TITLE: Health System Design and Health Services Reforms for Aboriginal and Other Vulnerable Populations: A Systematic Review of the Evidence

DATE: 11 October 2011

CONTEXT AND POLICY ISSUES:

Vulnerable populations often lack many of the social, economic, historical or geographic advantages available to the mainstream population. These disparities can contribute to poorer overall health status, providing specific challenges for the delivery of healthcare to certain marginalized groups.[1] In many cases, efforts to improve health outcomes for marginalized or vulnerable groups have required separate, specialized strategies in the design and delivery of healthcare.[2]

Vulnerable populations typically include Aboriginal people, single parents, recent immigrants, and people with disabilities. Vulnerable groups are affected by a broad range of social and economic determinants of health including income levels, employment, education, housing, access to health care, or cultural and transportation barriers that prevent them from effectively improving their health status relative the rest of the general population.[2]

In general, Aboriginal people are associated with having the poorest overall health status in Canada.[3] In addition, Aboriginal people share determinants of health unique to their situation, such as the impacts of colonization, residential schools and the loss of language and culture on overall health and wellbeing.[4]

In developing strategies to improve the health outcomes for vulnerable populations, healthcare providers may look to changes in health system design or health service delivery to improve both access and efficacy of health services.[5] For example, in the case of Aboriginal populations, a commonly held view is that health outcomes can be improved by bridging western and traditional approaches to medicine, thereby providing a more meaningful and relevant and experience within the healthcare system.[6]

This systematic review will evaluate the available evidence on how different approaches to health system design and service reforms have affected the health outcomes of indigenous populations and other disadvantaged or vulnerable groups.

There are many forms of evidence that are available. From a scientific point of view, it is generally agreed that a well-designed systematic review is the most authoritative source of evidence because the researchers have compiled an overview of primary studies that contains an explicit statement of objectives, materials and methods and has been conducted according to explicit and reproducible methodology.

At the same time, the evidence base for effective healthcare decisions involves multiple forms of evidence that balance rigour with expedience. This review will focus on evidence that is both

relevant and timely, relying on published, peer-reviewed literature, as well as grey literature. Although the study will emphasize results of primary studies, there will also be an assessment of higher level meta-analyses where appropriate. Limitations of a systematic review methodology include that it may not include Indigenous knowledge, which as noted by NCCAH (2007), is also valid evidence; Indigenous knowledge must be included along with 'scientific' evidence sources to build a complete understanding.[7]

RESEARCH QUESTIONS:

1. What is the impact of health system design and health service reforms on health system performance as well as on health outcomes and behaviours in Aboriginal populations, when compared with
    A. the situation prior to the intervention/reform?
    B. no intervention/reform?
    C. other system designs/reforms?
2. What is the impact of health system design and health service reforms on health system performance as well as on health outcomes and behaviours in vulnerable populations, when compared with:
    A. .the situation prior to the intervention/reform?
    B. no intervention/reform?
    C. other system designs/reforms?

METHODS:

Literature Search Strategy

An information specialist will perform the literature search using a peer-reviewed search strategy.

Published literature will be identified by searching the following bibliographic databases: MEDLINE with in-process records and daily updates and PsycInfo via Ovid; The Cochrane Library via Wiley; CINAHL via EBSCO; the University of New Mexico's Native Health Database (https://hscssl.unm.edu/nhd/) and PubMed (for non-Medline records). The search strategy consists of controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts are aboriginal peoples or additional populations of interest and health services designs or health system reforms in North America, Australasia, Scandinavia or South Africa.

Methodological filters will be applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, randomized controlled trials (RCTs), and non-randomized controlled clinical studies, including prospective cohort, case-control and before/after studies for the aboriginal peoples search. Because non-aboriginal vulnerable populations are not the main interest of the requestor, the search for materials relevant to these populations will be limited to health technology assessments, systematic reviews, and meta-analyses only. Where possible, retrieval will be limited to the human population. The search will also be limited to English or French language documents published between January 1, 2006, and September, 2011. Regular alerts will be established to update the search until data abstraction has begun. See Appendix 1 for the detailed Medline search strategy.

Grey literature (literature that is not commercially published) will be identified by searching relevant sections of the Grey Matters checklist (http://www.cadth.ca/en/resources/grey-matters). Google and other Internet search engines will be used to search for additional materials. These searches will be supplemented by reviewing the bibliographies of key papers and through contacts with an expert.

