



## Immunization At A Glance

Last Updated: February 2016

### Highlights

- Immunization coverage rates for diphtheria in both 7 and 17-year-olds in Durham Region are consistently higher than in Ontario but remain below the target coverage rate of 99%.
- Immunization coverage rates for pertussis in 7-year-olds in Durham Region are consistently higher than Ontario and are within or above the target coverage range of 85-95%. Rates in 17-year-olds in Durham Region are consistently higher than Ontario but remain below the target coverage range.
- Immunization coverage rates for tetanus in both 7 and 17-year-olds in Durham Region are consistently higher than in Ontario but remain below the target coverage rate of 99%.
- Immunization coverage rates for polio in both 7 and 17-year-olds in Durham Region are consistently higher than in Ontario but remain below the target coverage rate of 99%.
- Immunization coverage rates for measles in both 7 and 17-year-olds in Durham Region are consistently higher than in Ontario but remain below the target coverage rate of 99%.
- Immunization coverage rates for mumps in both 7 and 17-year-olds in Durham Region are consistently higher than in Ontario. Rates among 7-year-olds remain slightly below the target coverage rate of 99% but rates among 17-year-olds have met the target since 2011-12.
- Immunization coverage rates for rubella in both 7 and 17-year-olds in Durham Region are slightly higher than in Ontario and have met or exceeded the target coverage rate of 97% in most years.
- Immunization coverage rates for hepatitis B in 12-year-olds in Durham Region are similar to rates in Ontario but remain below the target coverage rate of 95%.
- Immunization coverage rates for HPV in 13-year-old females are higher in Durham Region than Ontario most years and exceeded the target coverage rate of 90% in 2013-14 but dropped below the target again in 2014-15.
- Immunization coverage rates for meningococcal disease in 12-year-olds in Durham Region are consistently higher than Ontario and have met or exceeded the target coverage rate of 90% since 2007-08.
- Religious/conscientious exemption rates for most vaccines have increased slightly in Durham Region in the past few years but overall remain low.

## Introduction

Ontario's Immunization of School Pupils Act [1] (ISPA) requires that students between ages 4 and 17 years attending school in Ontario provide proof of immunization against 9 infectious diseases (diphtheria, tetanus, pertussis (whooping cough), poliomyelitis, measles, mumps, rubella, meningococcal disease, and varicella (chicken pox)). Children who are not up to date on their immunizations (i.e. who have not received the recommended number of doses for their age according to the Ontario Immunization Schedule [2]) may not be allowed to attend school. Exemptions may be granted for medical reasons or conscience or religious beliefs. Similarly, the Child Care and Early Years Act [3] requires that children attending daycares in Ontario provide proof of immunization against the same 9 infectious diseases. Parents or guardians are required to report their child's immunizations to their local public health unit and the Durham Region Health Department enters these records into Panorama or, prior to 2016, into the Immunization Records Information System (IRIS).

This report provides estimates of immunization coverage for ISPA diseases along with select non-ISPA diseases including those covered under school-based immunization programs. A student is considered complete-for-age if the requisite number of doses of a vaccine for age has been received with the appropriate interval between doses [4]. Immunization coverage may be underestimated if students have been immunized but the information has not been provided to the Public Health Unit, for children under the age of seven and for individuals who do not attend school or who are home-schooled.

This report includes indicators with relevance to public health programming and/or referenced in the Ontario Public Health Standards (OPHS) [5] and provincial immunization coverage reports [4]. The current OPHS were published in 2008 by the Ministry of Health and Long-Term Care under the authority of Section 7 of the Health Protection and Promotion Act [6]. Charts and tables are provided for the following indicators for Durham Region and Ontario:

- Immunization Coverage:
  - Diphtheria in 7 and 17-year-olds
  - Pertussis in 7 and 17-year-olds
  - *Haemophilus Influenzae* Type B in 7 and 17-year-olds
  - Tetanus in 7 and 17-year-olds
  - Polio in 7 and 17-year-olds
  - Measles in 7 and 17-year-olds
  - Mumps in 7 and 17-year-olds
  - Rubella in 7 and 17-year-olds
  - Hepatitis B in 12-year-olds
  - Human papillomavirus in 13-year-old females
  - Meningococcal disease in 12-year-olds
- Religious/Conscientious Exemptions
  - Diphtheria in 7-year-olds
  - Pertussis in 7-year-olds

- Tetanus in 7-year-olds
- Polio in 7-year-olds
- Measles in 7-year-olds
- Mumps in 7-year-olds
- Rubella in 7-year-olds

For more detailed, topic specific reports that include immunization or vaccine preventable disease data please go to the [Health Statistics in Durham Region webpage](http://durham.ca/healthstats) found at [durham.ca/healthstats](http://durham.ca/healthstats).

Information available in alternate formats.

## **Definitions**

### **Definition: Immunization Coverage**

Immunization coverage refers to the proportion of a specific population that is appropriately immunized for a specific vaccine-preventable disease (VPD).

### **Definition: Religious/Conscientious Exemption**

A “statement of conscience or religious belief” means a statement by affidavit in the prescribed form by a parent of the person named in the statement that immunization conflicts with the sincerely held convictions of the parent based on the parent’s religion or conscience [1].

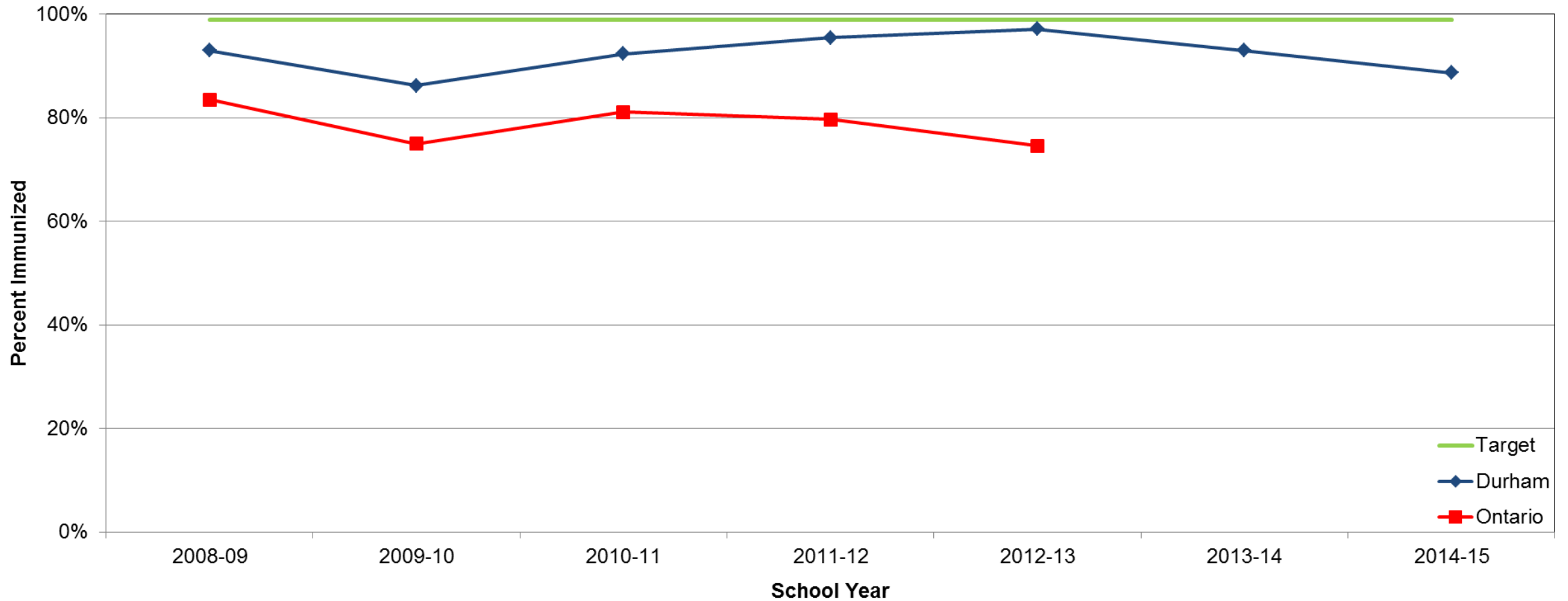
### **Definition: Medical Exemption**

A “statement of medical exemption” means a statement in the prescribed form signed by a physician or registered nurse in the extended class stating that the prescribed program of immunization in relation to a designated disease or designated diseases, (a) may be detrimental to the health of the person named in the statement, or (b) is unnecessary in respect of the person named in the statement by reason of past infection or laboratory evidence of immunity [1].

## Diphtheria

Diphtheria is a vaccine preventable disease caused by bacteria [7]. The bacteria produce a toxin (poison) that is carried in the blood stream. This serious infection which often involves the nose, throat, and much less frequently the skin, may cause serious complications such as heart, breathing, nerve and kidney problems. Diphtheria is best prevented by vaccination. According to Ontario's Immunization schedule it is typically provided to infants in a combined vaccine which also protects against pertussis, tetanus, polio and *Haemophilus influenza B*, then as a booster at 4-6 years combined with tetanus, pertussis and polio, as a booster at 14-16 years combined with tetanus and pertussis and every ten years as an adult in combination with tetanus [2]. Diphtheria is a designated disease under Ontario's Immunization of School Pupils Act [1].

**Figure 1: Percentage of Children (7 years) Immunized for Diphtheria, Durham Region and Ontario, 2008-09 to 2014-15 School Year**

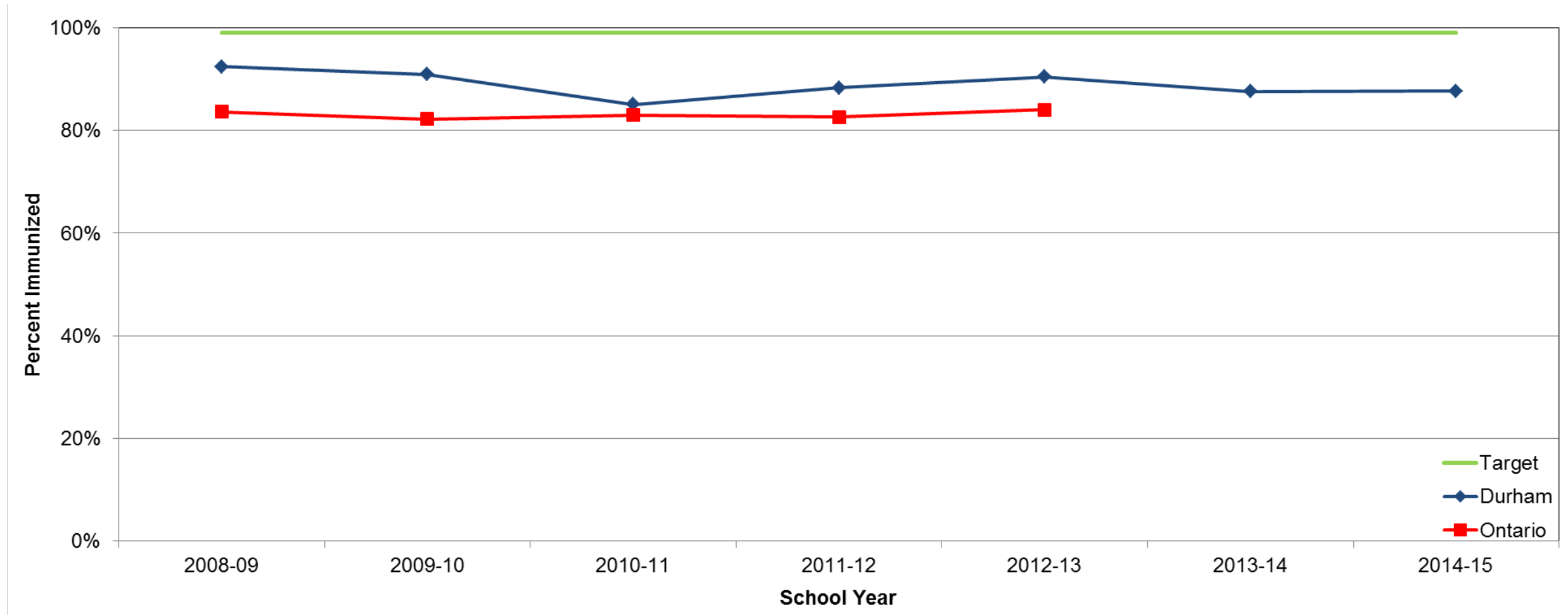


School Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	93.0%	86.3%	92.4%	95.5%	97.1%	93.0%	88.7%
Ontario	83.5%	75.0%	81.1%	79.7%	74.6%	No data	No data

Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Immunization coverage rates for diphtheria in 7-year-olds increased between 2009-10 and 2012-13 in Durham Region but decreased between 2012-13 and 2014-15. A similar decrease occurred in Ontario between 2010-11 and 2012-13. Rates are consistently higher in Durham Region than Ontario but still remain below the target coverage rate of 99% [7].

