei al. 2020	7	Nandyala et al. 2014	5
Donerty et al. 2020	7	Ogura et al. 2020	5
Drazin et al. 2017	7	Park et al. 2018	9
Elsamadicy et al. 2016	6	(a)Passias et al. 2018	7
Elsamadicy et al. 2017	8	(b)Passias et al. 2018	5
Elsamadicy et al. 2018	6	Passias et al. 2022	9
Elsamadicy et al. 2020	7	Phan et al. 2017	8
(a)Elsamadicy et al. 2021	5	(a)Poorman et al. 2018	6
(b)Elsamadicy et al. 2021	7	(b)Poorman et al. 2018	5
Engler et al. 2022	0	Pugely et al. 2014	9
Feng et al. 2018	5	Quinn et al. 2017	7
Fineherg et al. 2013	0	Sanford et al. 2019	8
Conhart at al. 2012	7	Schoenfeld et al. 2012	7
Gepnart et al. 2012	6	Seicean et al. 2017	6
Gnenbot et al. 2022	8	Sivaganesan et al. 2019	7
Guan et al. 2018	7	Skolasky et al. 2014	9
Hardman et al. 2022	8	Snyaer et al. 2019	8
Kashkoush et al. 2019	5	Intrumata et al. 2017	6
Kerezoudis et al. 2019	6	Wick et al. 2022	8
Kim et al. 2018	6	Woodara et al. 2022	8
Knusel et al. 2020	8	Te et al. 2010	9
Kohls et al. 2018	8	Dick bies was assessed using the	9 Newcostle Ottown Scale for
Lad et al. 2013	0	retrospective cohort studies. The	e scores represent the best
Lee et al. 2017	7	efforts of two independent investi-	gators to evaluate the risk of f 7-9 classified as a low risk

Appendix A3. Evaluating quality of eligible studies using Newcastle-Ottawa Scale.

bias of each study, with a score of 7-9 classified as a low risk of bias and a score of 4-6 as a high risk of bias.

**Appendix B1.1.** Funnel plot analysis performed of all studies on the outcome re-admission complications. The natural log of standard error is reported on the y-axis.



**Appendix B1.2.** Funnel plot analysis performed of all studies on the outcome non-routine discharge complications. The natural log of standard error is reported on the y-axis.



**Appendix B1.3.** Funnel plot analysis performed of all studies on the outcome re-operation complications. The natural log of standard error is reported on the y-axis.



**Appendix B1.4.** Funnel plot analysis performed of all studies on the outcome mortality complications. The natural log of standard error is reported on the y-axis.



**Appendix B1.5.** Funnel plot analysis performed of all studies on the outcome all medical complications. The natural log of standard error is reported on the y-axis.



**Appendix B1.6.** Funnel plot analysis performed of all studies on the outcome wound related complications. The natural log of standard error is reported on the y-axis.



**Appendix B2.1.** Meta-analysis with a fixed effects model of studies with <100,000 patients reporting readmission complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.



**Appendix B2.2.** Meta-analysis with a random effects model of studies with <100,000 patients reporting non-routine discharge complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.

										ouus mano
Study	Database	Surgery Type	e(White)	n(White)	e(AA)	n(AA)	n(Total)	Weight	OR	MH, Random, 95% CI
(b)Passias et al. 2018	NSQIP	Thor. Lum. Surg.	657	1743	32	88	1831	1.9%	0.94	<b>c</b> ) i
Malik et al. 2018	NSQIP	Post. Lum. Fus.	3227	19620	414	1914	21534	21.1%	1.40	
a)Elsamadicy et al. 2021	KID	Post. Fus.	23	2096	9	552	2648	0.4%	1.49	
Baek et al. 2019	NSQIP	Post. Fus.	45	906	14	193	1099	0.7%	1.50	
Ogura et al. 2020	SI	Lum, Fus.	245	1307	39	147	1454	1.7%	1.57	-0-
Ye et al. 2018	NSQIP	Post. Cer. Fus.	506	2242	120	376	2618	4.6%	1.61	
(b)Elsamadicy et al. 2021	NSQIP	Lum. Decomp./Fus.	759	4505	102	383	4888	4.1%	1.79	<b></b>
Snyder et al. 2019	NSQIP	PCDF	1667	6633	423	1117	7750	14.0%	1.82	
Murphy et al. 2017	NSQIP	Lum. Decomp.	671	7192	80	487	7679	3.3%	1.91	-0-
Macki et al. 2021	SSID	Lum, Surg.	1874	16788	286	1436	18224	11.1%	1.98	
Mummaneni et al. 2021	QOD	Cer. Surg.	88	852	30	160	1012	1.1%	2.00	-10-
Seicean et al. 2017	NSQIP	Lam./Fus.	328	3489	607	3489	6978	12.7%	2.03	
(b)Elsamadicy et al. 2020	NIS	ACDF	2133	13250	615	2150	15400	19.9%	2.09	
Guan et al. 2018	QOD	Lum, Fus.	60	201	2	4	205	0.1%	2.35	
Drazin et al. 2017	MEDPAR	Lum, Lam/Fus,	125	513	228	513	1026	3.3%	2.48	·
Woodard et al. 2022	SI	ACDF	3	199	5	79	278	0.1%	4.41	
Random effects r	nodel: 1 <sup>2</sup> = 6	8.5% , p <0.0001, k =	16 studies						1.80	•