Selection Criteria and Method

Two reviewers (NA and GB) will independently screen citations and select studies regarding health system design and health service reform in Aboriginal and vulnerable populations. In the first level of screening they will review the titles and abstracts for relevance using a predefined checklist (Appendix 2). Kappa coefficient, a statistical measure of inter-rater agreement, will be calculated and reported. Any discrepancies between reviewers will be discussed until consensus is reached. Full texts of any relevant titles/abstracts will be retrieved, and will be assessed by two independent reviewers (NA and GB) for inclusion, using a checklist (Appendix 3) incorporating explicit pre-determined criteria (Table 1). These will be checked for agreement, and any disagreement between reviewers will be discussed until consensus is reached. The study selection process will be presented in a Preferred Reporting Items for Systematic Reviews and Meta- Analyses (PRISMA) flowchart.

Table 1: Selection Criteria

Population	Research Question 1: €Aboriginal populations Research Question 2: €Ethno cultural minorities €Immigrant and refugees €Vulnerable/marginalized groups who experience barriers to accessing appropriate health and health related services
Intervention	• Health system design: o Includes aggregate levels of service: federal, provincial, regional, local, and institutional • Health systems organization, integration, coordination and partnerships, advisors, navigators, comprehensive community programs, multidisciplinary teams • Health service reforms: health service delivery for individual, family or community, including cultural components of the health service
Comparator	• Situation prior to the intervention/reform • No intervention • Other comparable health system designs/reforms
Outcome	• Incidence and prevalence of health conditions (for example, diabetes, tuberculosis, fetal alcohol spectrum disorder, etc.) • Human function (for example, disability), quality of life • Life expectancy • Deaths

	• Health behaviours (for example, adherence, practice of health lifestyle) • Health system performance (for example, effectiveness/efficiency, appropriateness, responsiveness, accessibility, continuous, capable, and sustainability)
Study Design	Research Question 1: RCTs and non-randomized studies, including prospective cohort, case-control and before/after studies Research Question 2: • Health technology assessments, systematic reviews, meta-analyses
Timeframe	January 1, 2006 onwards

Exclusion Criteria

Studies will be excluded if they: do not meet the selection criteria, provide the results of a qualitative or a non-comparative quantitative study, or present preliminary results in abstract form. Duplicate publications, narrative reviews, editorials, and studies published prior to 2006 will also be excluded.

Data Extraction

Data extraction for each article will be performed by one reviewer (NA), using a pre-drafted data extraction form (Appendix 4). The second reviewer (GB) will check the abstracted data for accuracy. Two reviewers (NA and GB) will pilot data extraction forms *a priori*. A calibration exercise using a small number of studies will be undertaken to ensure consistency between reviewers.

Critical Appraisal of Individual Studies for research question 1

Two reviewers (NA and GB) will independently evaluate the quality of RCTs and comparative non-randomized studies using a modified version of the Downs and Black instrument (see Appendix 5).[8] The assessment instrument, which has been modified to include the source of funding for studies, has a total score ranging from 0 to 28, with higher scores indicating a higher-quality study. Any disagreements will be resolved through discussion until consensus is reached. In addition to reporting numeric quality scores, the strengths and weaknesses of the included studies will be described.

Critical Appraisal of HTA/SR/MAs for research question 2

Two reviewers (NA and GB) will independently evaluate the methodological quality of the included systematic reviews and meta-analyses, using the measurement tool for the "assessment of multiple systematic reviews" (AMSTAR; Appendix 6)[9] AMSTAR is an 11-item checklist that has been developed to ensure reliability and construct validity of systematic reviews. The same tool will be used for the assessment of systematic reviews or meta-analyses included in identified HTA reports. Any disagreements will be resolved through discussion until consensus is reached.

Data Analysis Methods

Comparability of the studies will be defined by the population, interventions and outcome measures. When two or more comparable studies with quantitative outcomes are identified, pooled estimates of the outcome measures will be performed through meta-analysis. When the studies are not comparable in terms of population, interventions, or outcome measures, or if there is variation in the reporting of clinical outcomes, a formal meta-analysis will not be performed. Instead, the individual studies will be described and synthesized using a narrative approach.

Deliverables

- List of selected studies
- Draft reports
- Final report

Research Team

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References

1. *Social determinants of Inuit health in Canada: a discussion paper*. Ottawa: Inuit Tapiriit Kanatami; 2007. 29 p p. [cited 2011 Oct 3]. Available from: http://ahrnets.ca/files/2011/02/ITK_Social_Determinants_paper_2007.pdf

2. *Reducing health disparities & promoting equity for vulnerable populations*. Ottawa: Canadian Institutes of Health Research; 2002. [cited 2011 Oct 3]. Available from: http://www.cihr.ca/e/4277.html

3. Herring DA, Waldram JB, Young TK. *Aboriginal health in Canada: historical, cultural, and epidemiological perspectives*. 2nd ed. Toronto: University of Toronto Press, Scholarly Publishing Division; 2006.

