Barriers associated with mandatory influenza vaccination policies for healthcare workers: an integrative review

Journal of Infection Prevention
2020, Vol. 21(6) 212–220
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DOI: 10.1177/1757177420935629
jip.sagepub.com

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Abstract

Background: Uptake of influenza vaccination reduces staff absenteeism as well as mortality of patients and healthcare workers (HCWs); however, adherence of HCWs to annual influenza vaccination is poor and some healthcare facilities are now considering mandatory influenza vaccination policies.

Aim: The purpose of this study was to identify the perceived and reported barriers to the implementation of a mandatory influenza vaccination policy for HCWs.

Methods: An integrative review of the literature was conducted. Databases including CINAHL, Cochrane Library, Medline and PubMed were searched using key terms. The quality of papers was assessed utilising the Standard Quality Assessment Criteria for Evaluating Primary Research papers for a Variety of Fields which consisted of 10 questions with a possible total score of 20. PRISMA guidelines were used to report the search outcomes.

Results: A total of 68 papers were identified from the database search. Seven papers were relevant, following screening. The quality scores of these were in the range of 15–20. A number of barriers are reported to prevent the effective implementation of mandatory influenza vaccination policies including ethical and legal considerations, logistics, healthcare burden, leadership and management, and human factors such as HCWs' perspectives.

Conclusions: By comprehensively identifying these, barriers can be addressed to allow effective implementation of such policies in healthcare facilities to ensure improved outcomes. The results of the review indicated the need for further research to ensure that barriers are addressed cohesively.

Keywords

Immunisation, infection control, infection prevention, influenza, vaccination

Date received: 8 October 2019; accepted: 15 April 2020

Background

Influenza causes increased morbidity and mortality (Hopman et al., 2011); however, increasing healthcare worker (HCW) uptake of influenza vaccination reduces staff absenteeism and mortality of patients and HCWs (Bernstein and Starke, 2010). The Centers for Disease Control and Prevention (CDC) (1986) recommend 80% coverage of HCWs to achieve herd immunity with the circulating influenza strains covered by vaccination. Despite this, compliance with HCW influenza vaccination in high- and

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Table 1. Interchangeable search terms.

Search terms				
Immunisation	Influenza	Mandatory	Policy	Healthcare worker
<ul style="list-style-type: none"> – Immunization – Immunize – Immunise – Vaccine – Vaccinate – Vaccination 	<ul style="list-style-type: none"> – Flu 	<ul style="list-style-type: none"> – Compulsory – Required 	<ul style="list-style-type: none"> – Guideline – Practice Framework – Practice Guideline – Directive 	<ul style="list-style-type: none"> – Health professional/s – Health personnel – Health workers – Health practitioner – Nurse/s – Doctor/s – Allied health – Healthcare worker

middle-income countries is in the range of 18%–58% (Leask et al., 2010). Recommendations to support such practice from the World Health Organization (WHO) and CDC have had a minimal impact on increasing HCW uptake of influenza vaccination (CDC, 2016; WHO, 2012). Although influenza remains prevalent in the general population, a meta-analysis by Kuster et al. (2011) determined that unvaccinated HCWs are nearly three times more likely to contract influenza than vaccinated HCWs (18.69 per 100 persons versus 6.49 per 100 persons).

Given the low uptake of voluntary vaccination programmes and the risks to a vulnerable patient population of unvaccinated HCWs, mandatory influenza vaccination policies are considered ethical and necessary to improve patient safety (Bernstein and Starke, 2015). Healthcare professionals have an overriding responsibility to do no harm; however, this can be clouded by ethical concerns about fairness and loss of employee autonomy in the context of mandatory vaccination policies (Block et al, 2014; Bernstein and Starke, 2015).

The purpose of this integrative review was to identify barriers to the implementation of a mandatory influenza vaccination policy for HCWs in order to make recommendations to address these. Through a reduction in barriers to implementation of mandatory vaccination policies, more healthcare facilities may opt to implement such policies, leading to increased HCW annual influenza vaccination rates and improved patient and HCW safety outcomes (Leask et al., 2010).

Methods

This study used the five-step integrative review methodology outlined by Whittemore and Knafl as a theoretical framework (Whittemore and Knafl, 2005). These steps include problem identification, literature search, data evaluation, data analysis and data presentation. Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) was also used to guide study identification and selection (Moher et al., 2009).

