

***2012***  
***Annual***  
***Immunization***  
***Report***

A report on immunization statistics,  
programming and planning  
considerations for 2013-14



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## Introduction

Immunization is an effective way to prevent an increasing number of infectious diseases. Immunization coverage is defined as the percentage of persons who have received the recommended number of doses at a given age. Worldwide, childhood immunization rates are a recognized measure of the health of a population and the performance of health care systems.

Public Health Services, Saskatoon Health Region aims to achieve a benchmark of success of 85% immunization coverage to ensure population level disease protection in Saskatoon Health Region (SHR). In reality, the level of coverage required for population protection (herd immunity) may vary by disease and vaccine type. PHS provided a total of 141,510 mandated and purchased immunizations in 2012, an increase of 669 doses (0.4%) from the previous year of 140,841 doses. Appendix 1 shows the three year trend. Coverage targets are adjusted annually to reflect achievable outcomes within available resources. Appendix 2 provides a comprehensive list of the targets for 2012.

In comparing our coverage rates with those of other areas it is important to keep in mind that there are many different definitions and methods to assess up to date coverage which yield different results.<sup>1</sup> While our coverage rates are lower than we would like to achieve, we do well compared with other parts of Canada using similar data for similar immunization programs.

The SHR Strategic Plan gives clear direction to reduce health disparity in our Health Region<sup>1</sup>. The SHR 2008 Health Status Report<sup>2</sup> and the Health Disparity in Saskatoon Report<sup>3</sup> recommend reducing immunization disparities as one method to address health disparities. Within SHR the clearest disparities have been between low and high income neighbourhoods. Since 2006, a concerted effort has been made to increase preschool immunization rates and reduce neighbourhood level disparities. Appendices 3-5 summarize the complete listing and timelines associated with initiatives from 2006-2012.

In 2012 the focus continued on increasing the 2 year old coverage rate as measured using 2 dose measles vaccine. The frequency of calls made by the automated phone reminder system, Synvoice Technologies Inc., was changed so that reminders were sent out to all children under 18 months who were behind by 2 months and children 18-24 months who were behind by one month. By midyear, the enhanced reminder strategy, which relies on personal contact with parents by phone or home visit, was expanded to include an additional 14 neighborhoods with low coverage, increasing the total enhanced intervention to 20 neighborhoods in Saskatoon, referred to as core and core fringe neighborhoods. An expansion of the automated calls made proactively, typically at 4.5 years for school entry booster, was instituted for children at 11.75 months to remind them of MMR due at 12 months.

To provide further insight as to what factors were contributing to low coverage rates, client surveys were conducted in 3 communities over the summer months. These included neighborhoods in the core and northeast areas of Saskatoon and the rural quadrant of Rosthern and Area. Parents identified several barriers ranging from poor access (no location nearby) and transportation issues to simply "forgetting". The feedback served to inform interventions initiated in 2012 such as offering drop-in clinic at Friendship Inn and Duck Lake School and initiating the process for re-instating a clinic in the NE sector of Saskatoon. By end of the year public health nurses in neighborhoods outside core and core fringe neighborhoods were also making phone calls or home visiting to children between 20-23 months who were one month behind with immunization.

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<sup>1</sup> See methods section for description of methods used in this report.

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In November 2012, rotavirus vaccine program was implemented for 2-4 month olds.

To improve the quality of service, by ensuring consistent practise by public health nurses, the immunization clinician attended a 3 day LEAN workshop to develop a standard work process for obtaining informed consent. The prescribed steps were imbedded in policy and each public health nurse received individual training with the clinician or a designated trainer.

With the focus on improving the overall preschool coverage rate, other immunization programs experienced the same level of service, with the goal of maintaining the coverage rates in these programs consistent with the 2011 rates.

This report provides a brief summary of the immunization programs offered in Saskatoon Health Region, highlighting the coverage rates, rational for changing trends and interventions implemented in 2012. It serves to inform the strategic directions and targets for the upcoming year.

## Section 1: Vaccine Preventable Diseases in SHR and Saskatchewan

Rates of many vaccine preventable diseases (VPDs) have decreased dramatically over the last century due to the introduction of population based immunization programs; however, so far, eradication has only been possible for smallpox. Recent clusters of pertussis, measles and mumps in unimmunized or under-immunized populations in Canada, the United States, Europe and Asia point to the potential for outbreaks with serious health consequences in areas with high general coverage.<sup>5, 6</sup>

The principle of “herd” or “indirect” immunity is important. A high level of immunity in the general population results in less risk even for unimmunized people. In practice this sometimes means immunizing healthy individuals who may be able to fight infection themselves but can transmit disease to vulnerable persons not yet immunized (e.g., young infants) or unable to be immunized (e.g., some immune compromised individuals for some vaccines). In Saskatchewan, for example, seven infant deaths from pertussis were reported between 2008 and 2011, some too young to have been immunized.<sup>ii</sup> Complete immunization means protection of the individual, the family and communities.

- Table 1 illustrates that case numbers of VPDs are generally low with a few exceptions.
- VPDs with the highest numbers in recent years are pneumococcal invasive disease, pertussis (whooping cough), and influenza.<sup>iii</sup>

**Table 1: Selected vaccine preventable disease case counts for all ages by year, 2012 rate per 100,000 population in Saskatoon Health Region & Saskatchewan**

Vaccine preventable disease (VPD)	2008	2009	2010	2011	2012	SHR Rate per 100,000	SK** 2012 Rate per 100,000
Influenza*	357	654	112	193	314	96.3	
Pneumococcal disease-invasive*	46	34	41	45	29	9.0	11.3
Hepatitis B - acute	4	1	5	9	1	0.3	0.7
Pertussis	7	4	75	5	7	2.2	3.1
Haemophilus influenzae type B	2	0	0	0	0	0.0	0.1
Mumps	0	0	0	0	0	0.0	0
Measles	0	0	0	0	1	0.3	0.2
Diphtheria	0	0	0	0	0	0.0	0
Rubella	0	0	0	0	0	0.0	0
Tetanus	0	0	0	0	0	0.0	0
Polio	0	0	0	0	0	0.0	0
Meningococcal disease - invasive*	5	3	0	0	1	0.3	0.3

Source: iPHIS

\*Technically a VPD however vaccines do not cover all subtypes

\*\*Preliminary. Do not publish without express permission of Ministry of Health

<sup>ii</sup> Helen Bangura, provincial communicable disease epidemiologist, personal communication, July 14, 2011.

<sup>iii</sup> Currently available vaccines do not protect against all strains of pneumococcal bacteria or influenza virus respectively.

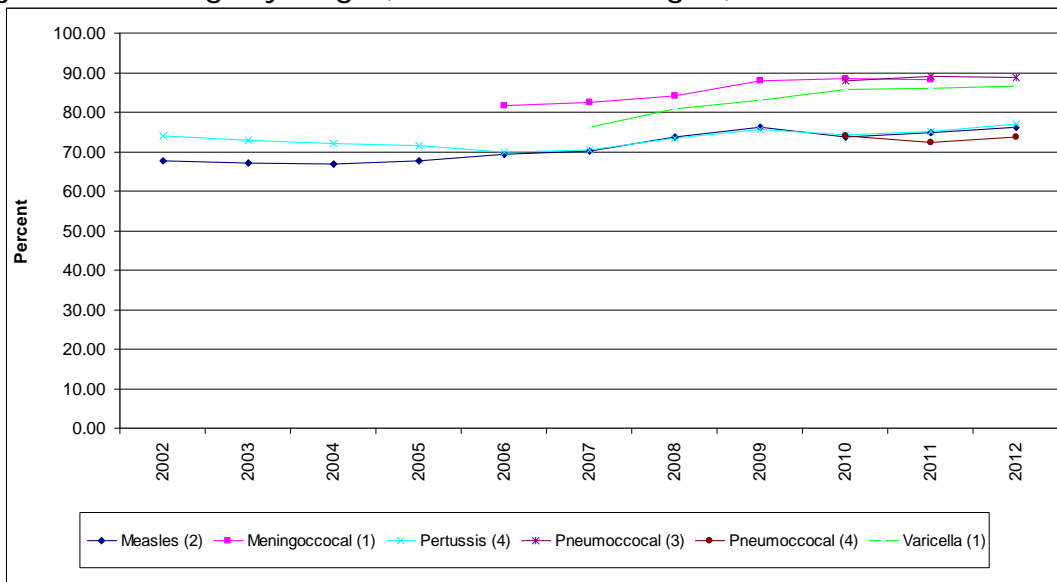
## Section 2: Pre-School Immunization

Vaccine schedules are based on national recommendations, adapted provincially. They are designed to maximize protection at the age of peak disease rates, which for many diseases occurs in early childhood (*see Appendix 6, Saskatchewan Childhood Immunization Schedule*).

Two years of age is a recognized age for comparing immunization coverage rates. Immunization with a combined vaccine against diphtheria, pertussis, tetanus, polio and *Haemophilus influenzae b* (DPTaP-Hib), for example, starts at 2 months of age. Children receive a series of vaccine doses at scheduled times. In 2012 the SHR target for two year old measles coverage (with 2 doses measles) was 79%; SHR overall achieved 76.15% two dose measles and 75.6% two dose MMR. The Saskatchewan provincial 2011-12 coverage was 74.9%.<sup>iv</sup>

- *Figure 1<sup>v</sup>* shows an overall increased coverage between 2002 and 2012. The decrease in 2010 may have been due to redirection of immunization resources during the pandemic influenza mass immunization in the fall of 2009.
- The absolute increase in SHR coverage percentage for pertussis from 2011 is 1.88%.
- The absolute increase in SHR coverage percentage for measles since 2002 is 8.35%.<sup>vi</sup>
- Varicella and meningococcal vaccine programs began in 2005 and 2004 respectively and show steady increases until 2009 when they reached a plateau.
- Although pertussis coverage had decreased between 2002 and 2007, it increased until 2009 and has remained fairly stable.
- Vaccines with a one dose schedule (varicella and meningococcal) show a higher coverage than those with more complex schedules.

Figure 1: Two year old coverage by antigen, Saskatoon Health Region, 2002-2012



<sup>iv</sup> Source: Ministry of Health, Quarterly report March 2013, not for publication. The Ministry's coverage is by fiscal year (cohort of children born between Oct 2009 and September 2010) compared to the calendar year used in the report. Some discrepancies in calculation methods and data extraction dates between SHR and Ministry of Health may exist. SIMS data is "real time" to the date of data extract. The preliminary 2011-12 report cited SHR coverage at 75.8%.

<sup>v</sup> Blank cells indicate data not available

<sup>vi</sup> To avoid describing percentage increase/decrease in percentages the absolute difference in percentages is used. This means, for example, the absolute increase in measles coverage between 2002 and 2011 is equal to 76.15-67.8 = 8.35%.

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Antigen	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Diphtheria (4)	73.0	72.0	72.0	71.5	69.9	70.4	73.6	75.6	74.2	75.0	76.9
Haemophilus Influenzae B (4)	72.1	71.3	70.5	70.2	69.0	69.5	72.7	74.8	73.2	74.4	75.7
Measles (2)	67.8	67.2	66.9	67.8	69.4	70.1	73.6	76.1	73.7	74.9	76.2
Meningococcal (1)					81.5	82.4	84.1	88.0	88.4	88.2	88.4
Mumps (2)	67.0	66.8	66.3	67.3	69.1	70.0	73.5	76.0	73.3	74.8	75.9
Pertussis (4)	73.9	72.9	72.0	71.5	69.9	70.4	73.5	75.6	74.1	75.0	76.9
Pneumococcal (3)								88.0	88.9	88.7	88.3
Pneumococcal (4)								74.0	72.4	73.6	73.9
Polio (4)	73.9	72.9	72.0	71.5	69.9	70.4	73.5	75.6	74.1	75.1	76.9
Rubella (2)	67.4	66.8	66.3	67.4	69.1	70.0	73.5	76.0	73.3	74.8	75.9
Tetanus (4)	72.2	72.2	71.7	71.4	70.5	70.5	73.4	75.6	74.2	75.0	76.9
Varicella (1)					76.1	80.8	83.0	85.6	86.1	86.6	88.0

\* Data from 2006-2008 was extracted in 2011 and has not been “frozen” in time annually. See explanation in Methods section pertaining to migration patterns.

### Disparities in Immunization Coverage

Disparities in health between different groups make it difficult for some individuals and groups to participate fully in society. Health disparities are cost drivers; as much as 20% of all health care spending may be attributed to income disparities.<sup>7</sup> Many factors influence the rate of immunization, including poor access, low education, limited family support, and poverty.<sup>2</sup> Research in SHR suggests incomplete immunization is primarily associated with low income; however, single parenthood, cultural status, and differences in beliefs also play a part.<sup>3</sup>

A grant was obtained from the Canadian Institutes of Health Research (CIHR) in 2007 to fund an intervention to increase immunization coverage rates among young children. The intervention involved contacting, via phone call or letter, the parents/guardians of 14 and 20 month old children in SHR who were behind in their immunizations. Since 2007 implemented interventions include: the Building Health Equity Program with new clinic sites, expanded hours, a reminder system, and incentives. See *Appendices 3-5* for a comprehensive timeline of immunization initiatives.

Immunization disparities within SHR exist between rural and urban areas and from neighbourhood to neighbourhood. The six core neighbourhoods of Saskatoon (Meadowgreen, King George, Pleasant Hill, Riverdale, Westmount and Confederation Suburban Centre) represent neighbourhoods with relatively low immunization coverage, and have been identified as priority areas.

*Figure 2* shows the disparities between core neighbourhoods, other Saskatoon neighbourhoods (called non-core) and rural SHR for two antigens that are representative of measles, mumps and rubella (MMR) and diphtheria, polio, tetanus, pertussis, and *Haemophilus influenzae b* (DTPaP-Hib) vaccine coverage at two years of age. It illustrates:

- In 2007<sup>vii</sup> the absolute difference between rural SHR immunization coverage and Saskatoon core neighbourhood coverage was between 23 and 28%, depending on the antigen (not shown). The gap between the highest and lowest immunization coverage steadily narrowed until this year when the gap increased slightly, reflective of growing population in the core, compared to rural areas. Seventeen percent more children were up to date at two years compared to 2011, but the population in the core increased by 35%.<sup>viii</sup>

<sup>vii</sup> Five years of data shown (2008-2012)

<sup>viii</sup> In 2011 there were total of 281 children in the core that required immunization to be up-to-date (UTD) at 2 years old. Of those children, 211 were fully immunized (75%). In 2012, the population increased to 378 children under 2 years old. Of these children, 247 were fully



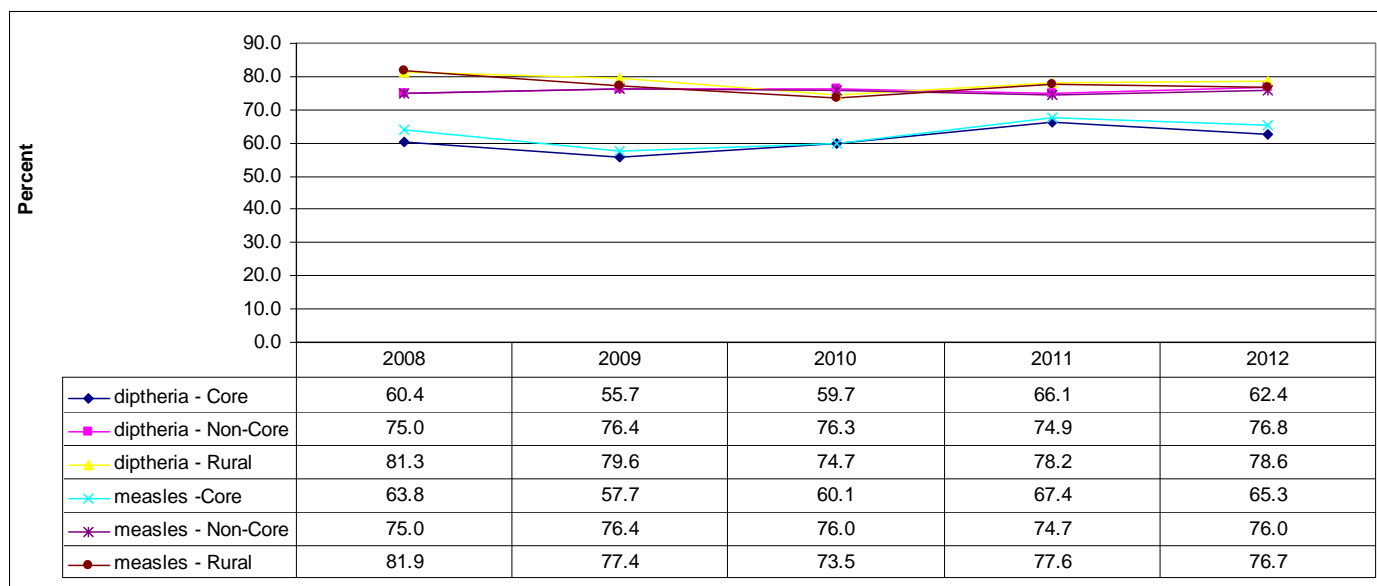
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- Coverage for core, non-core neighbourhoods and the rural area has improved.
- With the exception of 2010 rural two year old immunization coverage has been consistently higher than core and non-core neighbourhood coverage
- From the introduction of the immunization reminders project (CIHR grant) in October 2007 (not shown) until 2009 when the program funding was finished, the absolute increase in overall coverage rates among two year olds for MMR was 6%.
- Core neighbourhoods show the greatest increase since 2007 (not shown), with an absolute increase of 13.4% for measles and 13.3% for diphtheria.
- In 2012, the difference in coverage rates between the non-core and core neighbourhoods for measles and diphtheria was between 11% and 14% respectively. In 2009 the difference was approximately 20%.

