

Exemplar for Internal Achievement Standard Biology Level 2

This exemplar supports assessment against:

Achievement Standard 91154

Analyse the biological validity of information presented to the public

An annotated exemplar is an extract of student evidence, with a commentary, to explain key aspects of the standard. It assists teachers to make assessment judgements at the grade boundaries.

New Zealand Qualifications Authority

To support internal assessment from 2014

	Grade Boundary: Low Excellence
1.	<p>For Excellence, the student needs to comprehensively analyse the biological validity of information presented to the public.</p> <p>This involves giving reasons why or how:</p> <ul style="list-style-type: none"> • each biological feature is accurate or inaccurate, or contains bias • inaccuracies and/or bias may have consequences or impacts for the public • vested interest is conveyed in the information, and <ul style="list-style-type: none"> • prioritising, with reasons, aspects of the information in relation to their significance in the context • evaluating the overall impact of the article on the public, based on bias and the balance of accurate and inaccurate features. <p>This student gives reasons why biological features are accurate (1), and explains how vested interest is conveyed in the article (2). The purpose of the information, i.e. who produced it (3) and the intended audience (4), is identified. Aspects of the information in relation to their significance in the context of immunisation with Gardasil are prioritised, with reasons (5). Some evaluation is given of the overall impact of the article on the public, based on the balance of accurate features (6).</p> <p>For a more secure Excellence, the student could give a more thorough evaluation of the overall impact of the article on the public. For example, by considering in more detail the overall impact, including any bias or inaccurate features, of the government's offer of free immunisation to prevent the four HPV types on the family, community and country as a whole.</p>

Please note – This is an extract from a student’s response for one of three articles

The article is the Ministry of Health’s School consent form: *‘HPV Vaccine (Human Papillomavirus Vaccine) A vaccine to help prevent cervical cancer.’*

3 This article was written by the NZ Ministry of Health, the Government department responsible for improving, promoting and protecting the health of all New Zealanders.

The purpose of the article is to give sufficient information about the HPV virus to parents and year eight girls, in asking for their consent to immunise their child for free. While the consent form and other information are freely available to the general public, the intended audience is the year eight girls and their parents in New Zealand. 4

The information is mainly about the HPV virus and receiving the vaccine Gardasil. It explains the effectiveness of the immunisation and what else is needed after receiving the vaccination. It asks for consent whether or not to vaccinate the child.

One biological feature is, *“Cervical Cancer develops when HPV infections don't clear and cause abnormal cells to grow on the cervix. If these cells go undetected and untreated they can lead to cervical cancer.”* This is accurate, because when someone has sexual contact with someone who is a carrier of HPV, the HPV virus takes advantage of the ‘transformation zone’ in the cervix of the vagina where different types of cervical cells meet in a thin junction. Basal cells found close to the surface of the cervix are immature. The HPV virus invades these cells and reproduces within them. As the cells divide and mature into squamous cells, they rise to the surface and the infectious virus particles are released from the mature squamous cells, to then further invade more immature basal cells. If this process is allowed to continue over a long period of time, for example a decade, severe abnormalities can lead to cervical cancer. 1

1 During the process, the HPV virus goes through different stages. In mild abnormality, only a few cells are changed and sometimes clear up on their own. This can be checked in a regular Smear or Pap test. With a moderate abnormality, the affected cells are found throughout most of the surface lining on the cervix. This can also be picked up on regular Smear or Pap test and if caught early enough can be treated. With severe abnormality, cells progress to malignancy after the virus slips two key cancer causing genes into the DNA of the host. This is also picked up on a regular Smear or Pap test, but if not found early enough can cause death. 1

1 The consent form is making an accurate claim because they specifically state that, *“Cervical cancer develops when HPV infections don't clear.”* This true because only when the viral infection does not clear naturally is when it causes cervical cancer because of more abnormal cells forming, instead of just stating that you will get cervical cancer straight away after being exposed to the HPV virus. This would be making an inaccurate claim and providing false information to the public.

