Submission for Reclassification of the Meningococcal Vaccine for use in Adults

Executive Summary

This application requests a reclassification for the meningococcal vaccination allowing administration to people aged 16 years or over by pharmacists who have successfully completed the Immunisation Advisory Centre (IMAC) or another approved vaccinator's course, and are complying with the immunisation standards of the Ministry of Health.

Meningococcal invasive disease is a devastating illness. While children under five years are at greatest risk, a peak also occurs in the 15-19 year age group in NZ with a rate of 4.7 per 100,000 and three deaths in 2011.[1] Young adults in hostel-type accommodation (for example at university or in the military) are at greater risk,[2-5] and the Ministry of Health recommends meningococcal vaccination to these people, although it is not funded.[3]

The primary intention of this application is to improve vaccination rates of people 16 years or over at higher risk of meningitis by increasing the availability and awareness of the vaccine through Pharmacy. People about to move into hostel accommodation at University for the first time will be the primary targets for pharmacy.

Internationally, certified pharmacists are increasingly administering vaccinations.[6-8,9] This includes meningococcal vaccinations in Canada, the US and the UK. The increasing use of pharmacists recognises the accessibility and convenience of pharmacy and the advocacy of pharmacists as health professionals to increase consumer awareness and vaccination opportunities and ultimately increase the uptake. Vaccination rates improve[10,11] and healthcare consumers and pharmacists support this strategy.[9,12]

Allowing pharmacist-administration of meningococcal vaccinations will help protect adolescents and young adults from meningococcal disease. Increasing the number of pharmacists administering vaccinations will provide public health benefits for NZ. These benefits include greater accessibility (location, opening hours, convenience, usually no appointment); increased promotion of vaccinations; increased advocacy; and better coverage in epidemics or pandemics. In the Northland meningococcal C epidemic, youth were difficult to target, and required walk-in clinics and mobile clinics to help improve rates.[13] Pharmacy could increase awareness and increase accessibility to this important group in a mass vaccination. Pharmacists will collaborate with General Practice to facilitate an increased public awareness in vaccines and assist in the recall process so that patients are reminded to get their funded vaccinations within the required time-frame.

A comprehensive pharmacy process will include thorough screening, record-keeping, notification to the patient's GP (with consent), and reporting of adverse events to the GP and the Centre for Adverse Reactions Monitoring (CARM). The pharmacy process will meet the Ministry of Health standards including use of a private area and a 20 minute observation period.

To date over 170 pharmacists have successfully completed the MOH approved vaccination course and this covers both intradermal and intramuscular injections. Clinical assessments for all pharmacists now include the administering of two vaccines one of which must be an intramuscular injection. This has been amended in accordance with the MOH recommendations for pharmacist vaccinators for the 2013 influenza season dated 24 January 2013. Pharmacists who have been assessed prior to these changes to the process must attend a clinical training across the country conducted by the approved MOH vaccination course providers, this training will cover the administration of intramuscular injections. If pharmacists do not complete this training they are not able to provide intramuscular injections.

As stated in previous immunisation applications, Pharmacy is keen to contribute further to public health in NZ.

Part A

Important note: We have taken information from IMAC, the Ministry of Health Immunisation Handbook 2011, and CDC in the US in preference to datasheets of products registered on the NZ market owing to the need to follow latest best practice in this field.

1. International Non-proprietary Name (or British Approved Name or US Adopted Name) of the medicine

Meningococcal vaccine

2. Proprietary name(s)

Registered products in NZ include Menactra®, Meningitec®, and Menjugate®. However, this application is from Pharmacybrands, a separate company to the sponsors of these vaccinations.

3. Name of company/organisation/individual requesting reclassification

Pharmacybrands Ltd, the parent company for Life, Unichem, Amcal, Radius and Care Chemist Pharmacies in New Zealand.

4. Dose form(s) and strength(s) for which a change is sought

Dose form: Injection for intramuscular administration

Strength: we are not seeking a change by strength, simply that Meningococcal vaccine is reclassified.

5. Pack size and other qualifications

Pack sizes are single injections (0.5mL).

6. Indications for which change is sought

Immunisation for the prevention of invasive meningococcal disease in people aged 16 years and older.

Please note: we have chosen 16 years or older rather than adult to maximise coverage of the late teen group who will be going into hostel-type accommodation for education purposes (e.g. University). Most of these people will be 17 or 18 years, but could be 16, so we have suggested a 16 years and over cut-off.

7. Present classification of medicine

Prescription only medicine

8. Classification sought

Exemption to Prescription Medicine when administered to a person aged 16 years or over by a pharmacist who has successfully completed a vaccinator training course approved by the Ministry of Health and is complying with the immunisation standards of the Ministry of Health.

9. Classification status in other countries (especially Australia, UK, USA, Canada)

Internationally, pharmacist-administration of vaccines is becoming common through various mechanisms. In most countries the vaccines remain prescription medicines.

In Canada, meningococcus vaccine has been Schedule II since March 2001,[14] equivalent to NZ's Pharmacist-Only Medicine. Pharmacist vaccination rules vary by province. Some provinces authorise pharmacists to administer vaccination other provinces authorise pharmacists to administer injections. British Columbia, for example, authorises pharmacists to administer subcutaneous, intra-dermal and intramuscular injections for immunisation and to treat anaphylaxis to residents five years of age and older, providing the pharmacist is authorised to administer injections.[15] This includes funded and unfunded vaccines, including meningococcal vaccine. Many vaccinations are pharmacist-only medicines.

In the USA, vaccinations have been available from pharmacies in some States since the 1990s,[16] extended to all states in 2009. Following completion of the American Pharmacists Association Certification Program, pharmacists are able to administer vaccinations[12] through various practices, mostly a practice which has some similarities with standing orders or the UK's patient group directions. Meningococcal vaccinations are available through pharmacist-supply in the US,[17] and as of June 2012 at least 41 States allow meningococcal vaccinations to be administered by pharmacist.[18] In many states pharmacists can do this either by specific protocol or on prescription.