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**Figure 2: Two year old measles (2 doses) and diphtheria (4 doses) immunization coverage by geographic location, Saskatoon Health Region, 2008-2012**

Source: SIMS



An index of disparity summarizes a number of indicators of importance into a single measure for comparative purposes. Immunization disparity can be expressed as a ratio comparing the top socio-economic quintile to the bottom quintile. The ratio is calculated by dividing the two year old MMR coverage rate in the top socio-economic quintile by the coverage rate in the bottom quintile in Saskatoon.<sup>ix</sup> A disparity ratio of one means the coverage rates are equal in the top and bottom quintiles. A ratio greater than one means that there is a lower coverage in low income neighbourhoods, and indicates a greater disparity.

Moving forward, SHR will continue to explore other measures of disparity in immunization coverage rates, such as comparing the lowest deprivation quintile to the overall SHR coverage rates or other measure.

The 2012 SHR target for the disparity ratio index was set at 1.16, as measured for two year old immunization (2 doses of Measles antigen).

- *Figure 3* indicates the disparity ratio has decreased since 2002, and most rapidly since 2007 when initiatives were introduced to reduce the gap, which signals greater equity in immunization rates.
- The target of 1.16 was exceeded in February and March 2012. The annual rate was 1.16.<sup>x</sup>

<sup>ix</sup> Socio-economic quintile (i.e., 1/5<sup>th</sup> of the population) is based on the Total Deprivation Index, which includes income, employment, education and social support indicators. It is calculated at the Dissemination Area level geography for Saskatoon city only, and cannot be utilized at present for rural SHR.

<sup>x</sup> Average of fiscal quarter 4 2011, quarter 1, 2012 – quarter 3, 2012

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**Figure 3: Two year old MMR disparity ratio between top & bottom socioeconomic quintile in Saskatoon by quarter of fiscal year, SHR, 2002-2012**

1 indicates 1<sup>st</sup> quarter (April - June), 3 indicates 3<sup>rd</sup> quarter (October - December), etc.

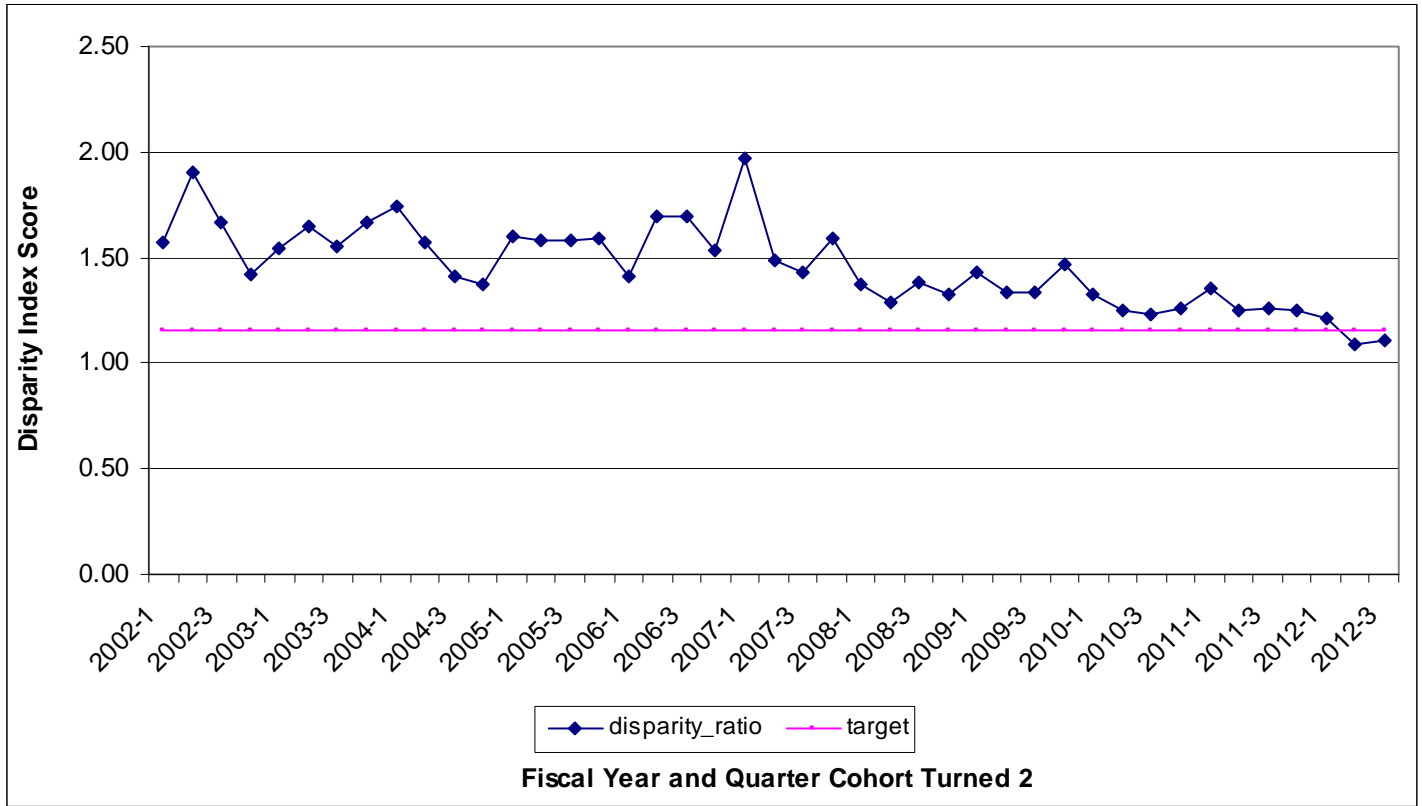
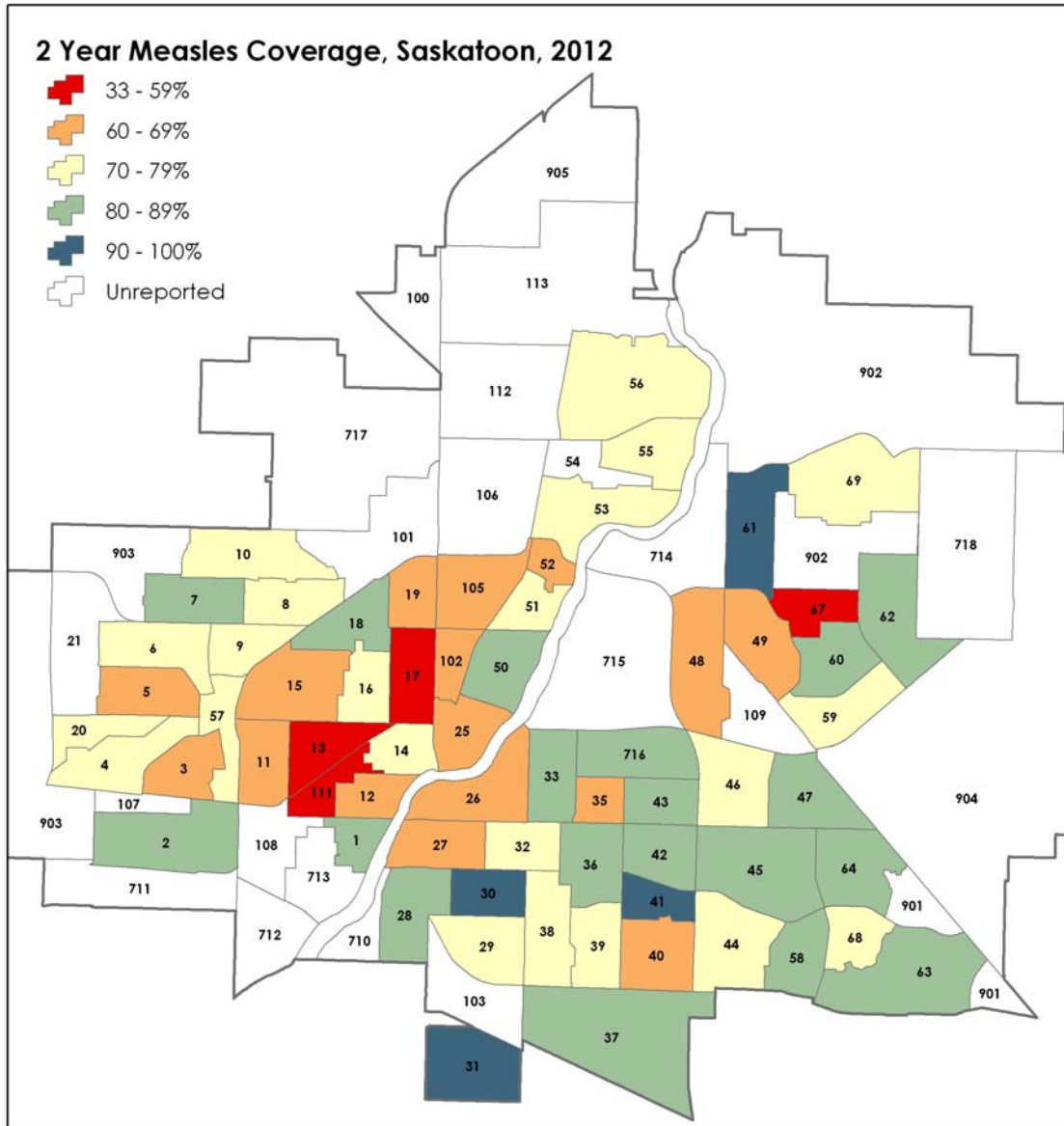


Figure 4 next page displays 2 year old measles (2 doses) coverage by Saskatoon neighbourhood for 2012.

- The neighbourhoods with the lowest coverage rates cluster around the core neighbourhoods; however, areas of low coverage are found in neighbourhoods in the south and east central parts of Saskatoon.
- See Appendix 7 for table of specific coverage percent by neighbourhood 2012.

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Figure 4: Two year old measles (2 doses) immunization coverage by Saskatoon neighbourhoods, 2012.



- |                      |                              |                       |                           |                           |
|----------------------|------------------------------|-----------------------|---------------------------|---------------------------|
| 1 Holiday Park       | 19 Mayfair                   | 41 Nutana SC          | 59 Arbor Creek            | 111 West Industrial       |
| 2 Montgomery Place   | 20 Blairmore SC              | 42 Brevoort Park      | 60 Erindale               | 112 Hudson Bay Industrial |
| 3 Fairhaven          | 21 Kensington                | 43 Greystone Heights  | 61 Silverspring           | 113 Marquis Industrial    |
| 4 Parkridge          | 25 Central Business District | 44 Lakeview           | 62 Willowgrove            | 710 Diefenbaker MA        |
| 5 Pacific Heights    | 26 Nutana                    | 45 Wildwood           | 63 Rosewood               | 711 CN Yards MA           |
| 6 Confederation Park | 27 Buena Vista               | 46 College Park       | 64 Briarwood              | 712 SaskPower MA          |
| 7 Dundonald          | 28 Exhibition                | 47 College Park East  | 67 University Heights SC  | 713 Gordie Howe MA        |
| 8 Westview           | 29 Avalon                    | 48 Sutherland         | 68 Lakewood SC            | 714 U of S Lands North MA |
| 9 Massey Place       | 30 Queen Elizabeth           | 49 Forest Grove       | 69 Evergreen              | 715 U of S MA             |
| 10 Hampton Village   | 31 The Willows               | 50 City Park          | 100 Agriplace             | 716 U of S Lands South MA |
| 11 Meadowgreen       | 32 Haultain                  | 51 North Park         | 101 Airport Business Area | 717 Airport MA            |
| 12 King George       | 33 Varsity View              | 52 Richmond Heights   | 102 Central Industrial    | 718 U of S Lands East MA  |
| 13 Pleasant Hill     | 35 Grosvenor Park            | 53 River Heights      | 103 CN Industrial         | 901 S.E. DA               |
| 14 Riversdale        | 36 Holliston                 | 54 Lawson Heights SC  | 105 Kelsey - Woodlawn     | 902 University Heights DA |
| 15 Mount Royal       | 37 Stonebridge               | 55 Lawson Heights     | 106 North Industrial      | 903 Blairmore DA          |
| 16 Westmount         | 38 Adelaide/Churchill        | 56 Silverwood Heights | 107 Agpro Industrial      | 904 Holmwood DA           |
| 17 Caswell Hill      | 39 Nutana Park               | 57 Confederation SC   | 108 South West Industrial | 905 North DA              |
| 18 Hudson Bay Park   | 40 Eastview                  | 58 Lakeridge          | 109 Sutherland Industrial |                           |

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### “Core- fringe” neighbourhoods in Saskatoon Health Region

The six core neighbourhoods are low income neighbourhoods in a concentrated area of Saskatoon. However, there are other neighbourhoods (adjacent or non-adjacent to the core) with similar characteristics which also have low immunization rates. Some residents move back and forth between the core and adjacent neighbourhoods. In 2012, 14 neighborhoods with low coverage rates (Appendix 8) were identified to receive the enhanced reminders of personal contact by phone or home visit. All made gains in coverage in 2012 with the exception of Mount Royal, Fairhaven, Sutherland, and Westview.

- Table 2 lists the 20 neighbourhoods with the lowest immunization rates and are considered for inclusion in the “core-fringe” designation. <sup>xi</sup>

**Table 2: Core Fringe Neighbourhoods for Most Recent Four Year Period (2009-2012) for MMR coverage (2 doses) for 2 year olds**

Neighbourhood	Four year average coverage	2012 coverage	2012 Population	Neighbourhood	Four year average coverage	2012 coverage	2012 Population
Kelsey/Woodlawn *	56.1	60.0	10	Holiday Park *	69.4	80.00	35
Caswell Hill *	60.1	55.1	49	City Park	69.4	80.00	30
Mayfair *	60.9	66.7	39	North Park *	69.5	75.00	28
Central Business District	64.0	66.7	9	Nutana	69.5	65.45	55
Mount Royal *	65.3	65.3	49	Nutana Park	69.5	75.00	29
Massey Place *	67.6	76.4	55	College Park	70.0	72.41	58
Fairhaven *	67.7	67.1	79	Pacific Heights	70.2	66.67	54
Richmond Heights	68.0	66.7	9	Eastview	71.7	69.05	42
Buena Vista	68.8	67.6	34	Adelaide/Churchill	72.4	74.29	35
Sutherland	69.2	68.83	77	Queen Elizabeth	73.2	91.30	23

\* Denotes designated core fringe in the previous year.

See 2yr measles cov by nbh rank cum in Annual Report 2012 Stats Update March 6.xls

Current year population from current year in annual\_report\_figure\_04\_01\_measles\_coverage\_by\_neighbourhood.

Cumulative average is from Annual\_report\_figure\_04\_001\_measels\_coverage\_by\_nbhd.

<sup>xi</sup> Children with an address linked to Social Services in Central Business District have been removed from the neighbourhood level analysis because they do not live in that neighbourhood. Children with a Social Services address have a five year average coverage rate of 51.2%. Some industrial neighbourhoods with very low numerators and denominators have been removed from this listing. See Appendix 6 for complete list with numerators and denominators.

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### Rural Communities in Saskatoon Health Region

Table 3 represents the 2 year old immunization coverage rate trends for SHR rural communities. The rural communities are divided into the health planning zones of approximately 15,000 persons in four quadrants: Saskatoon, Rosthern, Humboldt, and Watrous areas. <sup>xii</sup> 2012 coverage is mapped in Appendix 9.