**Figure 2: Percentage of Children (17 years) Immunized for Diphtheria, Durham Region and Ontario, 2008-09 to 2014-15 School Year**

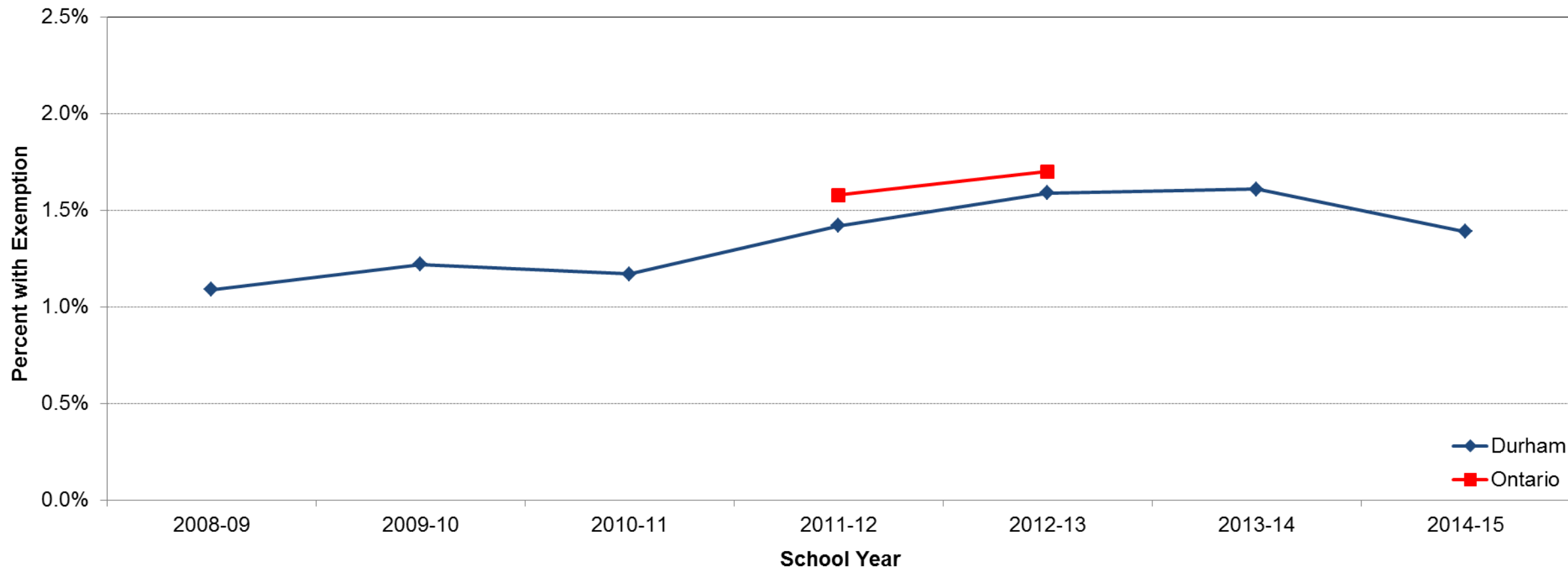


School Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	92.4%	90.9%	85.0%	88.3%	90.5%	87.6%	87.7%
Ontario	83.6%	82.2%	83.0%	82.6%	84.0%	No data	No data

Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Immunization coverage rates for diphtheria in 17-year-olds have remained fairly stable in Durham Region and Ontario since 2008-09 with a slight decline overall in Durham Region. Rates are consistently higher in Durham Region than Ontario but still remain below the target coverage rate of 99% [7].

**Figure 3: Percentage of Children (7 years) with Religious/Conscientious Exemption for Diphtheria-Containing Vaccine, Durham Region and Ontario, 2008-09 to 2014-15 School Year**



School Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	1.1%	1.2%	1.2%	1.4%	1.6%	1.6%	1.4%
Ontario	No data	No data	No data	1.6%	1.7%	No data	No data

Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

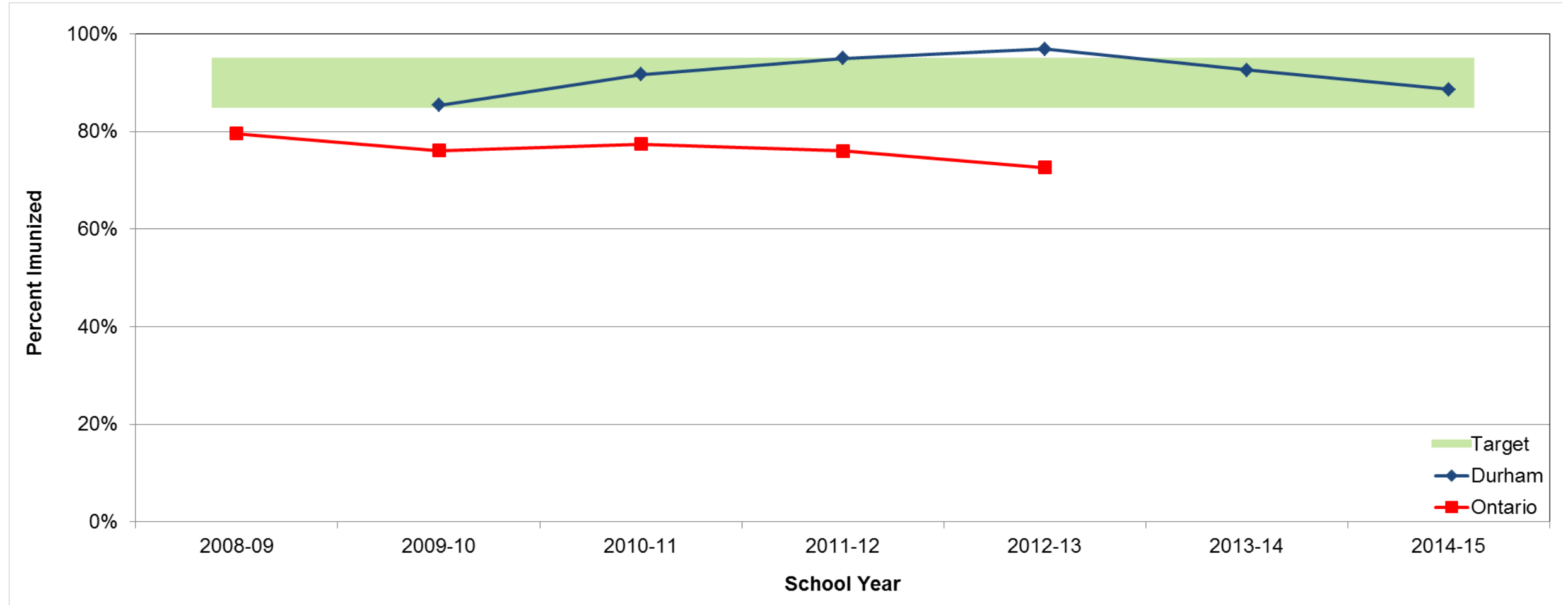
Religious/conscientious exemption rates for diphtheria-containing vaccine in 7-year-olds increased slightly in Durham Region between 2010-11 and 2012-13 but decreased again in 2014-15 and overall remain low. Although exemption rates for Ontario are only available for 2011-12 and 2012-13, they were higher than Durham rates for those years. Medical exemption rates for diphtheria-containing vaccine in 7-year-olds (not shown) are consistently lower than religious/conscientious exemption rates (less than 0.1%).



## **Pertussis**

Pertussis, commonly known as whooping cough, is an infection caused by bacteria [8]. Pertussis is most severe when it occurs in the first 6 months of life and can lead to serious complications. Pertussis typically starts like a cold with a runny nose, sneezing and coughing but the cough gradually gets worse within 1-2 weeks with episodes of repeated violent coughing. These coughing “fits” may be followed by vomiting, an inhaled breath or the characteristic “whoop,” or breathing may stop (apnea). Pertussis is best prevented by vaccination. According to Ontario’s Immunization schedule it is typically provided to infants in a combined vaccine which also protects against diphtheria, tetanus, polio and *Haemophilus influenza B*, then as a booster at 4-6 years combined with tetanus, diphtheria and polio, and as a booster at 14-16 years combined with tetanus and diphtheria [2]. Pertussis is a designated disease under Ontario's Immunization of School Pupils Act [1].

**Figure 4: Percentage of Children (7 years) Immunized for Pertussis, Durham Region and Ontario, 2008-09 to 2014-15 School Year**

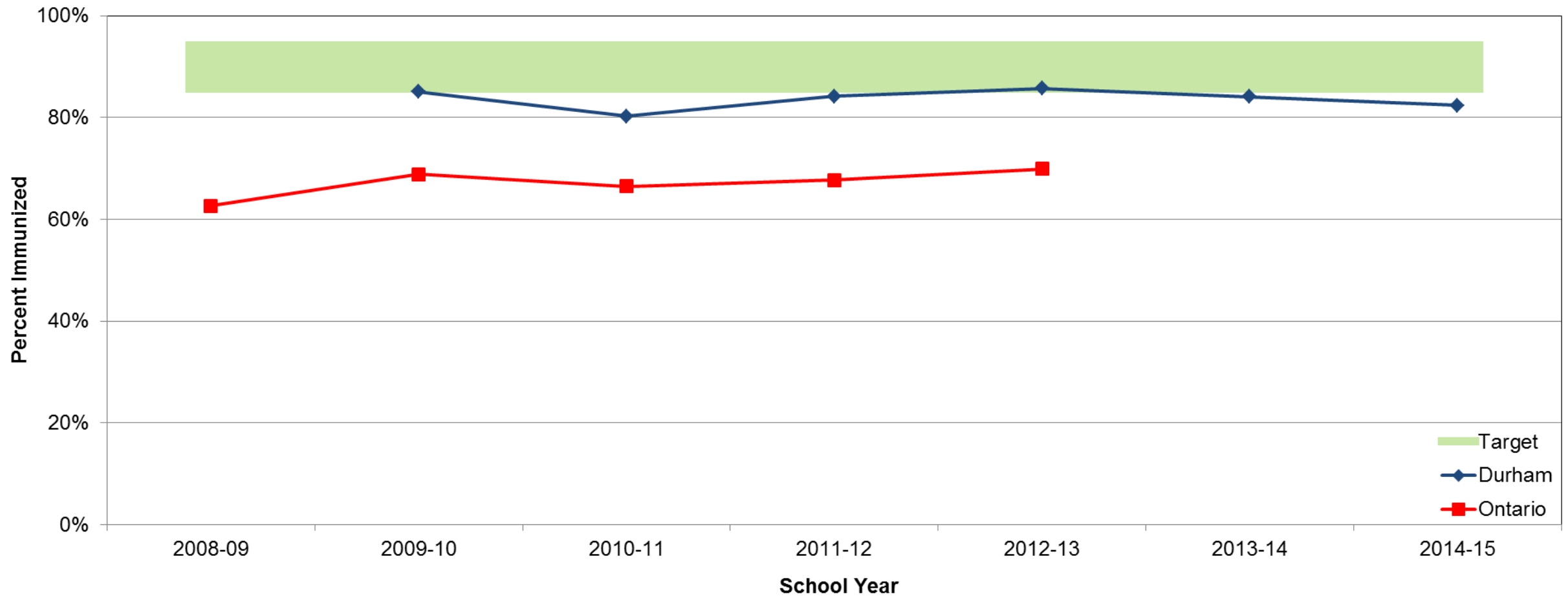


School Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	No data	85.4%	91.7%	95.0%	96.9%	92.6%	88.6%
Ontario	79.6%	76.1%	77.4%	76.0%	72.6%	No data	No data

Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Immunization coverage rates for pertussis in 7-year-olds increased between 2009-10 and 2012-13 in Durham Region but decreased between 2012-13 and 2014-15. A similar decrease occurred in Ontario between 2008-09 and 2012-13. Rates are consistently higher in Durham Region than Ontario and are within or above the target coverage range of 85-95% [7].