In the UK, influenza vaccination by accredited pharmacists in pharmacies under Patient Group Direction (PGD) is common.[19] Meningococcal vaccinations are administered in pharmacy where authorised under PGD.[20] Please see Appendix 1 for an example PGD.

Vaccinations in community pharmacies are also available in Portugal[21] and Ireland,[9] although it is unclear if the vaccinations available include meningococcal vaccines. In Portugal pharmacists administer human papilloma virus vaccines by IM injection.

In Australia, vaccines remain prescription medicines and are not administered by pharmacists.

10. Extent of usage in New Zealand and elsewhere (e.g. sales volumes) and dates of original consent to distribute

According to the Medsafe website a variety of meningococcal vaccinations have been available on the market since 1987. Lapsed vaccinations, such as the MeNZB group B (strain NZ98/254) are excluded:

- Menomune A, C, W135, Y (powder with diluent) polysaccharide was approved in 1987

- Meningitec (meningococcal group C diphtheria protein conjugate) was approved as a new medicine in 2003
- Menjugate (meningococcal group C diphtheria protein conjugate) was approved in 2005
- Mencevax A, C, W135, Y polysaccharide was approved in 1992
- Menactra meningococcal A, C, W135, and Y was approved in 2012
- NeisVac-C group C polysaccharide was approved in 2008

Sales figures for meningococcal vaccinations in NZ are unknown due to the unfunded status and availability through the private market only. Over 35,000 doses of meningococcal group C vaccination were targeted in Northland in 2011 to control an epidemic.[13] Usage outside of epidemics would be limited in NZ. The tailor-made group B vaccination used for the major epidemic several years ago is not licensed and routine administration stopped in 2008, so sales data is irrelevant to this application.

Internationally, usage of the various meningococcal vaccinations has been high with meningococcal C conjugate vaccination a routine childhood vaccination at times in different markets including the UK, Netherlands, Spain, Germany, and Ireland.[4,22,23]

In the US the quadrivalent Menactra has been marketed since 2005 and recommended for use in adolescents with usage recently increasing considerably to around 63% of the age group.[24] Since 2005, approximately 45 million doses have been distributed in the US.[25]

Note: meningococcal C conjugate vaccination covers *N. meningitidis* group C. Quadrivalent meningococcal conjugate vaccination covers *N. meningitidis* groups A, C, W135, Y. See Part B section 1 for the NZ incidence of the various groups. A group B vaccination (apart from tailor-made country vaccines like MeNZB) is not yet marketed despite various strains of group B being common causes of infections internationally.

Conjugate vaccination (conjugated to diphtheria toxoid[1]) is used rather than polysaccharide as it is longer lasting and more effective.[4]

11. Labelling or draft labelling for the proposed new presentation(s)

Labelling would not change for the proposed reclassification. This medicine is not going to be self-administered so consumer labelling is unnecessary.

12. Proposed warning statements if applicable

Current packaging would remain.

[1] Diphtheria toxoid is only a carrier, it is not a booster dose for diphtheria

13. Other products containing the same active ingredient(s) and which would be affected by the proposed change.

Any vaccination containing *Neisseria meningitidis* antigens without other prescription medicine ingredients that is registered on the NZ market will be affected by the change suggested in this application.

Part B

1. A statement of the benefits to both the consumer and to the public expected from the proposed change

The primary aim of reclassification is to reduce the incidence, morbidity and mortality from meningococcal invasive disease, primarily in at-risk adolescents. Effectively, reduce risk of hospitalisation, permanent disability or death from the disease.

In having more pharmacists trained in immunisation there are further follow-on benefits. Firstly, pharmacists will be better informed to be advocates for all immunisations on the current NZ programme. And secondly, should mass vaccination be required (e.g. future pandemics or epidemics), there is a larger workforce already skilled in this area. In the 2011 meningococcal C epidemic in Northland the implementation of a regional mass vaccination strategy had significant challenges, including *"inadequate numbers of authorised vaccinators."*[13] Additionally primary care reached only a very low proportion of the 17-19 year age group, so *"walk-in"* community and mobile clinics were implemented with higher usage by Māori and youth. Pharmacists would have made the vaccination more visible (for example with footpath whiteboard signs and in-store and window posters), and more accessible (particularly for weekend vaccinations), increasing the effectiveness of the mass campaign.

NZ Recommendations

The Ministry of Health's Immunisation Handbook recommends Meningococcal A, C, Y, W135 vaccination or Meningococcal C vaccination to young adults in their first year of residence in hostel accommodation and to close contacts of cases of meningococcal disease.[3] The Handbook also recommends the quadrivalent vaccination for individuals at high risk of invasive disease (including sickle cell anaemia, deficiencies of terminal complement components, HIV infection); and others at higher risk: military recruits, microbiologists and laboratory workers exposed to *Neisseria meningitidis* isolates; travellers to sub-saharan Africa and Hajj pilgrims. It is not funded in these cases. It is funded for patients pre-or post-splenectomy. People with underlying medical conditions increasing their risk of meningococcal disease will be treated through their doctor, and laboratory workers will probably be treated through their laboratory. Many travellers will be treated through travel clinics or their doctor as they may also need other treatments.

Place of pharmacist-supply

The primary benefit in pharmacy supply is in young adults in their first year of hostel residence. A second benefit is that, in the case of an epidemic (as in Northland) where mass immunisation is implemented, pharmacy would add accessibility, advocacy, promotion and more vaccinators to help maximise coverage in youth. Thirdly, travellers requiring evidence of meningococcal vaccination (for example in university hostel accommodation in the US, or going to the Hajj pilgrimage in Saudi Arabia) would be able to access this vaccination. The Hajj pilgrimage has been associated with meningococcal disease in those travelling to it, and

also nasal carriage in returning travellers, then potentially spreading to their families and others in the community.[26,27] We see the first two scenarios as being the primary role of pharmacy with meningococcal disease.