In 2012:

- Rosthern & area improved by 5% from the previous year following a client survey over the summer months. Of the sixteen recommendations, five were implemented, including establishing routine phone call reminders prior to booked appointments; booking clients for next visit; strengthening communication with the nurse on a nearby reserve regarding immunization status of shared clients; incorporating immunization into routine preschool services offered by the nurse practitioner and offering drop-in clinic at Duck Lake on a regular basis.
- Both Humboldt & area and Watrous & area lost some coverage this year. More children were up to date but due to population increase dropped in overall coverage rate.
- Humboldt & area have the highest coverage at 85.8%, an absolute difference of 10% compared to the overall SHR coverage of 75.6%.
- Saskatoon area (rural) remained at a fairly constant coverage rate in spite of a slightly increased population.

**Table 3. Rural Planning Quadrants/Zones, 2 year old MMR (2 doses) 2012 coverage**

Rural Planning Zone	2008	2009	2010	2011	2012	2012 population	2012 #UTD
Saskatoon	68.7	73.3	72.9	73.6	75.6	2905	2197
Humboldt and area	82.0	74.4	76.5	90.2	85.8	190	163
Rosthern and area	68.3	65.2	57.0	62.6	67.3	205	138
Saskatoon area	81.2	82.8	77.5	77.8	76.2	588	448
Watrous and area	79.0	81.4	80.7	88.9	82.2	135	111

Annual\_Report\_2012\_Stats\_Update\_march6.xls Tab = MMRbyRPZ  
 Rpz\_10\_4\_mmr\_coverage\_at\_2\_by\_rpz\_Crosstab  
 And rpz\_10\_3\_mmr\_coverage\_at\_2\_by\_rpz

<sup>xii</sup> "Strengthening Rural Communities Saskatoon Health Region's Rural Health Strategy 2010" recommended the establishment of rural planning zones to guide assessment of population health needs and inform service delivery. Aggregations finalized in June 2011 by rural managers and Public Health Observatory representatives and data calculated at that time.

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### Measures of immunization delay: Catch-up potential for preschool immunization

Vaccines delivered on a schedule require a certain interval between doses for optimal immune response in an individual. Delays in administering vaccination on the recommended schedule of two, four, six and 18 months add up over time, and may affect the ability to “catch up” those children by the age of two years. The diphtheria antigen is part of the DPTaP-Hib vaccine offered at two, four and six months, while the measles antigen is part of the MMR vaccine offered at twelve and 18 months. Looking at vaccine coverage two months after the recommended schedule is a measure of delayed immunization, and can be used for analysis and planning.

- *Table 4* shows SHR coverage for the initial DPTaP-Hib vaccine as measured at 4 months of age has moved back up to the 2008 rate.
- Measles vaccine remains considerably below target at 20 months.

**Table 4: Measures of immunization delay in children less than two years of age, by birth cohort, Saskatoon Health Region, 2008-2013**

	2008	2009	2010	2011	2012	2013
Diphtheria(1) at 4 months	90.26	89.79	88.42	89.45	89.47	90.47
Diphtheria(3) at 8 months	75.38	73.05	75.28	77.07	75.6	80.27
measles(2) at 20 months	53.40	55.10	57.93	61.6	58.7	*

\* Indicates coverage could not be computed at time of report due to age cohort. For example, children born in 2011 had not reached 20 months at the time of analysis.

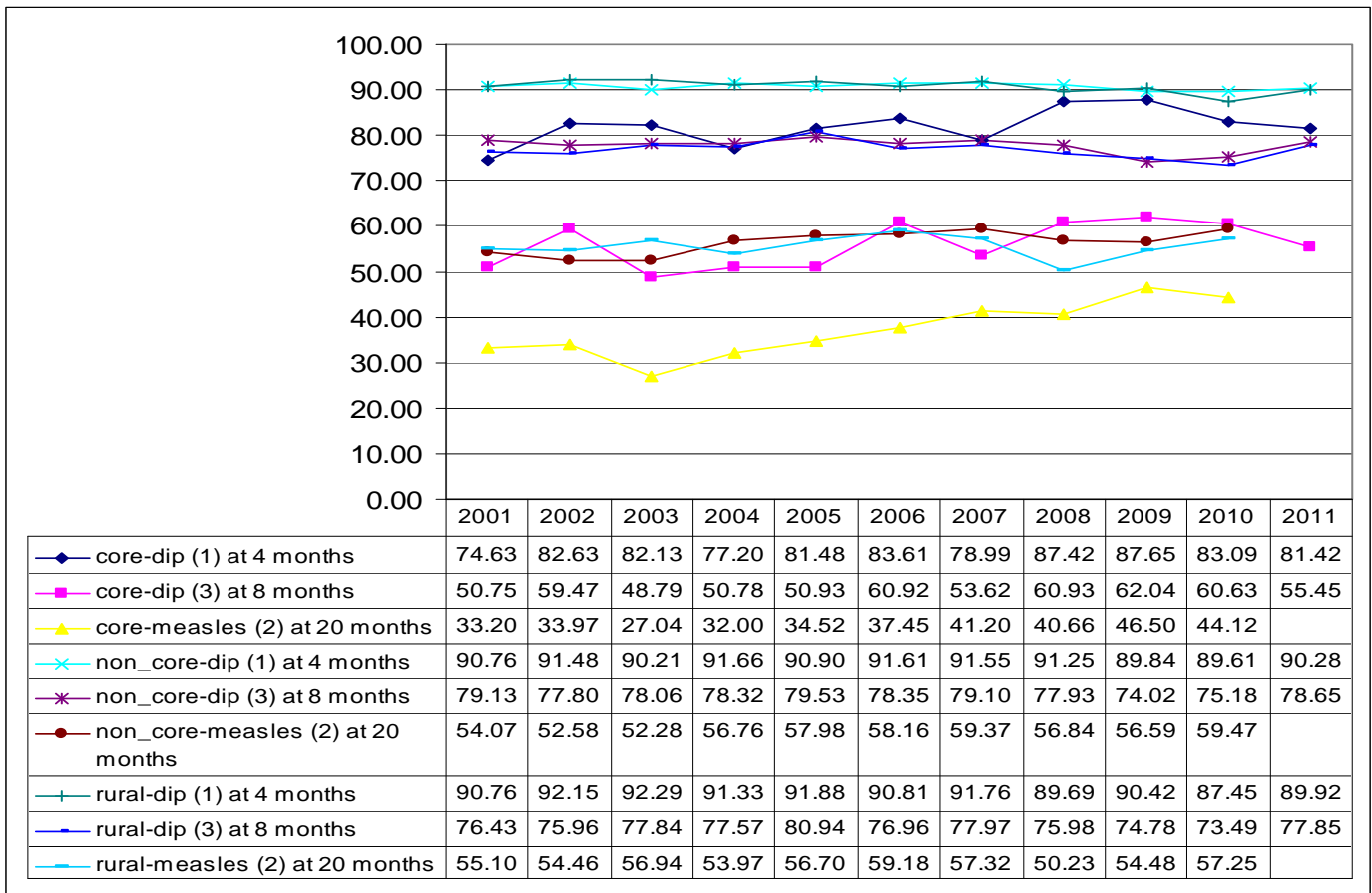
*Figure 5* on the next page shows age appropriate coverage at 4, 8 and 20 months respectively by year the child is born. <sup>xiii</sup>

- The first DPTaP-Hib immunization has high coverage of the series; the gap between all three geographic areas has increased slightly from 2010 to 2011. Both the 4 month and 8 month vaccination show some increased disparity between core and non-core/rural. The Synrevoice auto-reminder intervention was expanded to include all areas. Rural and non-core areas responded more favorably than the non-core to this intervention, as reflected in increased coverage for these two areas.
- At 20 months coverage has consistently been poor for all areas, though it has shown a gradual increase between 2001 and 2009 for all areas. This remained consistent for children born in 2011 in non-core and rural but not core neighbourhoods.

<sup>xiii</sup> Note: Describes coverage by “year born” rather by “year child turned age” in other graphs in this report because it summarizes different ages in the same chart.

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Figure 5: Immunization delay under two years of age, Diphtheria series & MMR by geographic location, birth cohort, Saskatoon Health Region, 2002-2012\*





## Section 3: School Immunization

Public Health is responsible for the provision of immunization in grades 6 and 8.

Knowing immunization protects the individual and indirectly, the rest of the school population, effort is expended to review school age immunization records to identify those who are not up to date with routine childhood immunizations.

For children under Grade 6, who are not up to date with routine childhood immunizations, a recall program is initiated at the beginning of the school year. If children remain not up to date by December of the current school year, certain grades are targeted for immunization by the Public Health Nurse in the school setting.

An electronic matching process with Health Services Number from the school divisions and Saskatchewan Immunization Management System (SIMS) provides an overall picture of the immunization status of children in Kindergarten – Grade 5 inclusive<sup>xiv</sup>.

**Table 5. School enrolment and immunization status as of September 2013 for children enrolled in Kindergarten-Grade 5 inclusive.**

	Enrollment 2013	Enrollment 2012	% Increase/Decrease Enrollment	Unknown imm status 2013	Unknown imm status 2012	Due for immunization 2013	Due for immunization 2012	% Increase/decrease imm due
<b>Saskatoon Public School Division</b>	9014	8860	1.7	1638	1751	773	818	-5.8
<b>Greater Catholic School Division</b>	7628	6596	15.6	827	1127	574	537	6.4
<b>Horizon School Division</b>	1813	1863	-2.7	572	784	107	101	5.6
<b>Prairie Spirit School Division</b>	4792	4260	12.5	930	986	409	345	15.6

\* Year of birth.

\* Note: year indicates year born (birth cohort), not year the child turned the number months indicated  
Blank cells indicate coverage that could not be computed at the time of this report due to the age of cohort (for example, children born in 2010 had not reached 20 months at the time of analysis in 2011).

Source: SIMS

The **Saskatoon Public Schools** reported an increase of 2% in overall enrolment to 8860, and a 5.8% decrease in the number of immunizations due.

The **Greater Saskatoon Catholic Schools** reported an increase of 15.6 % in enrolment to 7628 and a 6.4% increase in the number of immunizations due.

The **Horizon School Division** reported a decrease in enrollment of 2.7% to 1813 and an increase of 5.6% in immunizations due.

The **Prairie Spirit School Division** reported an increase in enrolment of 12.5% to 4792 and an increase of 15.6% in immunizations due.

<sup>xiv</sup> With the use of electronic matching, as with other databases, some limitations in data available and reported are noted.

Seven year old immunization coverage

*Measles and diphtheria<sup>xv</sup>*

Seven year old immunization coverage is a standard indicator of completeness of protection against childhood vaccine preventable diseases, and for assessing the preschool and school entry programs. Upon review of the records, the parents/guardians are notified of the child being overdue for immunization. Immunization is completed at school in some instances, or invitations are sent out to make an appointment at a Health Centre/Office or attend a drop in clinic.

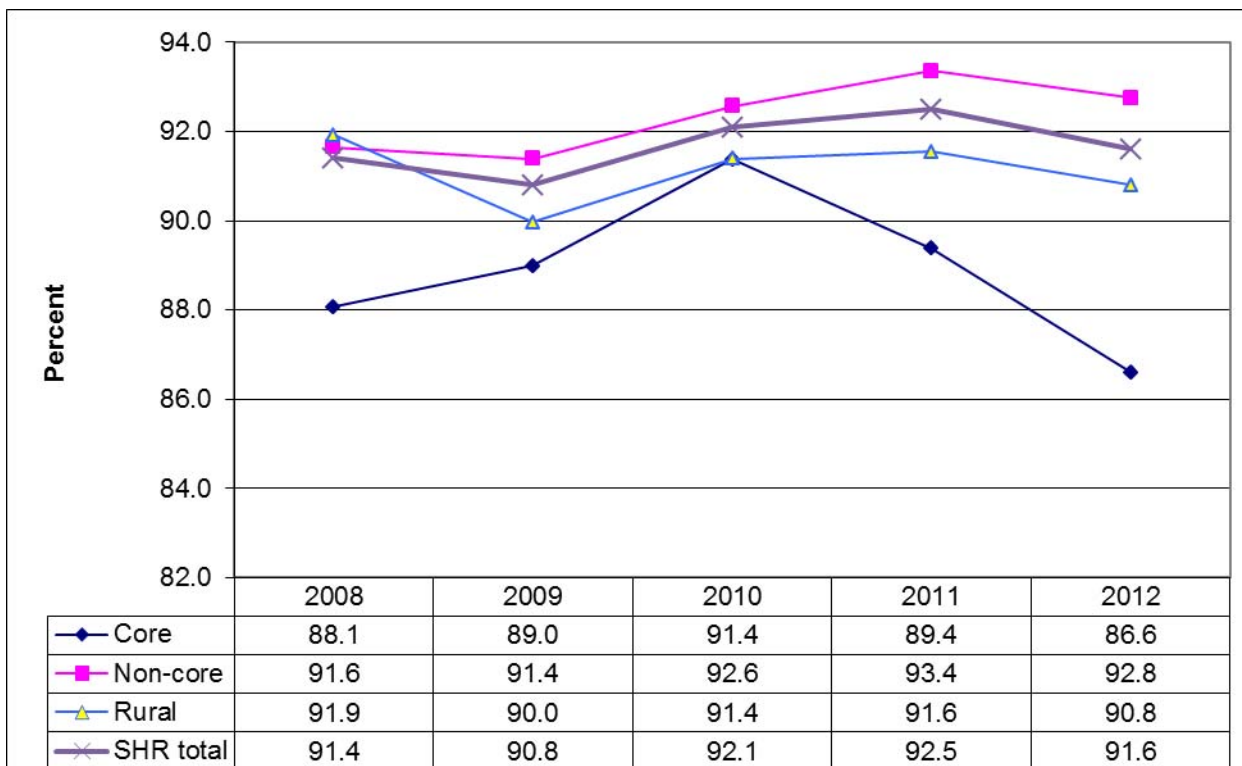
Since 2002, measles antigen is offered only in a combination vaccine of Measles, Mumps, and Rubella (MMR). Up to date coverage for this vaccine at age seven is two doses (given at age 12 and 18 months of age, according to the routine schedule).

The overall coverage achieved for 2 doses measles in SHR was 91.6%; the provincial coverage for 2011-2012 is 91.7%.<sup>xvi</sup>

Figure 6 below shows the five year trend for SHR overall seven year old measles coverage rates.

- Core coverage decreased slightly while coverage in non-core urban areas increased slightly and rural remained the same.
- The absolute difference in disparity in coverage between the three areas has increased from 4% to 6.2%.

Figure 6: Seven year-old coverage measles coverage (2 doses) by geographic location, Saskatoon Health Region, 2008- 2012



Source: SIMS

Diphtheria is one of 5 antigens in the DPTaP-Hib vaccine (protecting against diphtheria, polio,

<sup>xv</sup> Measles is a proxy measure for mumps and rubella (MMR), and diphtheria a proxy for polio, tetanus, and pertussis (DPTaP)

<sup>xvi</sup> Source Ministry of Health, preliminary data for internal use only and excludes children living in NITHA communities. Provincial coverage is based on fiscal year (cohort born between Oct 2004 and Sept 2005) compared to Skhr calendar year.

## 2012 Annual Immunization Report

tetanus, pertussis, and Haemophilus influenzae B). Up to date coverage for this vaccine by seven years of age can be four or five doses, depending on when it is administered.<sup>xvii</sup>

In 2012 86.8% of seven year olds are up-to-date for diphtheria antigen. The provincial coverage rate using five doses as the standard requirement is 77.7%.<sup>xviii</sup> However, children who received the fourth dose after the age of four, are considered up-to-date.

Figure 7 below illustrates core neighbourhoods have had consistently lower coverage but the gap widened again in 2012. In 2012 the core neighbourhoods trailed with a negative absolute difference of 4.5% compared to non-core Saskatoon areas. In 2012 the core neighbourhoods trailed by 11%, similar to the disparity seen in 2007 (not shown) when there was an absolute difference of 10%.

The decline in coverage in recent years is reflective of the social struggles families face in the core, specifically with the lack of housing causing increased movement in and out of the core neighborhoods. In addition, the volume of newly immigrated families into Saskatoon schools over the last few years, particularly in the Meadow Green neighborhood has increased the volume of records needing to be located and translated before immunization can be initiated. The record search and informed consent process is arduous given these circumstances, consequently leading to a delay in the initiation and completion of immunization in the same school year.

**Figure 7: Seven year old coverage for diphtheria antigen by geographic location, SHR, 2008- 2012**



Source: SIMS

<sup>xvii</sup> 4 or 5 doses DPTaP vaccine. To be considered up to date a child must have received a minimum of 4 doses diphtheria antigen, with at least 1 of which must have been received after the age of 4.

<sup>xviii</sup> Source: Ministry of Health 2011-12 by fiscal year, preliminary data for internal use only. Note: The Ministry uses a count of 5 doses diphtheria to calculate up to date independent of whether children received a dose after their 4<sup>th</sup> birthday which is different from the definition SHR uses (see footnote 18). In addition the Ministry includes children with "unknown" status pertaining to client activity (active or inactive) while SHR removes these clients from calculations (not believed to live in Region). Removal of unknown clients affects coverage minimally at the regional level.