**Appendix B2.3.** Meta-analysis with a fixed effects model of studies with <100,000 patients reporting reoperation complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.



**Appendix B2.4.** Meta-analysis with a fixed effects model of studies with <100,000 patients reporting mortality complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.



**Appendix B2.5.** Meta-analysis with a random effects model of studies with <100,000 patients reporting all medical complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.



**Appendix B2.6.** Meta-analysis with a random effects model of studies with <100,000 patients reporting cardiovascular complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.

22 S S S S S	날아야 가지 아까지	영철상 관계에서 전철을 얻었다.	0.0000000000	7/ V <u>C</u> SC 257 3	60 L.D.C.S.	1122.025	V ULEY (1993)	120032-01-01	1002123			
Study	Database	Surgery Type	e(White)	n(White)	e(AA)	n(AA)	n(Total)	Weight	OR		MH, Random	, 95% CI
Sanford et al. 2019	NSQIP	SS	10	4106	0	522	4628	0.6%	0.08	-		
Adogwa et al. 2016	SI	SS	8	458	0	142	600	1.0%	0.09	+		
a)Elsamadicy et al. 2017	SI	Complex Fus.	63	438	4	52	490	3.0%	0.50			
a)Elsamadicy et al. 2021	KID	Post. Fus.	336	2096	93	552	2648	27.9%	1.06			
(a)Passias et al. 2018	NSQIP	SS	1082	51895	118	4325	56220	38.8%	1.32		E	3
b)Elsamadicy et al. 2020	NIS	ACDF	305	13250	65	2150	15400	19.8%	1.32		÷	}
Seicean et al. 2017	NSQIP	Lam/Fus.	14	3489	24	3489	6978	3.3%	1.72		-	• · · · ·
Kim et al. 2018	NSQIP	ASD	26	4703	6	441	5144	1.1%	2.48		-	0
Quinn et al. 2017	NSQIP	Cr/Spine Surg.	94	51397	26	5072	56469	4.0%	2.81			
Lad et al. 2013	Mcaid DB	Lum. Lam./Fus.	4	1052	5	336	1388	0.5%	3.96		-	
Random effects m	odel: 12 = 64	.6%, p = 0.0535, k	= 10 studie	15				-	1.48			-

0.1 0.2 0.5 1

Worse for Whites Worse for AA Cardiovascular Complications

2

5 10

**Appendix B2.7.** Meta-analysis with a random effects model of studies with <100,000 patients reporting DVT/PE complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.





**Appendix B2.8.** Meta-analysis with a fixed effects model of studies with <100,000 patients reporting genitourinary complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.

Study	Database	Surgery Type	e(White)	n(White)	e(AA)	n(AA)	n(Total)	Weight	OR		MH, Fix	ed, 9	5% C	3	
Elsamadicy et al. 2018	SI	Lum. Surg.	3	292	0	53	345	0.4%	0.22	••		+			
(a)Elsamadicy et al. 2017	SI	Complex Fus.	96	438	11	52	490	4.9%	0.96		-	-	-		
Zakaria et al. 2019	SSID	Cer, Surg.	205	4582	28	602	5184	13.9%	1.04		,	-0-			
Macki et al. 2021	SSID	Lum, Surg.	1213	16788	117	1436	18224	53.9%	1.14			÷			
Elsamadicy et al. 2016	SI	ACDF	1	32	1	28	60	0.3%	1.15	•		-11-			-+
Seicean et al. 2017	NSQIP	Lam./Fus.	52	3489	63	3489	6978	15.7%	1.22			-0-			
Sanford et al. 2019	NSQIP	SS	42	4106	7	522	4628	2.9%	1.32		-	- 1+-	_		
Adogwa et al. 2016	SI	SS	40	458	16	142	600	5.2%	1.33			-	_		
Lad et al. 2013	Mcaid DB	Lum. Lam./Fus.	15	1052	7	336	1388	2.2%	1.47				_	- C	
(a)Elsamadicy et al. 2021	KID	Post. Fus.	5	2096	5	552	2648	0.6%	3.82			1		•	
Fixed effects mod	el: l <sup>2</sup> = 0.0%	, p = 0.0399, k = 10	) studies					100.0%	1.16			÷	1	-1	-
									0 W	.1 0.2 orse for Genit	0.5 r White: tourinar	1 s Wo y Con	2 orse f nplica	5 lor A/ ation:	10 4 5