A final benefit is to help improve access for contacts of meningococcal disease. Having the vaccine available in pharmacies may help access, particularly where a large number of contacts are likely. When the Northland mass immunisation was about to start, only 80 meningococcal C vaccines were reportedly available in the country.[13] More regular supply by pharmacy to at-risk groups is likely to increase the numbers of vaccines in communities around the country.

In the UK, a sample PGD (Appendix 1) uses the vaccination for children and adults with asplenia, travellers, close contacts of confirmed cases of meningococcal disease, and vaccination for local outbreaks.

The disease

Invasive meningococcal disease, including meningitis, pneumonia and septicaemia, has been a well-known deadly disease in NZ. *N. meningitidis* (also called meningococci), the organism causing invasive meningococcal disease, is a normal commensal of the pharynx and upper respiratory tract, found in 5-15% of humans, with higher rates often seen in adolescents and young adults, and in an epidemic.[3,4] Many carriage isolates have rarely caused disease. It causes both epidemic and endemic (sporadic) disease. Disease is almost always caused by five different serogroups; A, B, C, W135 or Y. Transmission occurs through aerosol droplets or direct contact. The disease is often misdiagnosed in the early stages, but can progress rapidly. Internationally, it has a 10-15% fatality rate, and 10-20% of the survivors have a permanent disability including deafness, amputation, and seizures.[4] In temperate zones, higher rates of invasive disease occur during winter, possibly because of increased contact, reduced ventilation, or more upper respiratory tract infections.

Risk of meningococcal disease is increased in close contacts of people with meningococcal disease, particularly household contacts, those who have drunk from the same container, shared eating utensils, kissed, or who have been at the same day care. These people should be given chemoprophylaxis (even if vaccinated). Vaccination may also be in order for some contacts.

Internationally, strains vary for unknown reasons with group A strains predominant in sub-Saharan Africa (but W135 as well), group B epidemics in Norway, Cuba, NZ, and Oregon and a group B outbreak in France (2006).[4] Group A epidemics have occurred in India, and the Philippines. Group A meningococci accounts for about 10% of disease in Russia. China, Mongolia and Nepal had relatively high rates of group A infection in the 1960s and 1970s. Group C disease has been important in Europe (with some countries introducing a routine vaccination in children and adolescents), Brazil, Canada and the US. Group Y disease is important in the US (causing over a third of cases),[4] and increasing in Nordic countries, and the UK to a lesser extent.[22] Halperin, *et al.* noted that in the UK *"the propensity for the emerging serogroup Y strains to cause disease in young adults... is concerning..."*.[22] W135 outbreaks have occurred in the Hajj pilgrimage in Saudi Arabia, and has recently been

emerging in some countries in Africa and South America. Group W135 disease causes a small number of infections in other countries.[4] Surveillance in Asia is incomplete.

Table 1 Meningococcal disease by main serogroups in selected locations[1,22,28]

Location	Year	Group B	Group C	Group Y	Group W135	Group A
European Union	2006	76%	17%	3%		
Canada	2006	54%	20%	13%		
US	2008	35%	31%	25%		
Latin America and Caribbean	2010	28%	57%	3%	12%	
Australia	2007	84%	8%			
Taiwan	2001	52%	3%	11%	31%	
NZ[1]	2011	62%	32%	3%	2%	
UK[28]	2009?	90%*	10 cases			

*As a result of a successful vaccination campaign with meningococcal conjugate C vaccine only 10 cases of meningococcal C invasive disease occurred in 2009

The different serogroups behave differently, including with respect to vaccination.[4] Group B meningococcal disease stands out compared with the other strains. It starts slowly and the epidemics are more prolonged than epidemics caused by other strains. Group B disease has not had a vaccination available internationally that covers a range of subtypes, despite it being the predominant strain in many countries (Table 1). Recent NZ and French group B epidemics with one predominant strain were treated with tailor-made vaccines. However, typically group B in the community includes various different strains. The vaccine used in NZ was not expected to help other group B strains as it worked mainly on a porin protein PorA which varies considerably. However, Novartis has just received European approval for a meningococcal B vaccine in January 2013.[29] This vaccination is not yet registered in NZ.

Natural immunity occurs from asymptomatic carriage of pathogenic or non-pathogenic meningococci or *N. lactamica* which stimulates antibodies.[4] Additionally, genetic factors predispose to infection.[23]

The disease in young adults

Peaks in incidence of meningococcal disease are seen in adolescents and young adults in Europe, the UK, the US,[4] and NZ.[3] Higher rates of colonisation by *N. meningitidis* has been seen in adolescents and young adults. In the UK, being a university student, living in a hostel

and/or kissing multiple partners increases risk of carriage or invasive disease.[4] Close living in military barracks also increases the risk of infection.[5] In the US, college students living in hostels have six times the risk of getting the infection of other college students.[30] Many colleges in the US require quadrivalent meningococcal vaccination before admission.[5] The UK Department of Health's Green Book advises all university students to be vaccinated before enrolment or as soon as possible after enrolment.[28] The University of Auckland advises it for hostel residents.[31]

In the US, fatality rates are higher in adolescents and young adults than in children, especially for group C disease.[4] In NZ, five people aged 15-19 died of meningococcal disease between 2009 and 2011.[1] The case fatality rate 2007-2011 was 8.2% in this age group, higher than all other age groups except the under 1 year age group.

The disease in NZ

Invasive meningococcal disease is a notifiable disease in NZ and occurs at a rate of around 2.5 per 100,000 people per year (Table 2).