## Grade 6 immunizations

### *Hepatitis B*

Hepatitis B virus (HBV) is one of several causes of hepatitis. Hepatitis infection may cause acute illness or chronic infection without symptoms. In 2005 it was estimated that chronic HBV infects approximately 250,000 Canadians. Without intervention between 15 and 40% will develop cirrhosis, end-stage liver disease or hepato-cellular carcinoma or require liver transplantation.<sup>8</sup> The vaccine has been offered to students 11-13 years of age (Grade 6 students) in Saskatchewan since 1995.

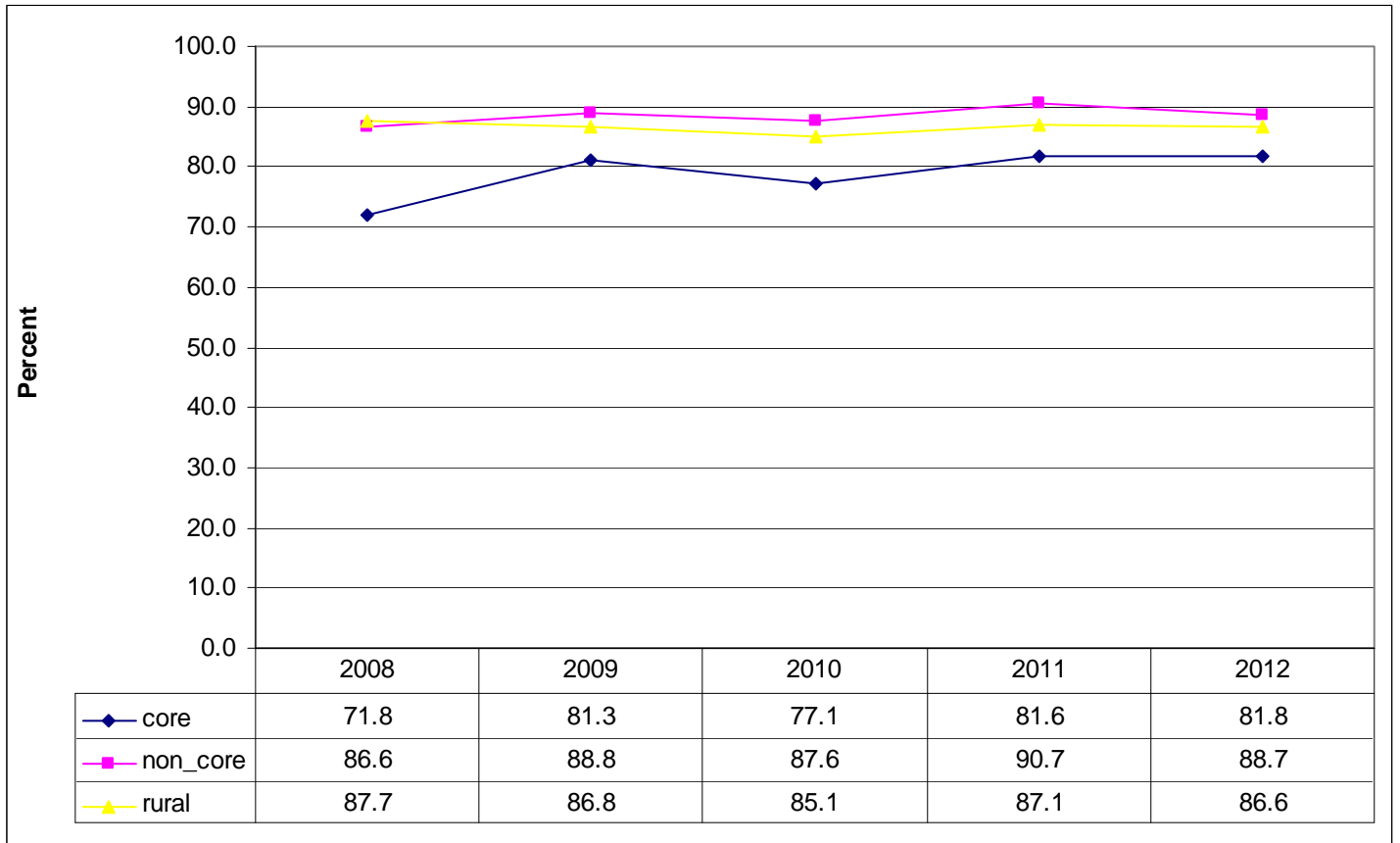
In September 2010, the eligibility for Hepatitis B vaccine was expanded and offered at no cost to children who are ages birth to Grade 5, have not previously received Hepatitis B vaccine, and whose families have immigrated to Saskatchewan from countries of intermediate or high prevalence of Hepatitis B [Table 3.4.1 *Recommended Publicly Funded Vaccines for Individuals Recently New to Canada, Chapter 7* (Saskatchewan Immunization Manual, 2012)]. A passive approach to eligibility means the Hepatitis B vaccine is offered to parents of eligible children when they present to public health for services. In 2012, 4424 doses of Hepatitis B vaccine were given to children less than 11 years, which was a substantial increase compared to 3292 doses provided in 2011. This is a reflection of the increasing numbers of newly immigrated families to Saskatoon.

In 2012, 6235 doses of Hepatitis B vaccine were administered to school aged children, 11 to 15 years (figure 9) as compared to 7043 in 2011. The 2012 overall percentage of 13 year old children with two doses of hepatitis B was 87.6%.

- *Figure 8* shows that overall coverage in the past year has decreased in the non-core neighbourhoods slightly and remained unchanged in the core neighbourhoods and rural.
- There remains a 7% absolute difference between core and non-core neighbourhood coverage in 2012.

## 2012 Annual Immunization Report

**Figure 8: HBV <sup>xix</sup> coverage at 13 yrs by geographic location, Saskatoon Health Region, 2008-2012**



Source: SIMS

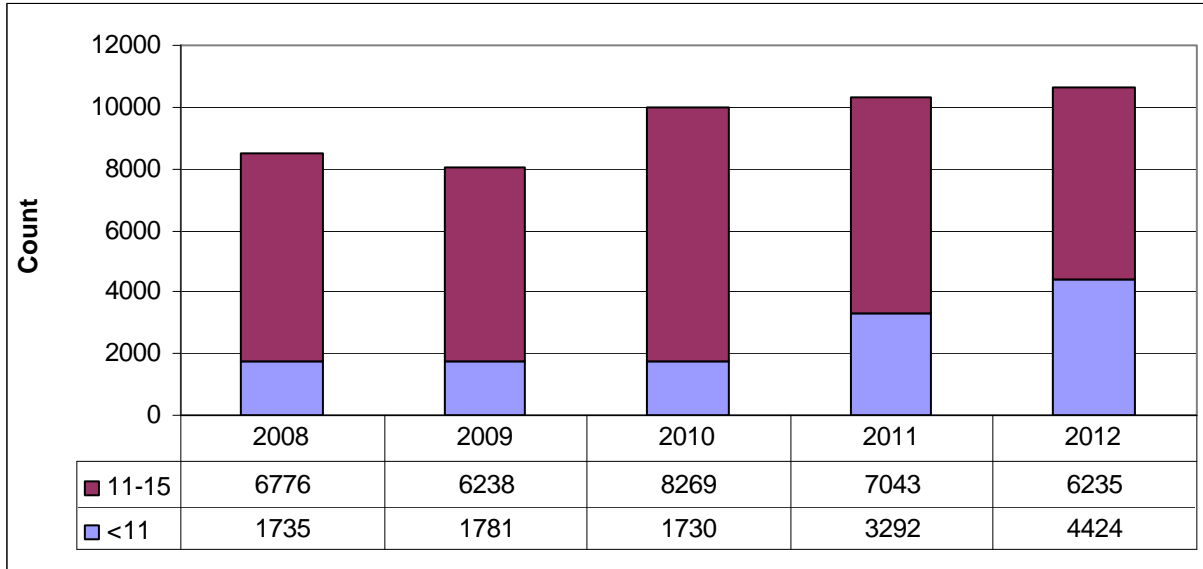
Hepatitis B vaccine is also offered to children at risk of developing disease due to certain chronic illness or close contact with persons with Hepatitis B infection.

- *Figure 9* shows the volume of hepatitis B doses administered to SHR children remained similar each year, until the increase in 2010 due to a change to a 3 dose series for Grade 6 children ages 11-15 years.
- In 2012, the number of Hepatitis B doses given to children less than 11 years of age increased by 34% due to the introduction of Hepatitis vaccine for newcomer children from countries with high or intermediate prevalence of hepatitis B disease.

<sup>xix</sup> In 2006 the vaccine changed and 3 doses were required for complete coverage. From 2007 to 2009 two doses of vaccine were required for coverage. In 2010, the program reverted to 3 dose series for one year due to Hepatitis B vaccine shortages.

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**Figure 9: Number of doses Hepatitis B vaccine given by selected age group, 2008-2012**



Source: SIMS

### ***Human Papillomavirus (HPV) for females only***

One of the most common sexually transmitted infections, HPV, is estimated to infect more than 70% of sexually active Canadians at some point in their lives. Most HPV infections occur without symptoms and are cleared without treatment, however, some types cause genital and anal warts, and persistent infection with other types can cause cervical cancer years later.<sup>9</sup>

Immunization in early teenage years is effective in protecting against most sexually transmitted HPV infections. The vaccine used at present in Saskatchewan provides protection against four HPV types, two that cause 70% of all cervical cancers and two that cause 90% of all genital and anal warts.<sup>9</sup>

The HPV immunization was introduced for Grade 6 and 7 females in elementary school in 2008 and the program has continued for females born on or after January 1, 1996 as a publicly funded 3 dose series.

## 2012 Annual Immunization Report

Table 6 highlights the statistics over the last five years of the HPV program and indicates a decline in the percentage of females who complete a three dose series while in Grade 6.

- Refusal rates are decreasing slightly. Females born on or after January 1, 1996 remain eligible for receiving publicly funded HPV vaccine into adulthood if they previously refused immunization.

**Table 6: HPV doses given at 12 years (females), 3 dose coverage percent and rate refused, SHR 2012\*\***

Birth year	Population	Percent (3)	Percent partial (1 or 2)	Percent philosophical objectors
1996	1905	66.5	1.5	19.7
1997	1792	70.6	1.2	19.3
1998	1779	72.2	1.5	15.1
1999	1793	74.0	5.3	13.8
2000	1842	70.0	9.0	9.2

\*Registered in SIMS

\*\* Coverage percentages are current to 2012 for each birth year that is displayed

Source: SIMS

Typically, females are immunized when they are in Grade 6 and 70% were up to date at 12 years of age in 2012, however, some females complete the series later on. In 2013, for example, 73.6% of females who had turned fourteen years of age (birth year 1998) were up to date for HPV vaccine, indicating that more females accept the vaccine or complete the HPV series in the two years subsequent to twelve years of age. Females remain eligible for funded vaccine into adulthood.

Grade 8 Immunization

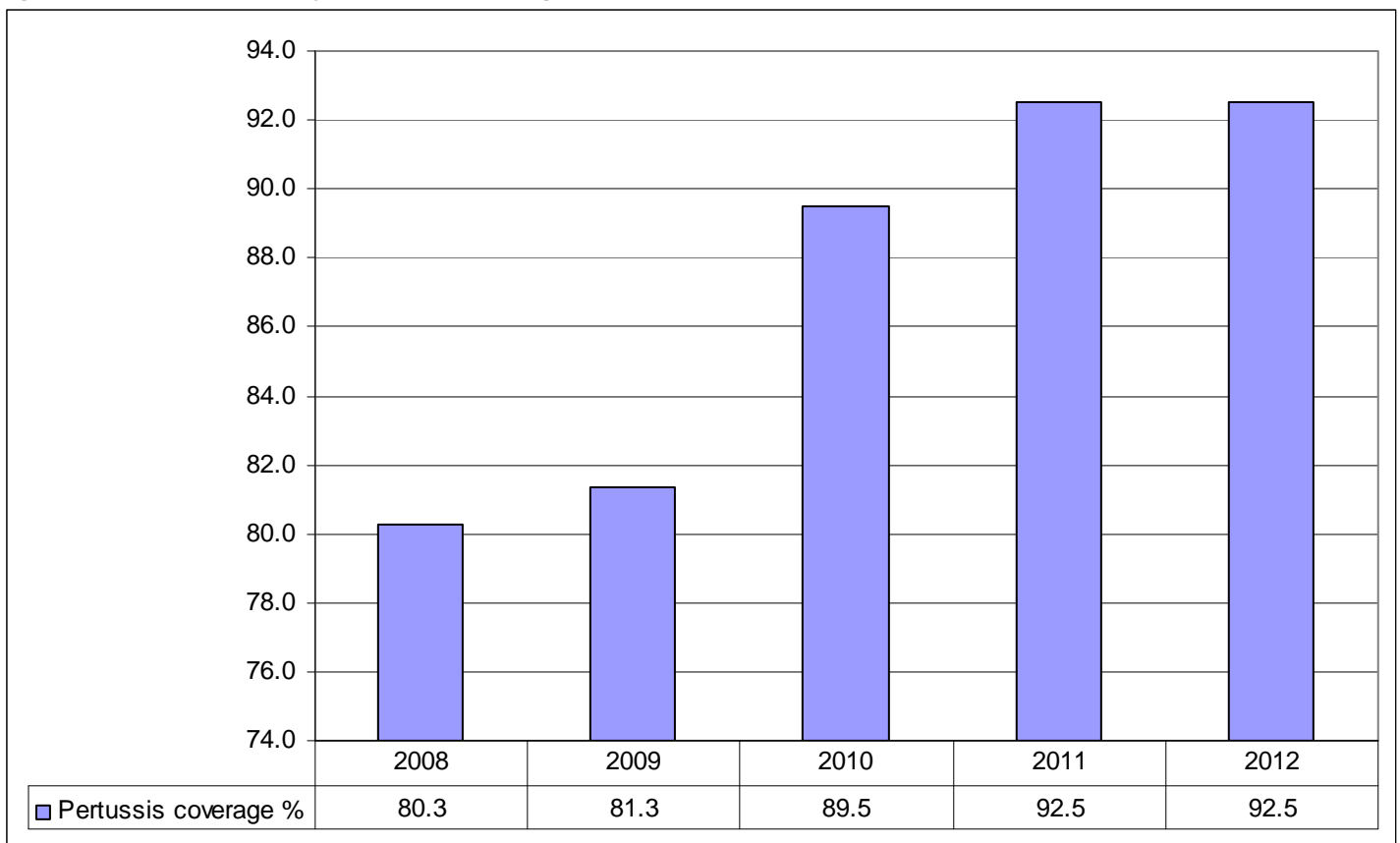
*Pertussis*

Pertussis, or whooping cough, is a highly infectious respiratory infection that can affect individuals of any age, although it is most common in childhood. Severity from the disease is greatest among young infants. One to three deaths occur each year in Canada, particularly in infants too young to have started their immunizations and in partially immunized infants (e.g. those who received only one or two doses). Although incidence rates of pertussis in Canada are far lower than in the pre-vaccine era, outbreaks continue to occur.<sup>10</sup>

In 2010, Saskatchewan experienced higher than normal numbers of pertussis cases in school age children after five years of low activity.

- *Figure 10* shows the percentage of 15 year olds receiving the Tdap vaccine <sup>xx</sup> increased quickly after the introduction of the Tdap booster program in 2004. <sup>xxi</sup>
- The increase in the percentage receiving the booster from 2009 to 2012 may partly be accounted for by increased focus on the importance of pertussis immunization during the outbreaks experienced in 2010.

Figure 10: Percent of 15 year olds receiving pertussis booster, SHR, 2008-2012



<sup>xx</sup> Percentage of 15 years olds receiving booster does not express a coverage rate. The recommended number of vaccines by age 15 depends on when the vaccine was received.

<sup>xxi</sup> In 2004 coverage was 6.7%. The impact of the school program was first seen in 2005.

