A review of the factors involved in older people's decision making with regard to influenza vaccination: a literature review

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ABSTRACT

Aims and objectives

By reviewing the relevant literature, the aim of this paper is to develop an understanding of the factors involved in older people's decision making with regard to influenza vaccination to inform strategies to improve vaccine uptake and reduce morbidity and mortality.

Background

Influenza is a major cause of morbidity and mortality world-wide. In the U.K. it accounts for 3-6000 deaths annually; 85% of these deaths are people aged 65 and over. Despite this, and the widespread and costly annual government campaigns, some older people at risk of influenza and the associated complications remain reluctant to take advantage of the offer of vaccination.

Methods

A review of the English language literature referring to older people and published between 1996 and 2005. Inclusion and exclusion criteria were identified and applied.

Findings

The majority of the literature was quantitative in nature, investigating personal characteristics thought to be predictors of uptake, such as age, sex, co-morbidity, educational level, income and area of residence. However, there was little discussion of the possible reasons for the significance of these factors and conflict between findings was often evident, particularly between studies employing different methodologies. Other factors identified were prior experience, concerns about the vaccine, perceived risk and advice and information.

Relevance to practice

The wealth of demographic information available will be useful at a strategic level in targeting groups identified as being unlikely to accept vaccination. However, the promotion of person-centred ways of working that value the health beliefs, attitudes, perceptions and subjective experiences of older people is likely to be more successful during individual encounters designed to promote acceptance. Without more research investigating these concepts our understanding is inevitably limited.

Keywords

Older people; influenza; vaccination, nurses, nursing, health promotion

INTRODUCTION

Influenza has been described as 'an invariable disease caused by a variable virus' (Potter 2001, p.573). It is this variability, the ability of the virus to mutate rapidly and even produce completely new unrelated strains, which allows it to be a continued cause of epidemic and pandemic disease. Historical records allude to possible pandemics as far back as 412BC and there is reliable evidence for the past 300 years (Potter 2001). Pandemics – sudden, unexpected outbreaks in a specific geographical area, subsequently spreading world-wide, infecting millions and causing large numbers of deaths – occur every 10-50 years and are due to new virus strains, a process known as antigenic *shift*. The majority of the population will have no immunity to these new influenza viruses, resulting in extremely high morbidity and mortality rates. An epidemic – a sudden, unexpected outbreak, infecting a large percentage of the population and disappearing within a few weeks or months – will occur somewhere in the world in most years, and is due to mutation of an existing virus strain, a process know as antigenic *drift* (Potter 2001). It is this mutation which necessitates annual vaccination.

Influenza is an acute viral illness of the upper respiratory tract, sudden in onset with fever, muscle pain, joint pain, headache, dry cough and malaise and, occasionally, rhinitis (Potter 2001, Riley & Riley 2003). Potter (2001, p.572) differentiates influenza from 'flu-like illness' with the phrase 'a degree of prostration out of all proportion with the severity of other symptoms'. Spread by droplets from the cough or sneeze of an infected person being inhaled by others, it is therefore more common in the U.K. in winter when people tend to congregate in warm, enclosed, poorly ventilated environments. An incubation period of 1 to 4 days precedes the onset of symptoms, with infectivity starting 1 day before and continuing for 7 days after. Recovery may take up to 2 weeks but a prolonged period of post-viral malaise may ensue (Riley & Riley 2003). Of the three identified types of influenza virus, A, B and C, only types A and B cause significant morbidity in humans, type A occurring more frequently and being more virulent (Riley & Riley 2003).

Influenza activity is monitored globally by the World Health Organisation (WHO). The three most virulent strains in circulation are identified and recommended for inclusion in the vaccine for the current year to provide protection against the strains thought likely to cause epidemics that particular year (Liddle & Jennings 2001). In recent years the vaccine strains have closely matched the circulating strains, resulting in high levels of protection.

Up to 20% of the UK population may be affected annually (NHS Centre for Reviews and Dissemination, 1996, available at www.york.ac.uk/inst/crd, accessed 16 May 2005) and between 10-20% of the US population (Goldrick 2004). However, it is not just influenza itself which is a cause for concern - it is the risk of complications arising from secondary infection and the exacerbation of pre-existing conditions. Significant increases in hospital admissions and an estimated 3-6000 deaths annually, 85% of which occur in those aged 65 or over, have been attributed directly or indirectly to influenza (NHS Centre for Reviews and Dissemination 1996; NICE 2003, available at www.nice.org.uk, accessed 16 June 2006). The costs are therefore high in both human and financial terms.