Table 2 Notified cases and rate of meningococcal disease, 2007-2011

Year	No.	Rate[1]
2007	104	2.5
2008	122	2.9
2009	133	3.1
2010	97	2.2
2011	119	2.7

[1] Rate per 100 000 population

Source: Lopez L, et al. The epidemiology of meningococcal disease in New Zealand 2011, ESR

In 2011, 119 cases of meningococcal disease were notified, a rate of 2.7 per 100,000 population (or 2.5 confirmed cases per 100,000 population),[1] a higher rate than Australia, Europe, Chile, Argentina, Canada and the US.[22] One hundred and fifteen were hospitalised, and 13 died giving an 11% fatality rate.[1] The strains were determined for 100 cases (Table 1)[2]. In 2011, Group C was more likely to be fatal than group B (10 fatalities of 38 cases versus 3 of 62 cases, respectively). Group C meningococcal disease cases have increased from 2007 to 2011, causing around 28-35 cases per year from 2009-2011, up from around 10-12 cases in 2007 and 2008[3] (Figure 1).

[2] The practice of initiating early antibiotic treatment may occur before complete collection of diagnostic specimens causing an apparent decrease in the number of culture-confirmed cases among patients with signs of meningococcal disease**4.** Granoff DM, Pelton S, Harrison LH. Meningococcal vaccines. In: Plotkin SA, Orenstein WA, Offit PA, eds. *Vaccines*: Elsevier; 2012.

[3] Actual case numbers may have been higher as not all cases could have strains identified.

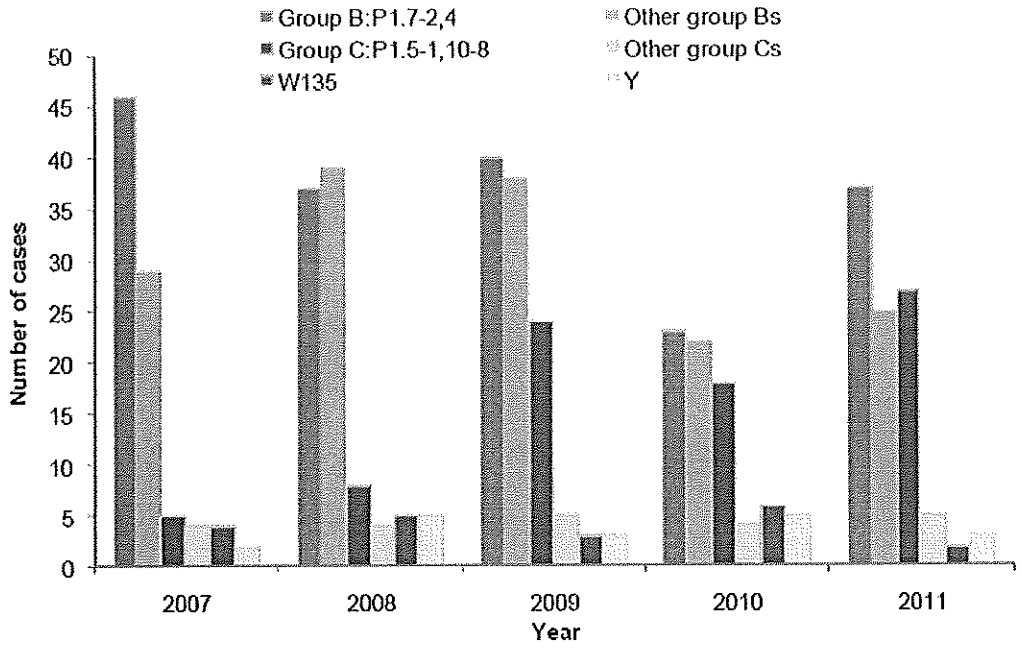

Figure 1 Groups and dominant subtypes among strain-typed meningococcal disease cases, 2007-2011

Source: Lopez L, et al. The epidemiology of meningococcal disease in New Zealand 2011, ESR

Over the past three years, a total of 105 cases of meningococcal disease in NZ were caused by strains targeted by the quadrivalent meningococcal vaccine, including 83 cases caused by strains targeted by the meningococcal C conjugate vaccine (Table 3).

Table 3 Number of meningococcal disease cases caused by vaccine-targeted strains, 2007-2011

Vaccine	Year					Total
	2007	2008	2009	2010	2011	
MeNZB™[1]	50	46	42	26	37	201
C conjugate[2]	9	12	29	22	32	103
Quadrivalent[3]	15	22	35	33	37	142

1 Targets the P1.4 PorA variable region, was part of the routine childhood immunisation schedule between 2004 and 2008.

2 Targets all group C strains, may be funded to control a community outbreak, otherwise not funded.

3 Targets all group A, C, Y and W135 strains. Polysaccharide quadrivalent vaccine is funded for adults and children pre- or post- splenectomy and may be funded to control a community outbreak. Conjugate quadrivalent vaccine is not currently licensed in New Zealand [3].

Source: Lopez L, et al. The epidemiology of meningococcal disease in New Zealand 2011, ESR

Meningococcal group B with P1.4 subtype was responsible for the long-lasting epidemic from 1991-2007 which peaked at over 600 cases in 2001,[3] and prompted mass vaccination in 2004-2008 with a specific MeNZ B vaccination. That specific subtype is still isolated from 26-46 cases per year (Table 3). Groups A and C have caused shorter epidemics in NZ.[3] Thirteen cases of invasive meningococcal disease from meningococcal C including three deaths in Northland in four months prompted a mass vaccination campaign in 2011.[13] A large group A outbreak occurred in Auckland in 1985-1986, and smaller group C outbreaks

have occurred in 1994, (Wellington and Taranaki), 2003 (Otago and the West Coast) and 2005 (Huntly), with vaccination provided in the group C outbreaks.