The consent form also states that, *“If these cells go undetected and untreated, they can lead to cervical cancer.”* This is accurate because you can prevent Cervical Cancer if you have regular Smear or Pap tests to make sure that there are no detected abnormalities, instead of stating, *“These cells will lead to Cervical Cancer.”* This would then be an inaccurate claim. 1

1 Another biological feature is, *“The vaccine causes the immune system to produce its own protection against four HPV types.”* This is accurate because the Gardasil vaccine is an

inactivated subunit vaccine. That means that it includes only the antigens that best stimulate the immune system. The antigen in the vaccine is the L1 major capsid protein of HPV, produced by using recombinant DNA technology. L1 proteins self-assemble into non-infectious, low risk units called virus-like particles (VLP). The antigens in the Gardasil vaccine stimulate the immune response to produce antibodies against it.

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The vested interest of this consent form is the government, through the Ministry of Health, to improve, promote and protect the health of all New Zealanders. They are offering the free vaccination because they want to help protect these girls from the four types of HPV infection that lead to most cervical cancers and genital warts. They are promoting this vaccination at a young age because they want to create community immunity to be able to protect most people from the HPV virus when they become sexually active.

The consent form it provides people with accurate information and easy to follow biology so that people understand both the risks and benefits of Gardasil. To prioritise aspects of the information of immunising year eight girls with Gardasil:

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Firstly, the information clearly explains, with reasons, why immunisation is important; that the HPV virus is a sexually transmitted virus and the consent is offering parents and their young daughters the option of free vaccination against it.

The information is important and could influence people's decisions of whether to let their child be vaccinated or not. This is because promoting Gardasil at a very young age may be thought of as unnecessary, especially as the exact period of protection is unknown. Parents of these year eight girls may want to immunise their daughters when they are older and more likely to be sexually active.

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Secondly, another aspect that could influence people's decisions on whether to vaccinate their child or not is how effective the immunisation is. The consent form says that the vaccine has been shown to be 95-100% effective in preventing infection from the four HPV types contained in the Gardasil vaccine. This information shows that the effectiveness of the vaccine is very high, and likely to influence parents to vaccinate their young daughters to make sure they are immunised before they become sexually active.

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These two aspects are the most important because you cannot catch the HPV virus until you are sexually active. The statistics matter on how effective the vaccine is because if the vaccine is not effective enough then why would you vaccinate yourself when the benefits do not outweigh the risks?

The overall impact of this consent form on parents and their year eight daughters is likely to be positive, based on the balance of the accuracy of biological features given in the information. The Ministry of Health is offering a free immunisation to prevent four HPV types in order to help prevent cervical cancer, genital cancers and genital warts. The impact on the individual is that if they become immunised with Gardasil, they will be immune for a substantial period of time which will benefit them and their future partners, and prevent cancers that may cause death.

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	Grade Boundary: High Merit
2.	<p>For Merit, the student needs to analyse in-depth the biological validity of information presented to the public.</p> <p>This involves giving reasons why or how:</p> <ul style="list-style-type: none">• each biological feature is accurate or inaccurate, or contains bias• inaccuracies and/or bias may have consequences or impacts for the public• vested interest is conveyed in the information. <p>This student gives reasons why biological features are accurate (1), and explains how vested interest is conveyed in the article (2). The purpose of the information, i.e. who produced it (3) and the intended audience (4), is identified. Some aspects of the information are prioritised in relation to their significance, in the context of immunisation with Gardasil (5).</p> <p>To reach Excellence, the student could provide more thorough reasons why the two aspects of the information in the article are important, and evaluate the overall impact of the article on the public, based on the balance of accurate, biased or inaccurate biological features.</p>

Please note – This is an extract from a student’s response for one of three articles

The article is the Ministry of Health’s School consent form: *‘HPV Vaccine (Human Papillomavirus Vaccine) A vaccine to help prevent cervical cancer.’*

3 This article was written by the NZ Ministry of Health, the Government department responsible for improving, promoting and protecting the health of all New Zealanders.

The purpose of the article is to give sufficient information about the HPV virus to parents and year eight girls, in asking for their consent to immunise their child for free. While the consent form and other information are freely available to the general public, the intended audience is the year eight girls and their parents in New Zealand. 4

The information is mainly about the HPV virus and receiving the vaccine Gardasil. It explains the effectiveness of the immunisation and what else is needed after receiving the vaccination. It asks for consent whether or not to vaccinate the child.