In 2000 the Department of Health recommended annual vaccination for all those in 'at risk groups' setting a target of 60% coverage, which has since been raised to 70% (DoH 2003). At risk groups are defined as those:

- aged 65 or over
- with chronic renal disease, including nephrotic syndrome, chronic renal failure and post-transplantation*
- with chronic heart disease, including hypertension with cardiac complications, chronic heart failure and those needing medication and/or follow-up for ischaemic heart disease*
- with chronic respiratory disease, including chronic obstructive pulmonary disease and asthmatic people requiring continuous or repeated inhaled or systemic steroids, or when exacerbations have previously required hospitalisation*
- Chronic liver disease, including cirrhosis*
- with diabetes mellitus, requiring insulin or oral hypoglycaemic drugs*

- with immunosupression due to disease or treatment*
- living in long-stay facilities such as residential or nursing homes
- who are the main carer of an older or disabled person.

*aged six months or over (DoH 2005).

Immunisation programmes in general are amongst the most effective public health initiatives undertaken and have been credited with saving more lives than any other, with the exception of the provision of clean water (Plotkin & Plotkin 1999). Influenza vaccination is estimated to provide between 60 and 90% protection against infection (Potter 2001), although there is evidence that a diminished immune response in older people may reduce that figure (Gross *et al*. 1995, Morgan & King 1996). Although 'immunisation has never made an impact on the course of an (influenza) epidemic' (Potter 2001, p.573), annual vaccination of all older people has proved to be cost-effective in reducing influenza related illness and death (Govaert *et al*. 1994, Ohmit & Monto 1995).

Vaccination should take place ideally before the 'flu season starts, October or early November in the U.K. (NHS Centre for Reviews and Dissemination 1996, Liddle & Jennings 2001). However, later vaccination may still be worthwhile, as an effective immune response has been demonstrated at 10 to 14 days post vaccination (Liddle & Jennings 2001, Riley & Riley 2003). Annual vaccination has been found to have a cumulative effect (NHS Centre for Reviews and Dissemination 1996), there is also evidence that pneumococcal and influenza vaccination have additive effects (Nichol 1999). Despite strong evidence of the safety and efficacy of modern influenza vaccines there is still reluctance among some older people to accept vaccination (NHS Centre for Reviews and Dissemination 1996, Andrew *et al*. 2004). The effectiveness of any vaccine depends largely on public acceptance (Cameron 1996, Ritvo *et al.* 2003). This review of the available evidence aims to develop an understanding of the factors involved in the decision to accept or refuse vaccination and may lead to strategies to improve acceptance and therefore, reduce morbidity and mortality.

SEARCH STRATEGY

BNI, AMED, CINAHL, HMIC, PsychINFO and Blackwell Synergy were searched electronically and reference lists followed up. Key words used were 'older people', 'elderly people', 'influenza vaccination'. Full texts were retrieved electronically or from the British Library via RCN Library Services, where available. The following inclusion and exclusion criteria were identified:

- Age of subjects, 65 years or over.
- English language.
- U.K. studies or those with findings transferable to the U.K. setting.
- Papers that identified and/or discussed the factors involved in uptake of vaccination.
- Papers from peer reviewed journals, where this could be ascertained.
- Papers published between 1996 and 2005.

A total of 207 papers were identified, after application of the above criteria 10 remained on which to base this review.

FINDINGS AND DISCUSSION

Analysis of these papers revealed recurrent themes and predictors of vaccination acceptance or refusal, which could be broadly grouped into the following categories:

- Demographics
- Prior experience
- Concerns about the vaccine
- Perceived risks
- Advice and information

Demographics

Personal characteristics have been studied as a means of predicting influenza vaccination uptake (Honkanen *et al*. 1996, van Essen *et al*. 1997, Gosney 2000, O'Reilly *et al*. 2002, Kamal *et al*. 2003, Andrew *et al*. 2004, Nowalk *et al*. 2004) but findings have not always been consistent.

Gender

Quantitative studies in the U.S have found that men are more likely to be vaccinated than women (Kamal *et al.* 2003, Nowalk *et al.* 2004), although Kamal *et al.* (2003) found gender not to be statistically significant. Nowalk

et al. (2004) conducted 557 interviews in a computer-assisted telephone survey of people aged 65 and older, which revealed that 81% of male respondents versus 73% of female respondents had been vaccinated. However, there is no comparison of the age ranges between sexes and as women tend to have a longer life expectancy than men, the female respondents may have been older (Office for National Statistics 2005, available at www.statistics.gov.uk accessed 17 July 2006).