4. Reading CL, Wein F. *Health inequalities and the social determinants of Aboriginal peoples' health*. Prince George (BC): National Collaborating Centre for Aboriginal Health; 2009.

5. Kelly MD. Toward a new era of policy: health care service delivery to First Nations. *Int Indigenous Pol J*. 2011 [cited 2011 Oct 3];2(1):11. Available from: http://ir.lib.uwo.ca/iipj/vol2/iss1/11

6. Molyneaux H, O'Donnell S. *ICT and health and wellness in remote and rural First Nations communities: a social determinants of health perspective*. In: Canadian Society of Telehealth conference (CST 2009), Vancouver, October 3-6 2009. Ottawa: National Research Council Institute for Information Technology; 2009 [cited 2011 Oct 3]. Available from: http://nparc.cisti-icist.nrc-cnrc.gc.ca/npsi/ctrl?action=rtdoc&an=15073199&lang=en.

7. *Dialogue circle: ways of knowing. Exploring evidence in aboriginal health. Proceedings from the Indigenous Knowledges Dialogue Circle, Vancouver BC*. Prince George (BC): National Collaborating Centre for Aboriginal Health (NCCAH); 2007. [cited 2011 Sep 28]. Available from: http://www.nccah.ca/docs/nccah%20reports/Dialogue%20Circle_Exploring%20Evidence.pdf

8. Downs SH, Black N. The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *J Epidemiol Community Health*. 1998 [cited 2011 Sep 12];52(6):377-84. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1756728/pdf/v052p00377.pdf

9. Shea BJ, Grimshaw JM, Wells GA, Boers M, Andersson N, Hamel C, et al. Development of AMSTAR: a measurement tool to assess the methodological quality of systematic reviews. *BMC Med Res Methodol*. 2007 [cited 2011 Sep 12];7:10. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1810543/pdf/1471-2288-7-10.pdf

APPENDIX 1: Literature search strategy

OVERVIEW	
Interface:	Ovid
Databases:	Ovid Medline <1948 to current date> Ovid Medline In-Process & Other Non-Indexed Citations <current version>
Date of Search:	TBD
Alerts:	Monthly search updates began in September 2011 and ran until date TBD.
Study Types:	Systematic reviews; meta-analyses; technology assessments; randomized controlled trials; comparative studies, including: cohort studies, case control studies; before/after studies.
Limits:	Publication years 2006-present Humans (for primary studies)

SYNTAX GUIDE	
/	At the end of a phrase, searches the phrase as a subject heading
.sh	At the end of a phrase, searches the phrase as a subject heading
MeSH	Medical Subject Heading
fs	Floating subheading
exp	Explode a subject heading
*	Before a word, indicates that the marked subject heading is a primary topic; or, after a word, a truncation symbol (wildcard) to retrieve plurals or varying endings
#	Truncation symbol for one character
?	Truncation symbol for one or no characters only
ADJ	Requires words are adjacent to each other (in any order)
ADJ#	Adjacency within # number of words (in any order)
.ti	Title
.ab	Abstract
.hw	Heading Word; usually includes subject headings and controlled vocabulary
.pt	Publication type

