

Do periodic vehicle inspections improve vehicle safety? – A literature review

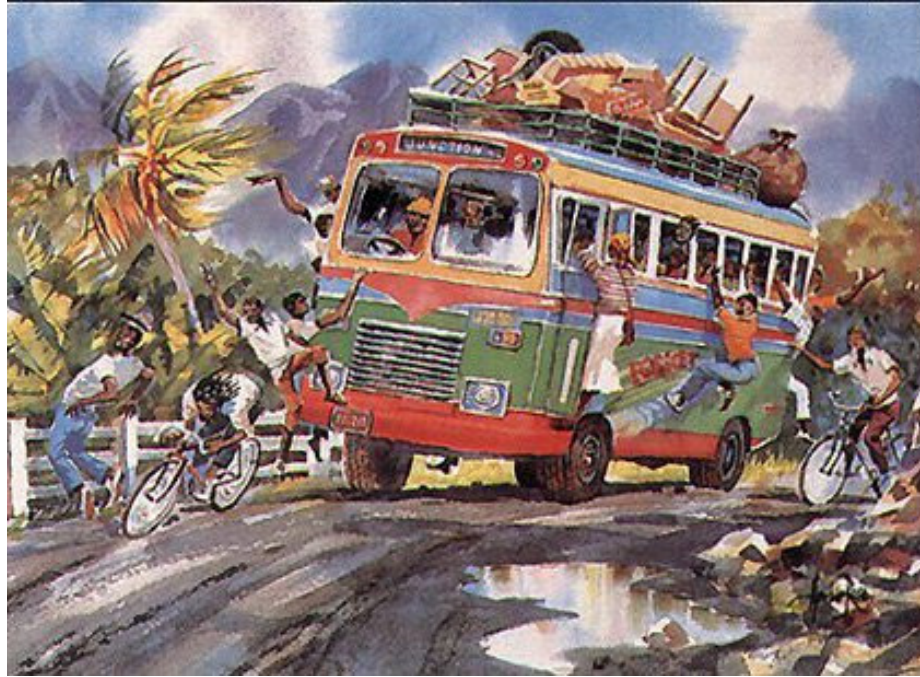
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*With the odour of petrol
both excessive and alarming
we hurtle hell-for-leather
between crimson bougainvillea blossom
and scarlet poinsettia.....
this day is our last!*

***Jamaican Bus Ride
A.S.J. Tessimond 1902-1962***

Content

- Road Traffic Crashes
- Possible solutions
- Aim of this work
- Method
- Results
- Themes & considerations
- Discussion
- Summary

Road Traffic Crashes (RTCs)


The current situation

- 3,500 deaths/ day worldwide¹
- 91% in lower & middle income countries (LIC & MIC)²
- 50 million injured/year²
- Britain: 29000 seriously injured/ year³
- Mwanza, Tanzania: 1600 surgical patients/ year⁴





1. Decade of Action. [Online] 2012. [Cited: 28 09 2012.]
http://www.who.int/roadsafety/decade_of_action/en/index.html
2. WHO fact sheet 358 March 2013
<http://www.who.int/mediacentre/factsheet/fs358/en/>
3. Department of Transport. Road Casualties Great Britain: 2006. The Stationary Office: London
4. Chalya et al. Journal of Trauma Management & Outcomes 2012, 6:1
<http://www.traumamanagement.org/content/6/1/1>

Possible solutions

	Human Factors	Vehicle factors	Environmental factors
Pre-crash; crash prevention	Information Attitude Behaviour Impairment Enforcement Visibility	Roadworthiness Vehicle visibility Handling Speed management	
During crash; injury prevention	Using restraints?	Crashworthiness Safety devices e.g. airbags, restraints	
Post-crash; life-sustaining	First-aid skills Access to medics	Ease of extrication Fire risk	

1. Haddon, W, Jr. *Advances in the epidemiology of injuries as a basis for public policy*. s.l. : Public Health Report, 1980, Vols. 95:411-421.
2. Bekefi, T. *The global road safety partnership and lessons in multisectoral collaboration*. Washington DC : Corporate Social Responsibility Initiative. 2006