Age

O'Reilly *et al*. (2002), in an audit of vaccination rates in 12 General Practitioner (GP) Practices in Northern Ireland, found that men between the ages of 75 and 90 were 5% more likely to be vaccinated than women. There is acknowledgement that the Practices audited may not be representative because of high levels of computerisation and generalizability thus is reduced. Again, there is no comparison of the age ranges between sexes so the finding may not be reliable. Andrew *et al*. (2004) in a quantitative survey of 5,007 community-dwelling adults over 65, without dementia and who responded to a question about influenza vaccination, found that increasing age was positively predictive of vaccination uptake. The sample in this study was drawn from the Canadian Study of Health and Aging, a population-based national cohort study of people aged over 65 conducted in 1991, and not specifically designed for the purpose. Although published in 2004, the data were collected in the early 1990s, therefore the age of the data may mean that the findings do not reflect the current position, but concurrence with other studies would indicate that this is not the case. Self-report is another source of potential bias but again this is asserted to be moderately specific and highly sensitive (Andrew *et al*. 2004) when compared with medical records. O'Reilly *et al*. (2002) found this to be true to an extent, up to the age of 85, but that people over 85 were less likely to be vaccinated. They suggested a number of causes for this including: a lack of ability to give informed consent due to cognitive impairment with advanced age; the attitude of the person's General Practitioner; acceptance of age-related decline coupled with increasing unwillingness to

interfere with the natural ageing process; and a belief that older people benefit less from the vaccination.

Conversely, van Essen *et al*. (1997) found that people over 75 years old were less likely to be vaccinated but this proved not to be statistically significant, whilst Honkanen *et al*. (1996) could relate neither age nor gender to increased uptake.

Place of domicile

O'Reilly *et al*. (2002) also found that living in a deprived area increased uptake, as did Andrew *et al*. (2004), although findings were not statistically significant. However, Nowalk *et al*. (2004) found those living in suburban areas were more likely to be vaccinated than those living in inner city areas. Neither author offers any explanation for this but, as will be discussed later, one's own perception of increased risk can influence acceptance of vaccination: perhaps the people living in deprived areas in Northern Ireland perceive their risk to be high. Higher income levels were cited in Norwalk *et al*. (2004) as being positive predictors of vaccination, which might be linked with living in the more affluent suburban areas.

One surprising finding in two U.K. studies (Gosney 2000, O'Reilly *et al*. 2004) given the current recommendations (DoH 2003), was that residence in a nursing or residential home or continuing care facility was not predictive of being vaccinated, although no suggestions are made to explain this. O'Reilly *et al*. (2002) made no distinction between those who lived in nursing or residential homes, and those who did not, analysis was by postcode, assuming that anyone over 65 with the same postcode as a residential or nursing home was living there. There is acknowledgement of this tenuous assumption, but the finding that vaccination rates in these postcode areas were lower than average, means that it cannot be ignored and a suggestion is made for further, specific research. Gosney (2000) on the other hand, in a quantitative study of 279 people over 75 who had been admitted to hospital with acute medical problems, specifically inquired about place of residence and still concluded that it was not predictive of vaccination. However, self-report, coupled with a failure to

validate information given throws some doubt on these findings. The exclusion of patients on the basis of a mental test score may have improved the reliability of the information that was given but also excluded a group of very vulnerable patients, likely to be resident in nursing or residential homes, from the study. However, this was made explicit, along with the difficulty that would have been encountered in eliciting the reasons behind the vaccination decision.

Other risk factors

All of the authors who commented on the presence of identified risk factors or co-morbidity, advanced age, diabetes, chronic heart, respiratory or renal disease, agreed that this increased the likelihood of being vaccinated (Honkanen *et al*. 1996, Gosney 2000, O'Reilly *et al*. 2002, Kamal *et al*. 2003, Andrew *et al*. 2004). Kamal *et al*. (2003) in particular, found that vaccination rates increased parallel with the number of risk factors present and that people without identified risk factors were less likely to be vaccinated. Gosney (2000) identified that many of her subjects had one or more of the risk factors mentioned above in addition to age and comments that although this increased the likelihood, it did not ensure vaccination.

Marital status

Being married or living with a partner or spouse was strongly predictive of vaccination acceptance (Kamal *et al*. 2003, Norwalk *et al*. 2004, Andrew *et al*. 2004) but there is no discussion of the reasons for this. O'Reilly *et al*. (2002, p.388) refer to the 'healthy survivor effect' as being a reason for reduced vaccination rates. This effect infers that having been widowed reduces the desire to protect one's health. However it is also possible to assume that the opposite might also be true.