OVID Medline Strategy

#	Searches	Results
1	*Oceanic Ancestry Group/ or *American Native Continental Ancestry Group/ or *Indians, North American/ or *Inuits/	12915
2	(aborigine? or aboriginal* or Amerindian? or Amerind? or Indian? or indigenous or Inuit? or Inupiat?).ti.	31293
3	((First adj2 Nation?) or First-Nation? or Firstnation? or Metis).ti.	516
4	((Alaska* or America* or Hawaii*) adj native?).ti.	992
5	(Maori or Sami).ti.	761
6	exp *Indigenous Populations/	93622
7	or/1-5	38383
8	or/2-6	114561
9	exp *Ethnic Groups/ or *Minority Groups/	82318
10	((ethno* or ethnic* or culture* or cultural*) and (divers* or minorit*)).ti.	4846
11	*African Cultural Groups/ or *Arabs/ or exp *Asians/ or *Blacks/ or *Jews/ or exp *Latinos-Latinas/ or *Minority Groups/ or *Romanies/	51665
12	or/9-10	84968
13	or/10-11	55093
14	*"Emigrants and Immigrants"/ or *Refugees/	8158
15	(immigrant? or foreigner? or alien? or emigrant? or refugee?).ti.	14274
16	*Immigration/ or *Refugees/ or exp *Expatriates/	24286
17	or/14-15	17600
18	or/15-16	28942
19	exp *Homeless Persons/ or *Medical Indigency/ or exp *Poverty/ or *Social Class/	28090
20	*Health Status Disparities/ or *Vulnerable Populations/	5391
21	(homeless* or indigen* or poor or poverty or socioeconomic* or socio-economic*).ti.	44170
22	(disadvantage? or health disparit* or inequalities or inequality or inequitab* or marginalized or marginal or underserved or vulnerable or sociodemographic* or socio-demographic*).ti.	24479
23	*At Risk Populations/ or *Disadvantaged/ or *Health Disparities/ or exp *Homeless/ or *Poverty/ or exp *Social Class/ or exp *Social Deprivation/ or exp *Socioeconomic Status/	42276
24	or/19-22	86050
25	or/21-23	95582
26	*Program Development/ or exp *Health Planning/ or *"Health Care Quality, Access, and Evaluation"/ or exp *Delivery of Health Care/ or exp *Health Services Research/	453594
27	exp *Patient Care Management/ or exp *Health Services/ or exp *Health Education/ or exp *Specialties, Nursing/ or *Community Health Aides/	974411
28	*Community-Institutional Relations/ or exp *Health Promotion/ or *Models, Organizational/ or exp *Health Planning Organizations/ or *"Outcome Assessment (Health Care)"/	60838
29	*Medicine, Traditional/ or *Shamanism/	4515
30	((federal* or govern* or institution* or international* or local* or national* or provincial* or regional* or territorial*) and (communicat* or health* or outreach*)).hw,tw.	480621
31	(advisor? or aggregat* or align* or (capacit* adj2 build*) or collaborat* or communit* or co-ordinat* or coordinat* or integrat* or holistic* or initiative? or innovation? or intervention* or navigator? or partnership* or partners or partnering or plan* or practice? or program* or project* or reform* or service* or social determinant* or strategies or strategy or stream-line* or streamline* or support or system* or wholistic*).ti.	1516388
32	(cross-disciplin* or crossdisciplin* or inter-disciplin* or interdisciplin* or multi-disciplin* or multidisciplin*).ti.	12778
33	(((traditional* or indigenous*) adj medicine?) or (cultur* adj (appropriate* or relevan* or responsive*))).ti.	1694
34	(cultural safety or shared decision-making or shared decisionmaking or patient participat* or engagement).ti.	6420

35	exp *Program Development/ or exp *Health Care Services/ or exp *Health Care Delivery/ or exp *Health Care Policy/ or exp *Quality of Services/	443732
36	*Client Education/ or exp *Health Education/ or *Educational Program Evaluation/ or exp *Case Management/ or exp *Communities/ or exp *Community Services/ or *Community Development/ or exp *Community Facilities/	157542
37	*Health Promotion/ or exp *Organizational Behavior/ or exp *Government Policy Making/	59155
38	*Folk Medicine/ or *Shamanism/ or *Holistic Health/	8477
39	or/26-34	2722510
40	or/30-38	2300542
41	exp North America/	1123798
42	(Canad* or British Columbia* or Alberta* or Saskatchewan* or Manitob* or Quebe* or Ontari* or Nova Scotia* or Newfoundland* or Labrador* or Prince Edward Island* or New Brunswick* or Northwest Territor* or Yukon* or Nunavut*).in,hw,tw.	567994
43	(United States or US or USA or America*).in,hw,tw.	8615968
44	Greenland*.in,hw,tw.	2680
45	(Australasia or Australia* or New South Wales or Northern Territor* or Queensland or Tasmania* or Victoria* or New Zealand*).in,hw,tw.	450942
46	South Africa*.in,hw,tw.	59894
47	exp Scandinavia/	111732
48	(Denmark or Finland* or Finmark or Norway or Norwegian* or Scandinavia* or Sweden or Swedish).in,hw,tw.	536253
49	or/41-48	9595302
50	(Canad* or British Columbia* or Alberta* or Saskatchewan* or Manitob* or Quebe* or Ontari* or Nova Scotia* or Newfoundland* or Labrador* or Prince Edward Island* or New Brunswick* or Northwest Territor* or Yukon* or Nunavut*).mp.	161209
51	(United States or US or USA or America*).mp.	6815176
52	Greenland*.mp.	2528
53	(Australasia or Australia* or New South Wales or Northern Territor* or Queensland or Tasmania* or Victoria* or New Zealand*).mp.	173705
54	South Africa*.mp.	36798
55	(Denmark or Finland* or Finmark or Norway or Norwegian* or Scandinavia* or Sweden or Swedish).mp.	188140
56	or/50-55	7161855
57	(Randomized Controlled Trial or Controlled Clinical Trial or Clinical Trial or Clinical Trial, Phase II or Clinical Trial, Phase III or Clinical Trial, Phase IV or Comparative Study or Evaluation Studies or Multicenter Study).pt.	2148490
58	exp Clinical Trials as Topic/	249454
59	Multicenter Studies as Topic/	14192
60	Evaluation Studies as Topic/ or Program Evaluation/	162533
61	Random Allocation/ or Double-Blind Method/ or Single-Blind Method/ or Placebos/ or Control Groups/	210405
62	Epidemiologic Studies/ or Epidemiologic Methods/	32895
63	Cohort Studies/ or Longitudinal Studies/ or Prospective Studies/ or Follow-Up Studies/ or Retrospective Studies/ or Case-Control Studies/ or Cross-Sectional Study/ or Organizational Case Studies/	1352935
64	(random* or sham or placebo*).tw.	737927
65	((singl* or doubl*) adj (blind* or dumm* or mask*)).tw.	121768
66	((tripl* or trebl*) adj (blind* or dumm* or mask*)).tw.	296
67	(control* adj3 (study or studies or trial*)).tw.	271895
68	(comparative* adj3 (study or studies)).tw.	85471
69	clinical trial?.tw.	182182
70	(nonrandom* or non-random* or quasi-random* or quasirandom*).tw.	24601