**Figure 5: Percentage of Children (17 years) Immunized for Pertussis, Durham Region and Ontario, 2008-09 to 2014-15 School Year**

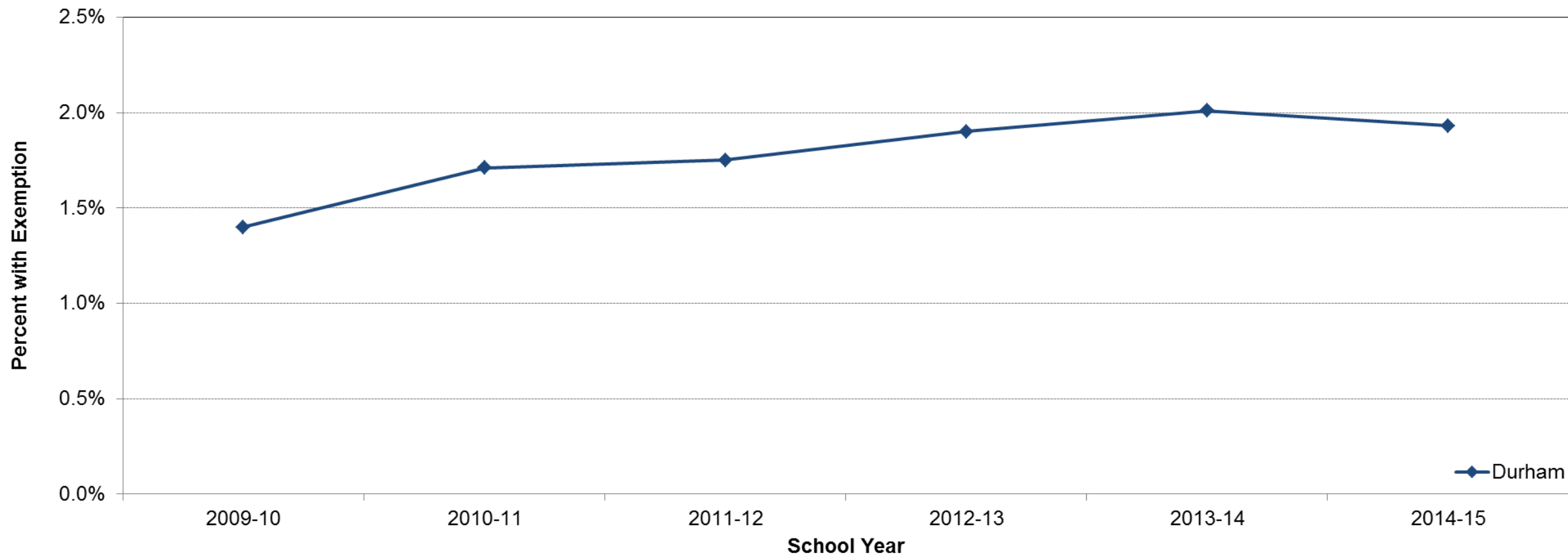


School Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	No data	85.1%	80.3%	84.2%	85.7%	84.1%	82.4%
Ontario	62.7%	68.9%	66.5%	67.7%	69.9%	No data	No data

Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Immunization coverage rates for pertussis in 17-year-olds increased between 2010-11 and 2012-13 in Durham Region and Ontario but decreased in Durham Region between 2012-13 and 2014-15. Rates are consistently higher in Durham Region than Ontario but remain below the target coverage range of 85-95% [7].

**Figure 6: Percentage of Children (7 years) with Religious/Conscientious Exemption for Pertussis-Containing Vaccine, Durham Region, 2008-09 to 2014-15 School Year**



School Year	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	1.4%	1.7%	1.8%	1.9%	2.0%	1.9%
Ontario	No data	No data	No data	No data	No data	No data

Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

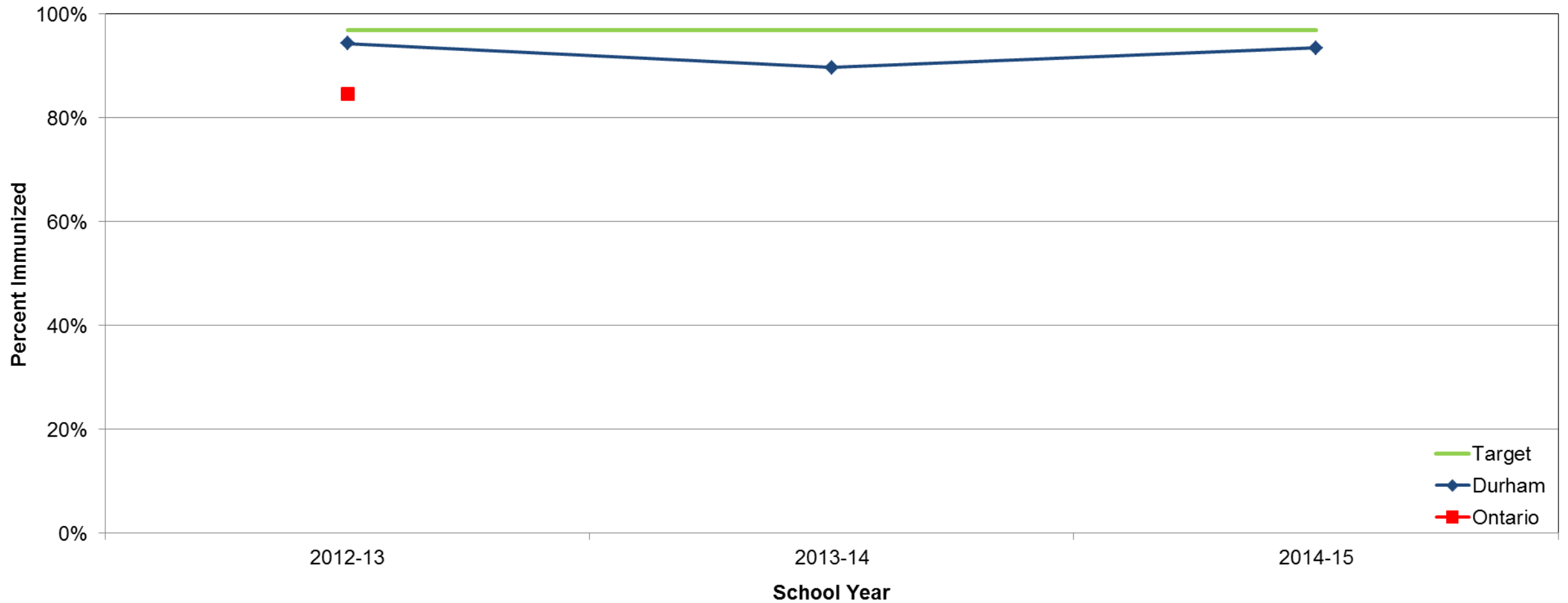
Religious/conscientious exemption rates for pertussis-containing vaccine in 7-year-olds increased slightly in Durham Region between 2009-10 and 2013-14, remained relatively stable in 2014-15 and overall remain low. Exemption rates for pertussis-containing vaccine for Ontario are not available. Medical exemption rates for pertussis-containing vaccine in 7-year-olds (not shown) are consistently lower than religious/conscientious exemption rates (less than 0.1%).

## ***Haemophilus Influenzae* Type B (Hib)**

*Haemophilus influenzae* type b (*Haemophilus b* or Hib) is a bacteria that can cause meningitis and other infections [9]. Symptoms can range from mild cold-like symptoms to severe invasive infections. Although less common, severe infections can result in meningitis, inflammation of the membranes of the brain and spinal cord, which results in fever, headache, stiff neck and change in consciousness or behaviour; or epiglottitis, an infection of the flap of skin at the back of the throat, which can result in sore throat and difficulty breathing that progresses rapidly. Hib infection is best prevented by vaccination. According to Ontario's Immunization schedule it is typically provided to infants in a combined vaccine which also protects against diphtheria, pertussis, tetanus, and polio [2]. Hib infection is not a designated disease under Ontario's Immunization of School Pupils Act [1].

This report provides immunization coverage estimates for Hib among 4-year-old students. This change was adopted to address significant limitations in the ability to use IRIS forecasting logic to assess coverage for this disease as children who are older than 59 months are assessed as complete-for-age, regardless of immunization history [7].

**Figure 7: Percentage of Children (4 years) Immunized for *Haemophilus Influenzae* Type B (Hib), Durham Region and Ontario, 2012-13 to 2014-15 School Year**



School Year	2012-13	2013-14	2014-15
Durham	94.4%	89.7%	93.5%
Ontario	84.6%	No data	No data

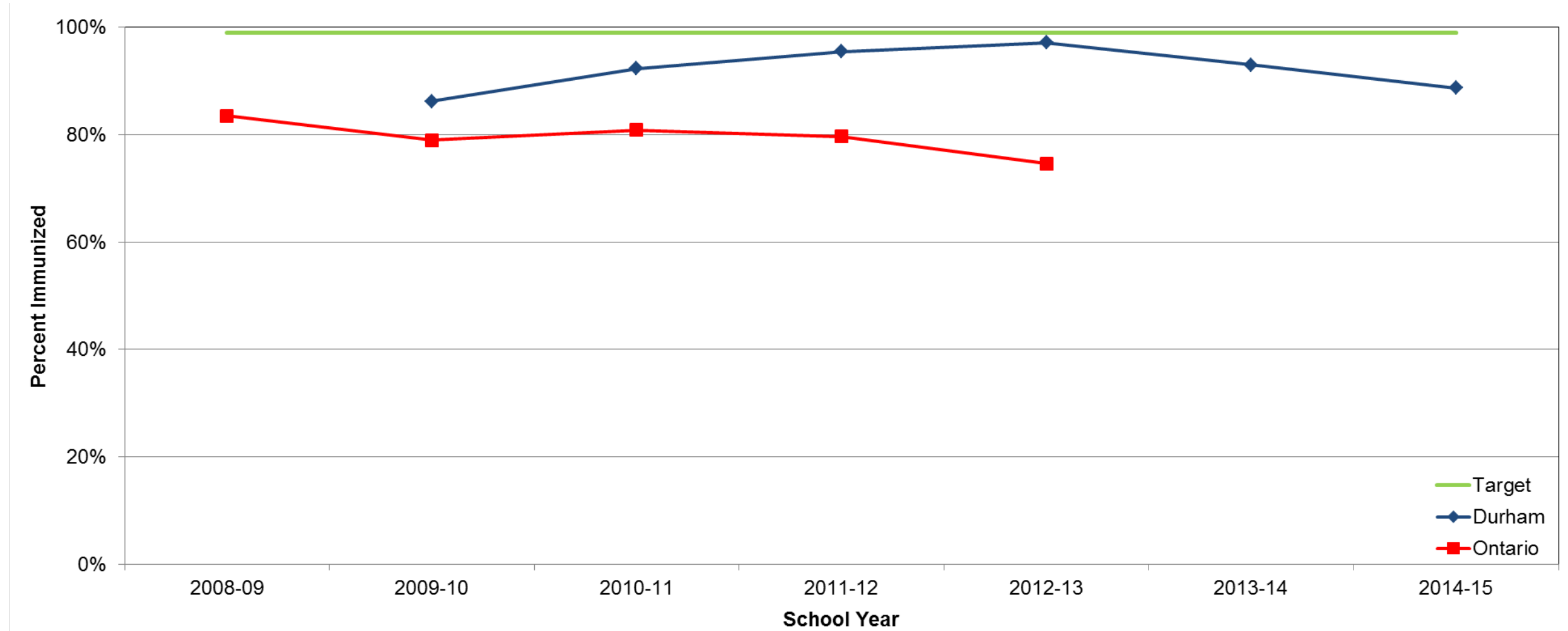
Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Immunization coverage rates for *Haemophilus Influenzae* Type B in 4-year-olds remained relatively stable between 2012-13 and 2014-15 in Durham Region. The rate was higher in Durham Region than Ontario in 2012-13, the only year that Ontario data was available, but rates were consistently below the target coverage rate of 97% [7].

## Tetanus

Tetanus, commonly known as lockjaw, is a serious, sometimes fatal disease of the nervous system caused by bacteria [10]. When the bacteria enter the body, a toxin is made that affects the nerves that control muscle activity. The bacteria usually enter the body through the skin after an injury such as a puncture, cut or bite that is contaminated with soil, feces or saliva. One of the first symptoms of tetanus is painful muscle spasms of the jaw and neck. This makes it hard to open the mouth, hence the name lockjaw. Tetanus is best prevented by vaccination. According to Ontario's Immunization schedule it is typically provided to infants in a combined vaccine which also protects against diphtheria, pertussis, polio and *Haemophilus influenza B*, then as a booster at 4-6 years combined with diphtheria, pertussis and polio, as a booster at 14-16 years combined with diphtheria and pertussis and every ten years as an adult in combination with diphtheria [2]. Tetanus is a designated disease under Ontario's Immunization of School Pupils Act [1].