Search strategies

A search of electronic databases including CINAHL, Cochrane Library, Medline and PubMed was conducted. Search terms included ‘immunisation’, ‘influenza’, ‘mandatory’, ‘policy’ and ‘healthcare worker’. Interchangeable terms listed in Table 1 were identified within the initial search and searched individually using limiters that included peer-reviewed articles published in English between 2008 and 2018. Individual terms were then searched utilising the Boolean operator OR. Subsequently, each category was searched utilising the operator AND. Search terms were identified in the article titles, abstracts and keywords.

Articles that were identified by the search were included if they met all of the following criteria: (1) articles with a clear, complete methodology; (2) published in English and related to humans; (3) published between 2008 and 2018; (4) HCWs providing direct patient care in acute settings; (5) quantitative, qualitative, and mixed methods; (6) multifaceted ideology including religious considerations; and (7) HCWs who provide direct patient contact in the context of healthcare provision. Exclusion criteria included: (1) non-acute settings, i.e. residential care facilities, assisted living facilities, long-term care, etc.; (2) low- and middle-income countries as defined by the World Bank; (3) staff working in tertiary facilities that are not HCWs, i.e. porters, cleaning staff, catering staff, etc.; (4) influenza ‘vaccination’ through holistic medicine; (5) articles relating to vaccines other than the influenza vaccination; (6) articles specifically outlining religious objection to vaccination only; (7) articles relating to student HCWs; and (8) hard copy journal articles that are not available through an accessible electronic means. A secondary search of references listed within the articles was performed.

Figure 1 demonstrates the selection strategy. Full articles were reviewed against the inclusion and exclusion criteria to identify seven articles for inclusion in the integrative review. Duplicate articles were removed.

Figure 1. PRISMA study selection.

Data extraction and synthesis

Information regarding barriers to the implementation of mandatory vaccination policies was extracted from the studies reviewed. Data extraction was completed by the primary author against the selection criteria and purpose/aim of the articles to identify suitable articles. Articles were reviewed by a second author to ensure validity. Discrepancies were adjudicated by the third author.

Quality assessment

Quality scores were calculated for each paper utilising the Kmet and Cook Standard Quality Assessment Criteria for Evaluating Primary Research papers from a Variety of Fields, which allowed information extraction from qualitative and quantitative sources (Kmet et al., 2004). The checklist consists of 10 questions with a possible total score of 20. Questions were scored as yes (2), partial (1) or no (0). Two authors independently assessed the studies extracted to obtain inter-rater agreement for papers eligible for inclusion.

Results

Search outcome

Study quality scores were in the range of 15–20. The mean quality score was 18.1; five studies scored > 16 (Block et al., 2014; Hopman et al., 2011; Leask et al., 2010; Nunn et al., 2018; Riphagen-Dalhuisen et al., 2012). Of these, one received a score of 20 (Block et al., 2014) and four achieved a score of 19 (Hopman et al., 2011; Leask et al., 2010; Nunn et al., 2018; Riphagen-Dalhuisen et al., 2012). The use of verification procedures to establish accountability was the poorest performing criterion while all articles clearly articulated their objective. Context of study, connection to theoretical framework or wider body of knowledge, and conclusion supported by results were consistently well represented across all of the papers reviewed.

Mandatory vaccination implementation barriers

Common subjects identified across the studies included logistics, ethical and legal considerations, healthcare burden,

management/leadership, communication, HCWs' perspectives and maleficence (Table 2). Five articles focused on ethical and legal considerations while four focused on healthcare burden, i.e. non-funded vaccination programmes or costs of providing clinics (Block et al., 2014; Gruben et al., 2014; Hopman et al., 2011; Jackson-Lee et al., 2016; Leask et al., 2010; Nunn et al., 2018; Riphagen-Dalhuisen et al., 2012). Papers that reviewed ethical and legal considerations also covered healthcare burden; all except one suggested that both should be considered in unison. Three articles focused on leadership/management considerations (Leask et al., 2010; Nunn et al., 2018; Riphagen-Dalhuisen et al., 2012). Three studies identified logistics as a barrier to effective implementation; all except one considered healthcare burden also (Hopman et al., 2011; Leask et al., 2010; Nunn et al., 2018). Two articles focused on the human factors, such as the need for effective communication, and two considered HCWs' views on mandatory vaccination (Leask et al., 2010; Nunn et al., 2018). Associated with this, two articles reviewed maleficence and HCWs' moral obligation to do 'no harm' to patients (Hopman et al., 2011; Riphagen-Dalhuisen et al., 2012).