Lifestyle

Higher educational achievement and income predicted higher vaccination uptake (Kamal *et al*. 2003, Andrew *et al*. 2004, Nowalk *et al*. 2004). This might be attributed to better understanding of health promotion messages, leading to increased health awareness and the adoption of

more health protective behaviours. Andrew *et al*. (2004) found those who took regular exercise to be more likely to be vaccinated, on the other hand a relationship between smoking and/or regular alcohol consumption and increased uptake was also established. Although alcohol consumption did not survive statistical analysis as a predictive factor, it was suggested that smokers perceived their risk to be higher and were therefore, vaccinated (Andrew *et al*. 2004). In addition, Nowalk *et al*. (2004) and Kamal *et al*. (2003) found caucasians as opposed to non-caucasians, more likely to accept vaccination.

Prior experience

Prior experience - personal or that of others - can have a positive or negative influence on the decision to accept or reject vaccination. Telford and Rogers' (2003) qualitative study of 20 people 75 or over, purposively selected to include 10 people who had accepted vaccination and 10 who had refused, used semi-structured in-depth interviews to identify 3 main themes of which prior experience was one. They found that experience of having lived through an influenza epidemic or having listened to the stories of someone who has might also be influential. Whether it influences a person to accept or refuse vaccination depends on what was experienced. For instance, having been severely ill or knowing someone who has been severely ill, hospitalised or even died because of influenza, is likely to influence positively. Similarly, being vaccinated or listening to someone who has been vaccinated and not experiencing illness due to influenza, is likely to influence for the vaccination (Telford & Rogers 2003). But these were not the only prior experiences appearing to have influence. Personal biography and the biographies of those around them, norms, values and beliefs about healthy living, preserving health and preventing illness, established and internalised over the course of a lifetime, were a strong influence in the decision making process (Cornford & Morgan 1999, Telford & Rogers 2003).

Conversely, lack of experience or contact with others who have experienced the negative effects of influenza, might influence against the vaccine. Experience of side effects, personal or anecdotal, has in some

studies been associated with subsequent refusal of vaccination (Honkanen *et al*. 1996, van Essen *et al*. 1997, Gosney 2000) but this had been shown to depend on the attitude of the individual. Cornford and Morgan (1999) conducted qualitative, semi-structured interviews with 25 vaccinated and 25 unvaccinated people aged 75 or over, selected on the basis that they were at risk from influenza. Interpretation of side effects, personal or in others, was found to be more important than the experience itself. Both Telford and Rogers (2003) and Cornford and Morgan (1999) highlight that the older person is more likely to continue to accept vaccination when they are aware that the vaccine is different each year. The older people in these studies held the belief that side effects might be experienced some years and not others, depending on the constituents of the vaccine that particular year, but on the whole they believed that the benefits of the vaccine outweighed the risks.

Modern injection equipment and techniques can make the whole experience much more comfortable. However, it might be argued that an older person whose last experience of being vaccinated was perhaps 40 or 50 years ago might expect the same experience now and be reluctant to undergo the procedure again.

Concerns about the vaccine

The literature identifies a range of concerns that: the vaccine may not be effective; the vaccine can cause influenza or other illness; the vaccine may have possible side effects; and the vaccine is not safe.

The NHS Centre for Reviews and Dissemination (1996) categorically states that modern influenza vaccines are safe, effective, cannot cause influenza and are relatively free from serious side effects. Efficacy has been estimated to be between 60 and 90% with reductions in morbidity and mortality estimated at between 50 and 69% (NHS Centre for Reviews and Dissemination 1996, Potter 2001, Liddle & Jennings 2001). Randomised controlled trials have established that the frequency of systemic side effects in placebo groups and vaccinated groups are equal and local side

effects mild and short-lived (NHS Centre for Reviews and Dissemination 1996, Winslow & Jacobson 1997, Liddle & Jennings 2001).

The issue, then, does not concern the safety of the influenza vaccine, its effectiveness or potential side effects but rather the attribution of any adverse event occurring after vaccination, to the vaccine. In other words, what people believe about the vaccine. A belief that the vaccine is safe, effective, cannot cause influenza and that any adverse effects that might be experienced are coincidental or preferable to influenza itself, is associated with vaccine acceptance. Conversely, the belief that the vaccine is not safe, not effective, causes influenza or side effects is associated with non-vaccination (Honkanen *et al*. 1996, van Essen *et al*. 1997, Cornford & Morgan 1999, Gosney 2000, Liddle & Jennings 2001, Telford & Rogers 2003, Nowalk *et al*. 2004). For example, Gosney (2000) found that only 30% of unvaccinated people thought the vaccine was effective compared to 95% of vaccinated people. Whilst 42% of unvaccinated people expressed concern about side effects, only 14% of vaccinated people expressed these concerns. It would seem therefore, that personal beliefs and experiences are important in the decision-making processes of older people.

Perceived risk

The risks identified by older people in the literature are divided into the risks associated with influenza per se, personal risks and consequences of contracting influenza and the risks associated with having the vaccination.