Possible solutions

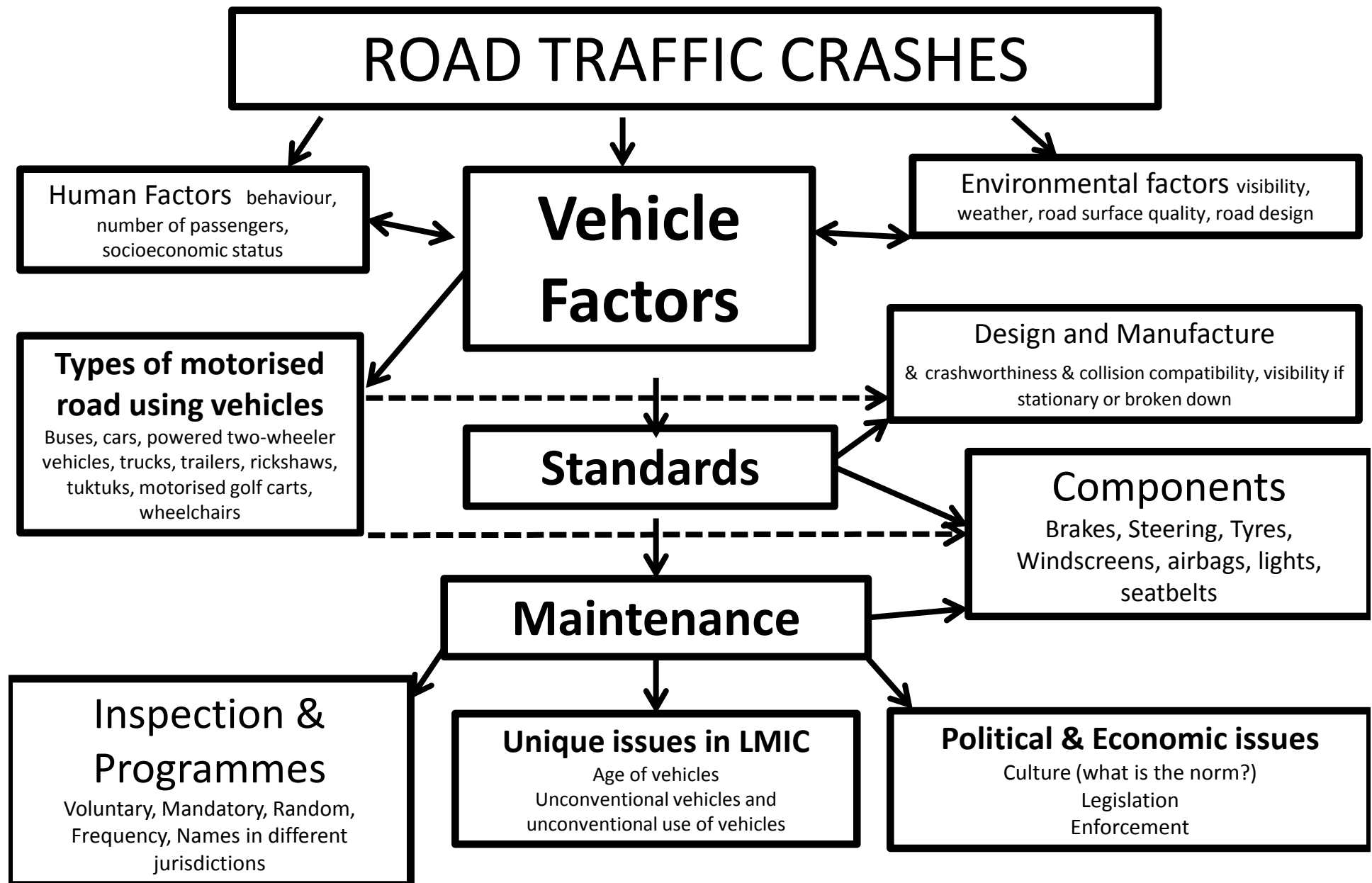
	Human Factors	Vehicle factors	Environmental factors
Pre-crash; crash prevention	Information Attitude Behaviour	 Roadworthiness vehicle visibility handling speed management	Road design Speed limits Pedestrian facilities Weather
	Is?	Crashworthiness/ safety devices e.g. airbags, restraints	Crash-protective roadside furniture
P Sustaining	Access to medics	Ease of extrication Fire risk	Rescue facilities Congestion

Aim:

The role of vehicle inspection programmes (VIPs) in preventing crashes, injuries and deaths.