The highest incidence of meningococcal disease occurs in those aged under 1 year (38 per 100,000), 1-4 years (12.7 per 100,000), and those aged 15-19 (4.7 per 100,000). While Pacific peoples and Māori are disproportionately affected in the under 5 years, in 2011 all reports in the 15-19 age group were in European or other ethnicities (not Pacific peoples and Māori).

Rates of meningococcal disease vary internationally and over time. The current rate of invasive meningococcal disease in NZ is about double the rate in Australia, over double the European rate, and around 8 times the US rate.[22]

Meningococcal vaccination

Group C conjugate vaccines are routinely used in the UK and some other European countries, where they have proven very effective (see below). [4,23]

Quadrivalent meningococcal conjugate vaccination has been recommended in routine vaccinations at age 11 or 12 years in the US since 2005,[2] and are currently recommended routinely in early adolescents in Canada.[4] Since October 2010, a booster at age 16 years has been recommended by the Advisory Committee on Immunization Practices (ACIP) on the basis that the vaccine may not protect many adolescents for more than five years and a peak in disease is seen at 18 years. While herd immunity was seen in the UK with meningococcal C vaccination, it hasn't been seen in the US, probably owing to lower coverage. The quadrivalent Menactra brand (conjugated onto a diphtheria toxoid as the protein carrier) has been available in the US since 2005. Studies have suggested it is around 80-85% effective.[22,32]

For pharmacy in NZ we are proposing a single vaccination for high risk people, generally young adults entering into hostel-type accommodation.

Benefits of meningococcal vaccination

Meningococcal vaccination reduces morbidity and mortality from vaccine-targeted meningococcal strains which cause:

- Hospitalisations
- Deaths[4] (11% in 2011)[1]
- Permanent disability4
- Cost to the taxpayer through health system costs and reduced productivity

Benefits of meningococcal vaccination have been clearly demonstrated.[4,23] In particular, in Ireland, the UK, and the Netherlands, high reductions in group C disease (up to 98% reduction in targeted age groups) were achieved with meningococcal C vaccination,

[4] Deaths and permanent disability as a percentage of invasive illness cases for vaccine-targeted strains has not been divided out in ESR reports

following a recent increase in group C infection.[4,23] Although the vaccine is not 100% effective and wanes relatively quickly, ten years after routine vaccination in under 25 year olds started in the UK, group C disease has all but disappeared for all age groups showing a significant herd effect. Fifteen to 19 year olds had an incidence of around 110 cases in the Netherlands and 200 cases in the UK in a two year pre-vaccination period dropping to nearly zero about eight years after vaccination started (shown in figure 3 of McIntyre, *et al.*, 2012).[23] In Australia, increasing group C disease and clusters of disease prompted immunisation with group C vaccination in all children aged 12 months, and children up to 19 years, from 2003 to 2006.[22] Notified cases reduced from 225 in 2002 to 13 in 2009 (94%). For 15-19 year olds the rate dropped from 2.6 notifications per 100,000 to 0.2 per 100,000. Meningococcal group C vaccination in the US army removed an important cause of disease.[4]

We anticipate that most vaccinations through pharmacy will be incremental gains, e.g. people who never get around to booking in with their doctor, may not have a doctor, or who may be unaware of the importance of being vaccinated before entering university hostel accommodation or embarking on overseas travel where an outbreak has been notified. Most community pharmacies are open at least six days a week, and many are open extended hours. An appointment will often not be necessary. In Australia, time and inconvenience were cited by a quarter of adults under 65 years with chronic medical conditions who did not get an influenza vaccination.[33] Youth were difficult to target in the Northland meningococcal C vaccination in 2011 but accessible walk-in clinics and mobile clinics were added which helped their uptake, suggesting pharmacy would be an easier way of reaching these people. Pharmacies located within and near University Campuses would be likely to supply and promote this vaccination to the public. Awareness of the benefits of vaccination may be low in at-risk adolescents, and their parents who may influence the vaccination.[5] Pharmacy availability will increase this awareness, particularly during an epidemic.

US physician support of pharmacist-vaccinations

The American College of Physicians and American Society of Internal Medicine stated in 2002: [34]

> *"ACP-ASIM supports the use of the pharmacist as immunization information source, host of immunization sites and immunizer, as appropriate and allowed by state law. ACP-ASIM will work with pharmacy organizations to increase immunization awareness."*

No concerns about pharmacist-immunisation were outlined by these doctor groups who noted:

- The potential benefit of non-physician immunisation
- Pharmacists increase access to immunisation through extended opening hours and locations
- Benefits expected include decreased antibiotic resistance and increased adult immunisation

In the US, pharmacist-administered vaccinations also have the support of the Centers of Disease Control and Prevention (CDC).[7]

Working with the GP

Pharmacist-led meningococcal vaccination will be complementary to general practice, offering another option of administration and promoting the need for vaccination. With patient consent their GP is notified of the vaccination. As is usual in pharmacy, the pharmacist will refer patients onto their GP where they feel appropriate, and as identified through the history taking/consent process.

Pharmacist administration of meningococcal vaccinations in USA and Canada

Most States in the US allow pharmacists to administer meningococcal vaccinations, usually by protocol or on a prescription.[18] Canada varies by province in what pharmacists are able to administer. Meningococcal vaccinations are available through the pharmacist in at least some provinces. There is not a lot of specific information available about meningococcal vaccinations and pharmacy for either country.