Honkanen *et al*. (1996) in a quantitative survey of 409 people over the age of 65 living outside institutions, established a link between older people's perceptions of the seriousness of influenza and acceptance of vaccination. When asked if influenza was serious and had they been vaccinated, 15% felt it was a mild disease and 33% of these had accepted vaccination. A further 66% thought it was quite serious and 52% of these people had been vaccinated. Nineteen percent thought influenza to be serious of which 70% had been vaccinated.

This study was conducted in Finland and although subject to the limitations of self-reporting, this was later found to be 93.4% concurrent with health records. Vaccination was offered free of charge, although it is not stated whether this is usual in Finland. The study also considered most of the co-morbidities identified by the Department of Health as increasing the risks from influenza (DoH 2003) and the findings – that the existence of co-morbidity increases the likelihood of vaccination - concur with other studies (for example Gosney 2000, O'Reilly *et al*. 2002, Kamal *et al*. 2003, Andrew *et al*. 2004).

An association between the perception that influenza is not dangerous and reduced vaccination rates was also found by van Essen *et al*. (1997) in a quantitative study in the Netherlands of 243 people aged over 65 (with no other risk factors) invited by their G.P. to attend vaccination. The study was conducted approximately six months after the invitations were sent in an epidemic year. Findings therefore may have been influenced by these factors but the correlation is supported by the fact that individuals had accepted (or refused) vaccination for several consecutive years.

Cornford and Morgan (1999) investigated older people's perceptions of the seriousness of influenza, in a qualitative study of purposively selected subjects who all had risk factors. A few people felt that it was never serious or that it was inconvenient rather than serious and was therefore a minor ailment. Most (80%) felt it might be serious for some people but did not see it as a threat to them personally. Only 10% thought influenza might be a risk to them. Although they were selected for inclusion in the study because they had at least one chronic illness recognised as putting them at increased risk of complications or death attributable to influenza, 94% of these people perceived themselves to be 'healthy' and so by inference, presumably not at risk. This would support the assertion that an older person's subjective assessment of their own health, often arrived at by comparison with others less able, may not be congruent with other 'objective' assessment.

Many authors have identified the association between the individual's perception of their own health status and acceptance of the vaccine. If the individual felt their health to be good, perceived or actual, they were less likely to be vaccinated. People who consider themselves to be healthy are less likely to consider themselves susceptible to influenza (van Essen 1997) and more likely to underestimate the risks and complications associated (Liddle & Jennings 2001). Their perception that they are not at risk renders the vaccine unnecessary (Gosney 2000, Telford & Rogers 2003) therefore, appealing to 'at risk' status may not be a useful strategy (Cornford & Morgan 1999). This perception, however, is subject to re-evaluation in light of new experiences, personal or of others, possibly leading to an increased willingness to accept vaccination.

People who perceive their health to be poor are more likely to be vaccinated (Honkanen *et al*. 1996, van Essen *et al*. 1997, Liddle & Jennings 2001, Kamal *et al*. 2003, Andrew *et al*. 2004). Perceptions of poor health might lead to an increased recognition of the risk from influenza itself or from a complication of any existing medical condition, and therefore lead people to seek vaccination. A simpler explanation might be that ill people have more contact with health care professionals who might have advised vaccination and provided more opportunity to be vaccinated. For example, Kamal *et al*. (2003) found that consulting with a doctor within the previous year was associated with higher vaccine uptake.

Advice and information

to avail themselves of the protection offered by influenza vaccination, older people first require the knowledge that it is available and second, how to get it. The main sources of information about the influenza vaccination for older people are radio, newspapers and relatives or friends (Honkanen *et al*. 1996). Reasons commonly cited for failure to be vaccinated include ignorance of a campaign, lack of information, misunderstanding information, lack of a direct offer and lack of personal recommendation or invitation (Gosney 2000, Liddle & Jennings 2001, Nowalk *et al*. 2004). Gosney (2000), in a study of older people admitted

to hospital with acute illness, found that 39% of them were either unaware of the existence of the vaccine or did not know how to obtain it. There was also a mistaken belief among some respondents that the vaccination campaign was aimed at babies and children and not older people.

It is well documented that information and a recommendation to be vaccinated from a health care professional increases the likelihood of acceptance (Gosney 2000, Liddle & Jennings 2001, O'Reilly *et al*. 2002, Nowalk *et al*. 2004). O'Reilly *et al*. (2002) cite it as the most common reason for presenting for vaccination. The amount, nature and type of information and even the person giving it, can all influence the decision to accept or refuse vaccination. Honkanen *et al*. (1996) found that information given by health visitors was most successful in raising vaccination rates even amongst those who were unfavourably disposed towards vaccination. However, the role of the Finnish health visitor is not defined and this finding may not therefore, be transferable to the U.K. setting as the role of our health visitors might be different.