Method

- Conceptual framework



Method

- Conceptual framework
- Advice
- Search strategy

MeSH used in database searches	Vehicle Inspection Program/ Motor vehicle roadworthiness certification
“Road”; “traffic”; “accident*”; incident*”; “crash*”; “collision*”;“fatal*”; “death*”; “injur*”; “prevent*”; “reduc*”; “declin*”; “safe*”;	MRC: motor vehicle certificat*, test*, assess*, inspect*, roadworth*, warrant of fitness, certificate of fitness, periodic vehicle monitor*, maint* (for maintenance), minimum safety standard*, ministry of transport*, department of transport*, vehicle test*, motor vehicle check*, certificate of approval, vehicle inspect*, technical inspect*
Free-text terms	“car”; “vehicle*”; “bus*”; “lorr*”; “truck*”; “van*”; “motorbi”; “push bi*”; “motorcycle*”; “cycl” “minibus*”; “rickshaw*” “power*”; “motor*”; “disab*”; “pedestrian*”; “speed*”

Medical Subject Headings [MeSH] below were used to perform the search and Boolean operators “AND” and “NOT” and “OR” and “*”) helped refine the literature search. The MeSH based search was complemented with a “free-text-search”.

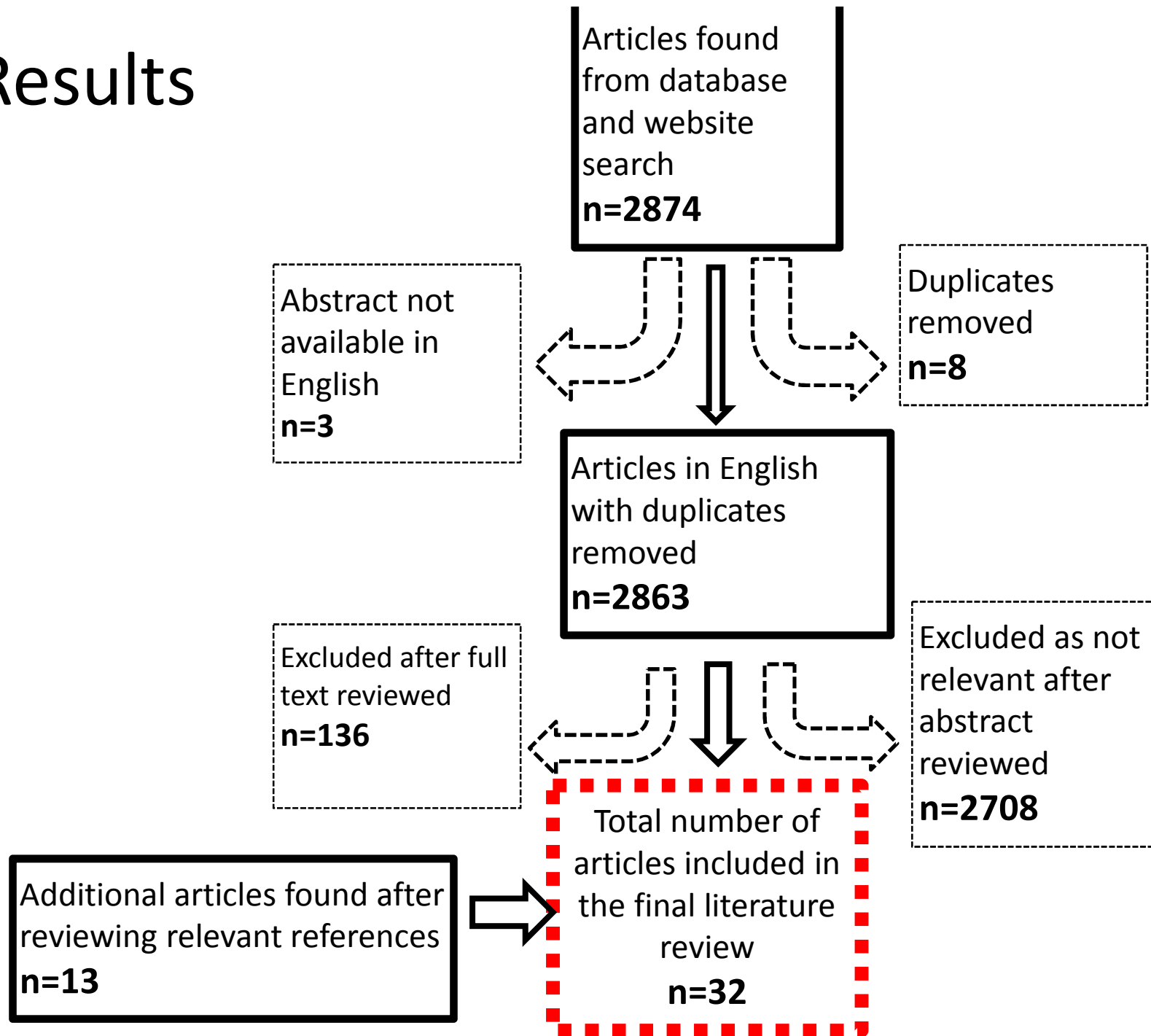
Method

- Conceptual framework
- Advice
- Search strategy
- Electronic databases & websites
- Ethics approval wavered
- Quality Assessment^{1,2}