Other international research and experience of pharmacist-administered vaccinations

In the US, pharmacists have administered vaccinations to adults since the 1990s, expanding to all states in 2009.[16] Pharmacists administer influenza vaccinations through a practice which has some similarities with standing orders or the UK's patient group directions. This has lead to 18% of influenza vaccinations in adults being given in the US through pharmacy, versus 40% through doctors and 17% at workplaces.[16] In Walgreens alone (a large community pharmacy chain), more than 4.5 million seasonal influenza vaccinations were pharmacist-administered in the 2009/2010 season, including 1.7 million in medically underserved areas.[6]

In June 2012, Centers for Disease Control and Prevention (CDC) in the US wrote to pharmacists to thank them for their *"tremendous efforts this past year to raise immunization rates in the United States."* CDC noted that *"Pharmacists and community vaccinators are uniquely positioned to promote and provide vaccines to people in a wide range of communities."*[7]

In New York, pharmacists have been used recently to manage the four-fold increase in influenza (partway through the season) over the whole of the previous 2011-2012 season.[35] The Governor of New York declared a disaster emergency in the state because of influenza, and temporarily authorised pharmacists (who were authorised to administer vaccinations) to immunise children down to the age of six months against seasonal influenza. He noted hardship including death, hospital overcrowding, shortage of healthcare workers and disruptions to businesses and critical infrastructure. Vaccination authority for pharmacists in New York normally starts at 18 years. An executive order was also signed post-Hurricane Sandy to get help from pharmacists, emergency medical technicians and dentists to ensure people were vaccinated against tetanus in case of exposure in post-storm clean-ups.[36]

Advocacy by GPs and practice nurses is an important motivator for people to have an influenza vaccination.[37] Pharmacist advocacy, even without vaccination administration, also significantly increases influenza vaccination rate in at-risk populations.[38-41] For example, in Japan pharmacist advocacy significantly increased vaccination rate in people over 65 years from 65% (controls) to 82% (intervention).[38] We anticipate that pharmacist encouragement of immunisation will assist in uptake by at-risk adolescents, as well as raise awareness of the importance of immunisation in general.

US studies have shown increased uptake of influenza vaccination and pneumococcal vaccination in states with community pharmacist-vaccination versus states without.[10,11,42] Pharmacist input in hospitals has also improved rates of vaccination. [43,44,45] In the UK when a Primary Care Trust in London allowed pharmacist-administered influenza vaccination, the vaccination rate in those over 65 years rose to 76% and in at risk under 65 years rose to 67% in 2008. The PCT reported that *"central to this success has been widening the range of venues where people can have the 'jab', including many pharmacies."*[46] Vaccinations by pharmacists have been well received by patients, e.g. in Portugal 99.5% satisfaction with immunisation provider, 98% with privacy, high satisfaction in Aberdeen.[9]

NZ government strategy

Administration of meningococcal vaccinations by approved pharmacists both provides public health benefits and potential benefits to the taxpayer as outlined above. It is also clearly in line with the government strategy of better, sooner, more convenient healthcare.

Population growth, an aging population and developments in health are increasing demand for health services in a constrained fiscal environment. These require better use of the existing health workforce, including extending existing roles,[47] and preventive care – keeping people out of hospital. Increasing the pool of vaccinators helps to meet the population needs now and in the future. Increasing the familiarity with meningococcal vaccine would provide benefits in an epidemic situation.

Community pharmacies are easily accessible to and used by most of the population, healthy and unwell, and all ages. Availability of meningococcal vaccination through trained pharmacists provides the community with another health professional group actively involved in immunisation and advocating for its use. US experience indicates pharmacists can provide advocacy and accessibility that increase vaccinations. Increased advocacy plus convenience/accessibility provide a strong reason to reclassify this medicine, to reduce the potentially devastating consequences of meningococcal disease.

2. Ease of self-diagnosis or diagnosis by a pharmacist for the condition indicated

The only pharmacists able to provide meningococcal vaccinations will have successfully completed a Ministry of Health approved vaccinator's course and clinical assessment and have met the requirements in standards set by the Ministry of Health (see Appendix 2). Establishing appropriate persons to vaccinate will be straight-forward for these trained pharmacists. The pre-vaccination checklist and consent form attached (Appendix 3) will be used by the pharmacist, recording each consultation. While created by Pharmacybrands,

these materials will available to any pharmacist vaccinator. Those fulfilling referral criteria would be referred to the GP, those answering no to all questions (except for the question on whether they have or are about to have close contact with infants which would require a "yes" answer) will be vaccinated if they consent.

3. Relevant comparative data for like compounds

Two vaccinations have been recommended by the MCC for availability through the pharmacist: Dukoral®, an oral vaccination for prevention of cholera and ETEC travellers' diarrhoea, and influenza vaccination. For the latter vaccination the pharmacist needs to have undergone appropriate training first, and the vaccination should only be provided to adults.

Pharmacists provide other preventive medicines, e.g. low dose aspirin for prevention of cardiovascular disease, folic acid for pregnancy, and insect repellents to travellers going to malarial areas.

4. Local data or special considerations relating to New Zealand

The above information on benefits provides local data and considerations for NZ. Meningococcal disease is a serious, tragic disease in young adults going to University hostels. It can be prevented with the administration of vaccines.

Meningococcal vaccine is generally unfunded in NZ in adults. For further information, see the Immunisation Handbook attached (Appendix 2).

Reminder: Please note that throughout this submission and in preparing the checklist and information sheet we have used information from IMAC, Ministry of Health and CDC rather than datasheets. This is because this area evolves quickly and information from these organisations is latest best practice.

5. Interactions with other medicines

Meningococcal vaccination is not a live vaccine, and therefore does not cause disease in people on immunosuppressants.[3] However, immunosuppression can affect response to vaccines, and therefore we recommend doctor referral.

Meningococcal vaccine should not be mixed with any other vaccinations. Pharmacists would not be mixing vaccinations.

Meningococcal vaccines can be given at the same time as other vaccines, preferably in a separate limb or at least 2.5cm apart.[28] CDC notes that "except for children with sickle cell disease or without a working spleen, meningococcal vaccines may be given at the same time as other vaccines." Such children would not be vaccinated in pharmacy.