Gosney (2000) also found that information given by a nurse was more likely to result in vaccination than if the information was given by a G.P. Nowalk *et al*. (2004) describe how older people are more likely to be vaccinated if they believe that their doctor, family or friends thought they should, and that only half of the unvaccinated believed their doctor had recommended it. The recommendation of health care professionals and family would therefore, appear to be important. However, Telford and Rogers (2003) dispute this, asserting that lay beliefs and perceived personal risk assume more importance than professional recommendation and government advice, whose approach to promoting influenza vaccination is seen as 'dictatorial and irrelevant' by older people (Telford & Rogers 2003, p.752).

RECOMMENDATIONS FOR PRACTICE

Clear, concise information about the risks of influenza, who is at risk and the risks and benefits associated with being vaccinated is needed both for

older people and for health care professionals, to dispel the myths surrounding it (Gosney 2000, Cornford & Morgan 1999).

All health care professionals need to be aware of their role in promoting the vaccine and using every opportunity to identify, educate, advise, remind and vaccinate eligible people. Computer systems in G.P. practices, outpatient departments and day care facilities might help to identify appropriate people, highlighting them on clinic lists. Personal written invitations, posters in local shops, reminder notes on prescriptions and opportunistic vaccination (Gosney 2000, Liddle & Jennings 2001) are approaches that can be used. Other approaches might even include pharmacists who have regular contact with patients using their dispensing software to flag up patients at risk, as identified by their prescription drugs, giving opportunity to educate, remind and recommend vaccination (Honkanen *et al*. 1996, Gosney 2000, O'Reilly *et al*. 2002, Kamal *et al*. 2003). Easy access to vaccination via drop-in clinics and visits by practice or community nurses to day-care centres, residential homes, sheltered housing complexes and the housebound, may improve uptake rates (Nowalk *et al*. 2004, Liddle & Jennings 2001).

The most effective method of improving uptake might be to enhance recognition of personal susceptibility and promote the vaccine as a health maintenance issue, placing it within the strongly held health beliefs of older people (Telford & Rogers 2003).

RECOMMENDATIONS FOR RESEARCH

During the course of this review, a number of methodological weaknesses have been identified in the published research. These include:

- Inaccuracies in comparing ages between the sexes
- Lack of representation amongst different types of General Practices
- Reliance on old data
- Predominance of self-report data
- Lack of discrimination between place of abode

- Exclusion of some patients due to application of mental test scores Studies completed in other countries not necessarily transferable.

Future research is therefore required which takes into account all the above limitations.

CONCLUSION

There is a wealth of demographic information, which is interesting and illuminating in identifying those likely or unlikely to accept vaccination, and will be useful when deciding, at a strategic level, where future efforts to improve uptake might be targeted. However, there is a mis-match between the lay and professional concepts and perceptions of influenza, its' possible consequences, the vaccine and indeed health itself.
At an individual consultation level, information about the older person, their health beliefs, values and attitudes will be more useful, allowing adoption of a person-centred approach to health promotion in general and promoting influenza vaccination in particular. Research designed to investigate these concepts and perceptions might promote congruence between lay and professional beliefs: this type of information is scarce but without it our efforts are unlikely to be successful.

CONTRIBUTIONS

Study Design: LW
Data Collection and Analysis: LW
Manuscript Preparation: LW and JD

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Table 1

Summary of papers included in the literature review

Paper	Purpose	Sampling	Data Collection	Instrumentation	Data Analysis	Ethical Issues	Major Findings
Andrew et al 2004 Canada Correlational study (n 5007) Quantitative	Identification of factors predictive of influenza vaccination to determine targets to increase coverage	Community dwelling participants without dementia, aged 65 or over, in whom self reported vaccination status is known, drawn from established population based national cohort Purposive	Self administered risk factor questionnaire	Demographic and lifestyle issues, medical and family history, medication use and vaccination history	Univariate analysis Chi squared test or Fisher's exact test used for categorical variables One way ANOVA used for continuous variables Multivariate analysis by stepwise selection of parameters previously found to be significant	Not discussed Questionnaire presumably anonymous Previous participation in separate study ?consent assumed by completion of questionnaire	55.2% had accepted vaccination in the past 2 years Largest predictive factors for acceptance were being married, higher educational level, smoking, more alcohol use, poorer self rated health, regular exercise and urban living Other predictive factors for acceptance included older age, higher Modified Mini Mental State score and higher co-morbidity