**Figure 8: Percentage of Children (7 years) Immunized for Tetanus, Durham Region and Ontario, 2008-09 to 2014-15 School Year**



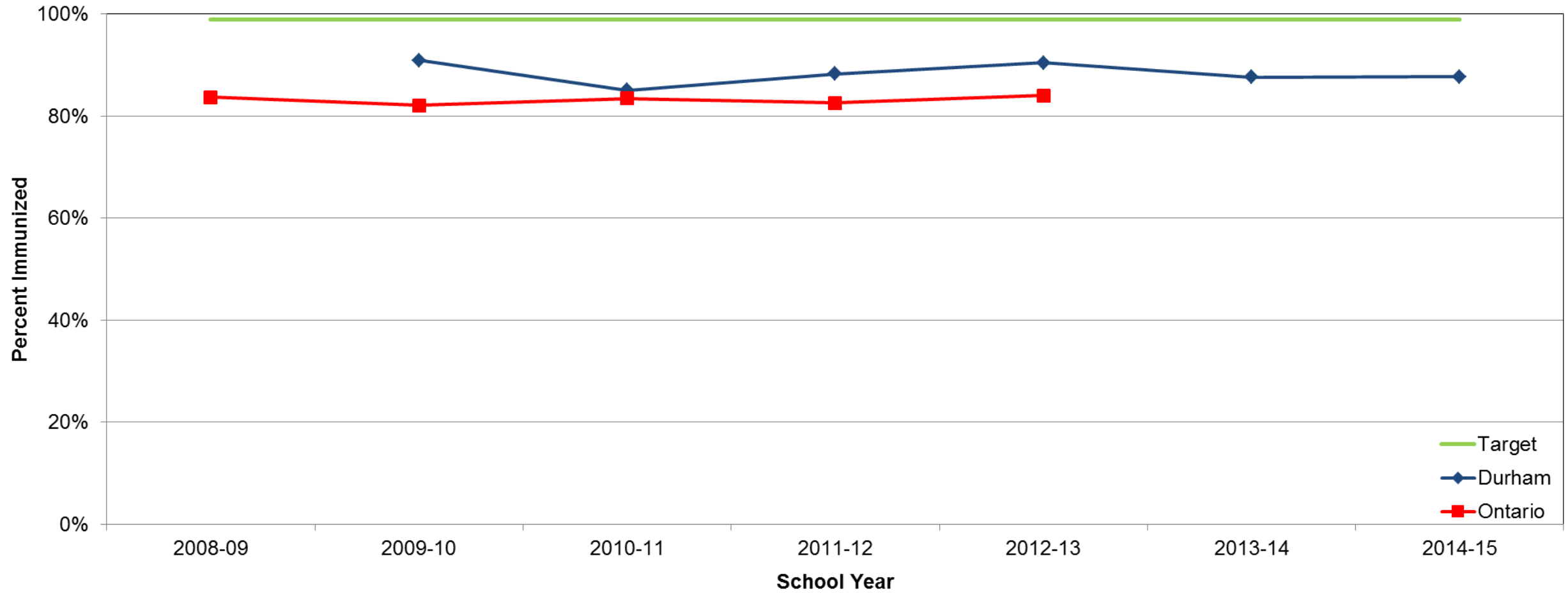
School Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	No data	86.2%	92.4%	95.5%	97.1%	93.0%	88.7%
Ontario	83.5%	79.0%	80.9%	79.7%	74.6%	No data	No data

Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Immunization coverage rates for tetanus in 7-year-olds increased between 2009-10 and 2012-13 in Durham Region but decreased between 2012-13 and 2014-15. A similar decrease occurred in Ontario between 2008-09 and 2012-13. Rates are consistently higher in Durham Region than Ontario but are below the target coverage rate of 99% [7].



**Figure 9: Percentage of Children (17 years) Immunized for Tetanus, Durham Region and Ontario, 2008-09 to 2014-15 School Year**

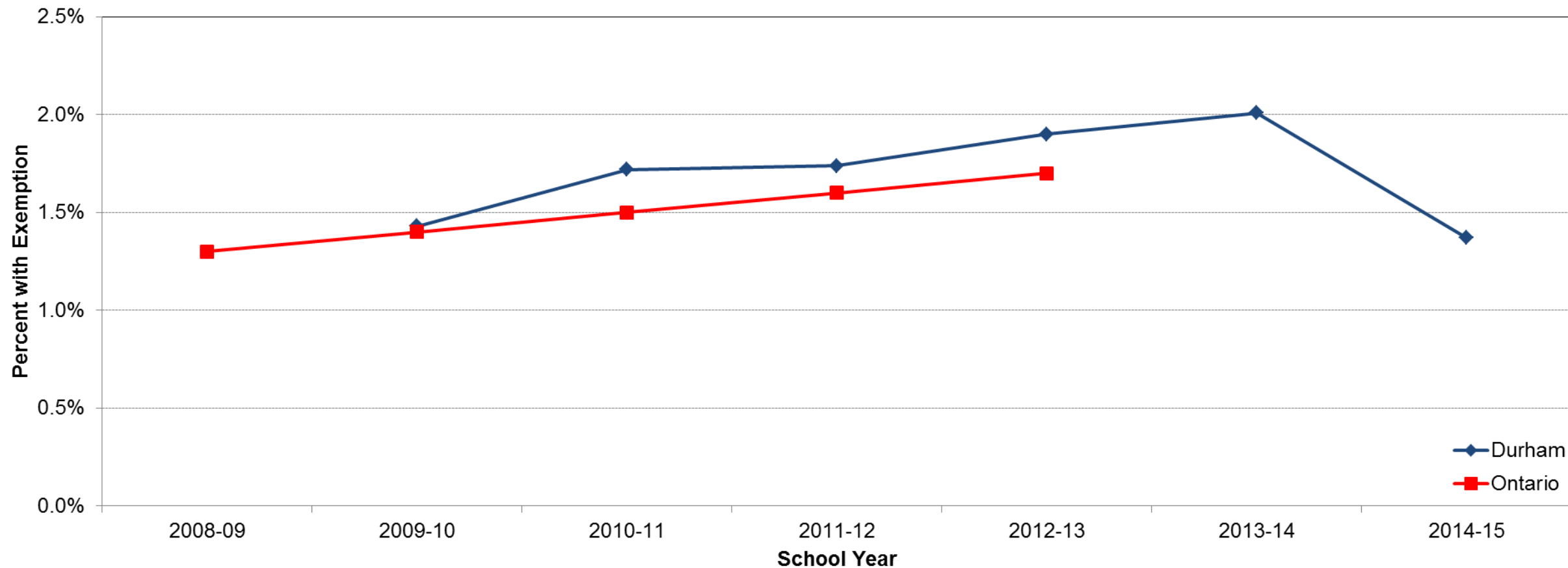


School Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	No data	90.9%	85.1%	88.3%	90.4%	87.7%	87.7%
Ontario	83.7%	82.1%	83.5%	82.6%	84.0%	No data	No data

Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Immunization coverage rates for tetanus in 17-year-olds have remained fairly stable in Durham Region and Ontario since 2008-09 with a slight decline overall in Durham Region. Rates are consistently higher in Durham Region than Ontario but still remain below the target coverage rate of 99% [7].

**Figure 10: Percentage of Children (7 years) with Religious/Conscientious Exemption for Tetanus-Containing Vaccine, Durham Region and Ontario, 2008-09 to 2014-15 School Year**



School Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	No data	1.4%	1.7%	1.7%	1.9%	2.0%	1.4%
Ontario	1.3%	1.4%	1.5%	1.6%	1.7%	No data	No data

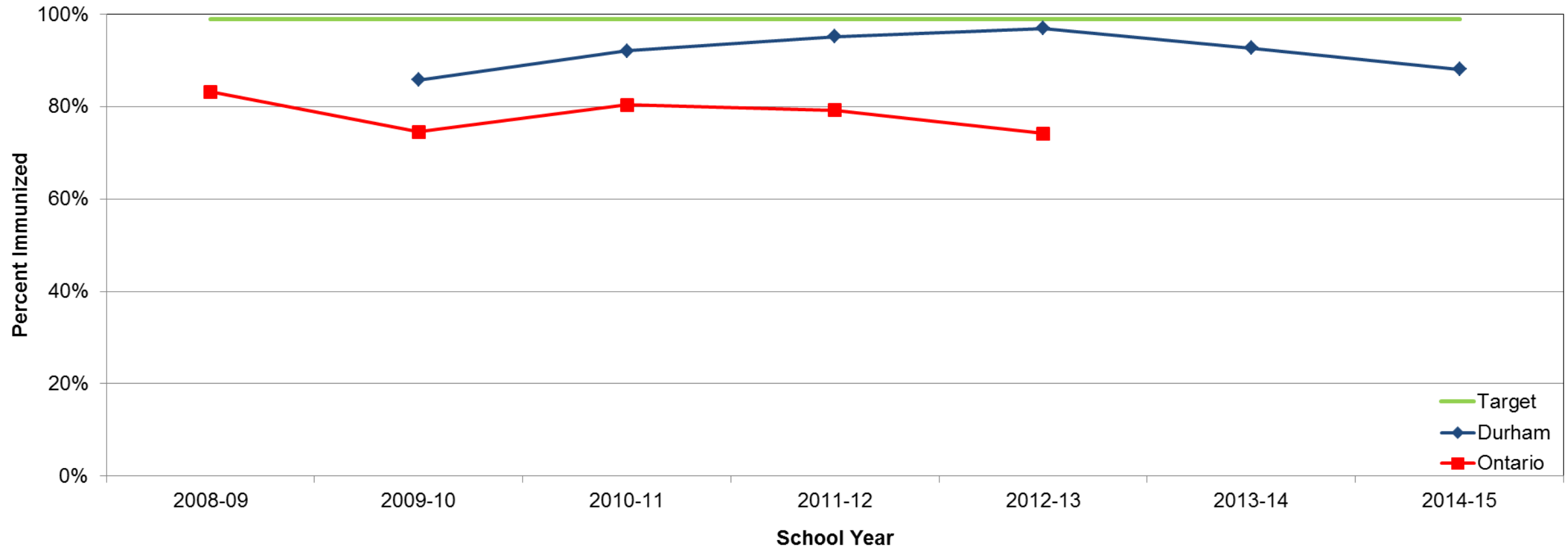
Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Religious/conscientious exemption rates for tetanus-containing vaccine in 7-year-olds increased slightly in Durham Region and Ontario between 2008-09 and 2013-14 but decreased again in 2014-15 in Durham Region and overall remain low. Exemption rates for Ontario were lower than Durham Region exemption rates most years. Medical exemption rates for tetanus-containing vaccine in 7-year-olds (not shown) are consistently lower than religious/conscientious exemption rates (less than 0.1%).

## Polio

Polio (short for poliomyelitis) is caused by a virus that attacks the nervous system and can destroy the nerve cells in muscles leading to permanent paralysis of the muscles used for breathing, eating and walking [11]. Canada was declared polio-free in 1994, and Ontario has had no cases of polio since that time. However, polio does continue to exist in some developing countries such as Africa and Asia. Polio is best prevented by vaccination. According to Ontario's Immunization schedule it is typically provided to infants in a combined vaccine which also protects against diphtheria, pertussis, tetanus and *Haemophilus influenza B*, then as a booster at 4-6 years combined with diphtheria, pertussis and tetanus [2]. Polio is a designated disease under Ontario's Immunization of School Pupils Act [1].

**Figure 11: Percentage of Children (7 years) Immunized for Polio, Durham Region and Ontario, 2008-09 to 2014-15 School Year**

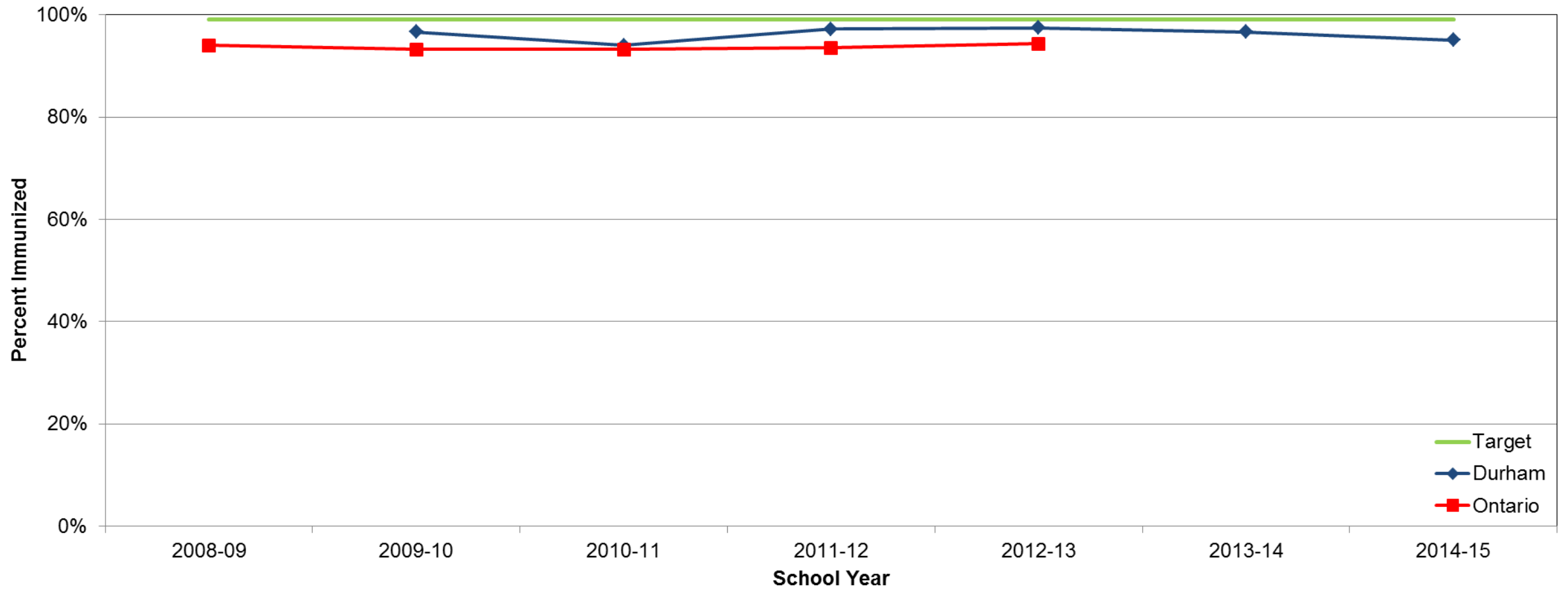


School Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	No data	85.8%	92.1%	95.2%	97.0%	92.7%	88.1%
Ontario	83.2%	74.5%	80.4%	79.2%	74.2%	No data	No data

Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Immunization coverage rates for polio in 7-year-olds increased between 2009-10 and 2012-13 in Durham Region but decreased between 2012-13 and 2014-15. A similar decrease occurred in Ontario between 2008-09 and 2012-13. Rates are consistently higher in Durham Region than Ontario but are below the target coverage rate of 99% [7].