**Appendix B2.9.** Meta-analysis with a random effects model of studies with <100,000 patients reporting neurologic complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.





**Appendix B2.10.** Meta-analysis with a random effects model of studies with <100,000 patients reporting respiratory complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.



**Appendix B2.11.** Meta-analysis with a fixed effects model of studies with <100,000 patients reporting wound related complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.

Study	Database	Surgery Type	e(White)	n(White)	e(AA)	n(AA)	n(Total)	Weight	OR	MH, Fixed, 95% CI
Elsamadicy et al. 2016	SI	ACDF	1	32	0	28	60	0.5%	0.34 +	
(b)Elsamadicy et al. 2020	NIS	ACDF	45	13250	5	2150	15400	4.2%	0.68	
Adogwa et al. 2016	SI	SS	11	458	3	142	600	1.7%	0.88	
Lee et al. 2017	NSQIP	Spinal Fus.	111	4709	11	442	5151	6.2%	1.06	
Kim et al. 2018	NSQIP	ASD	111	4703	11	441	5144	6.2%	1.06	
Seicean et al. 2017	NSQIP	Lam./Fus.	69	3489	83	3489	6978	22.5%	1.21	- <del>[]</del>
(a)Elsamadicy et al. 2021	KID	Post. Fus.	75	2096	24	552	2648	10.0%	1.22	
Drazin et al. 2017	MEDPAR	Lum, Lam./Fus.	20	513	26	513	1026	6.4%	1.32	
Schoenfeld et al. 2012	SPORT	SS	40	1367	4	101	1468	1.8%	1.37	
Sanford et al. 2019	NSQIP	SS	68	4106	13	522	4628	5.0%	1.52	
Lad et al. 2013	Mcaid DB	Lum. Lam./Fus.	67	1052	32	336	1388	9.8%	1.55	
(a)Elsamadicy et al. 2017	SI	Complex Fus.	55	438	10	52	490	3.2%	1.66	
Feng et al. 2018	SPARCS	Cer. Fus.	206	57717	66	10060	67777	20.3%	1.84	100
Knusel et al. 2020	NSQIP	Post, Lum, Decomp.	12	4676	8	1577	6253	2.0%	1.98	
Elsamadicy et al. 2018	SI	Lum, Surg.	2	292	1	53	345	0.2%	2.79	
Fixed effects mod	del: 1² = 0.0%	, p <0.0001, k = 15 stu	dies					100.0%	1.38	+



**Appendix B3.1.** Meta-analysis with a fixed effects model of single institution studies reporting readmission complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.



**Appendix B3.2.** Meta-analysis with a fixed effects model of single institution studies reporting nonroutine discharge complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.



**Appendix B3.3.** Meta-analysis with a fixed effects model of single institution studies reporting reoperation complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.

Study	Database	Surgery Type	e(White)	n(White)	e(AA)	n(AA)	n(Total)	Weight	OR	1	Od MH, F	lds F ixed	Ratio	CI	
Ghenbot et al. 2022	SI	SS	102	307	21	63	370	73.9%	1.00			- [	-		
Woodard et al. 2022	SI	ACDF	16	199	8	79	278	26.1%	1.29				0	1	
Fixed effects mo	odel: 1 <sup>2</sup> = 0.09	%, p = 0.7581, k =	2 studies					100.0%	1.08	_		-	-	_	_
									0. We	1 0.2 prse fo	0.5 Whit Re-	1 es Ope	2 Worse ration	5 for A	10 IA

**Appendix B3.4.** Meta-analysis with a fixed effects model of single institution studies reporting all medical complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.