Paper	Purpose	Sampling	Data Collection	Instrumentation	Data Analysis	Ethical issues	Major Findings
Cornford and Morgan 1999 U.K. Phenomenological study (n 50) Qualitative	To examine beliefs about influenza vaccination in older people at risk from influenza	Aged 75 or over and defined as being at risk of influenza, equally divided between those who had been vaccinated and those who had not Purposive	Semi-structured interviews conducted between April and July, outside the usual vaccination period, lasting between 45 and 90 minutes	Interviews based on a schedule of open questions developed from previous literature and focussed interviews with four older people from a non-study practice and covering what health means, perceptions of their own health, ideas about how to maintain health and ideas about the benefits or otherwise of vaccination	Interviews were tape recorded and fully transcribed Data were analysed using a computer software package (QSR NUD*IST) and analysis was based on a constant comparative approach, initial categorizing of ideas, building them into main themes and re-categorizing following further analysis	Approval of local ethical committee	Few older people perceived themselves to be at risk from influenza despite having identified risk factors and recognizing the risk to certain groups of people The decision to be vaccinated was based on the interpretation and evaluation of beliefs about whether it could cause or prevent colds and influenza and the importance of side effects Older people's subjective assessment of their own health is often incongruent with objective assessment

Paper	Purpose	Sampling	Data Collection	Instrumentation	Data Analysis	Ethical Issues	Major Findings
Gosney 2000 U.K. Descriptive exploratory study (n 279) Quantitative	To determine whether patients defined as being at risk were vaccinated and identify factors influencing acceptance	Aged 79 or over admitted to hospital with acute medical illness during January and February Convenience	Structured interviews	Questioned by a single qualified nurse with regard to current vaccination status , open ended questions explored reasons for their decision, source of advice and information selected from a list and 'free text' to address concerns about vaccination	Little detail Vaccinated group compared with non-vaccinated group Some mention in text of Chi and confidence intervals	Ethical approval obtained Consent from consultant geriatricians Patients asked to participate as indicated by refusal figures	Vaccination uptake is sub-optimal, being designated as at risk or living in a nursing or residential home does not guarantee vaccination Health care professionals have a large role to play in educating older people about the vaccination programme Belief that the vaccine is effective and free from side effects is associated with acceptance, fear of side effects was the most common reason for non-vaccination

Paper	Purpose	Sampling	Data Collection	Instrumentation	Data Analysis	Ethical Issues	Major Findings
Honkanen et al 1996 Finland Correlational study (n 409) Quantitative	Investigation of factors associated with influenza vaccination in order to devise strategies to improve coverage	Purposive selection of the districts that the sample was drawn from for their different vaccination rates Random sampling of individuals aged 65 or over living outside institutions	Postal questionnaire with follow up questionnaire to those who did not reply to the first one	Previous years vaccination status, level of knowledge about the campaign and source of information, co-morbidity, Previous experiences and beliefs regarding influenza vaccination and beliefs about influenza itself	Statistical analysis using SSP for Windows t-test to determine significance of difference between means Medians subject to Mann-Whitney U-test Variables measured on nominal scales with the Chi square test Risk ratios with 95% confidence intervals calculated	Not discussed ?consent assumed by completion of questionnaire Influenza vaccination offered free of charge ? usual situation in Finland Those born in even years also offered pneumococcal vaccine	Predictive factors for acceptance included a perceived need for the vaccine, belief in it's adverse effects Belief in adverse effects was negatively associated with vaccine acceptance Health care professionals need to recognize the importance of their role in promoting the vaccine

Paper	Purpose	Sampling	Data Collection	Instrumentation	Data Analysis	Ethical Issues	Major Findings
Kamal et al 2003 U.S. Analysis of data collected for the Centers for Disease Control and Prevention Behavioral Risk Factor Surveillance Survey (n 64 048) Quantitative	Determine national vaccination rates for influenza and pneumonia in adults aged 65 and older and influenza vaccination rates in adults aged 50 to 64 Assess differences in the effect of selected predisposing, enabling and need-related factors Identify and statistically compare the predictors for each age group	Sample identified from the 1999 Behavioral Risk Factor Surveillance Survey Data weighted by age, race and sex to represent the adult population of the U.S.	Data extracted from existing study	Vaccination history, sex, race, marital status, education, employment, annual household income, physician visits, health care insurance status, perceived health status and presence of co-morbidity	Analysis performed by using SPSS 10.1 (Chicago, 111) and STATA 5.0 (College Station, Tex.)	Not detailed ?consent assumed by completion of information in original survey	Factors predictive of vaccine acceptance were being male, being white, being married, having visited a doctor within the past year, feeling health to be poor or having identified risk factors and having a higher education and income