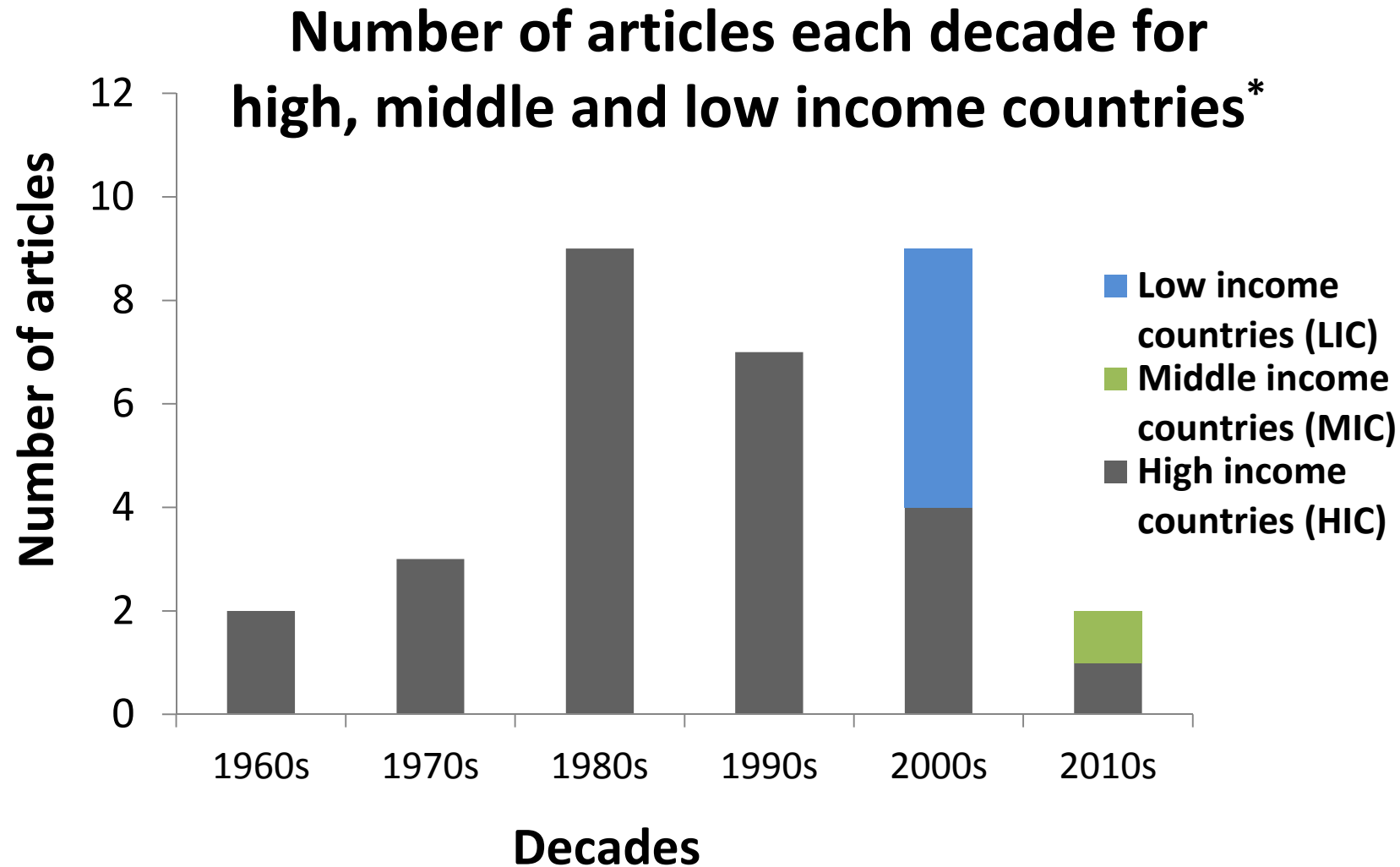
1. *Quality Assessment Tool for Review Articles*. **Health evidence Canada**. 2010.