Ethical and legal considerations

Legal obstacles associated with mandatory HCW influenza vaccination policies exist, as unions and professional associations argue that such policies violate an individual's right to freedom and to refuse unwanted medical treatment, therefore preventing consent (Jackson-Lee et al., 2016). However, Gruben and colleagues argue that when reviewing legal and ethical considerations of implementation, patient safety must be considered (2014). The rights of the employee to non-vaccination have implications for patient safety and therefore the move towards mandatory vaccination of HCWs favours the patient (Gruben et al., 2014).

Healthcare burden

Hopman et al. (2011) found 79.5% of vaccinated and 66.3% of unvaccinated HCWs believed that mandatory vaccination was 'not only offered to reduce costs' to the organisation; however, gaps in clinician knowledge remain a barrier to the implementation of mandatory influenza programmes. Through the implementation of mandatory funded influenza programmes for HCWs, a 28% reduction in patient deaths was achieved in Ontario, Canada (Jackson-Lee et al., 2016). Social and economic costs associated with influenza outbreaks have also been reduced, by mandatory vaccination of HCWs, for example, a 52% reduction in hospitalisations (Jackson-Lee et al., 2016). The cost of delivering an effective influenza programme within healthcare facilities differs between organisation, with a strong correlation existing between facilities with a larger budget for the delivery of mandatory programmes and compliance

with policy (mean difference = 8.97; $P < 0.05$) (Riphagen-Dalhuisen et al., 2012).

Organisational factors

Change management is often well supported by employees when clear communication exists and leaders take an evidence-based practice approach (Leask et al., 2010; Nunn et al., 2018). Nunn and colleagues (2018) went on to identify that clear roles and responsibilities should be outlined before the implementation of a mandatory policy to support monitoring and compliance across all levels, from administration to front line clinicians. Hopman and colleagues (2011) similarly identify that heads of department can influence uptake and should act as leaders as long as they are well informed; however, they can also derail programmes with personal beliefs and misguided information. Coupled with this, consideration must be given to the increased workload of clinicians to implement education and develop human resource capital and training on how to enforce the proposed policy.

Leask et al. (2010), Hopman et al. (2011) and Nunn et al. (2018) all report that implementation of mandatory influenza vaccination creates logistical challenges requiring significant resources to reduce the effort required by HCWs to comply. Influenza vaccination is associated with tight deadlines to ensure sufficient coverage before the peak season, which is exacerbated by an insufficient number of clinics and staff who can administer vaccinations (Nunn et al., 2018).

Human factors

The majority of papers identified human factors, particularly those of the HCW, influenced compliance with mandatory influenza vaccination. HCWs play a fundamental role in the implementation of mandatory policies; however, staff resistance is a barrier to policy implementation (Block et al., 2014) and some state that the implementation of mandatory policies is likely to result in a backlash from HCWs who can express resentment and opposition (Leask et al., 2010).

The benefit to HCW contacts should be considered, as 18% of vaccinated and 3.5% of unvaccinated HCWs believe that vaccination reduces the risk to family members suggesting that knowledge is poor (Hopman et al., 2011). Gruben and colleagues (2014) reported that support for mandatory policies is associated with increased clinician knowledge, a lengthier career in healthcare and exposure to a patient with influenza. However, as reported by Leask and colleagues (2010), HCW misconceptions remain in relation to vaccine efficacy and influenza risks. To counteract this, Gruben et al. (2014) reinforce the critical importance of education in gaining HCW acceptance of mandatory vaccination.

Table 2. Characteristics of included studies.