One biological feature is, *“Cervical Cancer develops when HPV infections don't clear and cause abnormal cells to grow on the cervix. If these cells go undetected and untreated they can lead to cervical cancer.”* This is accurate, because when someone has sexual contact with someone who is a carrier of HPV, the HPV virus takes advantage of the 'transformation zone' in the cervix of the vagina where different types of cervical cells meet in a thin junction. Basal cells found close to the surface of the cervix are immature. The HPV virus invades these cells and reproduces within them. As the cells divide and mature into squamous cells, they rise to the surface and the infectious virus particles are released from the mature squamous cells, to then further invade more immature basal cells. If this process is allowed to continue over a long period of time, for example a decade, severe abnormalities can lead to cervical cancer. 1

1 During the process, the HPV virus goes through different stages. In mild abnormality, only a few cells are changed and sometimes clear up on their own. This can be checked in a regular Smear or Pap test. With a moderate abnormality, the affected cells are found throughout most of the surface lining on the cervix. This can also be picked up on regular Smear or Pap test and if caught early enough can be treated. With severe abnormality, cells progress to malignancy after the virus slips two key cancer causing genes into the DNA of the host. This is also picked up on a regular Smear or Pap test, but if not found early enough can cause death. 1

1 The consent form is making an accurate claim because they specifically state that, *“Cervical cancer develops when HPV infections don't clear.”* This true because only when the viral infection does not clear naturally is when it causes cervical cancer because of more abnormal cells forming, instead of just stating that you will get cervical cancer straight away after being exposed to the HPV virus. This would be making an inaccurate claim and providing false information to the public.

The consent form also states that, *“If these cells go undetected and untreated, they can lead to cervical cancer.”* This is accurate because you can prevent Cervical Cancer if you have regular Smear or Pap tests to make sure that there are no detected abnormalities, instead of stating, *“These cells will lead to Cervical Cancer.”* This would then be an inaccurate claim. 1

1 Another biological feature is, *“The vaccine causes the immune system to produce its own protection against four HPV types.”* This is accurate because the Gardasil vaccine is an

inactivated subunit vaccine. That means that it includes only the antigens that best stimulate the immune system. The antigen in the vaccine is the L1 major capsid protein of HPV, produced by using recombinant DNA technology. L1 proteins self-assemble into non-infectious, low risk units called virus-like particles (VLP). The antigens in the Gardasil vaccine stimulate the immune response to produce antibodies against it. They attach to a specific antigen to let T lymphocytes or T cells destroy the antigen.

1

Some people cannot become immune because of vaccine failures or they are immunocompromised. These people remain vulnerable to the virus if they are sexually active and rely on community immunity. When community immunity occurs, it reduces the risk of HPV infection because a critical portion of the community is immunised against a contagious infection, like HPV. Most members of the community are protected against the infection because there is little opportunity for an outbreak.

2

The vested interest of this consent form is the government, through the Ministry of Health, to improve, promote and protect the health of all New Zealanders. They are offering the free vaccination because they want to help protect these girls from the four types of HPV infection that lead to most cervical cancers and genital warts. They are promoting this vaccination at a young age because they want to create community immunity to be able to protect most people from the HPV virus when they become sexually active.

The most important information in the article:

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1. The article explains why immunisation is important and the consent is offering parents and their young girls the option of free vaccination against it. The information is important and could influence people's decisions of whether to let their child be vaccinated or not.

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2. Secondly, could influence people's decisions on whether to vaccinate their child or not by how effective the immunisation is. The consent form says that the vaccine has been shown to be 95-100% effective in preventing infection from the four HPV types contained in the Gardasil vaccine.

These are both important because you cannot catch the HPV virus until you are sexually active.