71	(allocated adj "to").tw.	33837
72	((open label* or open-label*) adj5 (study or studies or trial*)).tw.	17626
73	(observational* adj3 (study or studies or design? or analysis or analyses)).tw.	45360
74	(cohort* adj7 (study or studies or design? or analysis or analyses)).tw.	99713
75	(prospective* adj7 (study or studies or design? or analysis or analyses or cohort)).tw.	240417
76	((follow up or followup) adj7 (study or studies or design? or analysis or analyses)).tw.	80073
77	((longitudinal or longterm or (long adj term)) adj7 (study or studies or design? or analysis or analyses or data or cohort)).tw.	156092
78	(retrospective adj7 (study or studies or design or analysis or analyses or cohort or data or review)).tw.	196353
79	((case adj control) or (case adj comparison) or (case adj controlled)).tw.	65846
80	(case-referent adj3 (study or studies or design or analysis or analyses)).tw.	549
81	(population* adj3 (study or studies or analysis or analyses)).tw.	102466
82	(descriptive adj3 (study or studies or design? or analysis or analyses)).tw.	35213
83	((multidimensional or (multi adj dimensional)) adj3 (study or studies or design or analysis or analyses)).tw.	2522
84	(cross adj sectional adj7 (study or studies or design or research or analysis or analyses or survey or findings)).tw.	108803
85	((natural adj experiment) or (natural adj experiments)).tw.	1064
86	(quasi adj (experiment or experiments or experimental)).tw.	7285
87	((non experiment or nonexperiment or non experimental or nonexperimental) adj3 (study or studies or design or analysis or analyses)).tw.	1151
88	(prevalence adj3 (study or studies or analysis or analyses)).tw.	19705
89	case series.tw.	26532
90	((before-after or (before* adj after)) adj3 (study or studies or design?)).mp.	912
91	((follow up or followup) and (base line* or baseline*)).tw.	56488
92	Between Groups Design/ or Cohort Analysis/ or exp Longitudinal Studies/ or Prospective Studies/ or Retrospective Studies/ or Followup Studies/ or Pretesting/ or Posttesting/ or Quasi Experimental Methods/ or Treatment Effectiveness Evaluation/ or exp Program Evaluation/	1190774
93	or/57-91	4107187
94	or/64-92	2509840
95	Review.pt.	1680446
96	93 not 95	3842533
97	exp animals/	15857431
98	exp animal experimentation/	5113
99	exp models animal/	363075
100	exp animal experiment/	5113
101	nonhuman/	0
102	exp vertebrate/	15392545
103	animal.po.	104117
104	or/97-103	15885639
105	exp humans/	12099272
106	exp human experiment/	0
107	human.po.	1076739
108	or/105-107	13176011
109	104 not 108	3771063
110	96 not 109	3294207
111	94 not 109	2328063
112	Meta-Analysis.pt.	30848