Study	Database	Surgery Type	e(White)	n(White)	e(AA)	n(AA)	n(Total)	Weight	OR	A	Odd AH, Fb	is R ced,	atio 95%	CI	
Elsamadicy et al. 2018	SI	Lum. Surg.	3	292	0	53	345	2.5%	0.22 .			+			
(a)Elsamadicy et al. 2017	SI	Complex Fus.	417	438	46	52	490	21.4%	0.39	_	-00-	-			
Elsamadicy et al. 2016	SI	ACDF	2	32	1	28	60	3.8%	0.56 +	-		+			
Adogwa et al. 2016	SI	SS	95	458	33	142	600	72.4%	1.16			Ŧ	-		
Fixed effects mode	al: 1² = 35.1%	, p = 0.7895, k =	4 studies					100.0%	0.95	_	-	+			
									0.	1 0.2	0.5	1	2	5	10
									We	All N	White Medical	s \ I Coi	Vorse mplica	for A/	Ą

**Appendix B3.5.** Meta-analysis with a fixed effects model of single institution studies reporting cardiovascular complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.

Study	Database	Surgery Type	e(White)	n(White)	e(AA)	n(AA)	n(Total)	Weight	OR		Odd MH, Fib	is Rited,	atio 95% (	CI	
Adogwa et al. 2016	SI	SS	8	458	0	142	600	25.1%	0.09 •			+			
(a)Elsamadicy et al. 2017	SI	Complex Fus.	63	438	4	52	490	74.9%	0.50	_	P	+			
Fixed effects mode	el: l² = 0.0% ,	p = 0.0699, k = 2	studies					100.0%	0.39	-	+	+			
									0, Wo	1 0.2 irse for Cardio	0.5 White wascul	1 s V iar C	2 Vorse Compli	5 for A cation	10 A ns

**Appendix B3.6.** Meta-analysis with a fixed effects model of single institution studies reporting DVT/PE complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. <math>n(White) = sample size of white patients. n(Total) = total sample size from study.



**Appendix B3.7.** Meta-analysis with a fixed effects model of single institution studies reporting genitourinary complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.

Study	Database	Surgery Type	e(White)	n(White)	e(AA)	n(AA)	n(Total)	Weight	OR		Odd AH, Fix	s Rated, 9	tio 5% C	3	
Adogwa et al. 2016	SI	SS	5	458	1	142	600	41.2%	0.64	•	- 0	++			
Elsamadicy et al. 2018	SI	Lum. Surg.	0	292	0	53	345	4.5%	1.00	•		+-			
Elsamadicy et al. 2016	SI	ACDF	0	32	0	28	60	8.6%	1.00	•		++			
(a)Elsamadicy et al. 2017	SI	Complex Fus.	13	438	3	52	490	45.6%	2.00			+	Ð		2
Fixed effects mode	el: 1² = 0.0% ,	p = 0.6126, k = 4	studies					100.0%	1.31		-	+	1	-	_
									0 W	0.1 0.2 lorse for Genit	0.5 Whites ourinar	1 We y Cor	2 orse f mplica	5 for A/ ation:	10 A s

**Appendix B3.8.** Meta-analysis with a fixed effects model of single institution studies reporting neurologic complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.



**Appendix B3.9.** Meta-analysis with a fixed effects model of single institution studies reporting respiratory complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.

Study	Database	Surgery Type	e(White)	n(White)	e(AA)	n(AA)	n(Total)	Weight	OR		M	Odd IH, Fix	s R ed,	atio 95%	CI	
Elsamadicy et al. 2016	SI	ACDF	1	32	0	28	60	16.7%	0.34	-		œ;	+			
Adogwa et al. 2016	SI	SS	15	458	2	142	600	83.3%	0.42	-	_	0	t	-		
Fixed effects mo	del: 1² = 0.0%	, p = 0.1964, k = 2	studies					100.0%	0.41	=	-	-	+	-	_	_
									0	0.1 (	).2	0.5	i.	2	5	10
									V	/orse	for	Whites	i V	Vorse	for A	A
										F	tesp	iratory	Cor	mplica	itions	

**Appendix B3.10.** Meta-analysis with a fixed effects model of single institution studies reporting wound related complications for AA versus White cohorts. OR=odds ratio. e(AA) = number of adverse events in AA patients. n(AA) = sample size of AA patients. e(White) = number of adverse events in White patients. n(White) = sample size of white patients. n(Total) = total sample size from study.