**Figure 12: Percentage of Children (17 years) Immunized for Polio, Durham Region and Ontario, 2008-09 to 2014-15 School Year**

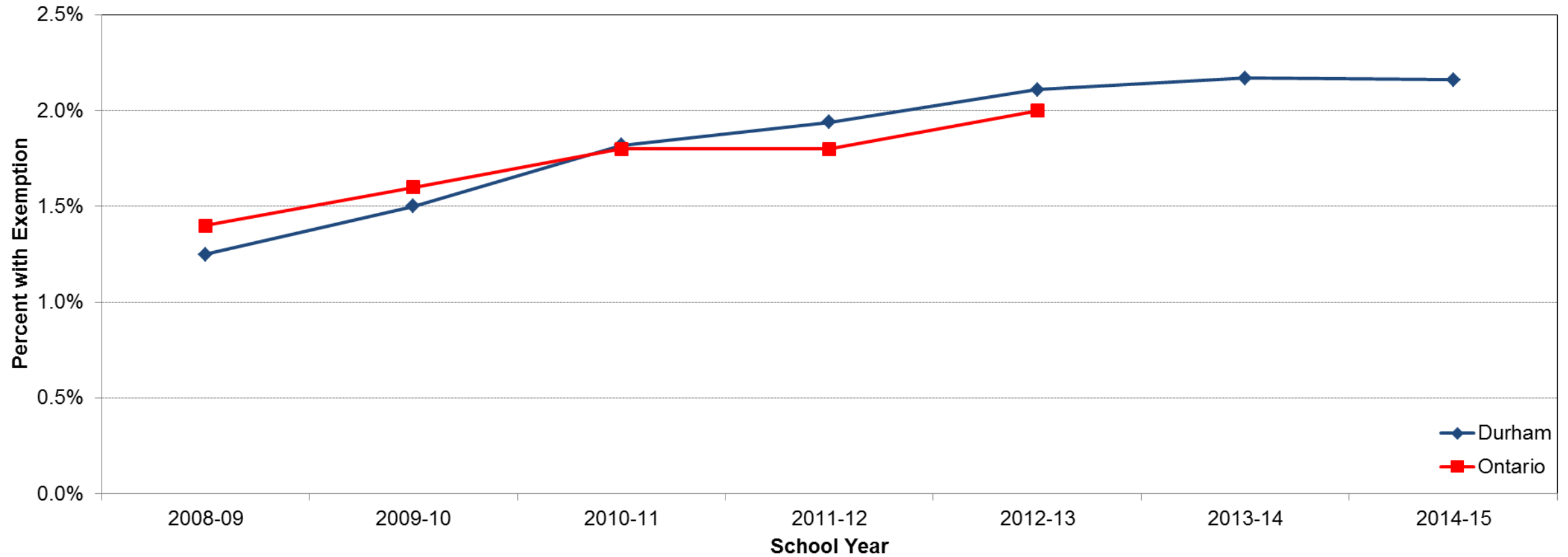


School Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	No data	96.6%	94.0%	97.2%	97.5%	96.7%	95.1%
Ontario	94.0%	93.2%	93.2%	93.5%	94.3%	No data	No data

Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Immunization coverage rates for polio in 17-year-olds have remained fairly stable in Durham Region and Ontario since 2008-09. Rates are consistently slightly higher in Durham Region than Ontario but still remain below the target coverage rate of 99% [7].

**Figure 13: Percentage of Children (7 years) with Religious/Conscientious Exemption for Polio-Containing Vaccine, Durham Region and Ontario, 2008-09 to 2014-15 School Year**



School Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	1.3%	1.5%	1.8%	1.9%	2.1%	2.2%	2.2%
Ontario	1.4%	1.6%	1.8%	1.8%	2.0%	No data	No data

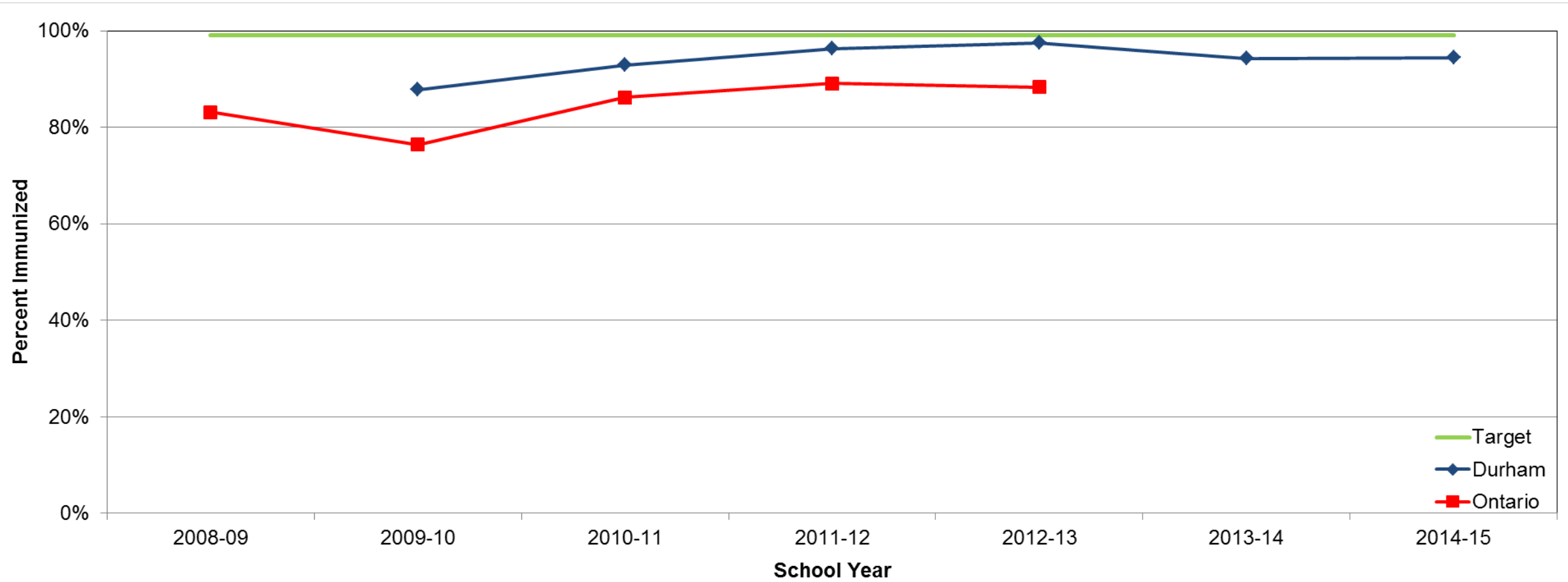
Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Religious/conscientious exemption rates for polio-containing vaccine in 7-year-olds increased slightly in Durham Region and Ontario between 2008-09 and 2012-13, remained relatively stable between 2012-13 and 2014-15 in Durham Region and overall remain low. Exemption rates for Ontario are similar to Durham Region exemption rates. Medical exemption rates for polio-containing vaccine in 7-year-olds (not shown) are consistently lower than religious/conscientious exemption rates (less than 0.5%).

## **Measles**

Measles is a highly contagious disease caused by a virus [12]. Symptoms of measles include, fever, runny nose, cough, drowsiness, irritability, soreness and redness of the eyes, and small white spots in the mouth. A red blotchy rash appears on the third to seventh day, beginning on the face and spreading down the body. Complications of measles can include diarrhea, pneumonia, hearing loss or inflammation of the brain. Measles is best prevented by vaccination. According to Ontario's Immunization schedule it is typically provided to infants at 12 months in a combined vaccine which also protects against mumps and rubella, then as a booster at 4-6 years combined with mumps, rubella and varicella [2]. Measles is a designated disease under Ontario's Immunization of School Pupils Act [1].

**Figure 14: Percentage of Children (7 years) Immunized for Measles, Durham Region and Ontario, 2008-09 to 2014-15 School Year**



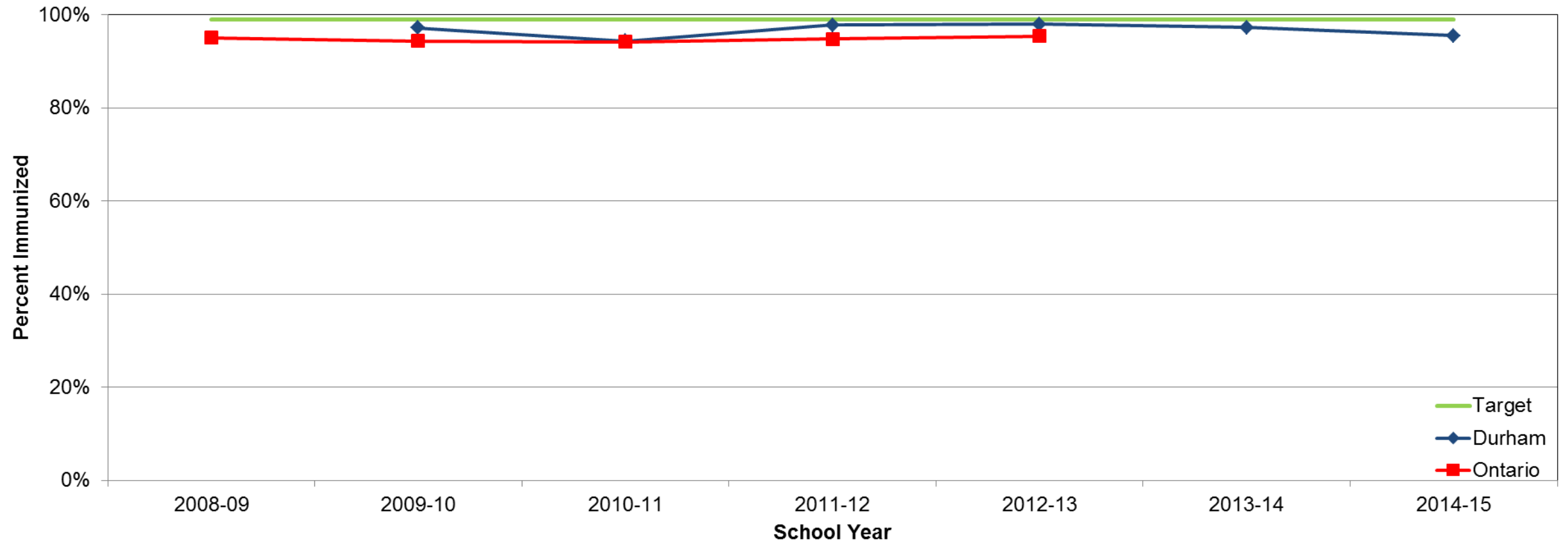
School Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	No data	87.8%	92.9%	96.3%	97.5%	94.2%	94.4%
Ontario	83.1%	76.4%	86.2%	89.1%	88.3%	No data	No data

Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Immunization coverage rates for measles in 7-year-olds increased between 2009-10 and 2012-13 in Durham Region but decreased slightly between 2012-13 and 2013-14. A similar increase occurred in Ontario between 2009-10 and 2012-13. Rates are consistently higher in Durham Region than Ontario but are below the target coverage rate of 99% [7].