	Grade Boundary: Low Merit
3.	<p>For Merit, the student needs to analyse in-depth the biological validity of information presented to the public.</p> <p>This involves giving reasons why or how:</p> <ul style="list-style-type: none">• each biological feature is accurate or inaccurate, or contains bias• inaccuracies and/or bias may have consequences or impacts for the public• vested interest is conveyed in the information. <p>This student gives some brief reasons why biological features are accurate (1), and some explanation of how vested interest is conveyed in the article (2). The purpose of the information, i.e. who produced it (3) and the intended audience (4), is identified.</p> <p>For a more secure Merit, the student could give a more in-depth explanation of why or how each biological feature is accurate, and the vested interest conveyed in the consent form. For example, by explaining in more detail why it is an advantage to the Ministry of Health, related to the individual and community, for year eight girls to become immunised with Gardasil at an early age.</p>

Please note – This is an extract from a student’s response for one of three articles

The article is the Ministry of Health’s School consent form: *‘HPV Vaccine (Human Papillomavirus Vaccine) A vaccine to help prevent cervical cancer.’*

3

This article was written by the NZ Ministry of Health.

The purpose is to give information about the HPV virus to parents and year eight girls, to ask for their consent to immunise their child for free. The form and other information are available to the general public; however, the intended audience is the year 8 girls and their parents in New Zealand. The information is about the HPV virus and receiving the vaccine Gardasil.

4

One biological feature is, *“Cervical Cancer develops when HPV infections don't clear and cause abnormal cells to grow on the cervix. If these cells go undetected and untreated they can lead to cervical cancer.”*

1

This is accurate, because when someone has sexual contact with someone who is a carrier of HPV, the virus invades cells in the cervix of the vagina and reproduces within them. As the cells divide and mature, they rise to the surface and the virus particles are released to then further invade more immature cells. If this process is allowed to continue over a long period of time, for example a decade, severe abnormalities can lead to cervical cancer.

1

The HPV virus goes through different stages. In mild abnormality, only a few cells are changed and sometimes clear up on their own. This can be checked in a regular Smear or Pap test. With a moderate abnormality, the affected cells are found throughout most of the surface lining on the cervix. This can also be picked up on regular Smear or Pap test and if caught early enough can be treated. With severe abnormality, cells progress to malignancy after the virus slips two key cancer causing genes into the DNA of the host.

Another biological feature is, *“The vaccine causes the immune system to produce its own protection against four HPV types.”*

This is accurate because the Gardasil vaccine is an inactivated vaccine. That means that it includes only the antigens that stimulate the immune system. The antigen in the vaccine is the protein of HPV, produced by using recombinant DNA technology. The proteins change into low risk virus-like particles. The antigens in the Gardasil vaccine stimulate the immune response to produce antibodies against it. Antibodies are proteins produced by the body’s immune system when it detects harmful substances. They attach to a specific antigen to let T lymphocytes or T cells destroy the antigen.

1

Some people cannot become immune because of vaccine failures or they are immunocompromised.

These people remain vulnerable to the virus if they are sexually active and rely on community immunity. When community immunity occurs, it reduces the risk of HPV infection because a critical portion of the community is immunised against a contagious infection, like HPV. Most members of the community are protected against the infection because there is little opportunity for an outbreak.

2

The vested interest of this form is the government, through the Ministry of Health, to improve, promote and protect the health of all New Zealanders.

They are offering the free vaccination because they want to help protect these young girls from the four types of HPV infection that could lead to most cervical cancers and genital

warts in the future. They are promoting this vaccination because they want to protect people from the HPV virus when they become sexually active.

To increase the Ministry of Health's success to accomplish healthy communities would be to make the vaccine available to more than one year level at school in case children were not vaccinated when they were in year 8. They could make it available to both year 8 and 9 and maybe even year 10 to help increase the success of the community.

	Grade Boundary: High Achieved
4.	<p>For Achieved, the student needs to analyse the biological validity of information presented to the public.</p> <p>This involves:</p> <ul style="list-style-type: none">• recognising and describing biological features in the information and identifying them as accurate, inaccurate or biased using biological knowledge• identifying the purpose of the information (e.g. who produced it and the intended audience). <p>Recognising inaccuracies may be demonstrated by making corrections to inaccurate biological features.</p> <p>This student recognises and describes biological features that are accurate (1) using biological knowledge and vested interest conveyed in the article (2). The purpose of the information is identified, i.e. who produced it (3) and the intended audience (4).</p> <p>To reach Merit, the student could develop the analysis further by giving reasons why or how each biological feature is accurate, and how vested interest is conveyed in the information. For example, by elaborating on why it is an advantage to the Ministry of Health for year eight girls to become immunised with Gardasil at an early age.</p>

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The article is the Ministry of Health’s School consent form: *‘HPV Vaccine (Human Papillomavirus Vaccine) A vaccine to help prevent cervical cancer.’*

3 This article was written by the NZ Ministry of Health.

The purpose is to give information about the HPV virus to parents of year eight girls, to ask for their consent to immunise their child for free. The form and other information are available to the general public; however, the intended audience is the year eight girls and their parents in New Zealand. The information is about the HPV virus and receiving the vaccine Gardasil.