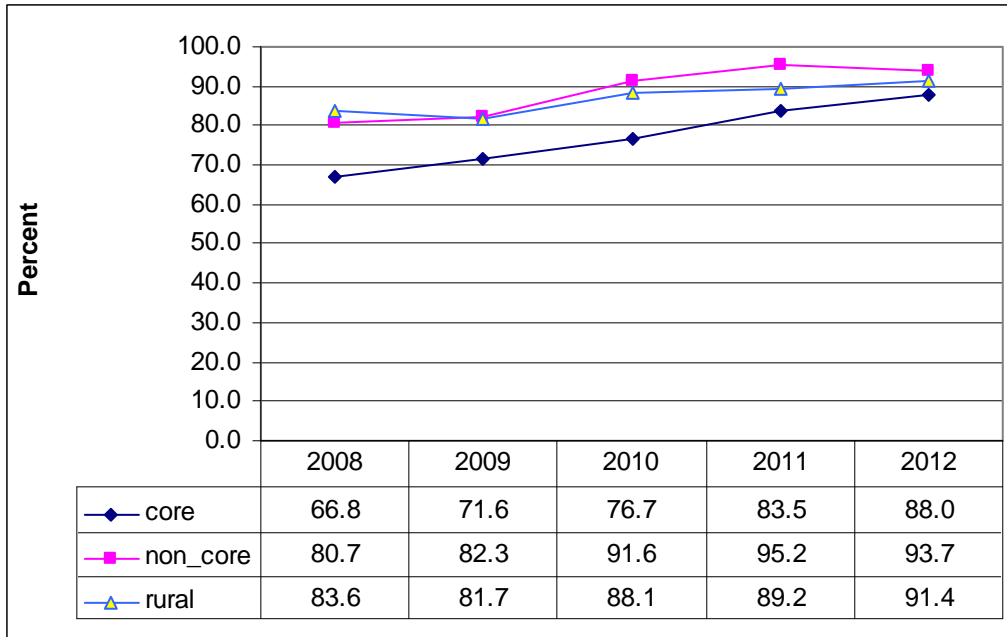


## 2012 Annual Immunization Report

Coverage for pertussis at 15 years remained high as illustrated in *Figure 11*.

- In 2011 there was a 12% disparity between core and non-core neighbourhoods; in 2012 there is a 5.7% disparity.
- The 2012 Tdap (1 dose) Grade 8 vaccine uptake decreased slightly to 93.7% for non-core neighbourhoods in Saskatoon, and increased in core neighbourhoods and rural SHR.

**Figure 11: Percent of 15 year olds receiving pertussis immunization (1 dose) by geographic location, Saskatoon Health Region, 2008-2012**



Source: SIMS #of children in SIMS who received dose at age 15 years/# of active SIMS registered children

## Section 4: Adult immunization

### Hepatitis B

Hepatitis B is a blood borne virus that is clinically recognized as an acute (symptomatic) or chronic (carrier) illness. Major modes of transmission include sexual or close household contact with an infected person, mother to infant transmission, and injection drug use. The trend in both acute and chronic infection has been increasing in SHR since 2005. After several years of increases acute Hepatitis B infections, the rate decreased in 2012 to 0.3 (one case) from 2.8 per 100,000 (9 cases) in 2011.

In addition to the preschool and school age programs, Hepatitis B vaccine is offered at no cost to persons at high risk for developing disease, including those in close contact with individuals with Hepatitis B infection, and persons at high risk of acquiring disease.

Persons travelling to countries of high and intermediate risk are encouraged to purchase the vaccine, as the risk of acquiring Hepatitis B is higher than in Canada.

The data in this section provides a picture of the role of programs within and outside of Public Health Services in immunizing our population with hepatitis B vaccine for all age groups.

- Table 7 and Figure 12 show the greatest increase in number of doses has been administered through the Public Health offices and the Sexual Health Program. International Travel Centre continues to administer the greatest volume of doses.<sup>xxii</sup>
- Total number of Hepatitis B doses administered in the programs below increased in 2012 to 13246, compared to 12255 doses in 2011.
- Public Health Centres increased immunizations by 31% in 2012 from 2011, as result of parents, newly immigrated to Canada, presenting with children at child health clinics and also being immunized.
- Physicians also increased by 18% in 2012 from 2011.

**Table 7: Number doses of Hepatitis B vaccine given by selected immunization programs and other providers, Saskatoon Health Region, 2009-2011, all age groups\***

	2008	2009	2010	2011	2012
<b>Public Health Services</b>					
Communicable Disease Control	414	320	208	191	201
Public Health Centres	1034	1159	1419	2729	3583
International Travel Centre	1657	3294	4915	4784	4644
Sexual Health	71	44	51	117	179
Street Outreach	90	49	116	282	243
<b>Non Public Health Services</b>					
Physicians	2317	2944	2511	2465	2909
Positive Living Program	11	52	51	50	34
SHR Hospital	457	357	540	450	420
OH&S*	n/a	1604	1238	1390	1089

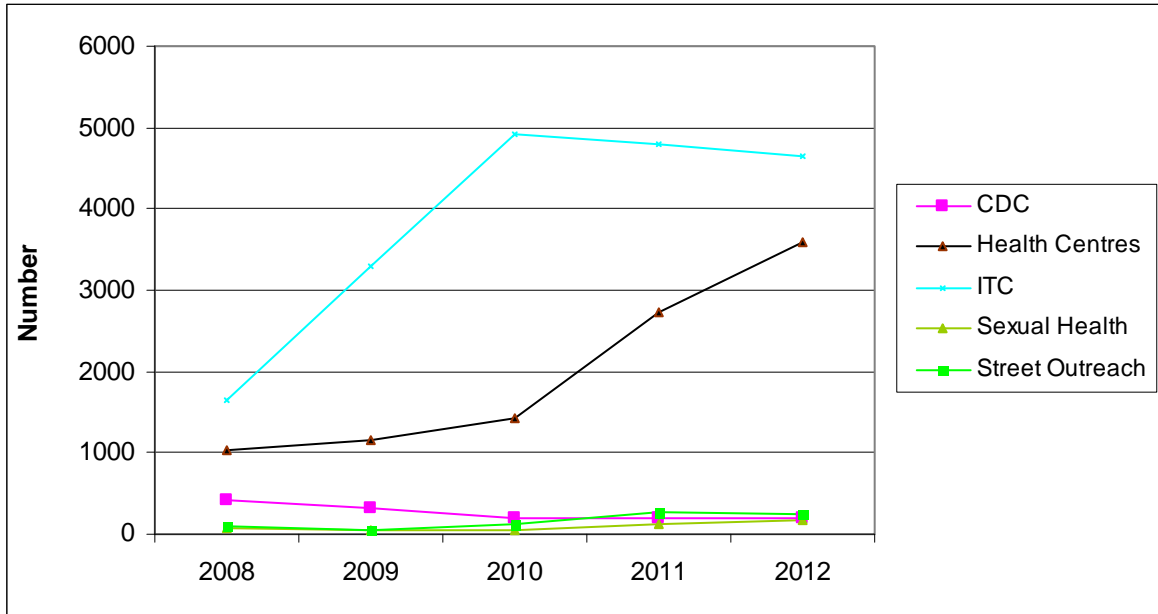
Source: SIMS and People Strategies (SHR Occupational Health and Safety)

<sup>xxii</sup> Data includes doses that were paid for by the individual clients (ITC and physician numbers) as well as funded program vaccine doses.

## 2012 Annual Immunization Report

\* Note: Not all Hepatitis B vaccines given prior to June 1, 2008 have been back-entered in to SIMS; therefore 2008 data is incomplete. Not all programs are displayed here. The programs shown are here are mostly adult programs.

Figure 12: Hepatitis B immunization by Public Health Services programs, Saskatoon Health Region, 2008-2012



Source: SIMS

## 2012 Annual Immunization Report

### Pertussis

As a result of increased cases of pertussis in 2010, a campaign to immunize mothers and other primary caregivers of infants less than six months of age began in June 2010, with in-hospital immunization of postpartum of mothers starting in September 2010. The in-hospital provision of pertussis immunization for mothers creates equity in health care service for those clients eligible for immunization through a standing physician order.

In 2011, with the expansion of the Tdap program eligibility to all adults over 18 years of age, Public Health saw increases in pertussis vaccination, as did other locations, such as physician offices.

- *Table 8* shows increased volume of adult pertussis immunization across locations in 2012 except staff immunization delivered by People Strategies.
- Under Public Health Centres, the Sexual Health program immunized 126 clients in 2012, more than doubling immunizations in 2011 (not shown). Street Health immunized 206 clients, about the same volume immunized in 2011 (not shown)
- Hospitals immunized 4112 in 2012; in 2011 <sup>xxiii</sup>there were 3880 births to SHR residents (2012 births not available). Taking into account a slightly higher population in 2012, the coverage rate for new mothers will very likely be close to 100%.

**Table 8: Adult (18+ yrs) pertussis immunization doses by specific programs in SHR, 2008-12**

	2008	2009	2010	2011	2012
<b>Population &amp; Public Health Services</b>					
Communicable Disease Control	12	14	33	67	106
Public Health Centres	44	44	2361	2729	3020
ITC	147	593	971	1400	2114
<b>Other Immunizers- Non Public Health Services</b>					
People Strategies			1537*	779	469
Physicians	49	71	159	1631	3502
SHR Hospital		4	1403	3949	4112
SIMS recorded not assigned to above programs	54	61	225	842	792
*People Strategies started administering Tdap in 2010 but did not differentiate between Td and Tdap in Parklane database					

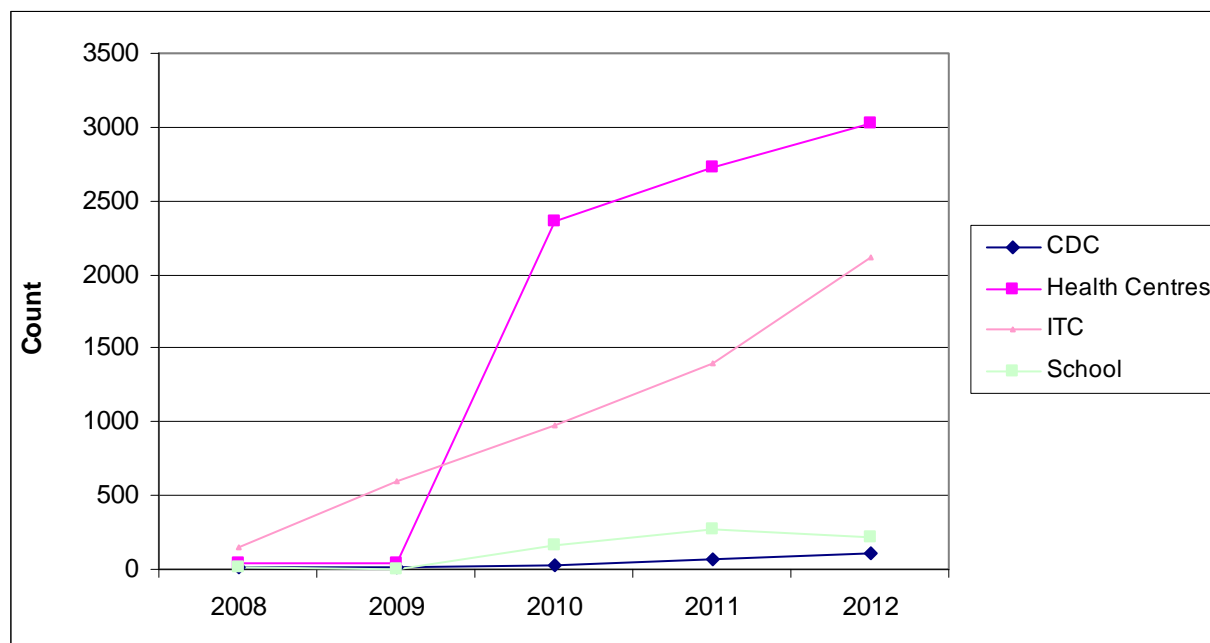
Source: SIMS and Parklane database (OH&S only)

<sup>xxiii</sup> Source: Vital Statistics – latest available year at time of report. Census SD for calendar year reports 4116.

## 2012 Annual Immunization Report

- The volume of Tdap given at International Travel, SHR hospitals and Physician offices had the largest increase in the past year. The increase is due to the expanded eligibility for adult Tdap immunization program.
- *Figure 13* shows a continued increasing trend in specific public health programs delivering Tdap vaccine, most specifically Health Centres and ITC.

**Figure 13: Adult pertussis immunizations by specific programs in Public Health Services, 2008-2012**



	2008	2009	2010	2011	2012
CDC	12	14	33	67	106
Health Centres	44	44	2361	2729	3020
ITC	147	593	971	1400	2114
School	8	5	161	276	212

Source: SIMS

### ***Pneumococcal Polysaccharide 23 Immunization***

Invasive pneumococcal disease is a reportable disease that causes meningitis and septicaemia among other serious outcomes. There are dozens of different strains of pneumococcal disease, with the current adult vaccine protecting against 23 of the most common. In SHR the vaccine is primarily administered to eligible persons in conjunction with the influenza immunization program.<sup>xxiv</sup> Eligibility includes: those who have recently turned 65 years of age, those newly identified with specific health conditions, and those requiring a one-time re-immunization.<sup>xxv</sup>

Offering vaccine to persons eligible when they present for their annual influenza immunization at mass immunization clinics improved the uptake of vaccine by those who are at increased risk.

<sup>xxiv</sup> Pneumococcal conjugate vaccine protects against fewer strains of pneumococcal disease than the polysaccharide vaccine and is administered to pre-school aged children after two months of age.

<sup>xxv</sup> For eligibility for provincially funded pneumococcal polysaccharide vaccine see <http://www.health.gov.sk.ca/pneumococcal-tearsheet>

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- *Table 9* demonstrates that the number of clients receiving this vaccine has decreased since 2010. In 2010 the vaccine was offered to clients medically at risk, as well as, person over 65 when influenza vaccine was provided. This caused a noticeable increase which is now levelling off to more reflect what we administered annually. Once immunized, no further doses are required except in very special circumstances.
- Total number of Pneumococcal 23 doses given in 2011 was 3532 and in 2012 was 2633, a 25% decrease. The approach is passive, whereby persons receive the vaccine when they present for another service. For example, in 2012 Street Outreach program more than doubled the number of doses provided to high risk clients compared to 2011.

**Table 9: Pneumococcal 23 vaccine doses by specific immunization program/facility, by Birth Cohort, Saskatoon Health Region, 2008-2012, all age groups**

	2008	2009	2010	2011	2012
<b>Public Health Services</b>					
Communicable Disease Control	20	29	27	29	40
Public Health Centres	1283	1120	705	773	409
International Travel Centre	149	138	76	45	65
Mass Immunization			2270	1615	1003
Sexual Health	7	9	8	8	67
Street Outreach	33	17	30	107	235
<b>Other Non Public Health Services</b>					
Physicians	716	658	551	466	472
Positive Living Program	6	38	22	27	4
SHR Hospital	139	94	97	104	114
SHR Long Term Care	111	94	112	72	74
Unspecified/Unknown/Other	136	158	206	286	150

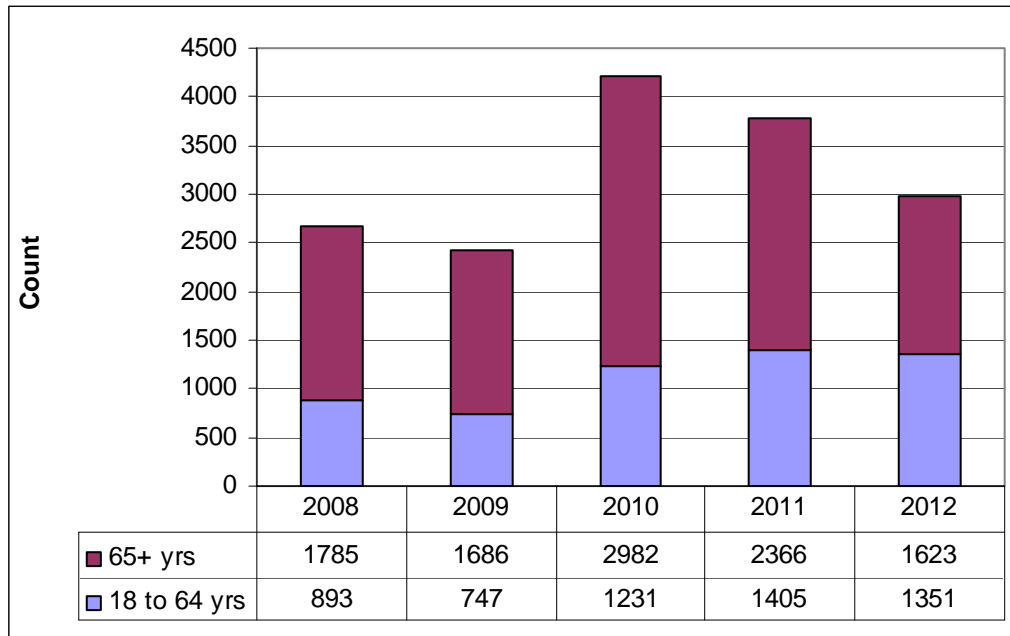
Source: SIMS

\*Vaccine given at mass immunization clinics 2007-2009 entered under Public Health Centres for these years.

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Figure 14 illustrates those client groups most likely eligible for this vaccine: persons under 65 years of age with a chronic medical condition, or those clients over 65 years of age. Children under 18 years of age qualify for certain medical conditions, but are not reported in this table.

