

Supplemental file 3

Geographical variations in prostate cancer outcomes: a systematic review of international evidence

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1 Table 1 Geographical measures, summary scores, overall grades and levels of evidence for included studies

Study	Country	Geographical measure definitions		Score	Quality ²	Level ³
		Rurality	Disadvantage ¹			
Aarts et al, (2010) (1)	Netherlands	N/A	Composite Index	14	High	II
Aarts et al, (2013) (2)	Netherlands	N/A	Composite Index	16	High	II
Aggarwal et al, (2017) (3)	England	RUC2011	IMD2004	14	High	II
Aggarwal et al, (2018) (4)	England	RUC2011	IMD2004	12	Moderate	II
AIHW, (2013a) (5)	Australia	ARIA+	N/A	14	High	II
AIHW, (2013b) (6)	Australia	N/A	IRSD	14	High	II
Altekruse et al, (2010) (7)	USA	RUCC	N/A	14	High	II
Baade et al, (2011) (8)	Australia	ARIA+	N/A	12	Moderate	II
Baade et al, (2012) (9)	Australia	Access to services	IRSD	13	Moderate	II
Baldwin et al, (2013) (10)	USA	OMB classification	Poverty and employment	15	High	II
Belot et al, (2018) (11)	France	N/A	EDI	13	Moderate	II
Borrell et al, (2010) (12)	Spain	N/A	Composite Index	12	Moderate	IV
Boscoe et al, (2014) (13)	USA	N/A	Poverty	13	Moderate	II
Boscoe et al, (2016) (14)	USA	N/A	Poverty	15	High	II
Bravo et al, (2014) (15)	Colombia	N/A	Income	12	Moderate	II
Bryere et al, (2014) (16)	France	N/A	French DI	14	High	II
Burns et al, (2014) (17)	RoI	N/A	Carstairs Index	16	High	II
Byers et al, (2008) (18)	USA	N/A	Composite Index	14	High	III-3
Campbell et al, (2000) (19)	UK	Access to services	Carstairs Index	12	Moderate	II
Cary et al, (2016) (20)	USA	RUCC	N/A	15	High	II
Cetnar et al, (2013) (21)	USA	RUCA	N/A	14	High	III-3
Chen et al, (2016) (22)	USA	RUCC	Median income and education	13	Moderate	III-3

Study	Country	Geographical measure definitions		Score	Quality ²	Level ³
		Rurality	Disadvantage ¹			
Cheng et al, (2009) (23)	USA	N/A	Composite Index	15	High	IV
Chu et al, (2012) (24)	USA	N/A	Composite Index	13	Moderate	III-3
Clegg et al, (2009) (25)	USA	Census urban/rural areas	N/A	13	Moderate	III-3
Cobran et al, (2016) (26)	USA	Population density	Education	12	Moderate	III-3
Coleman et al, (2004) (27)	UK	N/A	Carstairs Index	14	High	II
Colli and Amling (2008) (28)	USA	Census urban/rural areas	N/A	12	Moderate	II
Coory and Baade (2005) (29)	Australia	ARIA+	N/A	12	Moderate	II
Cramb et al, (2011) (30)	Australia	ARIA+	IRSD	13	Moderate	II
Depczynski et al, (2018a) (31)	Australia	ARIA+	N/A	13	Moderate	III-3
Depczynski et al, (2018b) (32)	Australia	ARIA+	N/A	13	Moderate	III-3
DeRouen et al, (2018) (33)	USA	N/A	Composite Index	16	High	III-3
des Bordes et al, (2018) (34)	USA	RUCA	Poverty	15	High	III-3
Dey et al, (2011) (35)	Egypt	CAPMAS codes	N/A	12	Moderate	II
Du et al, (2006) (36)	USA	N/A	Composite Index	15	High	II
Ellis et al, (2018) (37)	USA	N/A	Composite Index	15	High	II
Exarchakou et al, (2018) (38)	England	N/A	IMD2004	14	High	II
Fairley et al, (2009) (39)	England	N/A	IMD2004	15	High	II
Fogleman et al, (2015) (40)	USA	RUCC	N/A	11	Moderate	II
Freeman et al, (2011) (41)	USA	N/A	Composite Index	14	High	III-3
Garcia-Gil et al, (2014) (42)	Spain	N/A	Composite Index	12	Moderate	III-3
Garg et al, (2013) (43)	USA	MSA	N/A	12	Moderate	IV
Ghali et al, (2018) (44)	USA	RUCA	N/A	16	High	II
Gilbert et al, (2011) (45)	USA	N/A	Median income and education	13	Moderate	III-3
Glaser et al, (2017) (46)	USA	RUCC	Median income	12	Moderate	III-3
Goovaerts and Xiao (2011) (47)	USA	RUCC	N/A	11	Moderate	II
Goovaerts et al, (2015) (48)	USA	N/A	Median income	13	Moderate	II
Gorday et al, (2014) (49)	Canada	N/A	Median income and education	11	Moderate	III-3