Author (year), location, quality score	Aim	Methods	Study findings	Limitations
Hopman et al. (2011), Netherlands, 19	Identification of influenza vaccination compliance predictors in hospital based HCWs	Questionnaire distributed to eight university medical centres (response rate 39%)	<ul style="list-style-type: none"> - 37.6% vaccinated against influenza - Implementation programmes should target determinants and behaviours of HCWs - Effective education methods should focus on knowledge through leaflets, websites, group presentations, media and role models. - Logistic enablers, e.g. implementation of mobile carts and increasing the number of accredited vaccinators 	<ul style="list-style-type: none"> - Response and gender bias: overrepresentation of nurses and physicians; more females - Limited to the Netherlands - Likely to be seen as a lengthy survey
Block et al. (2014), USA, 20	Exploration of institutional factors associated with implementation of HCW mandatory influenza vaccination policy	Cross-sectional survey of SHEA-RN in acute care institutions 56 institutions completed the survey	<ul style="list-style-type: none"> - Barriers: lack of support from employees (33%), administration (25%), union interference (20%), inadequate information systems (26%), perceptions of unfairness and loss of employee autonomy - Facilitators: well-defined exemptions (57%), a safety culture (50%), well-defined HCW population (40%), adequate information systems (40%) - Facilities with a mandatory policy had higher compliance with vaccination (95%) than those without (83%) 	<ul style="list-style-type: none"> - Incomplete survey responses - Bias may exist due to reluctance to identify barriers - Study limited to SHEA-RN acute care facilities in the USA - 44% indicated they would like to participate in the study; however, 36% response at time of survey
Leask et al. (2010), Australia, 19	Examination of views of NSW Health administrators and clinical leaders on adding mandatory influenza vaccination policy	Interviews with 58 participants from 4 NSW Health staff groups: implementation group, NSW hospital staff, professional association staff and university student liaison groups	<ul style="list-style-type: none"> - Voluntary influenza vaccination uptake were in the range of 18%–58%, supporting need for mandatory policy - Barriers included: addressing logistical challenges of clinics, enforcing an annual vaccination; providing staff with an evidence base to address staff resistance and concerns about vaccine efficacy and safety 	<ul style="list-style-type: none"> - Sample size not representative of all HCWs in NSW - Health therefore reducing generalisability - Did not include key leaders in implementation - No consideration of healthcare burden
Gruben et al. (2014), Canada, 15	Review of the impact of, and HCWs' attitudes towards mandatory influenza vaccination	Brief review of the literature regarding the impact of policies on vaccination rates among HCWs and their attitudes towards a mandatory policy	<ul style="list-style-type: none"> - Mandatory policy supported by employment law, human rights codes, and charter of rights and freedom - Supports the vaccinate or mask policy in the context of increasing compliance - 57%–85% of staff recommended or strongly recommended influenza vaccination as a condition of service 	<ul style="list-style-type: none"> - Mandatory policy for vaccinate or mask use does not work in the instance of a facility outbreak - Largely focused on the legal components of implementation rather than general barriers

(continued)

Table 2. (continued)

Author (year), location, quality score	Aim	Methods	Study findings	Limitations
Nunn et al. (2018), Canada, 19	Evaluation of the implementation of a vaccine or mask policy for influenza season	Online questionnaire sent to care providers – short-term care facilities (127 respondents from 33 acute (36%) and 99 long-term (27%) care facilities from British Columbia	<ul style="list-style-type: none"> - Implementation of policy is complex - 84% agreed clear guidance was received from health authorities regarding influenza vaccination - 61% had sufficient staffing, 36% of programmes had sufficient financial support - Varied communication methods were utilised (93% email, 92% posters, 79% internal newsletters, 66% websites, 50% face-to-face meetings) - Mask availability was a barrier to policy 	<ul style="list-style-type: none"> - Limited to Canada - Self-reported results - Study conducted a number of months after 2013–2014 influenza season - A relatively small response rate of 36% from acute care facilities, generalisability may be limited
Jackson-Lee et al. (2016), Canada, 16	Identification of the likelihood of adopting a policy for mandatory HCW vaccination retrospectively by identifying potential areas of change	Documents from secondary data sources were analysed utilising Kingdon's agenda setting framework to identify windows of opportunity for possible policy adoption	<ul style="list-style-type: none"> - While opportunities have arisen to use the framework for policy adoption of mandatory influenza vaccination, these have been short in duration - Political interference leads to poor uptake of mandatory policies - Implementation of mandate likely to occur when problems, politics and policy streams align in Kingdon's framework 	<ul style="list-style-type: none"> - No limitations identified within the study itself - Only reviewed Kingdon's agenda setting framework - Mandatory influenza policy not implemented as agenda alignment period inadequate - Only Canada
Riphagen-Dalhuisen et al. (2012), Netherlands, 19	Review of factors reported by general hospital administrators impacting compliance with HCW influenza vaccination	A survey of 81 hospitals (response rate 52%, n=79), average vaccination rate of responders was 17.7%	<ul style="list-style-type: none"> - Few managers support mandatory policies, though lack of financial and logistical investments related to poor uptake - 71.4% of managers agreed that vaccination rates affect mortality and both HCWs and facilities have patient safety responsibilities - 45.2% believed intervention programmes have a positive effect on vaccination rates and 69.0% believed that the vaccine is effective - Consideration should be given to education 	<ul style="list-style-type: none"> - Response bias present - Variable hospital size - Only percentage of HCWs vaccinated was collected, not total number - Netherlands only