4

One biological feature is, *“Cervical Cancer develops when HPV infections don't clear and cause abnormal cells to grow on the cervix. If these cells go undetected and untreated they can lead to cervical cancer.”*

1

This is accurate, because when someone has sexual contact with someone who is a carrier of HPV, the virus invades cells in the cervix of the vagina and reproduces within them. If this process is allowed to continue over a long period of time, this can lead to cervical cancer. The cells are found near the surface of the cervix. As they mature the virus escapes.

1 The HPV virus goes through different stages. Sometimes, only a few cells are changed and sometimes they clear up on their own. This can be checked in a regular Smear or Pap test.

When it is severely abnormal and not checked up on early enough, then this can cause death.

Another biological feature is, *“The vaccine causes the immune system to produce its own protection against four HPV types.”*

1

This is accurate because the Gardasil vaccine is a weakened vaccine. The antigen in the vaccine is the protein of HPV, produced by using DNA technology. The proteins change into low risk virus-like particles. That means that it has antigens in it that stimulate the immune system to produce antibodies against it. Antibodies are proteins produced by the body’s immune system. They attach to an antigen to let special cells destroy the antigen. This also happens when we get sick, like a cold and the flu.

There are some people that cannot become immune because of vaccine failures. These people are not safe to the virus if they are sexually active. They rely on community immunity to reduce the risk of HPV infection

2 The vested interest of this consent form is the Ministry of Health, as they want to to improve, promote and protect the health of all New Zealanders.

They are offering the free vaccination because they want to help protect these young girls from any type of HPV infection that may lead to most cervical cancers and genital warts.

From the articles I read there are two sides to the story when using Gardasil. The ones that present the true facts are the best, even when they talk about side effects. Sometimes the information is too hard for people to understand because of the science information in them. The best ones use diagrams to show how the vaccine works.

The consent form is very technical in parts and the parents would need to read up on more sides of the issue to be well informed. If the article had invalid information this may mislead readers into making life changing decisions which they may regret.

I think the Ministry of Health should make the vaccine available to more than one year level at school in case children were not vaccinated when they were in year 8. If they made it available to both year 8 and 9 and maybe even year 10 it would be safer for the community.

	Grade Boundary: Low Achieved
5.	<p>For Achieved, the student needs to analyse the biological validity of information presented to the public.</p> <p>This involves:</p> <ul style="list-style-type: none">• recognising and describing biological features in the information and identifying them as accurate, inaccurate or biased using biological knowledge• identifying the purpose of the information (e.g. who produced it and the intended audience). <p>Recognising inaccuracies may be demonstrated by making corrections to inaccurate biological features.</p> <p>This student recognises and describes biological features that are accurate (1) using some biological knowledge and the vested interest conveyed in the article (2). The purpose of the information, i.e. who produced it (3) and the intended audience (4), is identified.</p> <p>For a more secure Achieved, the student could further develop the analysis by describing the biological features identified in the information as accurate, using relevant biological knowledge more fully.</p>

Please note – This is an extract from a student’s response for one of three articles

The article is the Ministry of Health’s School consent form: *‘HPV Vaccine (Human Papillomavirus Vaccine) A vaccine to help prevent cervical cancer.’*

3

This article was written by the NZ Ministry of Health.

The reason is because it is free, and has a lot of information about the HPV virus for parents and year eight girl. It is to ask for their consent to immunise their child for free. The form and lots of other information are available to the general public. The target audience is the year eight girls and their parents in New Zealand. The information is about the HPV virus and getting the vaccine Gardasil.