Study	Country	Geographical measure definitions		Score	Quality ²	Level ³
		Rurality	Disadvantage ¹			
Greenlee and Howe (2009) (50)	USA	N/A	Poverty	16	High	II
Guessous et al, (2016) (51)	Switzerland	Population density	N/A	13	Moderate	III-3
Haddad-Khoshkar et al, (2015) (52)	Iran	N/A	HDI	13	Moderate	II
Hagedoorn et al, (2018) (53)	Belgium	Population density	Belgian DI	14	High	II
Hall et al, (2005) (54)	Australia	ARIA	IRSD	15	High	II
Hastert et al, (2015) (55)	USA	N/A	Composite Index	11	Moderate	II
Hayen et al, (2008) (56)	Australia	Health service areas	IRSD	15	High	II
Haynes et al, (2008) (57)	New Zealand	Access to services	NZDep	14	High	II
Hellenthal et al, (2010) (58)	USA	N/A	Composite Index	15	High	II
Henry et al, (2014) (59)	Australia	Regional city (urban)	N/A	9	Moderate	III-3
Higginbotham et al, (2001) (60)	USA	Census urban/rural areas	N/A	12	Moderate	II
Hoffman et al, (2015) (61)	USA	N/A	Education	13	Moderate	II
Holmes et al, (2012) (62)	USA	RUCC, Distance to urologists	N/A	14	High	II
Holowaty et al, (2010) (63)	Canada	Census urban/rural codes	N/A	14	High	II
Hong et al, (2015) (64)	USA	N/A	Median income	14	High	II
Houston et al, (2018) (65)	USA	N/A	Poverty	12	Moderate	II
Ito et al, (2014) (66)	Japan	N/A	JDI	12	Moderate	II
Jansen et al, (2014) (67)	Germany	N/A	GIMD	14	High	II
Jarup et al, (2002) (68)	UK	Population density	Carstairs Index	12	Moderate	II
Jeffreys et al, (2009) (69)	New Zealand	N/A	NZDep	14	High	II
Jemal et al, (2002) (70)	USA	Unclear	Education and employment	11	Moderate	II
Jemal et al, (2005) (71)	USA	Population density	N/A	13	Moderate	II
Jin et al, (2018) (72)	Canada	N/A	MEDIAN INCOME	14	High	II
Jones et al, (2008a) (73)	England	Access to services,	IMD2004	14	High	II
Jones et al, (2008b) (74)	England	Access to services	IMD2004	13	Moderate	II
Jong et al, (2004) (75)	Australia	ARIA	N/A	14	High	II
Kish et al, (2014) (76)	USA	N/A	Composite Index	12	Moderate	II
Krishna et al, (2017) (77)	USA	N/A	Median income and education	12	Moderate	III-3
Krupski et al, (2005a) (78)	USA	N/A	Median income and education	15	High	II
Krupski et al, (2005b) (79)	USA	N/A	Median income and education	16	High	II