113	Meta-Analysis/ or Systematic Review/ or Meta-Analysis as Topic/ or exp Technology Assessment, Biomedical/	50781
114	((systematic* adj3 (review* or overview*)) or (methodologic* adj3 (review* or overview*))).tw.	43619
115	((quantitative adj3 (review* or overview* or synthes*)) or (research adj3 (integrati* or overview*))).tw.	7114
116	((integrative adj3 (review* or overview*)) or (collaborative adj3 (review* or overview*)) or (pool* adj3 analy*)).tw.	8721
117	(data synthes* or data extraction* or data abstraction*).tw.	10680
118	(handsearch* or hand search*).tw.	4439
119	(mantel haenszel or peto or der simonian or dersimonian or fixed effect* or latin square*).tw.	11307
120	(met analy* or metanaly* or health technology assessment* or HTA or HTAs).tw.	2237
121	(meta regression* or metaregression* or mega regression*).tw.	1610
122	(meta-analy* or metaanaly* or systematic review* or biomedical technology assessment* or bio-medical technology assessment*).mp,hw.	88925
123	(medline or Cochrane or pubmed or medlars).tw,hw.	65776
124	(cochrane or health technology assessment or evidence report).jw.	9012
125	(Meta Analysis or Systematic Review).md.	9187
126	or/112-124	164050
127	or/114-125	157596
128	7 and 39 and 49 and 110 use mesx	0
129	7 and 39 and 49 and 110 use prmz	2170
130	8 and 40 and 56 and 111	7154
131	from 130 keep 6967-7154	188
132	7 and 39 and 126 use mesx	0
133	7 and 39 and 126 use prmz	95
134	8 and 40 and 127	404
135	from 134 keep 388-404	17
136	128 or 129 or 131 or 132 or 133 or 135	2457
137	limit 136 to (english or french)	2435
138	limit 137 to yr="2006 -Current"	1158
139	remove duplicates from 138	1022
140	(12 or 17 or 24) and 39 and 126 use mesx	1
141	(12 or 17 or 24) and 39 and 126 use prmz	827
142	(13 or 18 or 25) and 40 and 127	989
143	from 142 keep 626-989	364
144	140 or 141 or 143	1192
145	limit 144 to (english or french)	1167
146	limit 145 to yr="2006 -Current"	860
147	remove duplicates from 146	706
148	139 or 147	1693

Appendix 2: Title and abstract screening checklist

Reviewer: **Date:**

Ref ID: **First Author (year):**

Research question 1: What is the impact on health outcomes and behaviours and health system performance of health system design and health service reforms in Aboriginal populations?	
1.1 What is the STUDY POPULATION in this article?	€ **Aboriginal populations (include)** € All other population groups (***go to question 2.1 [research question 2]***)
1.2 What is the INTERVENTION?	€ Health system design* (include) € Health systems organization, integration, coordination and partnerships, governance**, advisors, navigators, comprehensive community programs, multidisciplinary teams (include) € • Health service reforms† (include) € Any other interventions (e.g., individual community or education programs) (exclude) € Can't decide (include)
1.3 What is the TYPE OF STUDY reported in this article?	€ Report of a clinical trial (controlled/uncontrolled; randomized/non-randomized) (include) € Meta-analyses/systematic reviews/HTAs (include) € Report of a prospective or retrospective cohort study (include) € Report of a case-control study (include) € Report of a before-after study (include) € Report of an analytical cross-sectional study [comparative] (include) € Other observational studies (e.g. descriptive cross-sectional, case report/series, survey) (exclude) € Qualitative designs (e.g. grounded theory, phenomenology, ethnography) (exclude) € Academic/narrative review, comment, editorial, letter, note, patient handout, study design description (exclude) € Can't decide (include)
Selection decision:	€ **Include for question 1** € **Exclude**

***Health system design includes aggregate levels of service: federal, provincial, regional, local, and institutional

**** i.e., engaging vulnerable populations in decision-making regarding health systems and services

†Health service reforms refer to changes made in health service delivery for individual, family or community, including cultural components of the health service

Research question 2: What is the impact on health outcomes and behaviours and health system performance of health system design and health service reforms in vulnerable populations	
2.1 What is the STUDY POPULATION in this article?	€ Ethno cultural minorities (include) € Immigrant and refugees (include) € Vulnerable/marginalized groups who experience barriers to accessing appropriate health and health related services (include) € All other population groups (exclude)
2.2 What is the INTERVENTION?	€ Health system design* (include) € Health systems organization, integration, coordination and partnerships, advisors, navigators, comprehensive community programs, multidisciplinary teams (include) € • Health service reforms** (include) € Any other interventions (exclude) € Can't decide (include)
2.3 What is the TYPE OF STUDY reported in this article?	€ Meta-analyses/systematic reviews/HTAs (include) € Report of a clinical trial (controlled/uncontrolled; randomized/non-randomized) (exclude) € Report of a prospective or retrospective cohort study (exclude) € Report of a case-control study (exclude) € Report of a before-after study (exclude) € Other observational studies (e.g. analytical or descriptive cross-sectional, case report/series, survey) (exclude) € Qualitative designs (e.g. grounded theory, phenomenology, ethnography) (exclude) € Academic/narrative review, comment, editorial, letter, note, patient handout, study design description (exclude) € Can't decide (include)
Selection decision	€ **Include for question 2** € **Exclude**