2. *Quality Assessment Tool for Quantative Studies*. **McMasters University, School of Nursing, Effective Public Health Practice Project**. McMaster University, Toronto : McMaster University School of Nursing, 2011.

Results



Results



***World Bank.** How we Classify Countries. [Online] 2012. [Cited: 18 09 2012.]
[http://data.worldbank.org/about/country-classifications.](http://data.worldbank.org/about/country-classifications)

CAB Global
Health

DH Data

Medline

Global
Health

Embase

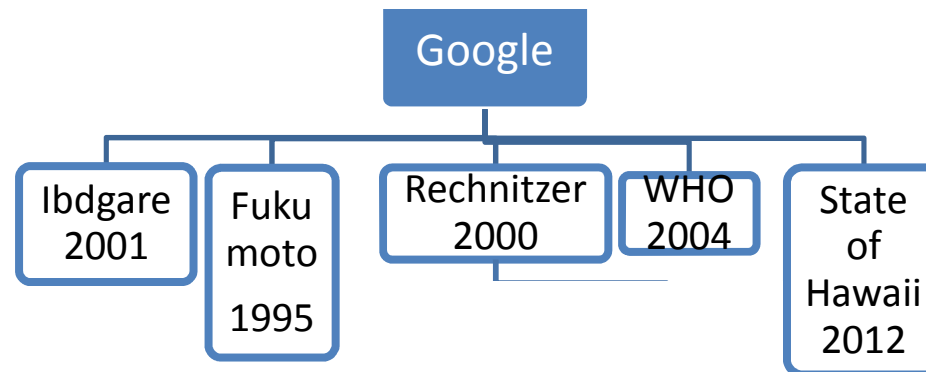
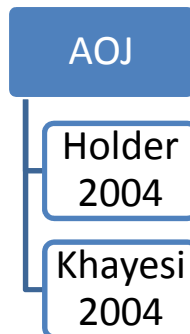
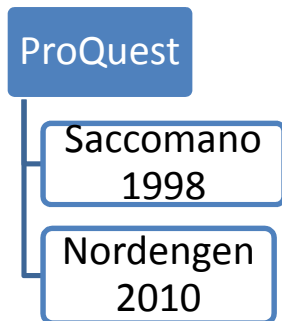
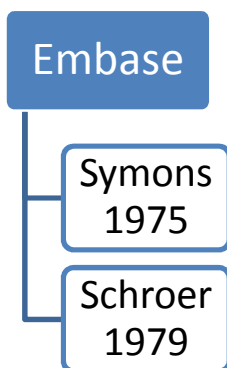
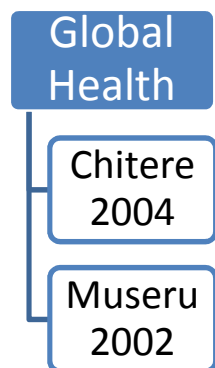
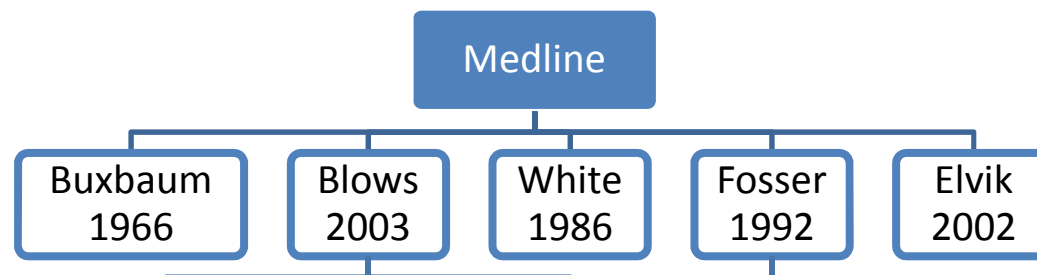
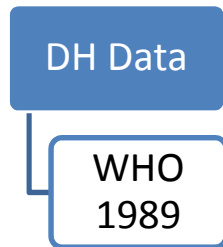
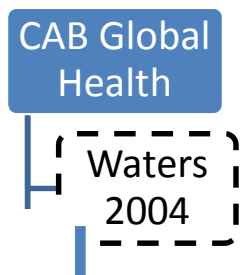
ProQuest