HCW, healthcare worker; NSW, New South Wales

Discussion

The aim of the review was to identify the barriers associated with the implementation of a mandatory HCW influenza vaccination policy. The included studies varied in rigour with quality scores of 15–20 out of a possible 20. Common barriers were identified such as ethical and legal considerations, healthcare burden, organisational factors including leadership and logistics, and human factors such as communication and maleficence.

It is suggested that seasonal influenza vaccination should be considered at a population level rather than an individual level (Lee, 2015). Influenza vaccination is an effective method of reducing the incidence of influenza. HCWs need to trust the effectiveness of the vaccine and mandatory vaccination as a risk reduction strategy for others, including patients, colleagues and family (Hopman et al., 2011; Riphagen-Dalhuisen et al., 2012).

A number of articles contained unsubstantiated statements about ethical and legal considerations related to vaccination. HCWs have an overriding obligation to deliver safe and effective care (Hopman et al., 2011; Riphagen-Dalhuisen et al., 2012), act in the best interest of their patient and first 'do no harm' (Walton and Kerridge, 2014). A policy statement by Bernstein and Starke suggested that mandating influenza vaccination for all HCWs is ethically justified, necessary and long overdue (2010). Commentary by Ottenberg (2011) suggests that facilities should enforce vaccination for two primary reasons: (1) to adhere to the HCW's professional obligation for self-protection; and (2) to comply with the shared obligation of HCWs to protect the public from preventable infectious diseases. Although there is ethical support for annual influenza vaccination, some argue that there is no direct correlation between the HCW's protection and patient's protection, especially in the context of asymptomatic carriers and visitors. However, multiple study outcomes refute these claims (Lee, 2015). A number of papers review the association between ethical and legal considerations and maleficence; however, many of these are unsubstantiated commentary and further studies would be required to support the association between the two subjects (Bernstein and Starke, 2010, 2015; Nelson and Lahey, 2013; Ottenberg et al., 2011).

Healthcare burden must be considered when implementing a mandatory policy. The policy statements by Bernstein and Starke (2010, 2015) highlight the need for customised plans for each healthcare facility in relation to financial investment to ensure that the healthcare burden is minimised. The budget allowed for influenza vaccination campaigns varies greatly between facilities, from €0 through to €2000; the average cost of campaigns is €640.38 (Riphagen-Dalhuisen et al., 2012). Consideration needs to be given to the cost for the organisation, as well as the individual cost for non-funded programmes. The average workplace absence associated with influenza is in the range of <1–5.9 days, which has financial implications for health services

(Hansen et al., 2017). Tucker and Poland (2013) identify that healthcare-associated influenza is associated with death, major complications, increased cost to healthcare facilities and lengths of stay. The implementation of a Universal Influenza Immunization Program in Ontario as a public health measure saw a 61% reduction in the number of reported cases of influenza and mortality reductions of 28% (Jackson-Lee et al., 2016). The consequent decrease in hospitalisations resulted in a 52% decrease in healthcare service costs along with reduced HCW absenteeism (Lee, 2015; Riphagen-Dalhuisen et al., 2012).