Study	Country	Geographical measure definitions		Score	Quality ²	Level ³
		Rurality	Disadvantage ¹			
Krupski et al, (2006) (80)	USA	N/A	Median income and education	13	Moderate	II
Lagace et al, (2007) (81)	Canada/Australia	MIZ (Canada) ; ARIA+ (Australia)	N/A	13	Moderate	II
Li et al, (2012) (82)	Sweden	Population density	Composite Index	16	High	II
Littlejohns et al, (2016) (83)	UK	Population density	Townsend Index	15	High	IV
Liu et al, (2001) (84)	USA	N/A	Composite Index	14	High	II
Louwman et al, (2010) (85)	Netherlands	N/A	Composite Index	14	High	II
Luce et al, (2017) (86)	West Indies	N/A	Composite Index	13	Moderate	II
Luo et al, (2015) (87)	Australia	ARIA+	IRSD	14	High	II
Lyratzopoulos et al, (2010) (88)	UK	N/A	IMD2004	15	High	II
Lyratzopoulos et al, (2013) (89)	England	N/A	IMD2004	17	High	II
Maclean et al, (2015) (90)	England	N/A	IMD2004	16	High	III-3
Mahal et al, (2015) (91)	USA	RUCC	Composite Index	15	High	II
Mahal et al, (2016) (92)	USA	RUCC	N/A	13	Moderate	III-3
Major et al, (2012) (93)	USA	Urologist density	Composite Index	12	Moderate	II
Maringe et al, (2013) (94)	England	N/A	Townsend Index	15	High	II
Mariotto et al, (2002) (95)	USA	N/A	Median income and education	12	Moderate	II
Marlow et al, (2010) (96)	USA	N/A	Median income and education	12	Moderate	III-3
Marsa et al, (2008) (97)	Denmark	Urbanization	N/A	14	High	II
Marsh et al, (2018) (98)	USA	RUCC	Median income and education	13	Moderate	III-3
Mather et al, (2006) (99)	USA	N/A	Education	11	Moderate	II
McAlister et al, (2017) (100)	Canada	Specialists/GP ratio	Median income	13	Moderate	III-3
McLafferty and Wang (2009) (101)	USA	RUCA	Median income	16	High	II
McVey et al, (2010) (102)	UK	N/A	IMD2004	12	Moderate	III-3
Meijer et al, (2013) (103)	Denmark	Population density	Employment	16	High	II
Miki et al, (2014) (104)	Japan	N/A	JDI	13	Moderate	III-3
Morgan et al, (2013) (105)	UK	N/A	SIMD	15	High	III-3
Muralidhar et al, (2016) (106)	USA	RUCC	Median income and education	13	Moderate	III-3
Nikolaidis et al, (2015) (107)	Greece	Urbanization	N/A	10	Moderate	II
Niu et al, (2010) (108)	USA	N/A	Poverty	16	High	II

Study	Country	Geographical measure definitions		Score	Quality ²	Level ³
		Rurality	Disadvantage ¹			
Obertova et al, (2016) (109)	New Zealand	MUA	N/A	12	Moderate	III-3
Ocana-Riola et al, (2004) (110)	Spain	Population density	Education and employment	15	High	II
Odisho et al, (2010) (111)	USA	RUCC	Median income, education and insurance	15	High	II
Oliver et al, (2006) (112)	USA	Census urban/rural areas	Median income, education and poverty	14	High	II
Pampalon et al, (2006) (113)	Canada	MIZ	N/A	11	Moderate	II
Papa et al, (2014) (114)	Australia	ARIA+	IRSD	15	High	II
Parikh et al, (2017) (115)	USA	Access to services	N/A	14	High	III-3
Park et al, (2016) (116)	South Korea	Population density	N/A	13	Moderate	III-3
Prasad et al, (2014) (117)	USA	Population density	Median income and education	14	High	III-3
Pukkala and Weiderpass (2002) (118)	Finland	N/A	Occupation	14	High	II
Rachet et al, (2010) (119)	England	N/A	IMD2004	14	High	II
Rand et al, (2014) (120)	USA	N/A	Median income	13	Moderate	III-3
Rogerson et al, (2006) (121)	USA	Unclear	N/A	12	Moderate	II
Rowan et al, (2008) (122)	UK	N/A	Carstairs Index (1986-1995) , IMD (1996-1999)	13	Moderate	II
Ruseckaite et al, (2016) (123)	Australia	ICS areas	N/A	12	Moderate	III-3
Rusiecki et al, (2006) (124)	USA	RUCC	N/A	12	Moderate	II
Sammon et al, (2016) (125)	USA	Population density	N/A	12	Moderate	IV
Sanderson et al, (2006) (126)	USA	N/A	Composite Index	14	High	III-3
Schwartz et al, (2003) (127)	USA	N/A	Composite Index	15	High	II
Schwartz et al, (2009) (128)	USA	N/A	Composite Index	14	High	II
Schymura et al, (2010) (129)	USA	Census urban/rural areas	Poverty and education	12	Moderate	III-3
Shack et al, (2010) (130)	UK	N/A	Carstairs Index (1986-1995) , IMD (1996-2000)	14	High	II
Shafique and Morrison (2013) (131)	UK	N/A	SIMD	15	High	II
Shafique et al, (2012a) (132)	UK	N/A	Carstairs Index	13	Moderate	II
Shafique et al, (2012b) (133)	UK	N/A	SIMD	13	Moderate	III-3
Sharma et al, (2016) (134)	Australia	Access to services	N/A	9	Moderate	III-3