**Figure 14: Doses of Pneumococcal 23 vaccine by high risk age group\*, Saskatoon Health Region, 2008-2012**



\* High risk categories include over 65 years and 18-64 years with a chronic medical condition  
Source SIMS

## Section 5: Influenza

Each year influenza disease causes significant morbidity and mortality in the Canadian population. Complications are most common among the elderly and persons with underlying health conditions. Annual vaccination is necessary to protect against the strains deemed most likely to be circulating in a given year. Laboratory confirmed cases, of course, represent only a small proportion of influenza cases, however they provide a general indication of disease rates and severity of influenza activity each season.

This year, influenza activity started earlier than in the previous two seasons and was more intense. The annual number of cases in 2012-13 (314) exceeded the previous year's total by 64% (192). The overall percentage hospitalized and the percentage of age groups hospitalized did not change appreciably, and age specific rates were similar to last year with the highest rates in infants and seniors. Overall rates of influenza B were roughly double. In 2012 to time of this report there were a total of 10 confirmed influenza A outbreaks and 13 other respiratory outbreaks (corona, rhino, metapneumo, parainfluenza and RSV) in Long Term Care facilities this year, compared to 11 influenza A and 7 respiratory outbreaks than last season.

In 2013 activity was sporadic into the summer months. Although influenza seasons occur from September to August annually in the northern hemisphere, most activity occurs in the winter months. This is the second year in a row when influenza activity has continued past the winter. Late influenza activity raises questions about the protection offered by the annual influenza vaccine, and has implications for the timing of influenza immunization scheduling, which traditionally occurs in the early fall each year. In 2011-12 the number of influenza cases presenting after April 30 represented 16 % of total cases of influenza A cases and 58% of influenza B cases. 2011/12 was the first season (excluding pandemic year) when there was influenza positivity in June and July for the previous five years.

- In *Table 11* the overall 2012-13 rate of laboratory confirmed influenza A cases was 70.7 per 100,000 population (compared to 45.6 in 2011-12) and confirmed influenza B was 21.8 per 100,000 population (compared to 14.8 in 2011-12).
- A total of 79 cases were hospitalized (25%), similar to last year. The highest percentage of hospitalizations for influenza are the youngest and the oldest age groups.
- Fourteen percent (44) of all laboratory confirmed cases were in children under five; 21% (64) of all cases were in children 0 to 19 years.
- All sub-typed influenza in SHR were covered by the 2012 seasonal vaccine. <sup>xxvi</sup>

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<sup>xxvi</sup> 23 A/H3/N2(seasonal), 6 A/H1N1, 1B/Wisconsin. The World Health Organization (WHO) recommended that the trivalent vaccine for the 2011-2012 season in the Northern Hemisphere contain A/California/7/2009 (H1N1)-like, A/Perth/16/2009(H3N2)-like and B/Brisbane/60/2008(Victoria lineage)-like antigens.



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**Table 11: Influenza cases, percent hospitalized and rate per 100,000 population by age group, Saskatoon Health Region, 2012/13\***

Influenza 2012-13 full season, 2013						
Age Group	Type A	% Inf A hospitalized	Inf A rate/100K	Type B	% Inf B hospitalized	Inf B rate/100K
<1	12	60	241.4	4	50	96.6
01 to 04	20	15	122.3	11	18.2	67.3
05 to 19	22	9.1	37.9	30	10	51.6
20 to 44	48	8.3	41.8	17	11.8	14.8
45 to 64	43	25.6	51.5	15	0	18
65 +	82	41.5	199.7	10	70	24.4
Total	227	26.7	70.7	87	21.8	27.3

\* The influenza season is from Sept 1 to Aug 31<sup>st</sup>.

Source: Sentinel reporting influenza

The National Advisory Committee on Immunization (NACI) expanded recommendations for eligibility in 2011 and encouraged all persons to receive the vaccine, although it fell short of recommending ongoing government funded universal influenza programs.

Provincially funded vaccine has been made available to everyone in Saskatchewan since 2011, although there has been a particular focus on immunizing high risk groups. High risk groups included: children 6 months to less than fifty nine months of age, persons age 65 years and older, people with chronic medical conditions, pregnant women, health care workers, and long term care residents and staff.

The 2012-13 influenza programs commenced on October 14 2012, with the majority of immunizations provided at large community drop-in clinics from early mid -October to mid- November. Vaccine was not offered after March 31 2013, except to children under 9 years who required a 2<sup>nd</sup> does to complete their series.

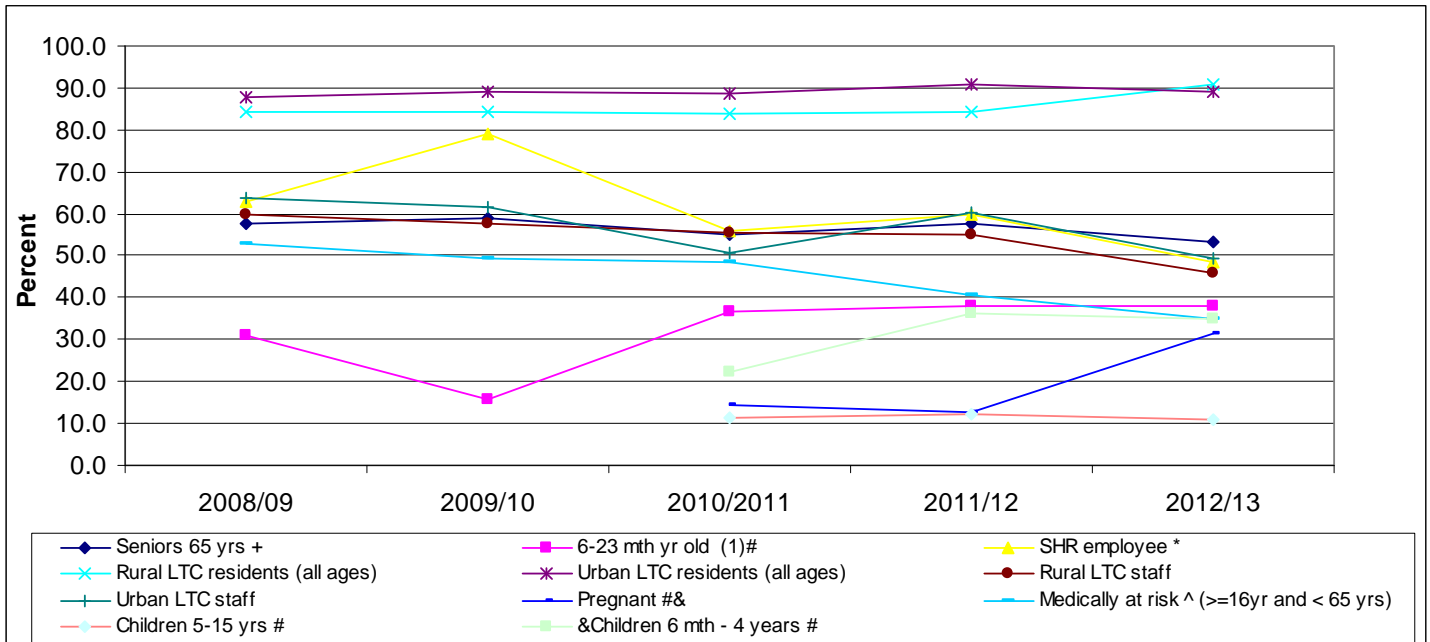
During the 2012-13 influenza season 23% (75090/323938) of the population in SHR received seasonal influenza vaccine. Before 2009-10, the eligible age groups for funded influenza vaccine included clients 65 years of age and older, and infants 6- 23 months of age. Other clients outside the eligible categories had to purchase the vaccine (approximately 11,347 doses of influenza purchased by clients in 2008-09; no seasonal influenza vaccine doses purchased in 2009-10).

*Table 12 and Figure 15* show influenza immunization coverage by risk category.

- Coverage continues to decrease among seniors 65 years and older.
- Immunization coverage for six to 23 month old children has remained at 38% for two years
- Coverage of medically at risk has been falling for five years and was 34.8% in 2012-13.
- SHR employee immunization fell dramatically to 48.6% after an increase to 60% coverage in 2011/12.
- Long term care staff coverage is now under 50%. Urban long term care (LTC) staff coverage is slightly higher than rural, at 49.3% and 45.7% respectively.
- Immunization coverage of LTC residents is consistently high and 89% and 90.7% for urban and rural facilities respectively.

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Figure 15: Seasonal influenza vaccine coverage by risk group, Saskatoon Health Region, 2007-2012



	2008/09	2009/10	2010/2011	2011/12	2012/13
Seniors 65 yrs +	57.6	59.0	55.1	57.5	53.1
6-23 mth yr old (1)#	31.1	15.6	36.6	38.0	38.0
SHR employee *	63.0	79.0	56.0	60.0	48.6
Rural LTC residents (all ages)	84.1	84.3	83.9	84.2	90.7
Urban LTC residents (all ages)	87.7	89.2	88.8	90.7	89.0
Rural LTC staff	59.8	57.7	55.4	54.9	45.7
Urban LTC staff	63.6	61.6	50.8	60.3	49.3
Pregnant #&			14.5	12.7	31.5
Medically at risk ^ (>=16yr and < 65 yrs)	52.9	49.3	48.6	40.7	34.8
Children 5-15 yrs #			11.4	12.4	10.8
&Children 6 mth - 4 years #			22.4	36.4	35.0

Source: PHS, SIMS, People Strategies

\* includes LTC staff (\*Source SHR People Strategies)

+ includes LTC residents 65+ yrs

^ based on medically at risk counts plus continuing care divided by estimate of % of total population

& based on the number of live births in calendar year

Coverage seniors 65 yrs + includes LTC resident

Note: blank cells indicate new parameters for which no data collected previous to 2010

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Table 12: Influenza (1 dose) by risk group, Saskatoon Health Region, 2008-2012

Risk Group	2008/09	2009/10	2010/2011	2011/12	2012/13
Seniors 65 yrs + (not in LTC)	20609	21530	19964	21666	20851
6-23 mth yr old *	2419	1236	2930	3213	3123
SHR employee	7324	8252	6859	7188	6646
Rural LTC residents	618	569	600	577	569
Rural LTC 65 yrs +	596	540	576	553	547
Urban LTC residents	1382	1318	1313	1381	1407
Urban LTC 65 yrs +	1073	1075	994	1128	1084
Rural LTC staff	541	520	484	451	416
Urban LTC staff	1350	1492	1137	1330	1311
Pregnant	248	296	565	525	473
Medically at risk~	8828	8284	8169	7274	5849
Children 5-15 yrs	n/a	n/a	4577	5094	4348
Children 6mth - 4 years *	n/a	n/a	4293	7309	7192

\* 1 dose Source SIMS

+ <65 yrs residing in LTC facilities

~ >=16rs and <=64 yrs medically at risk (risk 3) minus LTC

^^ urban and rural LTC

n/a not available

Table 13 indicates that the largest proportion of influenza immunizations in 2011 was provided by Public Health Services.

Table 13: Influenza doses by service providers, Saskatoon Health Region, 2009-2012

	2009/10	2010/11	2011/12	2012/13	% increase or decrease from previous year
Public Health Services	25212	50971	53091	47164	decrease 11.2%
Physicians	8881	16302	15225	15446	increase 1.5%
People Strategies	8252	6859	7188	6914	decrease 3.8%
Third party nursing services*		7596	9359	5566	decrease 40.5%

Source: SHR influenza database; external nursing service providers

\*Third party nursing services provide purchased influenza immunization to clients through contracts with employers. 2010-11 was the first year of stats included from them in this report.

\* Third Party includes private nursing service with the exception of WeCare.

## Section 6: Strategic Goals, Directions and Activities for Immunization 2013-14

An improvement target in the Ministry of Health-Plan for 2012-13 is to immunize 95% of children ages two and seven by 2017 for the recommended doses of publically funded vaccines. This target is a placeholder value and currently under review. It is subject to change following consultation with expert advisory groups.

### Objective 1: Improve overall coverage for 2 year olds (2 doses measles).

#### Activities:

##### General program

- Continue social marketing campaign during National Immunization Awareness week with a focus on promoting immunization to newly immigrated families.

##### Pre-school age

- Expand immunizers to other health care providers to immunize children at opportunistic times when present for other health services, with a focus on: acute care Pediatrics, and NPs as primary care providers.
- Continue with "Done by 2" strategy for all neighborhoods in SHR.
- Use a standard definition for calculating "wait time" so that a client waits no more than one week from booked appointment to appointment with the immunizing nurse.

### Objective 2: Reduce disparity in immunization coverage rates

#### General program

- Continue to measure disparity. Calculate disparity by comparing Disparity Area 5 (lowest income) to overall SHR coverage rate to determine how this measure compares to the current measure of DA5 to DA1.

#### Pre-school age

- Maintain the enhanced personalized reminder system to core and core-fringe neighbourhoods within SHR that have low coverage rates.
- Review the use of text messaging and privacy policy compliance to potentially expand recall program for children living in core and core-fringe neighbourhoods.
- Work collaboratively with BHE (Building Health Equity Program) to implement ideas put forward in their strategic planning process as follows:
  - Continue to work on relationships with other agencies providing immunization services to core neighborhoods.
  - Immunize in homes where appropriate
  - Explore a mobile service.
  - Explore ways for the transportation supports(taxi) to operate more smoothly
  - Explore possibility of adding content to waiting room video loops provided by other service providers.
  - Create social media climate to convey urgency for timely immunizations.
  - Create a Facebook page where the information could be shared with others.

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- Consider allocating one public health nurse position to work closely with community program builder to allow for drop-in and home immunizations.
- Define and implement an immunization blitz for Pleasant Hill neighborhood.
- Consider other means of contacting clients such as H-15 and district book.
- Consider including taxi number on immunization promotional products such as door hangers to advertise transportation is available.
- Explore clinic locations and hours of operation to maximize access.
- Review clinic locations and times to ensure access is maximized.

Work collaboratively with the Rosthern and Area team to implement recommendations generated from the client survey conducted summer 2012:

- Place standing advertisement in community newsletters including name of PHN, days for clinic in that community and phone number for appointment.
- Submit articles to local newspapers aimed at influencing attitudes, emphasizing the importance of immunization and addressing common misconceptions. Topics to be addressed could include: absence of thimerisol in vaccines, previous reactions to whole cell vaccines, family history of vaccine reactions, and importance of following recommended immunization schedule.
- Pilot an extended hours clinic in Rosthern once/month.
- Continue with SHR automated phone message reminders, adding a proactive reminder for the 18 month appointment. Mail postcard reminder for clients with no phone number. (The advantage of a written reminder is that it is a visual reminder for the client to make an appointment.)
- Explore possibility of family physicians reminding families when immunization is due. Physicians could hand out immunization postcard at 6, 12, and 18 month appointments and share key immunization messages with parents regarding the importance of immunization and following the recommended schedule.
- Continue to work with Social Services to ensure that children in the foster care system are immunized.
- Explore possibility of data sharing for children moving on and off reserves.
- Develop a visual reminder of recommended immunization schedule that could easily be displayed. (i.e. fridge magnet) Explore the possibility of a more personalized card indicating when that particular child is due, including a phone number to book appointment.
- Utilize social marketing principles to explore strategies to impact attitudes towards immunization, dispelling myths, and recognizing the role fathers play in decision making.
- Explore use of community program builders to assist with home visiting and reminding families due for immunization. Explore possibility of having public health nurses' phone or home visit clients behind in immunization.
- Explore possibility of having "Immunization" link on health region home page to assist clients in locating clinic locations and times. (This could possibly be located under ITC link)

### **School age**

- Align local process for school immunization with the new provincial strategy (September 2013) while maintaining the electronic matching of class lists with SIMS to identify children due for immunization.

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- Focus work of program assistants and nurses on obtaining immunization records and immunizing students in all schools grades 1, 6, 8 and high school daycares. Students in all other grades continue to be matched to SIMS and if not UTD are invited to a drop-in clinic.
- For 2014 school year, use the school database to generate a notice to parents of students Not matched with SIMS to provide information for locating an immunization record.