***Health system design includes aggregate levels of service: federal, provincial, regional, local, and institutional

**Health service reforms refer to changes made in health service delivery for individual, family or community, including cultural components of the health service

APPENDIX 3: Full text screening checklist
Reviewer: **Date:**

Ref ID: **First Author (year):**

What question was the study included for, in the first level of screening

- € Question 1: What is the impact on health outcomes and behaviours and health system performance of health system design and health service reforms in Aboriginal populations?
- € Question 2; What is the impact on health outcomes and behaviours and health system performance of health system design and health service reforms in vulnerable populations

1. **Did this article include aboriginal population, or other vulnerable population including ethno cultural minorities, immigrant and refugees vulnerable/marginalized groups *who experience barriers to accessing appropriate health and health related services****?***

- € Yes (include)
- € No (exclude)
- € Maybe (include)

2. **Is the article the PRIMARY REPORT of the FINAL results from:**

- € Report of a clinical trial (controlled/uncontrolled; randomized/non-randomized) (include)
- € Meta-analyses/systematic reviews/HTAs (include for question 2, exclude for question 1)
- € Report of a prospective or retrospective cohort study (include)
- € Report of a case-control study (include)
- € Report of a before-after study (include)
- € All other study types (exclude)
- € Can't decide (include)

3. **What COMARATOR is used in the study?**

- € Any comparator (include)
- € No comparator (exclude)

4. **Include if the OUTCOME of interest in the study is one of the following:**

- € Incidence and prevalence of health conditions (for example, diabetes, tuberculosis, fetal alcohol spectrum disorder, etc.)
- € Human function (for example, disability)
- € Life expectancy
- € Deaths
- € Health behaviours (for example, adherence, practice of health lifestyle)
- € Health system performance (for example, effectiveness/efficiency, appropriateness, responsiveness, accessibility, continuous, capable, and sustainability)
- € None of the above (exclude)

5. **Final Decision**

- € **Include (question 1)**
- € **Include (question 2)**
- € **Exclude**
- € **Non-English /Unable to translate**

Reason for Exclusion:

- **Inappropriate study population**
- **Not study types of interest**
- **Meta-analysis/Systematic review/Health technology assessment (for question 1)**
- **Not primary report of study**
- **Study description only**
- **No intervention of interest**
- **No/inappropriate control group**
- **No relevant outcomes**

APPENDIX 4: Data abstraction form

Ref ID		
Citation		
Location		
Sponsor/ funding source		
Study design		
Study Population		
Data collection period		
Intervention(s)		
Comparator(s)		
Outcome(s)	**Primary**	
	Secondary	
Results	**Primary outcome(s)**	
	Secondary outcome(s)	
Conclusions		

First reviewer: Date:

Second reviewer: Date:

APPENDIX 5: Downs and Black Checklist[8]

REPORTING	Yes/No/Partially	**Score**
1. Is the objective of the study clear?	Yes=1, No=0	
2. Are the main outcomes clearly described in the Introduction or Methods?	Yes=1, No=0	
3. Are characteristics of the patients included in the study clearly described?	Yes=1, No=0	
4. Are the interventions clearly described?	Yes=1, No=0	
5. Are the distributions of principal confounders in each group of subjects clearly described?	Yes=2, Partially=1, No=0	
6. Are the main findings of the study clearly described?	Yes=1, No=0	
7. Does the study estimate random variability in data for main outcomes?	Yes=1, No=0	
8. Have all the important adverse events consequential to the intervention been reported?	Yes=1, No=0	
9. Have characteristics of patients lost to follow-up been described?	Yes=1, No=0	
10. Have actual probability values been reported for the main outcomes except probability<0.001?	Yes=1, No=0	
11. Is the source of funding clearly stated?*	Yes=1, No=0	
EXTERNAL VALIDITY	Yes/No/Unclear	**Score**
12. Were subjects asked to participate in the study representative of the entire population recruited?	Yes=1, No=0, Unclear=0	
13. Were those subjects who were prepared to participate representative of recruited population?	Yes=1, No=0, Unclear=0	
14. Were staff, places, and facilities where patients were treated representative of treatment most received?	Yes=1, No=0, Unclear=0	
INTERNAL VALIDITY	Yes/No/Unclear	**Score**
15. Was an attempt made to blind study subjects to the intervention?	Yes=1, No=0, Unclear=0	
16. Was an attempt made to blind those measuring the main outcomes?	Yes=1, No=0, Unclear=0	
17. If any of the results of the study were based on data dredging was this made clear?	Yes=1, No=0, Unclear=0	
18. Was time period between intervention and outcome the same for intervention and control groups or adjusted for?	Yes=1, No=0, Unclear=0	
19. Were statistical tests used to assess main outcomes appropriate?	Yes=1, No=0, Unclear=0	
20. Was compliance with the interventions reliable?	Yes=1, No=0, Unclear=0	
21. Were main outcome measures used accurate? (valid and reliable)	Yes=1, No=0, Unclear=0	
INTERNAL VALIDITY-CONFOUNDING (SELECTION BIAS)	Yes/No/Unclear	**Score**
22. Were patients in different intervention groups recruited from the same population?	Yes=1, No=0, Unclear=0	
23. Were study subjects in different intervention groups recruited over the same period of time?	Yes=1, No=0, Unclear=0	
24. Were study subjects randomized to intervention groups?	Yes=1, No=0, Unclear=0	
25. Was the randomized intervention assignment concealed from patients and staff until recruitment was complete?	Yes=1, No=0, Unclear=0	
26. Was there adequate adjustment for confounding in the analyses from which main findings were drawn?	Yes=1, No=0, Unclear=0	
27. Were losses of patients to follow-up taken into account?	Yes=1, No=0, Unclear=0	