Study	Country	Geographical measure definitions		Score	Quality ²	Level ³
		Rurality	Disadvantage ¹			
Sharp et al, (2014) (135)	Ireland (RoI, NI)	Population density	N/A	14	High	II
Singh and Jemal (2017) (136)	USA	N/A	Composite Index	14	High	II
Singh et al, (2011) (137)	USA	RUCC	Composite Index	12	Moderate	II
Skolarus et al, (2013) (138)	USA	RUCA	N/A	11	Moderate	II
Sloggett et al, (2007) (139)	UK	N/A	Carstairs Index	15	High	II
Smailyte and Kurtinaitis (2008) (140)	Lithuania	Population density	N/A	12	Moderate	II
Soto-Salgado et al, (2012) (141)	Puerto-Rico	N/A	Composite Index	14	High	II
Stanbury et al, (2016) (142)	Australia	N/A	IEO	14	High	II
Tan et al, (2018) (143)	Australia	Unclear	N/A	12	Moderate	II
Tervonen et al, (2016) (144)	Australia	ARIA+	IRSD	15	High	II
Tervonen et al, (2017a) (145)	Australia	ARIA+	IRSD	14	High	II
Tervonen et al, (2017b) (146)	Australia	N/A	IRSD	15	High	II
Thomas et al, (2017) (147)	Australia	ARIA+	IRSD	16	High	II
Trinh et al, (2016) (148)	USA	Population density	N/A	9	Moderate	IV
Tweed et al, (2018) (149)	UK	N/A	SIMD	15	High	II
Vetterlein et al, (2017) (150)	USA	RUCC	Median income and education	12	Moderate	III-3
Vicens et al, (2014) (151)	Spain	N/A	Composite Index	12	Moderate	II
Wan et al, (2011) (152)	USA	N/A	Composite Index	12	Moderate	II
Watson et al, (2017) (153)	USA	N/A	Composite Index	16	High	IV
Weiner et al, (2018) (154)	USA	N/A	Composite Index	14	High	III-3
White et al, (2011) (155)	USA	RUCA	Composite Index	16	High	II
Williams et al, (2012) (156)	USA	Population density	Median income and education	12	Moderate	III-3
Xiao et al, (2007) (157)	USA	N/A	Median income	16	High	II
Xiao et al, (2011) (158)	USA	Farm houses	N/A	12	Moderate	II
Xiao et al, (2014) (159)	USA	N/A	Median income	13	Moderate	II
Xiao et al, (2016) (160)	USA	N/A	Median income	12	Moderate	II
Yang and Hsieh (1998) (161)	Taiwan	Population density	N/A	11	Moderate	II
Yin et al, (2010) (162)	USA	N/A	Composite Index	15	High	II
Yu et al, (2008) (163)	Australia	N/A	IRSD	13	Moderate	II

Study	Country	Geographical measure definitions		Score	Quality ²	Level ³
		Rurality	Disadvantage ¹			
Yu et al, (2014a) (164)	Australia	ARIA+	IRSD	16	High	II
Yu et al, (2014b) (165)	USA	N/A	Composite Index	11	Moderate	II
Zahnd et al, (2017a) (166)	USA	RUCC	Income and Employment	13	Moderate	II
Zahnd et al, (2017b) (167)	USA	RUCC	N/A	12	Moderate	II
Zahnd et al, (2018) (168)	USA	RUCC	N/A	13	Moderate	II
Zhu et al, (2011) (169)	USA	Population density	N/A	10	Moderate	IV

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