Where the management team support the programme and communicate effectively, there is a greater likelihood of uptake of evidence-based policy (Nunn et al., 2018). All leadership groups should be represented when decisions are made to implement mandatory policies; however, Tucker and Poland (2013) suggest that key stakeholders, such as influential nurse leaders, are often excluded. For leadership teams to effectively develop and implement policies, clear guidelines and directives must be received from key influencers such as Ministries of Health and health authorities (Nunn et al., 2018). To maximise success when implementing mandatory policies, full support from healthcare leadership is required (Bernstein and Starke, 2010, 2015). Medical and religious exemptions should be stated, and clearly defined outcomes are required for those who refuse vaccination, such as wearing a mask for all clinical contact, or termination of non-compliant employees (Block et al., 2014).

Significant change requires effective communication to ensure that HCWs remain informed of the requirements (Nunn et al., 2018). Communication should focus on mandatory vaccination processes, as well as patient safety, and current data on successes and benefits to the individual and organisation should be shared with staff (Leask et al., 2010). However, to enable programme implementation, provision of logistical support for vaccination clinics should be planned well in advance of policy implementation with feasible options for HCWs who remain non-compliant (Hopman et al., 2011; Leask et al., 2010; Nunn et al., 2018).

Beliefs about vaccination can be targeted through education to increase vaccination uptake (Riphagen-Dalhuisen et al., 2012). Many HCWs believe that they are not at risk of getting influenza, and that influenza vaccination is implemented primarily to protect colleagues and not patients (Hopman et al., 2011; Riphagen-Dalhuisen et al., 2012). Therefore, facilities must provide adequate resources to support clinician engagement and education to improve vaccination uptake. This is particularly important as voluntary programmes have had a minimal effect on increasing compliance (Riphagen-Dalhuisen et al., 2012).

Limitations

A lack of quality research studies exists as only seven articles met the inclusion criteria. While other papers exist,

many of these are commentaries or policy statements that voice opinions often lacking sound evidence to support claims. Furthermore, a number of studies focused on a different context including assessing a consequence for non-compliance such as wearing of a mask, rather than reviewing the barriers to implementing a mandatory policy to support influenza vaccination uptake specifically. Therefore, generalisability of findings may be impacted. Consideration must also be given to the subjective nature of the quality assessment which, although it has established validity, may introduce bias.

The review has a number of strengths. Whittemore and Knafl's (2005) revised integrative review framework provided a transparent and robust method for identifying and evaluating studies to allow synthesis of the results that support implementation of mandatory policies for influenza vaccination while reducing barriers. Despite the limitations, the review offers a foundation upon which future mandatory policies may be implemented with minimal barriers.

Conclusion

Identification of barriers associated with mandatory influenza vaccination will allow health facilities implementing these policies to develop strategies aimed at minimising barriers as part of the planning and implementation process. Such barriers include ethical and legal considerations, lack of staff knowledge and staff resistance, financial considerations, lack of leadership and implementation logistics. To ensure optimal outcomes, all of the above must be addressed in unison. Successful implementation of a mandatory vaccination policy will require leadership at the highest level, education programmes for HCWs, adequate resourcing, and development of clear policies and processes with guidance on exemptions and consequences for non-adherents. Given the paucity of research on the topic, structured and extensive research into barriers to effective implementation of mandatory influenza vaccination policies should be considered to support the development of a strong evidence-based framework for policy development and implementation.

Acknowledgements

A special thanks to the Bonnie Dixon, Griffith University for assisting in the preparation of this integrative review.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Peer review statement

Not commissioned; blind peer-reviewed.