Power	Size of smallest intervention group Score 0-5	**Score**
28. Was the study sufficiently powered to detect clinically important effects where probability value for a difference due to chance is <5%?		

*Criteria was added for the current systematic review

APPENDIX 6: AMSTAR measurement tool to assess systematic reviews [9]

1. Was a priori design provided? The research question and inclusion criteria should be established before the conduct of the review.	□ Yes □ No □ Can't answer □ Not applicable
2. Was there duplicate study selection and data extraction? There should be at least two independent data extractors and a consensus procedure for disagreements should be in place.	□ Yes □ No □ Can't answer □ Not applicable
3. Was a comprehensive literature search performed? At least two electronic sources should be searched. The report must include years and databases used (e.g. Central, EMBASE, and MEDLINE). Key words and/or MESH terms must be stated and where feasible the search strategy should be provided. All searches should be supplemented by consulting current contents, reviews, textbooks, specialized registers, or experts in the particular field of study, and by reviewing the references in the studies found.	□ Yes □ No □ Can't answer □ Not applicable
4. Was the status of publication (i.e. grey literature) used as an inclusion criterion? The authors should state that they searched for reports regardless of their publication type. The authors should state whether or not they excluded any reports (from the systematic review), based on their publication status, language etc.	□ Yes □ No □ Can't answer □ Not applicable
5. Was a list of studies (included and excluded) provided? A list of included and excluded studies should be provided.	□ Yes □ No □ Can't answer □ Not applicable
6. Were the characteristics of the included studies provided? In an aggregated form such as a table, data from the original studies should be provided on the participants, interventions and outcomes. The ranges of characteristics in all the studies analyzed e.g. age, race, sex, relevant socioeconomic data, disease status, duration, severity, or other diseases should be reported.	□ Yes □ No □ Can't answer □ Not applicable
7. Was the scientific quality of the included studies assessed and documented? A priori' methods of assessment should be provided (e.g., for effectiveness studies if the author(s) chose to include only randomised, double-blind, placebo controlled studies, or allocation concealment as inclusion criteria); for other types of studies alternative items will be relevant.	□ Yes □ No □ Can't answer □ Not applicable
8. Was the scientific quality of the included studies used appropriately in formulating conclusions? The results of the methodological rigor and scientific quality should be considered in the analysis and the conclusions of the review, and explicitly stated in formulating recommendations.	□ Yes □ No □ Can't answer □ Not applicable
9. Were the methods used to combine the findings of studies appropriate? For the pooled results, a test should be done to ensure the studies were combinable, to assess their homogeneity (i.e. Chi-squared test for homogeneity, I2). If heterogeneity exists a random effects model should be used and/or the clinical appropriateness of combining should be taken into consideration (i.e. is it sensible to combine?).	□ Yes □ No □ Can't answer □ Not applicable
10. Was the likelihood of publication bias assessed? An assessment of publication bias should include a combination of graphical aids (e.g., funnel plot, other available tests) and/or statistical tests (e.g., Egger regression test).	□ Yes □ No □ Can't answer □ Not applicable
11. Was the conflict of interest included? Potential sources of support should be clearly acknowledged in both the systematic review and the included studies.	□ Yes □ No □ Can't answer □ Not applicable