**Figure 15: Percentage of Children (17 years) Immunized for Measles, Durham Region and Ontario, 2008-09 to 2014-15 School Year**

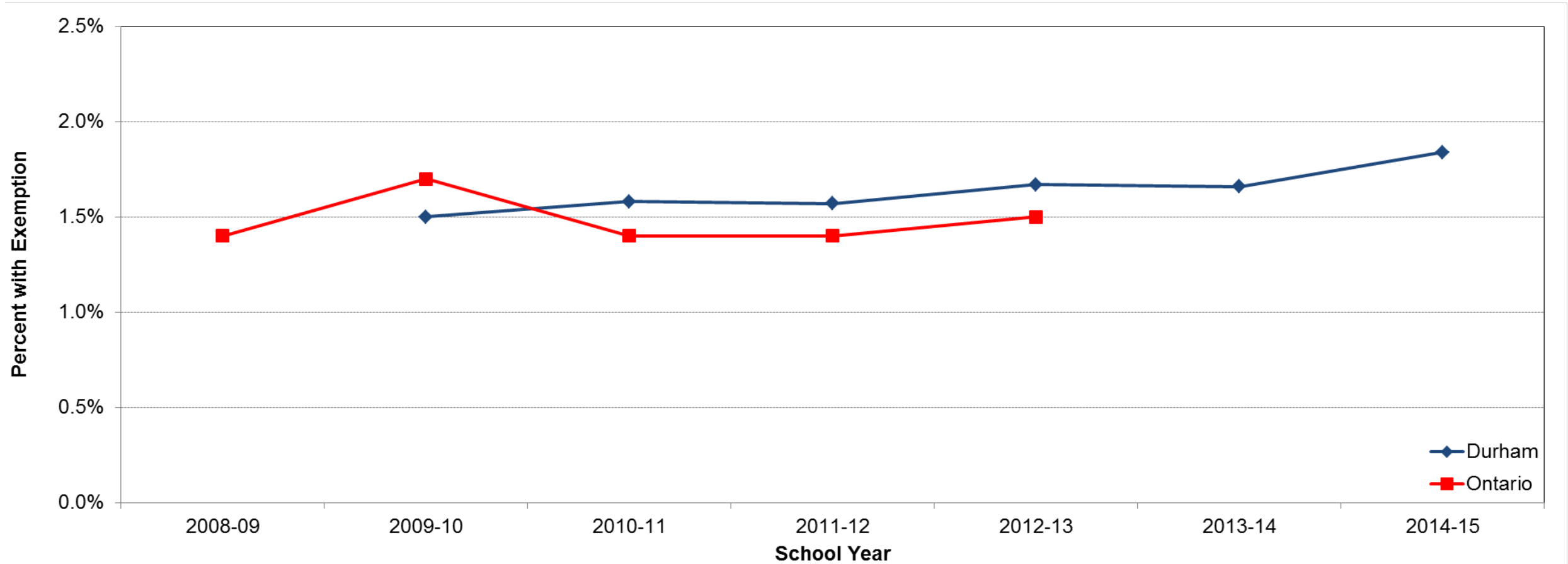


School Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	No data	97.2%	94.4%	97.8%	98.0%	97.3%	95.5%
Ontario	95.1%	94.4%	94.2%	94.8%	95.4%	No data	No data

Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Immunization coverage rates for measles in 17-year-olds have remained fairly stable in Durham Region and Ontario since 2008-09. Rates are consistently slightly higher in Durham Region than Ontario but still remain slightly below the target coverage rate of 99% [7].

**Figure 16: Percentage of Children (7 years) with Religious/Conscientious Exemption for Measles-Containing Vaccine, Durham Region and Ontario, 2008-09 to 2014-15 School Year**



School Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	No data	1.5%	1.6%	1.6%	1.7%	1.7%	1.8%
Ontario	1.4%	1.7%	1.4%	1.4%	1.5%	No data	No data

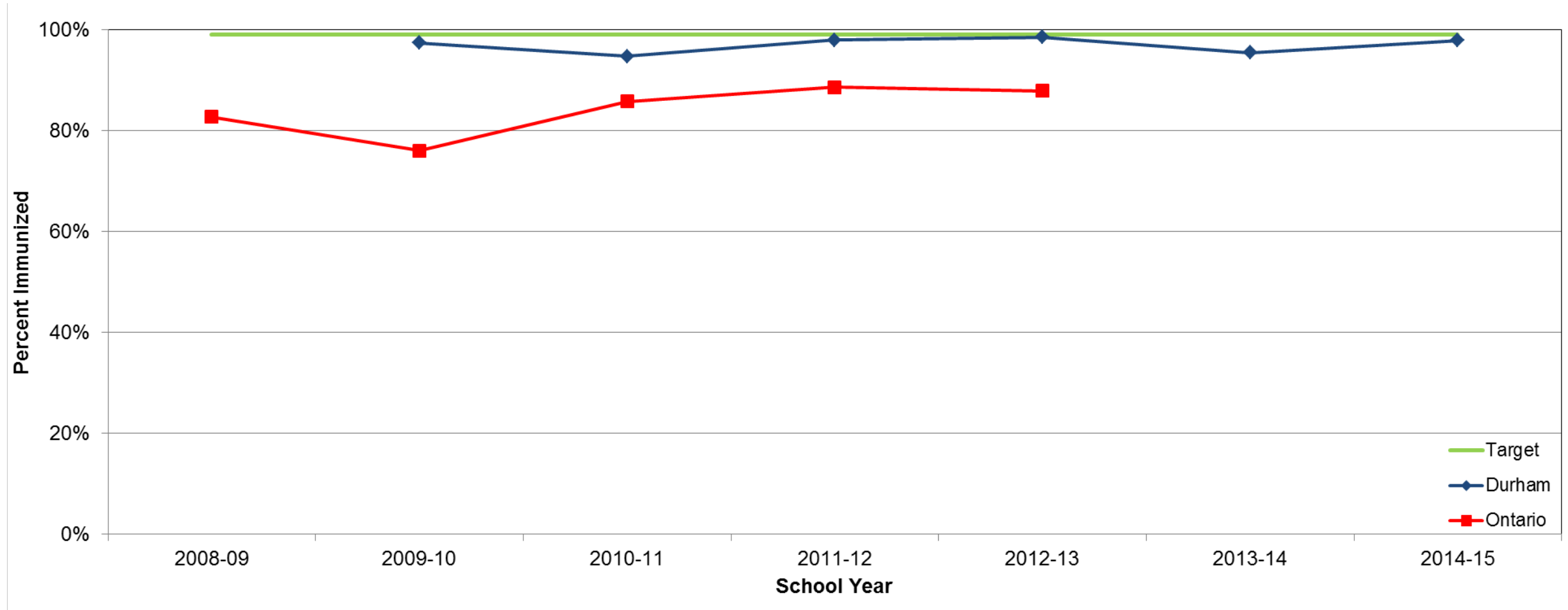
Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Religious/conscientious exemption rates for measles-containing vaccine in 7-year-olds increased slightly in Durham Region between 2009-10 and 2014-15 but overall remain low. Exemption rates for Ontario increased slightly in 2009-10 but otherwise remained relatively stable. Ontario exemptions rates were lower than Durham Region exemption rates between 2010-11 and 2012-13. Medical exemption rates for measles-containing vaccine in 7-year-olds (not shown) are consistently lower than religious/conscientious exemption rates (less than 0.1%).

## Mumps

Mumps is a disease caused by a virus, which begins as an infection of the nose and throat but may spread through the blood to many parts of the body [13]. Common symptoms include fever, swelling and tenderness of one or more of the salivary glands, usually the parotid glands (at the angle of the jaw). Most people with mumps recover fully, however mumps can occasionally cause complications including temporary or permanent hearing loss, mumps encephalitis (swelling of the brain), infection of the testes in post pubertal males (sterility is rare), and the ovaries in females. Mumps can also cause meningitis, an infection of the fluid and lining that cover the brain and spinal cord. Mumps is best prevented by vaccination. According to Ontario's Immunization schedule it is typically provided to infants at 12 months in a combined vaccine which also protects against measles and rubella, then as a booster at 4-6 years combined with measles, rubella and varicella [2]. Mumps is a designated disease under Ontario's Immunization of School Pupils Act [1].

Figure 17: Percentage of Children (7 years) Immunized for Mumps, Durham Region and Ontario, 2008-09 to 2014-15 School Year

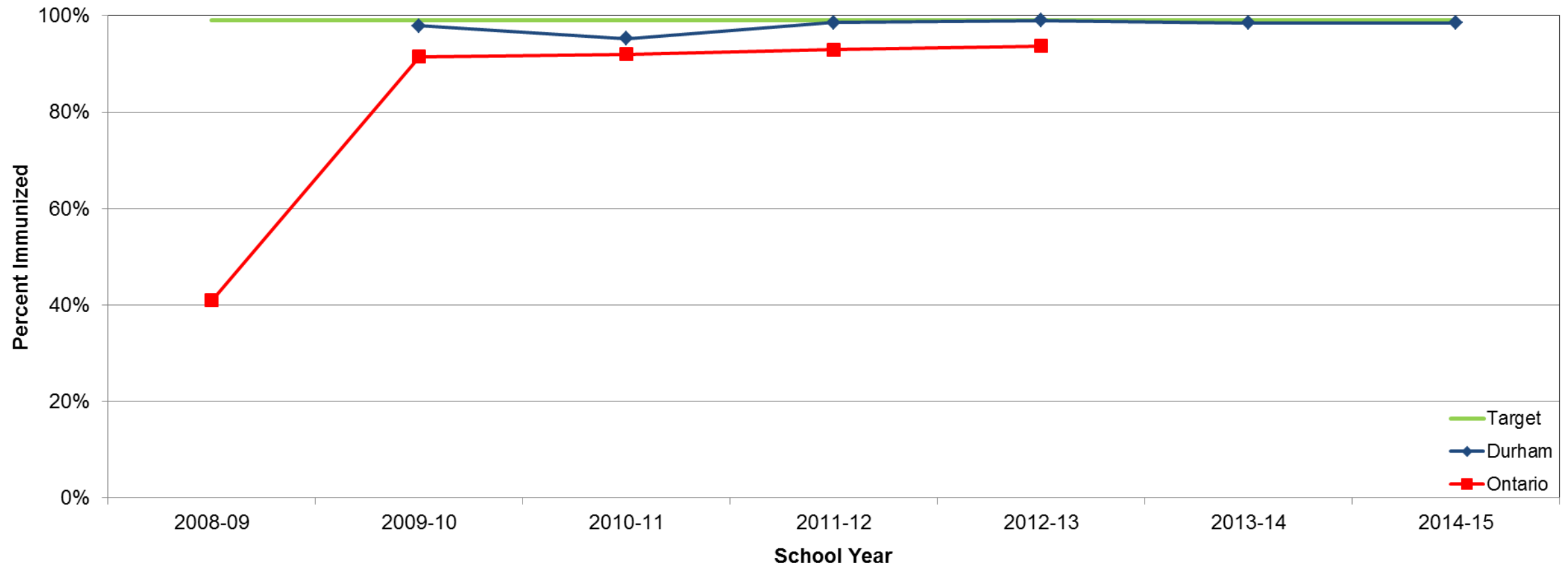


School Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	No data	97.3%	94.7%	97.9%	98.5%	95.4%	97.9%
Ontario	82.7%	76.0%	85.8%	88.6%	87.9%	No data	No data

Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Immunization coverage rates for mumps in 7-year-olds have remained fairly stable in Durham Region since 2009-10 whereas rates have increased in Ontario since 2009-10. Rates are consistently slightly higher in Durham Region than Ontario but remain slightly below the target coverage rate of 99% [7].

**Figure 18: Percentage of Children (17 years) Immunized for Mumps, Durham Region and Ontario, 2008-09 to 2014-15 School Year**

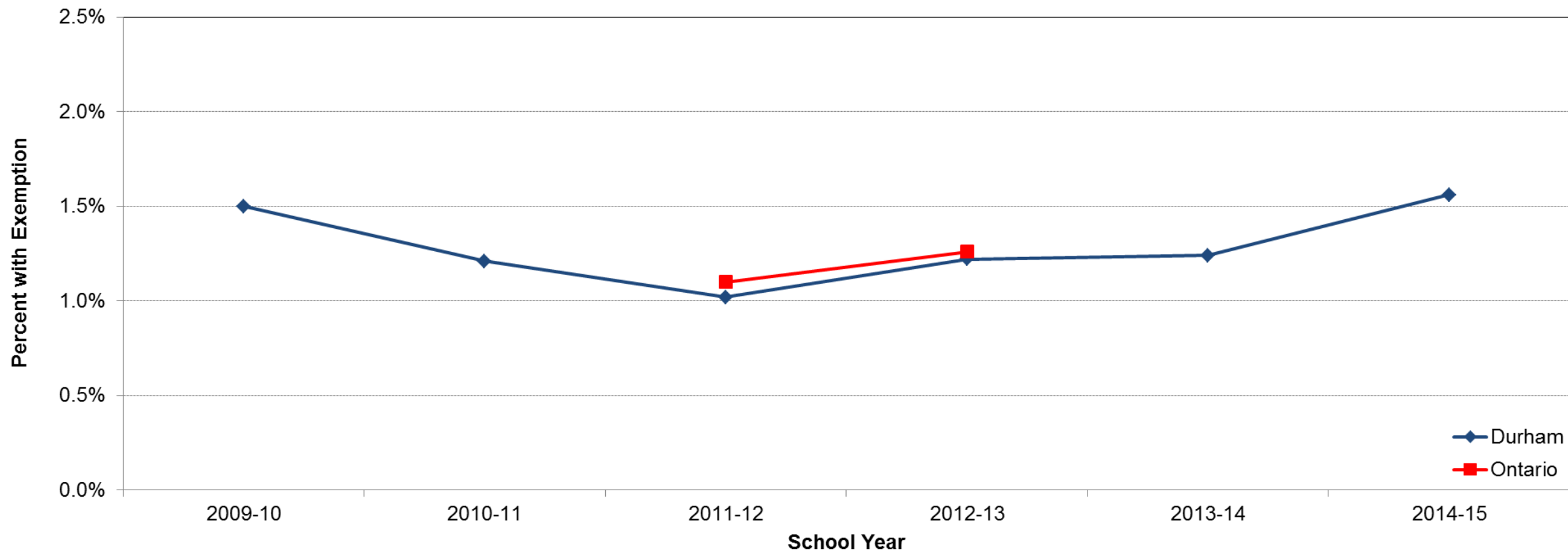


School Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	No data	97.9%	95.2%	98.6%	99.0%	98.5%	98.5%
Ontario	41.0%	91.5%	92.0%	92.9%	93.7%	No data	No data

Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Immunization coverage rates for mumps in 17-year-olds have remained fairly stable in Durham Region and Ontario since 2009-10. Two-dose mumps coverage was exceptionally low in 2008-09 as a result of the use of monovalent measles vaccine (as opposed to mumps-containing MMR vaccine) during Ontario's measles catch-up campaign in 1996 [7]. Rates are consistently slightly higher in Durham Region than Ontario and have met the target coverage rate of 99% [7] since 2011-12.