Paper	Purpose	Sampling	Data Collection	Instrumentation	Data Analysis	Ethical Issues	Major Findings
Liddle and Jennings 2001 U.K. Review	Review of the literature on influenza and influenza vaccination in older people	Search strategy and inclusion exclusion criteria not detailed	Not detailed	Not applicable	Not applicable	Not applicable	The risk of influenza and it's complications is underestimated Vaccination is still worthwhile even after an epidemic is established Influenza vaccination is safe and effective in older people Improved education of health care professionals and the public is required to improve uptake

Paper	Purpose	Sampling	Data Collection	Instrumentation	Data Analysis	Ethical Issues	Major Findings
Nowalk et al 2004 U.S. Telephone survey (n 557) Quantitative	To identify facilitators and barriers to vaccination	Two stage stratified random cluster sampling of patients from several inner city and suburban practices, aged 65 or over who had visited their doctor within the previous 3 years Random	Computer assisted telephone interviews	Questionnaire designed by multi-disciplinary team based on the Triandis mode of consumer decision making Approximately 75 questions including multiple choice and Likert-scale items covering attitudes, social influences and perceived consequences	Demographic statistics calculated using SAS (SAS Institute, Inc., Cary, NC) Chi-square tests use to compare patient's beliefs with reported vaccination status using SUDAAN software (Research Triangle Institute, Research Triangle Park, NC) Analyses weighted for unequal patient selection probabilities and logistic regression performed	Institutional review board of the University of Pittsburgh approval	Factors predictive of vaccine acceptance were being male, being white, being married, being registered with a suburban practice and having higher educational level and income A belief that the vaccine was effective and that their doctor, family or friends thought they should be vaccinated was also associated with acceptance

Paper	Purpose	Sampling	Data Collection	Instrumentation	Data Analysis	Ethical Issues	Major Findings
O'Reilly et al 2002 U.K. Audit report Quantitative	To explore the variations in vaccination rates with special reference to uptake amongst older people	All those at risk of influenza and it's complications registered with 12 practices in Northern Ireland Purposive	Data extracted from existing computerised medical records	Data relating to age, sex, co-morbidity and vaccination status	Differences between categorical variables tested using Chi-square test Multiple logistic regression modelling done separately for under and over 65 year olds	Not discussed Use of existing data collected for a separate purpose	Uptake rates peaked at age 85 and declined thereafter Presence of co-morbidity increases the likelihood of vaccination even in older patients Living in a nursing or residential home decreases likelihood of vaccination

Paper	Purpose	Sampling	Data Collection	Instrumentation	Data Analysis	Ethical Issues	Major Findings
Telford and Rogers 2003 U.K. Phenomenological study (n 20) Qualitative	To analyze the influences on older people to accept or refuse influenza vaccination To inform practice and policy making	Identification of eligible patients aged 75 or over and where vaccination acceptance or refusal could be determined, application of exclusion criteria Purposive	Semi-structured in-depth interviews using a topic guide in the patient's choice of location, lasting between 20 and 45 minutes Saturation achieved	Background demographic information, general health, knowledge about influenza, transmission and prevention, experiences of influenza, personal or in others, knowledge and experience of influenza vaccination	Interviews tape recorded and transcribed verbatim by interviewer Manual coding using summary sheets to document emerging themes Links made between associated categories Verification and elaboration by original respondents	Not discussed	Three key themes; trust or mistrust of modern medicine, prior experience of vaccination and perceived risk from influenza Older people are well informed about healthy lifestyles and influenza Decision making is informed by beliefs, values and attitudes adopted and internalized over a lifetime and by experience of health, ill-health and influenza

Paper	Purpose	Sampling	Data Collection	Instrumentation	Data Analysis	Ethical Issues	Major Findings
Van Essen et al 1997 Netherlands Correlational study Qualitative	To assess motivating factors of healthy older people to comply with influenza vaccination	Aged 65 or over with no other risk factors for influenza vaccination Purposive	Data were extracted from existing medical records with regard to age, sex, type of medical insurance and vaccination history Postal questionnaire with pre-coded answer categories sent to all of the non-compliant and 30% of the compliant patients selected by computer randomization	Background demographic information, perception of own health, perceived threat of influenza, perceived benefits and drawbacks of vaccination	All the variables were dichotomized. Odds ratios for personal characteristics and socio-psychological factors adjusted for possible confounding variables. Stepwise forward selection and significance testing by the likelihood ratio test to investigate possible interactions between variables	Not discussed ?consent assumed by completion of questionnaire	Correlations between non-compliance and personal characteristics were low except for age Factors associated with non-acceptance were being under 75 years old, belief that the vaccine caused serious side effects, perceived good health and belief of not being susceptible to influenza