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References

- Bernstein H and Starke J. (2010) Policy Statement-Recommendation for Mandatory Influenza Immunization of All Health Care Personnel. *American Academy of Pediatrics* 126(4): 809–815.
- Bernstein H and Starke J. (2015) Influenza Immunization for all health care personnel: Keep it mandatory. *American Academy of Pediatrics* 136(4): 809–818.
- Block L, Pitts S and Perl T. (2014) Barriers and facilitators of implementation of a mandate for influenza vaccination among healthcare personnel. *Infection Control and Hospital Epidemiology* 35(6): 724–727.
- Centers for Disease Control and Prevention. (1986) Recommendations for prevention and control of Influenza. Atlanta, GA: CDC. Available at <https://www.cdc.gov/mmwr/preview/mmwrhtml/00022941.htm> (accessed 4 June 2018).
- Centers for Disease Control and Prevention. (2016) Influenza vaccination information for health care workers. Atlanta, GA: CDC. Available at <https://www.cdc.gov/flu/healthcareworkers.htm> (accessed 3 June 2018).
- Gruben V, Siemieniuk R and McGeer A. (2014) Health care workers, mandatory influenza vaccination policy and the law. *Canadian Medical Association Journal* 186(14): 1076–1080.
- Hansen S, Zimmerman P-A and van de Mortel T. (2017) Assessing workplace infectious illness management in Australian workplaces. *Infection, Disease & Health* 22(1): 12–20.
- Hopman C, Riphagen-Dalhuisen J, Looijmans-van den Akker I, Frijstein G, Van der Geest-Blankert A, Danhof-Pont M, De Jager HJ, Bos AA, Smeets E, De Vries MJT, Gallee PMM, Lenderink AF and Hak E. (2011) Determination of factors required to increase uptake of influenza vaccination among hospital-based healthcare workers. *Journal of Hospital Infection* 77(4): 327–331.
- Jackson-Lee A, Barr N and Randall G. (2016) Mandating influenza vaccination for health care workers: Analysing opportunities for policy change using Kingdon's agenda setting framework. *BioMed Central Health Services Research* 16(1): 522–527.
- Kmet L, Lee R and Cook L. (2004) Standard quality assessment criteria for evaluating primary research papers from a variety of fields. Available at <https://www.ihe.ca/advanced-search/standard-quality-assessment-criteria-for-evaluating-primary-research-papers-from-a-variety-of-fields> (accessed 1 June 2018)
- Kuster S, Shah P, Coleman B, Lam P, Tong A, Wormsbecker A and McGeer A. (2011) Incidence of influenza in health adults and healthcare workers: A systematic review and meta-analysis. *PLOS One* 6(10): e26239.
- Leask J, Helms C, Chow M, Cooper Robbins S and McIntyre P. (2010) Making influenza vaccination mandatory for health care workers: The views of NSW Health administrators and clinical leads. *NSW Public Health Bulletin* 21(9–10): 243–247.
- Lee L. (2015) Adding justice to the clinical and public health ethics arguments for mandatory seasonal influenza immunisation for healthcare workers. *British Medical Journal* 41(8): 682–686.
- Moher D, Liberati A, Tetzlaff J, Altman D and The PRISMA Group. (2009) Preferred reporting items for systematic reviews and meta-analyses: The PRISMA Statement. Available at <http://prisma-statement.org/prismastatement/flowdiagram.aspx> (accessed 29 May 2018).
- Nelson W and Lahey T. (2013) The ethics of mandatory flu shots: Balancing patient protection with healthcare worker autonomy is essential. *Healthcare Executive* 28(6): 42–46.

- Nunn A, Campbell A, Naus M, Kwong J, Puddicombe D, Quach S and Henry B. (2018) Implementing a province-wide mandatory vaccinate-or-mask policy at healthcare facilities in British Columbia, Canada. *Vaccine* 36(3): 395–399.
- Ottenberg A, Wu J, Poland G, Jacobson R, Koenig B and Tilburt C. (2011) Vaccinating Health Care Workers Against Influenza: The Ethical and Legal Rational for a Mandate. *American Journal of Public Health* 101(2): 212–216.
- Riphagen-Dalhuisen J, Kuiphuis J, Procé A, Luytjes W, Postma M and Hak E. (2012) Contributing factors to influenza vaccine uptake in general hospitals: An explorative management questionnaire study from the Netherlands. *BMC Public Health* 12: 1101.
- Tucker S and Poland G. (2013) Health care reform and influenza immunization. *American Association of Occupational Health Nurses* 61(5): 193–195.
- Walton M and Kerridge I. (2014) Do no harm: Is it time to rethink the Hippocratic Oath? *Medical Education* 48(1): 17–27.
- Whittemore R and Knafl K. (2005) The integrative review: Updated methodology. *Journal of Advanced Nursing* 52(5): 546–553.
- World Health Organization. (2012) *Interventions to increase influenza vaccination among healthcare workers in hospitals*. Geneva: WHO. Available at http://www.who.int/influenza/surveillance_monitoring/updates/2012_10_26_update_GIP_peer_reviewed/en/ (accessed 8 June 2018).