**Figure 19: Percentage of Children (7 years) with Religious/Conscientious Exemption for Mumps-Containing Vaccine, Durham Region and Ontario, 2009-10 to 2014-15 School Year**



School Year	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	1.5%	1.2%	1.0%	1.2%	1.2%	1.6%
Ontario	No data	No data	1.1%	1.3%	No data	No data

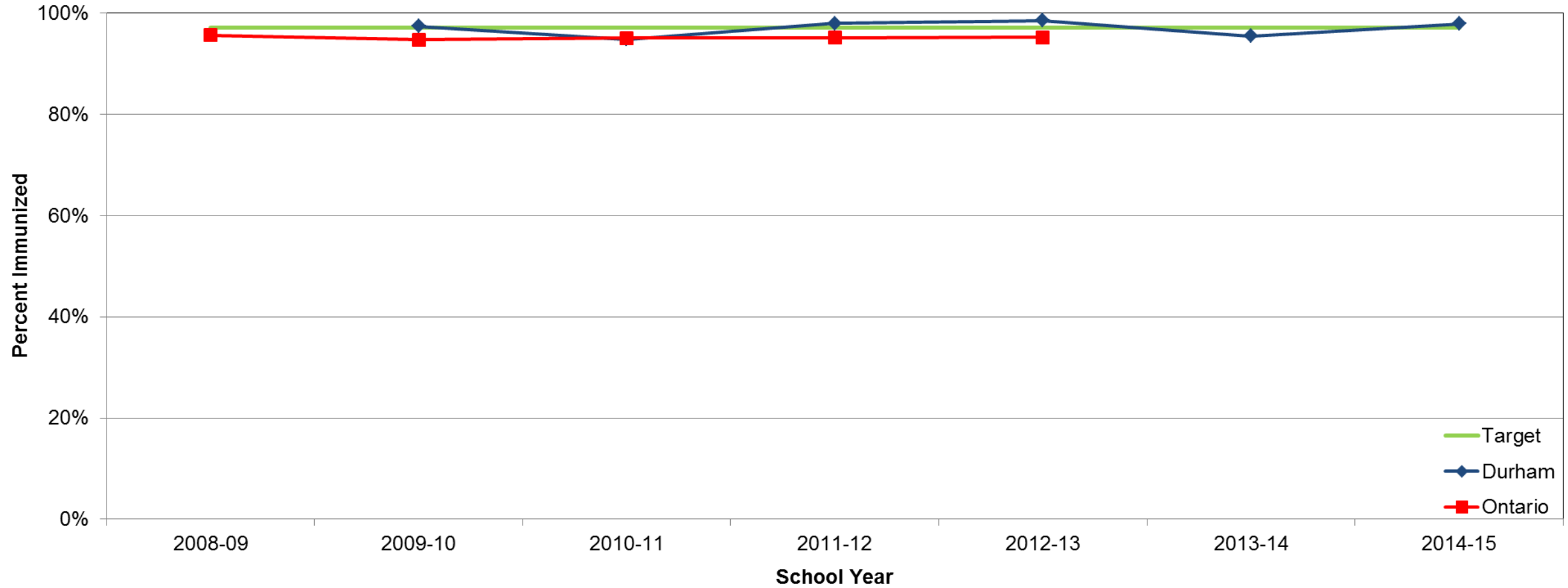
Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Religious/conscientious exemption rates for measles-containing vaccine in 7-year-olds decreased slightly in Durham Region between 2009-10 and 2011-12 then increased again between 2011-12 and 2014-15 but overall remain low. Exemption rates for Ontario are only available for 2011-12 and 2012-13; for those years they were similar to Durham Region exemption rates. Medical exemption rates for mumps-containing vaccine in 7-year-olds (not shown) are consistently lower than religious/conscientious exemption rates (less than 0.1%).

## Rubella

Rubella (German measles) is a highly contagious disease caused by a virus which first affects the cells of the nose and throat and then spreads to the lymph glands in the neck [14]. For most children and adults, rubella is a mild illness but is extremely dangerous for a developing fetus if a pregnant woman is infected early in pregnancy. Only about half of children and adults infected with rubella develop any symptoms which can include low fever, headache, tiredness, red eyes, runny nose, joint pains, swollen and tender glands and faint red rash which can be itchy. Rarely, rubella can cause inflammation of the brain. Rubella is best prevented by vaccination. According to Ontario's Immunization schedule it is typically provided to infants at 12 months in a combined vaccine which also protects against measles and mumps, then as a booster at 4-6 years combined with measles, mumps and varicella [2]. Rubella is a designated disease under Ontario's Immunization of School Pupils Act [1].

**Figure 20: Percentage of Children (7 years) Immunized for Rubella, Durham Region and Ontario, 2008-09 to 2014-15 School Year**



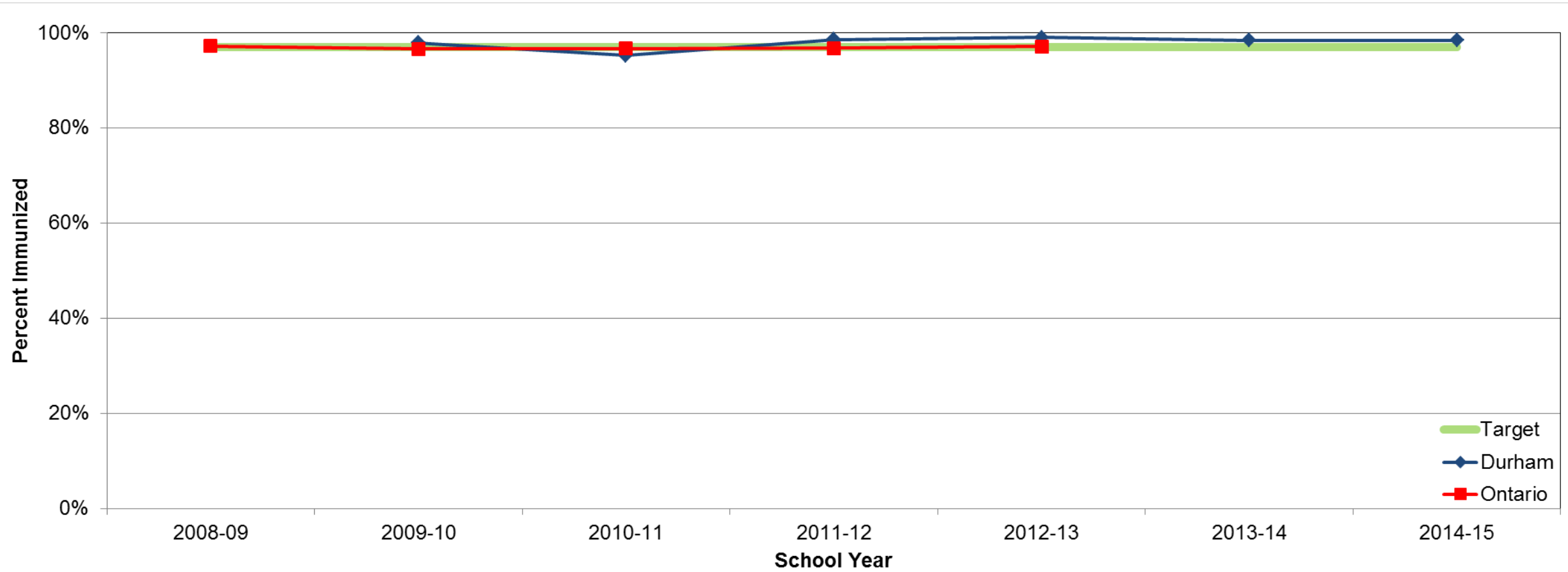
School Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	No data	97.3%	94.7%	97.9%	98.5%	95.5%	97.9%
Ontario	95.6%	94.7%	95.0%	95.1%	95.2%	No data	No data

Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Immunization coverage rates for rubella in 7-year-olds have remained fairly stable in Durham Region and Ontario since 2008-09. Rates are slightly higher in Durham Region than Ontario and meet the target coverage rate of 97% [7] most years.



**Figure 21: Percentage of Children (17 years) Immunized for Rubella, Durham Region and Ontario, 2008-09 to 2014-15 School Year**

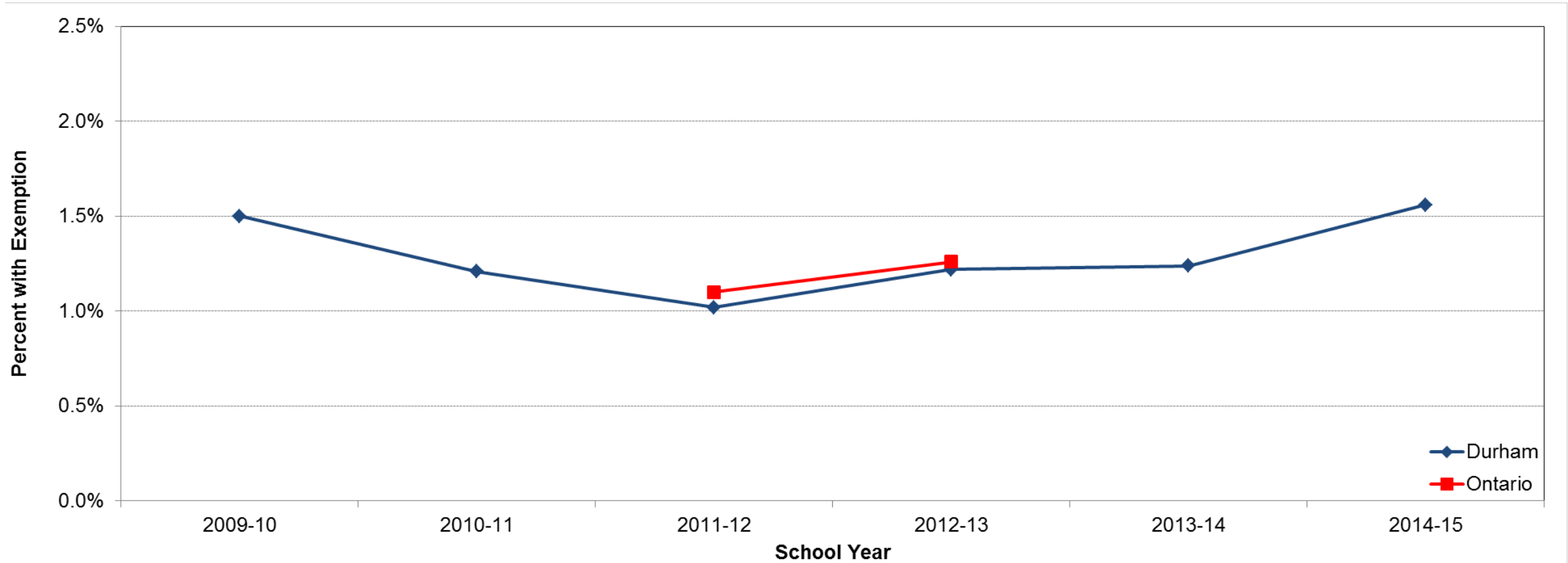


School Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	No data	97.9%	95.2%	98.6%	99.0%	98.5%	98.5%
Ontario	97.2%	96.6%	96.7%	96.8%	97.1%	No data	No data

Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Immunization coverage rates for rubella in 17-year-olds have remained fairly stable in Durham Region and Ontario since 2008-09. Rates are slightly higher in Durham Region than Ontario and meet or exceed the target coverage rate of 97% [7] most years.