4

One biological feature is, *“Cervical Cancer develops when HPV infections don't clear and cause abnormal cells to grow on the cervix. If these cells go undetected and untreated they can lead to cervical cancer.”*

1

This is accurate, because when someone has sexual contact with someone who is a carrier of HPV, the virus gets into the cells in the cervix of the vagina and reproduces. If this process is allowed to continue over a long period of time, this can lead to cervical cancer and other problems.

1

The HPV virus goes through different stages. The article shows this in a diagram. Sometimes, only a few cells are changed and sometimes they clear up on their own. This can be checked in a regular Smear or Pap test. When it is really bad and not checked up on early enough, then the person can die.

1

Another biological feature is, *“The vaccine causes the immune system to produce its own protection against four HPV types.”*

This is accurate because Gardasil is a weakened vaccine. The antigen in the vaccine is the protein of HPV, produced by using DNA technology. The proteins change into low risk virus-like particles. That means that it has antigens in it that stimulate the immune system to produce antibodies against it. This is how it works.

2

The vested interest of this form is the Ministry of Health. Their plan is to improve and protect the health of all New Zealanders, and save us money.

They are giving the free vaccination because they want to help protect these young girls from any form of HPV infection that lead to most cervical cancers and genital warts.

From the articles I read there are two sides to the story when using Gardasil. The ones that present the true facts are the best, even when they talk about side effects. Sometimes the information is too hard for people to understand because of the science information in them. The best ones use diagrams to show how the vaccine works.

The consent form is very technical in parts and the parents would need to read up on more sides of the issue to be well informed.

I think the Ministry of Health should make the vaccine available to more than one year level at school in case children were not vaccinated when they were in year 8. If they made it available to both year 8 and 9 and maybe even year 10 it would be safer for the community.

	Grade Boundary: High Not Achieved
6.	<p>For Achieved, the student needs to analyse the biological validity of information presented to the public.</p> <p>This involves:</p> <ul style="list-style-type: none">• recognising and describing biological features in the information and identifying them as accurate, inaccurate or biased using biological knowledge• identifying the purpose of the information (e.g. who produced it and the intended audience). <p>Recognising inaccuracies may be demonstrated by making corrections to inaccurate biological features.</p> <p>This student recognises and describes biological features that are accurate (1) using limited biological knowledge and a vested interest conveyed in the article (2). While it is identified who produced the article (3), the identification of the 'general public' as the intended audience (4) is not clear.</p> <p>To reach Achieved, the student could identify the intended audience more clearly, and describe the biological features in the information as accurate by using relevant biological knowledge more fully.</p>

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The article is the Ministry of Health’s School consent form: *‘HPV Vaccine (Human Papillomavirus Vaccine) A vaccine to help prevent cervical cancer.’*

3 This article was written by the NZ Ministry of Health.

The purpose is to give information about the HPV virus to the general public. The information is about the HPV virus and receiving the vaccine Gardasil.

4

One biology feature is, *“Cervical Cancer develops when HPV infections don't clear and cause abnormal cells to grow on the cervix.”*

1

This is true, because when someone has sex with someone who has the HPV, the virus gets into the reproductive system. If this process is allowed to continue over a long period of time, this can lead to a cancer in the cervix etc.

1 The HPV virus goes through different stages. Sometimes, only a few cells are changed and sometimes they clear up on their own. This can be checked in a regular Smear or Pap test.

Another biological feature is, *“The vaccine causes the immune system to produce its own protection against four HPV types.”*

1

This is also true because the Gardasil vaccine is a weakened vaccine. The antigen in the vaccine is the protein of HPV. These proteins change into low risk virus-like particles. That means that it has antigens in it that causes the immune system to make antibodies.

2 The vested interest of this form is the Ministry of Health. Because it is free, they want to help protect these girls from getting an HPV infection that could lead to cancers.

There are two sides to every story when using Gardasil. Articles that show the true facts are the best, even when they talk about side effects.

Sometimes the information is too hard for people to understand because of the science words. The best ones have simple diagrams to show how the vaccine works.

The consent form is very complicated in parts and the parents would need to read up on more sides of the issue before making any decisions.

I think the Ministry of Health should make the vaccine available to more than one year level at school just in case children were not vaccinated when they were in year 8. If they made it available to both year 8 and 9 and maybe even year 10 it would be much safer for everyone.