However, the IMAC website advises that "Menactra® must be administered a minimum of 4 weeks after Prevenar 13® to ensure the best immune response to the pneumococcal vaccine."[48] We do not expect this would occur but have included it in the consent form.

6. Contraindications and precautions

The Immunisation Handbook (p302) reports that the only contraindication for menincogoccal group C conjugate vaccination is anaphylactic reaction to any of the vaccination components previously.[3]

CDC states:[49]

- *"Anyone who has had a severe (life-threatening) allergy to any vaccine component should not get the vaccine"*

Please see the Immunisation Handbook (Appendix 2) and attached CDC Vaccination Information Sheet (Appendix 4).

The datasheet for Menactra (quadrivalent meningococcal conjugate vaccine) lists the following contraindications:[50]

- Known hypersensitivity to any component including diphtheria toxoid. Life threatening reaction after previous administration of a vaccine containing similar components
- Known history of Guillain-Barré syndrome
- Known hypersensitivity to dry natural rubber latex
- In case of febrile or acute disease postpone vaccination

The datasheets for Meningitec (meningococcal group C conjugate vaccine) and Menjugate (also meningococcal group C conjugate vaccine) list the following contraindications:[51,52]

- Hypersensitivity to any component of the vaccine, including diphtheria toxoid
- Occurrence of significant neurological signs or symptoms, or an allergic or anaphylactoid/anaphylactic reaction following a prior dose of Meningitec/Menjugate
- Postpone administration in patients suffering severe febrile illness

Contraindications will be covered in the vaccination checklist (Appendix 3), and pharmacists will have received the comprehensive training and completed vaccinator requirements including first aid training to level 3. This training includes theory and practical training on topics such as cardio-pulmonary resuscitation (CPR), airway management, bag-mask, use of automatic external defibrillator, oxygen therapy and anaphylaxis management including emergency drugs. Please see Appendix 5 for further detail. Pharmacies offering the vaccinations will have a private area for consultation available and will have the necessary emergency equipment available (see Appendix 6), and the pharmacist-administered vaccination would be advised to the patient's GP as previously discussed if patient consent is received and of course this will be strongly advocated. Patients will wait within line of sight in the pharmacy for 20 minutes after being dosed. They will also be given details of a process to be followed should they become unwell post vaccination (Appendix 3).

CDC notes that meningococcal vaccines may be given to pregnant women (if clearly needed),[53] but reports that no data is available on the safety of quadrivalent meningococcal

conjugate vaccine (Menactra).[54] We consider there will usually be no need to vaccinate a pregnant woman and have listed it in the consent form for screening and referral to the GP or LMC. We do not expect that women who are pregnant will seek this vaccination. If a person is unknowingly pregnant at the time of dosing, there is unlikely to be a significant risk. According to CDC there is no evidence of a risk to the foetus from vaccinating pregnant women with inactivated virus or bacterial vaccines or toxoids.[54]

People with a bleeding disorder should have a deep subcutaneous injection rather than IM. This will be screened for and the patient referred to the doctor.

7. Possible resistance

Not applicable.

8. Adverse events - nature, frequency etc.

Adverse events in children aged 11-18 years with Menactra (quadrivalent conjugate vaccine) were as follows:[50]

- Injection site reactions (most rated grade 1, the lowest grade)
  - Pain 59%
  - Redness 11%
  - Swelling 11%
  - Induration 16%
- Systemic reactions
  - Fever 5%
  - Headache 36%
  - Fatigue 30%
  - Malaise 22%
  - Arthralgia 17%
  - Diarrhoea 12%
  - Anorexia 11%
  - Chills 7%
  - Vomiting 2%
  - Rash 2%

Anaphylaxis with meningococcal vaccination has been reported at less than one per million for the conjugate C vaccination and one per 500,000 vaccine doses for the conjugate quadrivalent vaccination.[4] For the period 1 Jan 2008 to 31 Dec 2012 no reports of anaphylaxis occurred with meningococcal vaccination according to SMARS (suspected medicine adverse reaction search).[55]

Syncope (fainting) can occur just before during or after vaccination primarily in females aged 11-18 years. Falls can cause secondary injuries. Many cases will occur within five minutes of the injection. Patients will be advised to sit during and after their vaccination. As a thorough history is taken pre vaccination if syncope has been an issue in the past, or the person seems particularly bothered about needles, this will be identified through this process.

After immunisation the healthcare consumer will be given an information sheet for managing adverse events (Appendix 3).

Guillain-Barré syndrome has been reported post-vaccination. The background incidence is about 1-2 cases per 100,000 people per year. CDC has investigated this syndrome in relationship with Menectra, noting that the number of cases reported within six weeks of getting the vaccination were similar to the expected background effect, but the timing of the onset of neurological symptoms is of concern. The Menactra datasheet reports research that showed *"no evidence of increased GBS risk associated with the use of Menactra vaccine."* [50] The authoritative text, Vaccines by Plotkin, *et al.,* (2012) reports that further studies *"do not support an increased risk of GBS from MCV4-DT*[5] *immunization".*

9. Potential for abuse or misuse.

There is no potential for abuse.

Misuse is unlikely. It would be highly unlikely that someone would get two meningococcal vaccines. A vaccination is usually reasonably memorable, so this seems highly unlikely. Pharmacists will notify doctors of administration of the vaccination (with consent of the healthcare consumer) which minimises this highly unlikely risk.

10. Further information

Cold Chain

Appropriate storage and handling of the meningococcal vaccinations are important for viability of the vaccination, currently 2-8° C. Pharmacy currently manages the supply of cold chain products and has efficient cold chain Standard Operating Procedures to manage this. The cold chain and potential resulting issues are covered within the vaccinator assessment of the pharmacist and outlined in the Immunisation Handbook. During assessment, cold chain SOP's are reviewed together with contingency plans in the event of a cold chain failure. Fridges are currently monitored within pharmacy and are also subject to the pharmacy Medsafe audit process. Pharmacists will be familiar with this also from supplying influenza vaccinations as well as from the multitude of current pharmaceuticals that are cold chain managed.