AOJ

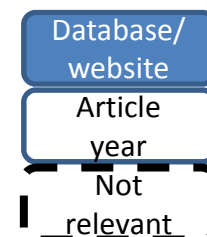
Google

Database/
website

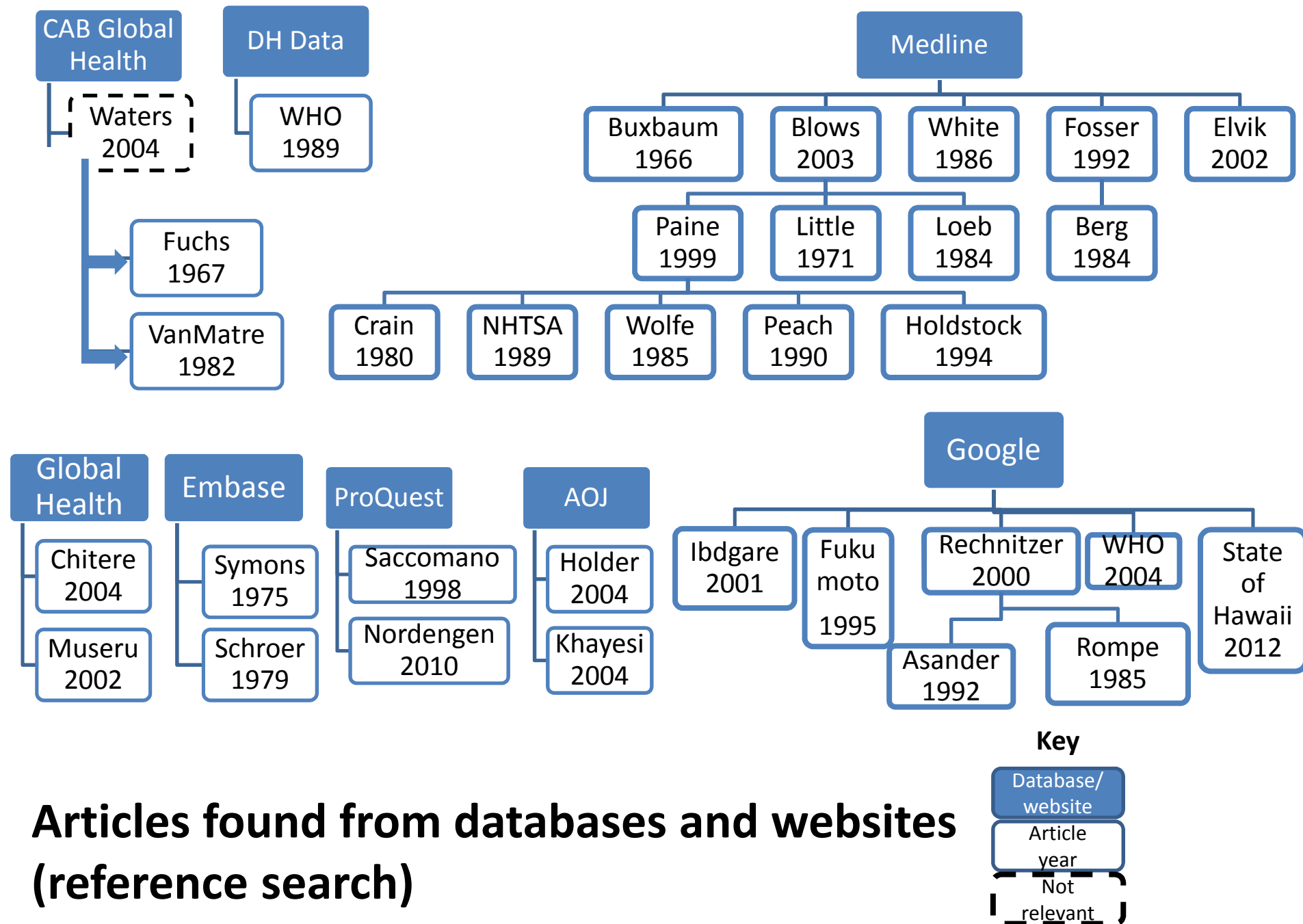
Databases and websites

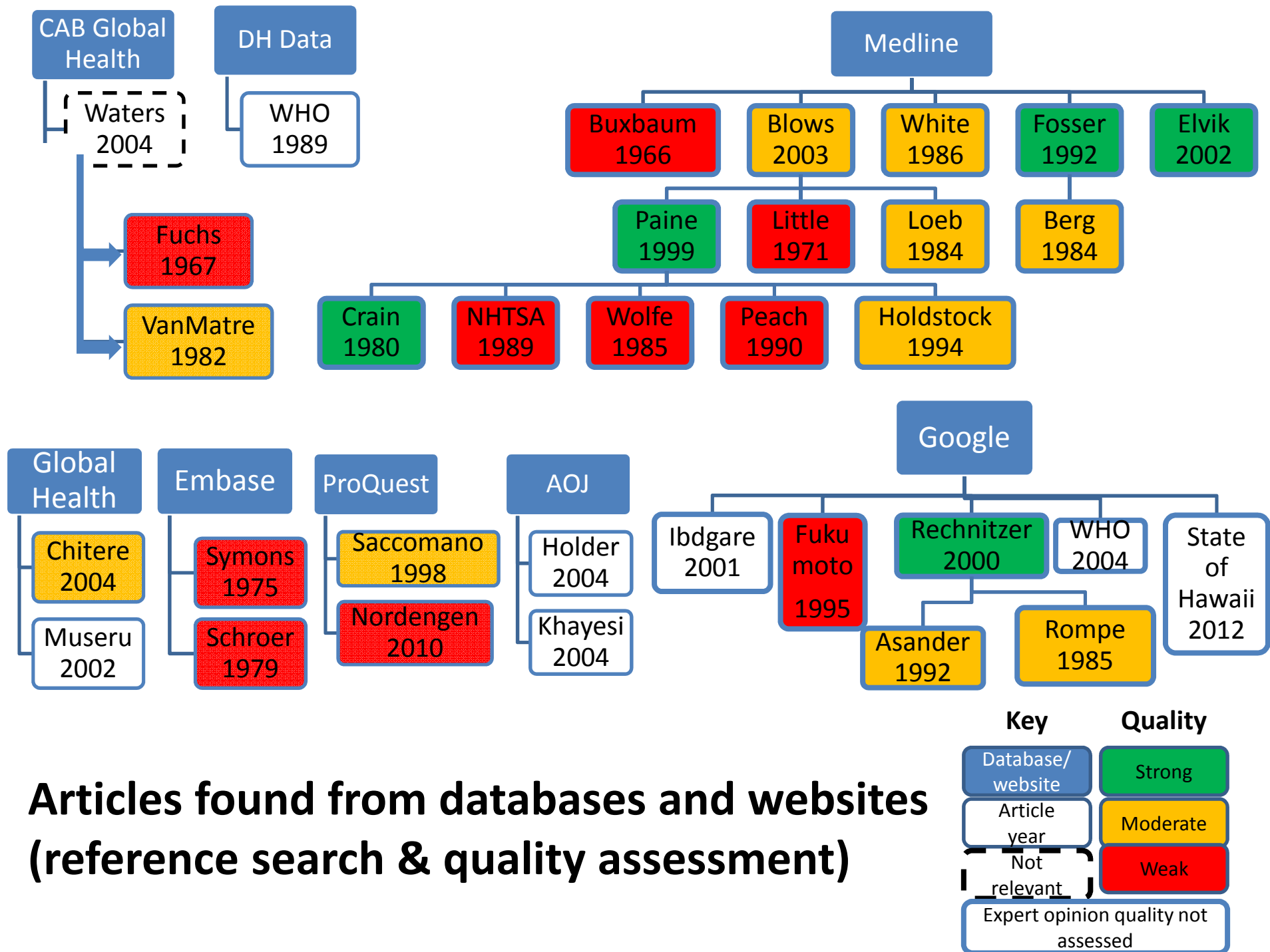


Key



Articles found from databases and websites





Important themes

- Mechanical defects contribute to crashes and injury severity^{1, 2}
- RTCs associated with lack of up-to-date vehicle inspection & lack of recent tyre pressure check^{3,4,5}
- VIPs provide a snapshot^{6, 7}
- VIPs and driver behaviour⁸

1. **Hockey, R.** *Public Health*. 2003, Vol. 27(6); 656.
2. **Asander, S** *Sydney : Wheels '92 Conference and Workshop*, 1992
3. **Elvik, R** *Accid. Anal. & Prev.* 2002, Vols. 34;753-762.
4. **Foldvary, LA.** *Australian Government Publishing Service*, 1971.
5. **Blows, S, et al.** *Aust. New Zealand J. Public Health*. 2003, Vols. 27(3); 323-327.
6. **Rechnitzer G et al.** *Report 164*. Victoria : Monash University Accident Research Centre, 2000.
7. **White, WT.** *Accid. Anal. & Prev.* GB, 1986, Vols. 18(1); 51-62.
8. **Crain, WWM.** American Enterprise Institute for Public Policy Research, 1980.