### **Objective 3: Improve quality of service provision for immunization services.**

#### **Activities:**

##### **General program**

- Revise immunization orientation modules to incorporate the British Columbia modules as the primary source for e-learning.
- Explore a standardized method of reporting immunization error rates.
- Recommend to Ministry of Health that all clients with new HSN numbers are given information on why/when to contact local public health office about immunization or refer clients to Health Line for phone numbers.
- Explore policy for the provision of an immunization record upon registration at school.
- Identify and explore issues related to newcomer population.
- Ensure all Public Health offices are reminding clients within 24 hours of booked appointments and calling "no shows" to rebook.
- Consider in-service education on Immunization Hesitancy, including how to talk with parents.
- Prepare to transition to Panorama for the management of vaccine supply (March 2014) and immunization provision (December 2014).
- Implement an electronic clinic scheduling system.
- Explore how to support First Nation Communities in SHR to have access to SIMS as their primary recording system.
- Explore how to best communicate with those clients with English as an Alternate Language, including informed consent for immunization.
- Identify ways to improve preschool immunization coverage rates by drawing on LEAN principles to guide the work.
- Provide immunization service to client first in appointment to decrease wait times for client, improve client safety for observation of severe allergic response, and to provide standard service

##### **Preschool age**

- Implement a mechanism to access SIMS easily at satellite clinics.
- Continue drop-in evening clinics and Saturday clinic to increase accessibility and flexibility for parents.
- Create a PHS policy where PHS staff must confirm current address, email and phone number of clients at every immunization appointment.
- Develop resources and a culture that supports pain management techniques to minimize client discomfort during immunization.

##### **School age**

- Explore working with local school divisions on how to increase immunization rates (i.e. registration process for newcomers to schools providing immunization record upon registration at school).
- Develop relationship with school boards in collaboration with other PPH departments by reporting back to them aggregate numbers of children up to date in their schools.
- Implement annual meeting with superintendents of school divisions to share immunization

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data and PPH initiatives.

- Develop resource for preteen-young adults addressing ways to cope with fears of immunization.

### **Adult**

- Ensure new mothers receive Tdap immunization prior to discharge home from hospital.
- Identify a process of identifying immunization status of mothers on postpartum that received Tdap in hospital after September 2010 to avoid a repeat dose of vaccine.

### **Influenza**

- Rely on SHR owned facilities for clinic sites after the blitz at Prairieland Park to reduce cost of operation.
- Explore a site in the Market Mall area. Continue with evening clinic times at mass clinic sites in both urban and rural areas.
- Continue with purposeful influenza appointment booking for family members of pre-school children attending Child Health Clinic appointments.
- Send public posters to display in physician offices to those persons with medical conditions as they are the most at risk from influenza disease. Include influenza statistic reporting on medically at risk clients to physician offices, as low numbers of coverage in this category.
- Recruit additional physician offices to immunize for influenza, especially those that have contact with high risk individuals such as obstetricians, gerontologists and paediatricians.

## Section 7: Methods

Methods for calculating coverage rates may vary from province to province and country to country, depending on the reporting source. Some coverage rates utilize self-report surveys by parents and others use manual counts of paper records. The coverage rates presented in this report are based on the electronic record in the Saskatchewan Management System (SIMS), a database primarily designed to look up and maintain a child's immunization schedule from birth. All children born 1993 to present have their immunization history recorded in SIMS.

In SHR children are registered in the SIMS database from the hospital birth notification, before they are eligible for immunization. This allows for the calculation of the coverage rate denominator. A child becomes part of the coverage numerator if they are immunized on or before the birthday of the age of interest. Pre-school children who migrate into the province are registered in SIMS when they receive a health services number and present to Public Health for services. School-age children are registered when Public Health becomes aware of the child and obtains immunization history.

Adult immunizations are entered into SIMS at point of service currently, since 2008, with the exception of seasonal influenza immunization. Prior to 2008, immunizations were recorded on hard copy records. These hard copy records are stored at the Public Health Services North East office. Adult immunizations presented in this report are based on a combination of SIMS, the SHR Public Health Services Influenza Vaccine database, and Parklane, operated by SHR People Strategies in SHR.

Influenza immunization for children ages 6- 23 months of age has been recorded in SIMS since free vaccine was offered for these ages, in 2005. In 2011, children under age 9 had influenza immunization recorded in SIMS. Influenza immunization for clients 9 years of age and older is not recorded in SIMS due to capacity for data entry, rather it is recorded on a paper consent form.<sup>xxvii</sup> The data source for the numerator for influenza immunization for high risk adults, including long term care residents, residents with chronic disease and seniors, is Public Health Services Influenza Vaccination Statistics; the denominators for this coverage are covered population. The estimated percentage of chronically ill residents (thereby eligible for free influenza vaccine) is 14% of the general population based on a methodology provided by CDC Atlanta.

The SIMS database is a live data set; this means that in and out migration can impact coverage rates over time. For example, if in 2010 we have 100 two- year-olds who are up to date for MMR (100% coverage) and in 2011 ten unimmunized two year olds move into that neighbourhood, when we measure the 2010 two year coverage rate in 2011 the coverage rate is 90%. In order to minimize the impact of migration, coverage rates are "frozen" in time, that is calculated and retained from the month after a person turns the age of interest. This allows Population and Public Health to monitor the performance indicators, i.e., coverage of persons living in SHR who will turn the age of interest. This methodology does not include in the numerator or denominator children who move into the Region **after** they turn the age of interest. This methodology was used to calculate the coverage rates in SHR for 2010 and 2011. This methodology yields coverage rates approximately 1% higher than a methodology that includes all individuals who have turned the age of interest during a calendar year regardless of when they moved into the area in a calendar year.

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<sup>xxvii</sup> In 2009 all influenza A H1N1 immunizations were entered into SIMS, not only high risk individuals.



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Coverage rates are expressed as the percent of clients who received the Saskatchewan Ministry of Health recommended number of doses for the antigen of interest (or combinations of antigens, for example DTaP which includes diphtheria, tetanus, and pertussis) and by or before the age reported.

In the case of school-aged children coverage uses the two years most relevant to that school year (for example for grade specific programs eligibility will include both years a child could have been in that grade). For all vaccines in children, with the exception of influenza, the percentage is described as the numerator divided by the denominator, multiplied by 100. The numerator consists of all children with active<sup>xxviii</sup> Personal Registry System (PRS) status in SIMS, reaching the age of interest in the calendar year who received the recommended number of doses for the antigen. The denominator is the number of children who turned that age in the same calendar year who have active PRS status in SIMS.

Provincial rates may be generated using active and non-active PRS, or other parameters, and therefore may vary slightly in methodology of active status SIMS registered children who lived in a neighbourhood and turned the age of interest within the calendar year. Neighbourhood of residence was based on their postal code as recorded in SIMS. Children with missing postal codes were not included in neighbourhood/rural quadrant level statistics in neither the numerator nor the denominator since no neighbourhood could be assigned. The number of active status children in PRS with missing postal codes in SIMS is usually small. As an example in 2009, there were 132 out of the 4083 active children.

### Data limitations

Children immunized in First Nations clinics may not be updated in SIMS and this may lead to an underestimation of coverage rates in some neighbourhoods.

In 2009, data entry procedures for H1N1 mass immunization clinics resulted in a significant number of incomplete client records being entered into SIMS.

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<sup>xxviii</sup> Active describes living and still registered to receive health services.

## **Section 8: Conclusion**

Despite efforts to increase the 2 year old measles rate, only a 1% increase was achieved from the previous year. Continuing to try innovative ways to connect with parents and address any barriers that holds them back from ensuring their children are fully protected is warranted. Expanding immunization provision to other health professionals increases immunization opportunities for clients.

Rolling out the new provincial school program is likely to consume a good portion of this upcoming year. In addition, preparing for a transition to Panorama for vaccine management and immunization provision will be necessary to successfully implement in 2014.

Finding cost saving measures for the delivery of the Influenza Immunization program is necessary to reduce the overall impact on the Population and Public Health budget.

Improving the quality of immunization programs involves taking action on addressing language barriers for obtaining informed consent, supporting clients to deal with the pain of injection and providing nurses with the tools to counsel parents struggling with vaccine hesitancy.

# *Appendices*

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**Appendix 1: Immunization Totals Year by Year Comparison**

	2010 (Q4 2009-10, Q1 – Q3 2010-11)			2011 (Q4 2010-11, Q1 – Q3 2011-12)			2012 (Q4 2011-12, Q1 – Q3 2012-13)		
	Travel Clinic	General	Total	Travel Clinic	General	Total	Travel Clinic	General	Total
Jan - Mar	*split data unavailable		30,522*	4,335	22,289	26,624	4,881	23,991	28,872
Apr - Jun	2,732	22,453	25,185	2,846	16,255	19,101	2,008	23,952	25,960
Jul - Sept	2,614	15,766	18,380	2,207	16,824	19,031	2,372	16,490	18,862
Oct - Dec	4,726	29,143	33,869	4,911	71,174	76,085	3,675	64,141	67,816
<b>Totals</b>			<b>107,956</b>	<b>14,299</b>	<b>126,542</b>	<b>140,841</b>	<b>12,936</b>	<b>128,574</b>	<b>141,510</b>

**Appendix 2: Summary of Immunization Benchmarks and Targets 2012**

## Immunization Target & Actual Rates in SHR: 2010-2013

June 11, 2012 at 1530

Target Group	2010 Target	2010 Actual	2011 Target	2011 Actual	2012 Target	2012 Actual	2013 Target
<i>Preschool</i>							
2 yr old - Measles (2 doses MMR)	76%	73.7%	79%	75%	79%	76%	80%
2 yr old - Measles - core	60%	60.1%	61%	67.4%	68%	65.3%	70%
2 yr old - Measles - non core	77%	76%	80%	74.7%	81%	76%	80%
2 yr old - Measles - rural	78%	73.0%	76%	77%	78%	76.7%	81%
2 yr old - Measles - Rosthern quadrant				62.6%	68%	67.3	70%
2 yr old-MMR Disparity ratio (2 doses MMR)	1.26	1.25	1.26	1.29	1.21	1.16	1.16
% of children eligible for reminder under 2 years of age overall					15%	15%	15%
% of children eligible for reminder under 2 years of age core				32%	25%	27%	23%
% of children eligible for reminder under 2 years of age core-fringe					20%	23%	17%
% of children eligible for reminder under 2 years of age Rosthern					25%	N/A	25%
4 months old - Diphtheria (1 dose)	88%	74.2%	88%	89.4%	90%	*	
Eight months old - Diphtheria (3 doses)	74%	74.04%	74%	77.1%	79%	*	
14 month old measles (1 dose)				69%	74%	71%	
20 months old - Measles (2 doses)	54%	57.9%	58%	*	? 60%	*	

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<i>School Age</i>							
7 years old – Measles (2 doses MMR)	90%	92.1%	92%	92.5%	92%	91.6%	92%
7 years old – Diphtheria (5 doses, or 4 doses if the 4 <sup>th</sup> dose was given after the 4 <sup>th</sup> birthday)	84%	86.9%	No target	87.6%	88%	86.8%	88%
7 years old- Measles (2 doses)				89%	No target		89%
13 years old – Hepatitis B (2 doses)	87%	85.9%	85%	88.9%	88%	87.6%	88%
13 years old female – HPV (3 doses)	63%	58%	63%	72.23%		72.23%	72%
15 years old – Tdap (1 dose)	81%	89.5%	89%	92.5%		92.5%	92%
Gr. 12 – 2 <sup>nd</sup> dose MMR	88%	83%	85%	84%	N/A*	N/A*	N/A
<i>Adults</i>							
Pneumococcal 23 – end of influenza season-April		4104 (↑1749)	No target	PPH- 2577 Other –955 <b>Total -- 3532</b>	Pop turning 66 yrs <sup>29</sup>	44.6% <sup>30</sup>	
Tdap-new mothers in hospital		1403	No target	3949 postpartum Total – 3880	No target	4112 Postpartum total not available	
<i>Influenza – end of influenza season annually (April)</i>							
					<i>Target</i>	<i>Actual</i>	<i>2013</i>
65 years and older	60% (~24,000)	60% (21,534)	~22,275	22,219 (54%)	54%	53%	53%
16 to 64 years old with chronic/high risk medical conditions	50% (~8,000)	48.6% (8,169)	↑60% (~9,500)	7,839 (17888-pop) 44%	45%	34%	34%
SHR staff	↑80%	56% (6,859)	↑79%	7188/11940=60%	80% standard	48%	80%
6 months to 4 years old	↑50% (8,200)	4,293	4,200	7309/16846=43%	43%	35%	35%
Pregnant women	925	565	650	511	No target	31%	31%
Overall coverage – PPH and other immunizers		81728=-27%		85273/318000=26.8%	27%	23%	23%

\*Catch-up program complete in 2012.

<sup>29</sup> Cohort population turned 65 in 2011 and has one year to receive a pneumo vaccine to be immunized.

<sup>30</sup> 21.5% were immunized before reaching the age of 65.23% were immunized while 65 years of age (between their 65<sup>th</sup> and 66<sup>th</sup> birthdays)giving a coverage rate within 1 year of turning 65 of 44.6%

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### Appendix 3: Childhood Immunization Initiatives Implemented 2006-2009

2006 January	<ul style="list-style-type: none"> <li>• Released the report <i>Improving Preschool Immunization Coverage Rates in Targeted Saskatoon Neighbourhoods - recommendations to improve coverage rates</i>.</li> <li>• Two ongoing Child Health Clinic (CHC) sites for drop-in Mayfair and Riversdale CHCs.</li> </ul>
2006 March	<ul style="list-style-type: none"> <li>• Released <i>Report of the MHO – Immunization Report</i> with recommendations to improve coverage rates.</li> </ul>
2006 June	<ul style="list-style-type: none"> <li>• Provided client incentives provided at Riversdale and Mayfair CHCs – digital photographs and magnetic photo frames for all children attending; t-shirts provided to 18 month olds when complete primary series.</li> </ul>
2007 January	<ul style="list-style-type: none"> <li>• Established the Building Health Equity (BHE) program to focus on health disparities in six core neighbourhoods in Saskatoon (Confederation Suburban Centre, Pleasant Hill, Meadowgreen, Westmount, King George, Riversdale).</li> </ul>
2007 January	<ul style="list-style-type: none"> <li>• Core neighbourhood 2 year old MMR coverage rates = 48%</li> <li>• Offered Child Health Clinic at Our Neighbourhood Health Centre Tuesday morning drop-in clinic.</li> </ul>
2007 April	<ul style="list-style-type: none"> <li>• Additional Child Health Clinic drop in site @ WP Bate School in Meadowgreen neighbourhood (1:30- 3:30 pm).</li> </ul>
2007 September	<ul style="list-style-type: none"> <li>• Manual (paper) surveillance of delayed immunizations in six core neighbourhoods. Community Program Builders (CPBs) (2 staff members) begin phone call reminders and home visits to those parents of children behind in immunization.</li> <li>• Average of monthly BHE births is ~ 22 children and added them to the BHE reminder program.</li> </ul>
2007 Fall	<ul style="list-style-type: none"> <li>• Made healthy snacks available to families at drop-in CHC sites (Riversdale CHC, Mayfair CHC, WP Bate CHC, Our Neighbourhood Health Centre CHC).</li> </ul>
2007 June 1	<ul style="list-style-type: none"> <li>• All SHR - Phone call (PC) reminders to parents of 20 month olds behind in routine immunizations through pilot project funded by the Canadian Institute of Health Research (CIHR) grant.</li> </ul>
2007 Dec 1	<ul style="list-style-type: none"> <li>• Added all SHR- Phone call reminders to parents of 14 month olds behind in routine immunizations through pilot project funded by a CIHR grant.</li> </ul>
2007 October	<ul style="list-style-type: none"> <li>• BHE Public Health Nurses (PHNs) start going to Westside Community Clinic - Student Wellness Initiative Towards Community Health (SWITCH) on Saturdays to see clients for immunization             <ul style="list-style-type: none"> <li>▪ now ½ day drop-in clinic almost every day of the week (except Fridays and Sundays)</li> </ul> </li> </ul>
2008 April	<ul style="list-style-type: none"> <li>• Released the report <i>Health Disparities in Saskatoon: Analysis to Intervention</i></li> </ul>