Compliance with standards

Pharmacists will comply with immunisation standards of the Ministry of Health, as described in Appendix 3 of the Immunisation Handbook 2011 (attached to this application as Appendix 2).

Vaccinator training

Vaccinator training through the Immunisation Advisory Centre is comprehensive and involves a choice of a two-day course or a flexible learning course requiring 12 hours self-guided study workbook and manual followed by a four hour face-to-face tutorial.[56] To become authorised the person must do the training, pass a supervised open book test, and

[5] MCV4-DT is the conjugate quadrivalent product using diphtheria as a carrier

be clinically assessed on a minimum of two vaccinations relevant to their clinical area. Updates for trained vaccinators can be either four hours face-to-face or conducted on-line.

WONS provides a two day vaccinator training course, an open book test, and clinical assessment (two vaccinations) with one-on-one mentoring before the clinical assessment for new vaccinators. Alternatively a one-day influenza only course and clinical assessment is offered.[57]

IM Injection

Pharmacists currently administering the influenza vaccination in most areas have been assessed administering this by intradermal injection with Intanza. However, recent minutes from the Ministry of Health meeting held December 2012 suggest assessors observe administration of two vaccines, one of which must be an IM vaccine. All vaccinators assessed before January 2013 have been trained in the delivery of IM vaccines during the vaccinators' course but must be reassessed administering an IM injection if they did not previously administer one during their initial assessment. In contrast, the meningococcal injection is administered by IM injection, preferably in the deltoid muscle in the upper arm. The National Training Manager of IMAC, has confirmed that pharmacists have been taught how to do this on the IMAC course, and does not believe any further training is required. This has been further confirmed in a conversation on the 15th of January 2013. The IMAC training and CPR training also ensures that for emergency procedures for vaccinations, vaccinators know how to give IM adrenaline. We would ask the Pharmacy Guild and the Pharmaceutical Society to include information about this requirement in communications about this reclassification, in addition to our communication to Pharmacybrands members. We will also ask Pharmacy Today to include it in their media article about the reclassification.

IM injection into the deltoid muscle in adults is reasonably straight-forward. Please see the video-clip at http://www.bccdc.ca/imm-vac/ForHealthProfessionals/ImmsCompetency.htm for further information.

Pharmacists will be well-informed by the Pharmacy Guild, the Pharmaceutical Society of NZ, Pharmacybrands and from news articles about a reclassification that will be published in Pharmacy Today, so chances of inadvertent administration by a pharmacist who is not accredited is highly unlikely. It is also important to note that ALL pharmacists once they pass assessment are requirement to inform the Pharmacy Defence Association to ensure that they have insurance coverage to provide vaccinations and have to advise the date of completion of their vaccination course.

Information for patients

We recommend that pharmacists give the Immunisation Advisory Centre Factsheet for parents and caregivers on meningococcal disease (see Appendix 7),[58] at time of considering having this immunisation.

Conjugate vaccinations versus polysaccharide vaccinations

Pharmacists would be administering conjugate vaccinations, either group C alone, or the quadrivalent conjugate vaccine that covers groups A, C, W135 and Y. We would anticipate that it would usually be the consumer's decision as to whether they wanted the group C or the quadrivalent conjugate vaccine, with information provided in the pharmacy (written and verbal) to assist their decision. While the majority of cases that vaccines would protect against are group C, some non-C cases of meningitis occur in NZ that the quadrivalent conjugate vaccine protects against (Table 3). The University of Auckland recommends the conjugate quadrivalent vaccine, Menactra, in people entering or living in hostel type accommodation as well as other risk groups (see Appendix 8).[31] Travel plans may also affect their decision.

Meningococcal vaccination began with polysaccharide vaccinations.[4] They do not induce T-cell-dependent immunity, causing low effectiveness in young children and short action. For group C polysaccharide vaccines, hyporesponsiveness occurs with booster doses (i.e. a booster dose is less effective than the original one at increasing antibodies). Nasal carriage still occurs with quadrivalent polysaccharide meningococcal vaccines.[4,26] Polysaccharide-protein conjugate group C vaccines have superceded the original polysaccharide group C vaccines, with higher antibody responses in infants and young children, higher antibody quality, higher antibody response to a booster dose. For children, adolescents and young adults, routine vaccinations where recommended are conjugate C (e.g. UK), or quadrivalent conjugate (e.g. US).

How long does protection last post-vaccination?

Protection wanes over time, and CDC recommends high–risk persons (such as travellers to countries in which *N. meningitidis* is hyperendemic or epidemic) be revaccinated every five years as long as their increased risk continues.[59]

How many injections?

In the population pharmacy would be vaccinating a single injection is sufficient. Other populations may require a primary series, e.g. people with HIV infection or asplenia.[59] These people will not be vaccinated in pharmacy.

Travel vaccination

The intention of this reclassification is to provide vaccinations to adolescents and young adults about to enter hostel accommodation, and to assist in mass vaccinations should they be required, and help in vaccinating close contacts of meningococcal disease if required. However, should a traveller going to a high risk meningitis area seek a meningococcal vaccination, pharmacists would be able to administer them with this vaccine if appropriate. Travellers may need other vaccinations as well. They will be advised both in the patient information and verbally (as per consent form, Appendix 3) that other travel vaccinations may be required, and to discuss this with an appropriate provider. The pharmacist vaccinator will have the CDC website link on the consent form for ready up-to-date access of

relevant travel information. The patient will be given a record of their vaccination to show other providers.