General considerations

- Not many articles in total
- Few from LIC and MIC¹⁻⁶
 - ?related to language
- VIPs often part of wider reforms^{1, 7}

1. **Chitere PO et al** *Efforts to improve road safety in Kenya*. Nairobi : Institute of Policy Analysis and Research (IPAR), 2004.
2. **Nordengen, P** *Improved performance of heavy vehicles on our roads..* p.18-19, South Africa : Transport Logistics, 2010, Vol. September.
3. **Holder, Y.** *Book Reviews: World report on road traffic injury prevention: its implication for low income countries.* 2, 2004, African Safety Promotion, Vol. 2, p. 59.
4. **Khayesi, M.** *Partnership and dialogue for implementation of new road safety rules in Kenya.* 2, 2004, African Safety Promotion, Vol. 2, p. 37.
5. **Ibagare, E.** On the buses in Lagos. <http://news.bbc.co.uk/1/hi/world/africa/1186572.stm>. [Online] BBC, 2001.
6. **Museru LM et al** *Road traffic accidents in Tanzania: A Ten Year Epidemiological Appraisal* Aug. 2002, East and Central African Journal of Surgery, Vol. 7 (1), pp. 23-26.
7. **Asander, S** *Sydney : Wheels '92 Conference and Workshop*, 1992.

Discussion: High Income Countries

- Established infrastructure^{1,2}
- Individual responsibility³
- Different programmes with the same country⁴
- Random roadside technical inspections²

1. **Rechnitzer G. et al** *The effect of vehicle roadworthiness on crash incidence & severity. Report 164.* Victoria : Monash University Accident Research Centre, 2000.
2. **Paine, M.** Vehicle roadworthiness and accidents. Submission to Victorian Parliamentary Road Safety Committee. [Online] 19 April 2000. [Cited: 18 June 2012.]
<http://users.tpg.com.au/users/mpaine/defects.html>.
3. **State of Hawaii Department of Transportation.** *SB 2625 Relating to traffic safety, Senate Committee on Transportation and International Affairs.* Honolulu: State of Hawaii, Dept of Transportation, 2012.
4. **United States General Accounting Office.** *MOTOR VEHICLE SAFETY. NHTSA should resume its support of state periodic inspection programs.* Washington DC : Resources, Community and Economic Development Division, US GAO, 1990.

Discussion:

Upper Middle Income & BRICS Countries

- Vehicle ownership > Infrastructural developments¹⁻³
- VIPs in one area⁴

1. **Mohan, D** *Road Accidents in India.. 1*, New Delhi : IATSS Research, 2009, Vol. 33.
2. **Fosser et al** *Accid. Anal. & Prev.* 1992, Vol. 24, 6; 599-612.
3. **Cundhill et al** *The costs of maintaining and repairing vehicles in developing countries.* Crawthorne, Berkshire : Transport Research Laboratory , 1997.
4. **Angloinfo.** The global expat network. São Paulo. Vehicle Roadworthiness. [Online] 2012. [Cited: 23 09 2012.]
<http://saopaulo.angloinfo.com/information/transport/vehicle-ownership/vehicle-roadworthiness/>.

Discussion:

Lower middle & lower income countries

- Average age of vehicles^{1, 2}
- Importation of vehicles³
- Informal and unmotorised vehicles^{4,5}

1. **Bekefi, T.** *The global road safety partnership and lessons in multisectoral collaboration.* Washington DC : Corporate Social Responsibility Initiative. 2006
2. **World Health Organization.** *World report on road traffic injury prevention.* Geneva : World Health Organization, 2004. 9241563609.
3. **US GAO.** *Commercial passenger vehicles . Safety inspections of buses entering the US from Mexico. Report GAO/RCED-97-194.* Washington : US GAO, 1997.
4. **Mohan D. et al** *Road safety in less motorized countries - relevance of international vehicle and highway safety standards* London : Institution of Mechanical Engineers; C567/008/2000, 2000 p.155-66.
5. **Mohan, D.** Road safety in less-motorized environments: future concerns. *International Epidemiological Association.* GB, 2002, Vols. 31 pp. 527-532.

Summary

- Very few articles from LIC and MIC
- Difficult to make country specific recommendations
- After reviewing 36 databases and websites
- 32 relevant articles were found
- Global and specific considerations regarding VIPs to HIC, MIC and LIC and crash, injury and mortality rates



***Thank you
Any Questions?***