**Figure 22: Percentage of Children (7 years) with Religious/Conscientious Exemption for Rubella-Containing Vaccine, Durham Region and Ontario, 2009-10 to 2014-15 School Year**



School Year	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	1.5%	1.2%	1.0%	1.2%	1.2%	1.6%
Ontario	No data	No data	1.1%	1.3%	No data	No data

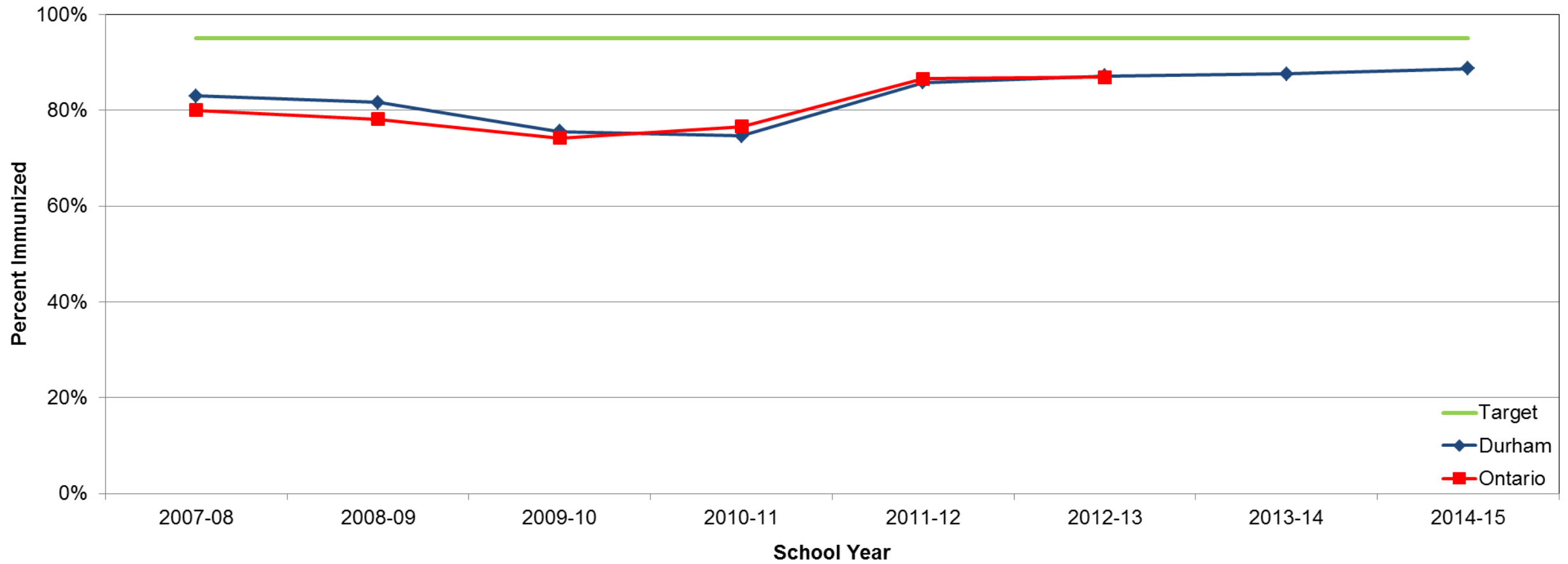
Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Religious/conscientious exemption rates for rubella-containing vaccine in 7-year-olds decreased slightly in Durham Region between 2009-10 and 2011-12 then increased again between 2011-12 and 2014-15 but overall remain low. Exemption rates for Ontario are only available for 2011-12 and 2012-13; for those years they were similar Durham Region exemption rates. Medical exemption rates for rubella-containing vaccine in 7-year-olds (not shown) are consistently lower than religious/conscientious exemption rates (less than 0.1%).

## **Hepatitis B**

Hepatitis B is a virus which can attack and damage the liver [15]. Between 50-70% of infected people have no symptoms or no signs of illness. However 30-50% of people who become infected with the hepatitis B virus will develop symptoms within 60-90 days which usually come on slowly and can include loss of appetite, stomach discomfort, feeling very tired, joint pain, fever and jaundice (where skin and whites of eyes turn yellow and urine darkens). While most people will develop immunity months later, 5-10% of adults infected with hepatitis B will become life-long carriers and can be infectious to others. Some hepatitis B carriers may develop chronic (life-long) liver disease and are at risk for liver scarring (called cirrhosis) and liver cancer. Hepatitis B infection is best prevented by vaccination. According to Ontario's Immunization schedule it is typically provided to children in grade 7 through school immunization clinics [2]. Hepatitis B infection is not a designated disease under Ontario's Immunization of School Pupils Act [1].

**Figure 23: Percentage of Children (12 years) Immunized for Hepatitis B, Durham Region and Ontario, 2007-08 to 2014-15 School Year**



School Year	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	83.0%	81.6%	75.5%	74.7%	85.8%	87.2%	87.6%	88.7%
Ontario	80.0%	78.1%	74.2%	76.6%	86.6%	86.9%	No data	No data

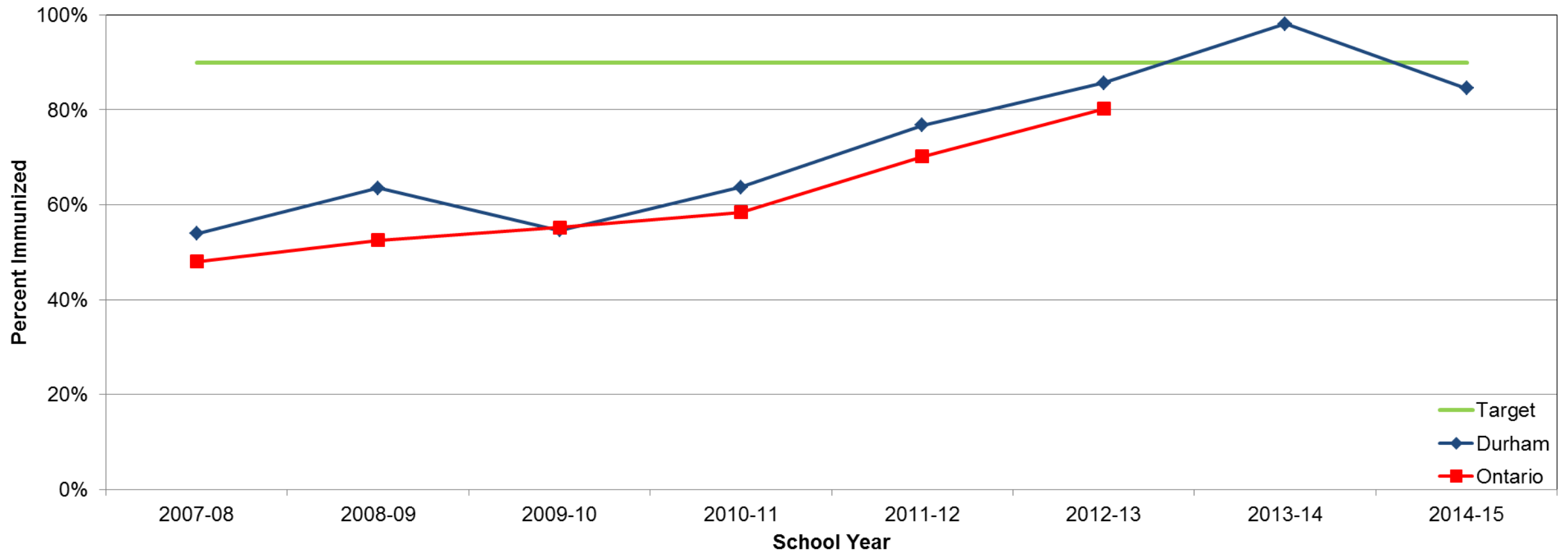
Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Immunization coverage rates for hepatitis B in 12-year-olds have increased in Durham Region and Ontario since 2010-11. Rates are similar in Durham Region and Ontario and are consistently below the target coverage rate of 95% [7].

## **Human papillomavirus (HPV)**

HPV is a common virus found in both men and women [16]. There are over 130 types, which can lead to genital warts and cancer of the cervix, vagina, vulva (area around the vagina), penis, anus, head and neck. In Canada, HPV types 16 and 18 cause over 70% of cervical cancers and HPV types 6 and 11 cause over 90% of genital warts. In females, pap tests detect changes on the cervix caused by an HPV infection that may lead to cervical cancer later in life. There is a vaccine which protects against HPV types 6, 11, 16 and 18 but does not protect against the many other types of HPV infection. According to Ontario's Immunization schedule it is typically provided to females in grade 8 through school immunization clinics [2]. HPV infection is not a designated disease under Ontario's Immunization of School Pupils Act [1].

**Figure 24: Percentage of females (13 years) Immunized for Human papillomavirus (HPV), Durham Region and Ontario, 2007-08 to 2014-15 School Year**



School Year	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	53.9%	63.6%	54.6%	63.7%	76.8%	85.7%	98.1%	84.5%
Ontario	48.0%	52.5%	55.2%	58.4%	70.2%	80.2%	No data	No data

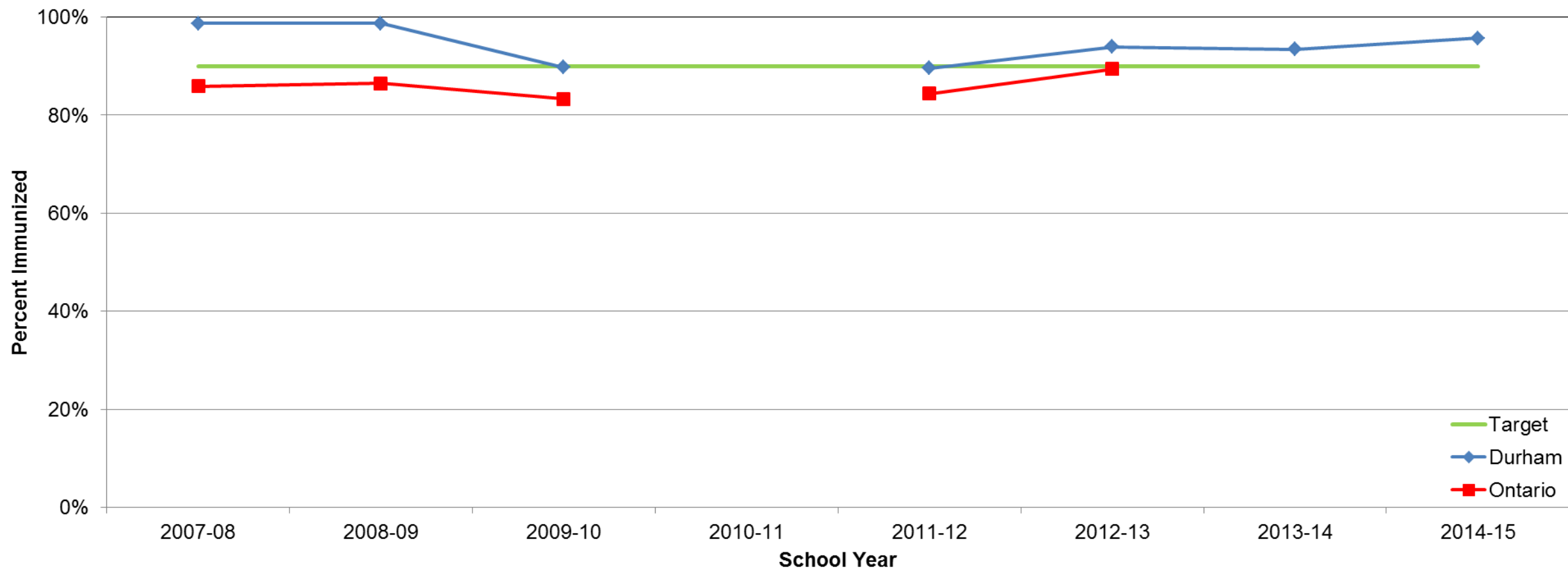
Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Immunization coverage rates for HPV in 13-year-old females increased in Durham Region and Ontario since 2007-08; however dropped again in 2014-15 in Durham Region. Rates are higher in Durham Region than Ontario most years and exceeded the target coverage rate of 90% [7] in 2013-14 in Durham Region but dropped below the target again in 2014-15.

## **Meningococcal Disease**

Meningococcal disease is caused by bacteria called *Neisseria meningitidis* which can cause swelling of the lining of the brain and spinal cord (meningitis) and/or a blood infection (meningococemia) [17]. People with meningococcal disease may have fever, bad headache, stiff neck, nausea, vomiting and a rash. Babies with meningococcal disease may have a high fever, be hard to wake up, not feel hungry, be cranky, cry more than normal, and have a red pinpoint or bruise-like rash. IMD can lead to serious illness or in some cases death. There is a vaccine which protects against 4 strains of meningococcal bacteria (A, C, Y and W135). According to Ontario's Immunization schedule it is typically provided to children in grade 7 through school immunization clinics [2]. Meningococcal disease is a designated disease under Ontario's Immunization of School Pupils Act [1].

**Figure 25: Percentage of Children (12 years) Immunized for Meningococcal Disease, Durham Region and Ontario, 2007-08 to 2014-15 School Year**



School Year	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Durham	98.7%	98.7%	89.7%	No data	89.5%	93.9%	93.4%	95.7%
Ontario	85.9%	86.5%	83.3%	No data	84.4%	89.4%	No data	No data

Data Source: Immunization Records Information System, Durham Region Health Department; Immunization Coverage reports, Public Health Ontario.

Immunization coverage rates for meningococcal disease in 12-year-olds have increased in Durham Region and Ontario since 2011-12. Rates are consistently higher in Durham Region than Ontario and meet or exceed the target coverage rate of 90% [7]. The Ontario school based immunization program replaced the meningococcal C vaccine in the 2009-10 school year with the quadrivalent meningococcal vaccine which includes coverage for serogroups A, C, Y and W-135. Coverage for this vaccine was not assessed at the provincial level in 2010-11 [7].



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