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2008 June	<ul style="list-style-type: none"> <li>• All children who lived in, or ever lived in, core neighbourhoods as of June 2008 while <i>less than 2 years of age</i> are included in BHE database.</li> <li>• Implemented an electronic BHE database for surveillance of delayed immunizations in six core neighbourhoods - matched with demographic data from Saskatchewan Immunization Management System (SIMS) and identified those children behind in immunization.</li> <li>• Community Program Builders (CPBs) using this database to track clients, identify those behind in immunization, collect additional data not able to be stored in SIMS (i.e. additional contact information or phone number, contact person such as Grandmother, etc.), and identify counts of:             <ul style="list-style-type: none"> <li>▪ children with no immunization initiated at 4 months, incomplete at 6, 8 and 12 months of age</li> <li>▪ Phone Calls and Home Visits made</li> <li>▪ taxi vouchers issued by PHS</li> <li>▪ Referrals to Saskatoon Tribal Council for transportation</li> <li>▪ Children immunized at various clinic options</li> <li>▪ Mail out reminders at 14 months that were returned to sender</li> <li>▪ % of intervention attempts that successfully reminded a parent that their child required additional immunizations is calculated</li> <li>▪ filtered for overdue immunizations at target points (ages) 75 days, 135 days, 195 days</li> </ul> </li> <li>• Enhanced the BHE reminder program to include: PHN Postnatal home visiting to all new mothers, additional home visit when infant six weeks of age by CPB to remind of immunization, further phone call and home visit reminders for people who live in and around the drop-in clinics running on certain days, as required by CPBs.</li> <li>• Relied on the demographic data (home address and phone number) in SIMS for mail merge of letters, home visits, and initial phone call - this data is not always current and the BHE database allows for alternate information to be recorded.</li> <li>• Identified other children that are behind in same family with newborn.</li> <li>• From Sept 2007 to Aug 2010 this program focused on children under 12 months of age. In Aug 2010, children 13 – 20 months were included in the BHE database reminder list extractions.</li> <li>• No specific target for children behind if after 20 month reminder did not come in to see us (i.e. no automatic identification of those older children still behind in immunization).</li> </ul>
2008 August	<ul style="list-style-type: none"> <li>• Our Neighbourhood Health Centre (ONHC) moved location from Avenue C to Avenue M South.</li> </ul>
2009 January	<ul style="list-style-type: none"> <li>• Changed PC reminders (14 &amp; 20 months) to mailed letters.</li> <li>• Health Information Management Practitioner (HIMP) began managing reminder program – checking SIMS history to determine if 14 and 20 month old due and eligible for immunization (i.e. minimum interval).</li> <li>• BHE maintained PC, letters and home visits made by CPBs- focus remained on children under 12 months of age.</li> </ul>



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2009 January	<ul style="list-style-type: none"> <li>• Additional reminder letters for those children turning 4 years of age - reminder letters sent on a monthly basis to encourage parents to book an appointment for 4-6 year routine immunization.</li> </ul>
2009 March	<ul style="list-style-type: none"> <li>• Added an additional CHC drop-in site @ Pleasant Hill School – Monday afternoons (1- 3:30 pm) in Pleasant Hill neighbourhood.</li> </ul>
2009 May	<ul style="list-style-type: none"> <li>• Piloted using minimum interval scheduling at drop-in site (Mayfair) to catch up children who are behind in routine childhood immunization.</li> </ul>
2009 September	<ul style="list-style-type: none"> <li>• Implemented minimum interval scheduling to catch up to children under 2 years that are behind in routine immunization (at all satellite clinics- <i>not well utilized</i>).             <ul style="list-style-type: none"> <li>▪ # of children attending for immunization on minimum interval scheduling 2007- 2009 – up to 15 children per month.</li> </ul> </li> <li>• Implemented of immunization of children attending pre-schools in core communities and day-cares in neighbouring high schools in Saskatoon.</li> </ul>
2009 October	<ul style="list-style-type: none"> <li>• Held an H1N1 pandemic mass immunization campaign in October - December 2009, impacted reminder program (14/20 month and 4 year letters) in SHR. Suspended reminder program completely in SHR for ~4-5 months, catching back up took ~ 9 months.</li> <li>• Enhanced BHE reminder program suspended during October- January 2010. Transition to full impact of reminder program restored in October 2010.</li> <li>• Children turning 2 years of age January 2010 to September 2010 were impacted, with greater impact occurring in the earlier birth cohorts.             <ul style="list-style-type: none"> <li>▪ Children turning 2 in January 2010 would have received their reminder letter after they turned 2 and therefore no impact on their under 2 rates is expected while children turning 2 in September 2010 only had their letters delayed by 1 month and the negative impact should have been much less.</li> <li>▪ Decrease in initiation of immunization for those living in BHE neighbourhoods (i.e. 2 month CHC visit delayed).</li> </ul> </li> </ul>

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### Appendix 4: Immunization Initiatives Implemented in 2010&2011

2010 April	<ul style="list-style-type: none"> <li>• Implemented Immunization Awareness Week campaign, specifically addressing barriers identified by clients when accessing clinics.             <ul style="list-style-type: none"> <li>▪ Provided increased written materials regarding immunization, sent out letters inviting children behind in immunization to drop-in clinics situated in schools in certain neighbourhoods.</li> <li>▪ Implemented a radio campaign focusing on whooping cough in young children.</li> <li>▪ Handed out tattoos with brand "<i>Immunization: Power to Protect</i>".</li> <li>▪ Developed posters with brand with key messages, distributed in SHR.</li> <li>▪ PSA and media campaign for social marketing messages related to pre-school immunization.</li> </ul> </li> </ul>
2010 April and October	<ul style="list-style-type: none"> <li>• Explored social media to connect with young families (e.g., Facebook advertisement, texting, emailing). Utilized Facebook ads during Immunization Awareness week campaign April 2010 and during influenza season blitz in October 2010 targeting females of child-bearing age.</li> </ul>
2010 August- OH&S - Nurses and Admin staff 2010 December - Positive Living Program 2010 Dec 1 physician in Pediatric Infectious Disease Unit at RUH	<ul style="list-style-type: none"> <li>• Provided education and access to the Saskatchewan Immunization Management System (SIMS) for other immunizers in agencies external to Public Health Services.</li> </ul>
2010 August	<ul style="list-style-type: none"> <li>• Expanded the BHE database to include 2 year olds – last chance functionality added to identify those children 20-24 months of age who remain behind and are prioritized for CBPs to make contact with to invite parents to attend clients.</li> </ul>
2010 September	<ul style="list-style-type: none"> <li>• Increased access to services by offering newly implemented drop-in clinics for school age children and adults in evening hours at the 3 main Health Centres in Saskatoon.</li> </ul>
2010 September	<ul style="list-style-type: none"> <li>• Developed new matching process between Saskatchewan Immunization Management System (SIMS) and electronic school class lists in September 2010 from Public and Catholic schools in Saskatoon to identify those behind in immunization from Pre-school to Grade 5. The matching process provided the first look at school level data for immunization coverage rates in the school divisions listed above.</li> </ul>

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<ul style="list-style-type: none"> <li>• 2010 October – 2011 April</li> <li>• Influenza Program 10-11</li> </ul>	<p>Expanded the influenza program at no-cost to all residents in SHR in 2010-2011, from a previously targeted high-risk program in past seasons.</p> <ul style="list-style-type: none"> <li>▪ 2011 October – continue with no-cost program.</li> </ul>
<p>2010 November</p>	<ul style="list-style-type: none"> <li>• Developed contracted translation services with Saskatoon Open Door Society (SODS) for the translation of immunization histories in alternate languages.</li> <li>• Developed centralized internal process for Public Health Nurses and Program Assistants in submitting and external process receiving translated records through the Disease Control Department.</li> </ul>
<p>2010 December</p>	<ul style="list-style-type: none"> <li>• Explored a different system for keeping Social Services notified of foster children due for immunizations by changing to letters addressed with foster child's name to be directly mailed/delivered to foster parent. <ul style="list-style-type: none"> <li>▪ Children in the care of Social Services have the lowest percentage of children up to date in SHR.</li> </ul> </li> <li>• Began to monitor the number of children behind each month and how many children are attending CHC for immunization.</li> </ul>
<ul style="list-style-type: none"> <li>• 2011 March, Prairie Spirit</li> <li>• 2011 August, Horizon</li> </ul>	<ul style="list-style-type: none"> <li>• Explored expansion of data sharing agreement between Prairie Spirit school division (2011 March, achieved) and Horizon school division (2011 August, achieved). The data sharing agreement would also provide opportunity for matching process for those children in Pre-school-Grade 5.</li> </ul>
<p>2011 March</p>	<ul style="list-style-type: none"> <li>• Replaced 14 and 20 month reminder letters with letters for all children in SHR under 2 years of age, who are more than 2 months behind in immunization for the 2, 4, 6, 12 month immunizations and more than 1 month behind for 18 month immunization.</li> <li>• Automated query in SIMS for all children under 2 years to identify who is behind in immunization in SHR.</li> <li>• DC OAA took over printing and mailing Under 2 year reminder letters to all in SHR more than 1 month behind in immunization</li> <li>• BHE- Good Food Store coupon incentives given to clients who attend CHC clinics in core – Pleasant Hill, Riversdale, WP Bate CHC sites</li> </ul>
<p>2011 April</p>	<ul style="list-style-type: none"> <li>• CPBs focus on last chance children (20-24 months of age) and calling parents in the 3 hours immediately prior to BHE drop-in clinics in certain neighbourhoods</li> </ul>

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2011 May	<ul style="list-style-type: none"> <li>• Development of brochure displaying impact of diseases for social marketing</li> <li>• Meet with Kids First home visitors and program coordinator re: tool, and drop-in clinics at Pleasant Hill School and meet and greet with the PHNs at Pleasant Hill CHC</li> </ul>
2011 May- Westside Community Clinic NPs/RNs and 1 MD	<ul style="list-style-type: none"> <li>• Provided education and access to the Saskatchewan Immunization Management System (SIMS) for other organizations that immunize</li> </ul>
2011 June	<ul style="list-style-type: none"> <li>• Reminder to all PHNs to implement minimum interval scheduling for all children under 7 years of age</li> <li>• # of children placed on minimum interval scheduling Jan 2010 – May 2011 - 10-25 children per month</li> <li>• <b>Core</b> MMR 2 year coverage rates up from <b>48%</b> in 2008-06 to <b>60%</b> in 2011</li> <li>• Meeting with Public and Catholic school representatives re: registration of immigrant families and how to support the attainment of immunization records and how to provide immunization information.             <ul style="list-style-type: none"> <li>▪ Catholic school board is continuing to provide any immunization histories and placing at PHN mailbox at school.</li> <li>▪ Public school board will formalize the process of sharing immunization records by faxing to central number in Disease Control.</li> </ul> </li> </ul>
2011 September	<ul style="list-style-type: none"> <li>• HC OAAs Reminder phone calls consistently for appointment reminders. Phone call for reminders and missed appointments.</li> <li>• HC OAAs to input data, including email, phone number, cell phone number from HGD-15 labels and save in database instead of deleting after printing. Purpose to explore to generate automated reminders to those children behind using Auto-dialer/Automated text messaging</li> <li>• Addition to BHE database – text messaging outcomes Text Success – Call back by parent and Text - Wrong Number</li> </ul>
2011 November	<ul style="list-style-type: none"> <li>• Provided education/access to the Saskatchewan Immunization Management System (SIMS)- Paediatrician, Infectious Diseases (Dr. McConnell)</li> </ul>
2011 December	<ul style="list-style-type: none"> <li>• Finalized Contract and operations with external provider for auto-dialer (Synvoice) automated immunization reminders to begin in January 2012.</li> </ul>

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### Appendix 5: Immunization Initiatives Implemented in 2012

2012 January	Auto dialer used for immunization reminders for children under 2 years of age behind in immunization (excluding BHE). Rotating by HSN numbers to all children under 18 months who are behind by 2 months and those children 18- 24 months who are 1 month behind in immunization.
2012 February	Piloted having increased number of appointments at ONHC Tuesdays 10-4:30 pm and one nurse available for drop-in clients at short notice. PHNs did some follow up and tracking of clients via phone calls, home visits, or text message reminders. Verified if refusers. Verified and updated current address and phone number.
2012 March	Community Program Builder (CPB) 1 day per week (Fridays out of WWPHC) to target families in core-fringe to invite in for immunization and track down accurate phone numbers and addresses for children who are turning 2 years in core-fringe neighbourhoods. ~200 kids under 2 years behind in immunization with a focus on the kids turning 2 years of age in the next few months. Taxi vouchers and bus tickets provided to parents attending core/core-fringe clinics if transportation barrier.
2012 April	Partnered with Rotary International to support drop in clinic at WWPHC, with reminders being sent and posters/flyers being distributed in the community. Free door prizes, refreshments and snacks provided by Rotary
2012 May	Immunization Awareness bus campaign social marketing on immunizations in the month of April with interior bus cards.
2012 June	Directed P&PH funding to enable CPB to focus on core-fringe 14 neighbourhoods, 3 days per week (Tuesday-Thursday) performing home visits and reminder phone calls. Focus on last chance children, first series, new address, and second series. Also added 1 day/week to core reminders (Friday) Total 4 days/week enhancement to reminders temporary for up to 2 years.
2012 August 19	Proactive reminders with Synrevoice for children at 11.75 months to make appointment for MMR
2012 July-August	Conducted in person survey with 45 clients in core neighborhoods, with focus on Pleasant Hill (42%).
2012 August-September	Conducted phone survey with 108 clients in the Rosthern area and 36 in-person/phone survey with clients in the northeast sector of Saskatoon.
2012 September	Expanded discipline immunizing. Nurse Practitioner in Duck Lake.
2012 December	District Public Health Nurses, outside the core and core-fringe neighborhoods, contacted parents of children 20-23 months behind with immunization to book an appointment, discuss concerns or offer to immunize in the home.

**Appendix 6: Saskatchewan Routine Immunization Schedule**

Source: Saskatchewan Immunization Manual

**Routine Immunization Schedule**

	DTaP-Polio	Hepatitis B	Hib	HPV (females)	Influenza	MC	M-C-ACYW-135	MMRV	PC	Pneumo-23-valent	Td	Tdap
2 months	•		•						•			
4 months	•		•						•			
6 months	•		•									
6 + months					•							
12 months						•		•	•			
18 months	•		•					•				
4-6 years	•											
Grade 6		••		•••			•					
Grade 8												•
Every 10 years											•	• Give 1 time ≥ 18 yrs
65 years +					• each fall					•		

DTaP-Polio – Diphtheria, Tetanus, acellular Pertussis, Polio; MC – Meningococcal C conjugate; M-C-ACYW-135 – Meningococcal-Conjugate A,C,Y,& W-135; MMRV – Measles, Mumps, Rubella, Varicella; PC- pneumococcal 13 conjugate; Td – Tetanus, Diphtheria; Hib – Haemophilus influenzae type b; HPV – Human Papillomavirus; Tdap – Tetanus, Diphtheria, acellular Pertussis;

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**Appendix 7: Two Year Measles Coverage % by neighbourhood or grouping, SHR 2012**

Neighbourhood	UTD	Total	%	Neighbourhood	UTD	Total	%	Neighbourhood	UTD	Total	%
Adelaide/Churchill	26	35	74.3	Grosvenor Park	9	13	69.2	Parkridge	47	61	77.0
Arbor Creek	55	71	77.5	Hampton Village	78	104	75.0	Pleasant Hill	79	134	59.0
Avalon	32	43	74.4	Haultain	19	25	76.0	Queen Elizabeth	21	23	91.3
Blairmore Suburban Centre	8	11	72.7	Holiday Park	28	35	80.0	Richmond Heights	6	9	66.7
Brevoort Park	38	46	82.6	Holliston	17	20	85.0	River Heights	28	37	75.7
Briarwood	47	56	83.9	Hudson Bay Park	15	18	83.3	Riversdale	26	36	72.2
Buena Vista	23	34	67.6	Kelsey/Woodlawn	6	10	60.0	Rosewood	6	7	85.7
Caswell Hill	27	49	55.1	King George	22	35	62.9	Rural Route	55	68	80.9
Central Business District	6	9	66.7	Lakeridge	27	31	87.1	Saskatoon Post Office Box	11	18	61.1
Central Industrial	3	5	60.0	Lakeview	54	74	73.0	Silverspring	36	40	90.0
City Park	24	30	80.0	Lakewood Suburban Centre	25	32	78.1	Silverwood Heights	75	105	71.4
College Park	42	58	72.4	Lawson Heights	38	53	71.7	Social Services	1	4	25.0
College Park East	35	42	83.3	Massey Place	42	55	76.4	Stonebridge	115	131	87.8
Confederation Park	106	138	76.8	Mayfair	26	39	66.7	Sutherland	53	77	68.8
Confederation Suburban Centre	18	23	78.3	Meadowgreen	57	92	62.0	The Willows	2	2	100.0
Dundonald	72	86	83.7	Montgomery Place	18	22	81.8	U of S Lands - South Mgmt Area	7	8	87.5
Eastview	29	42	69.0	Mount Royal	32	49	65.3	University Heights Suburban Centre	1	3	33.3
Erindale	30	36	83.3	North Park	21	28	75.0	Varsity View	19	23	82.6
Evergreen	10	13	76.9	Nutana	36	55	65.5	West Industrial	1	2	50.0
Exhibition	20	25	80.0	Nutana Park	22	29	75.9	Westmount	45	58	77.6
Fairhaven	53	79	67.1	Nutana Suburban Centre	9	9	100.0	Westview	40	57	70.2
Forest Grove	43	64	67.2	Outside Saskatoon	878	1148	76.5	Wildwood	45	52	86.5
Greystone Heights	19	23	82.6	Pacific Heights	36	54	66.7	Willowgrove	105	124	84.7

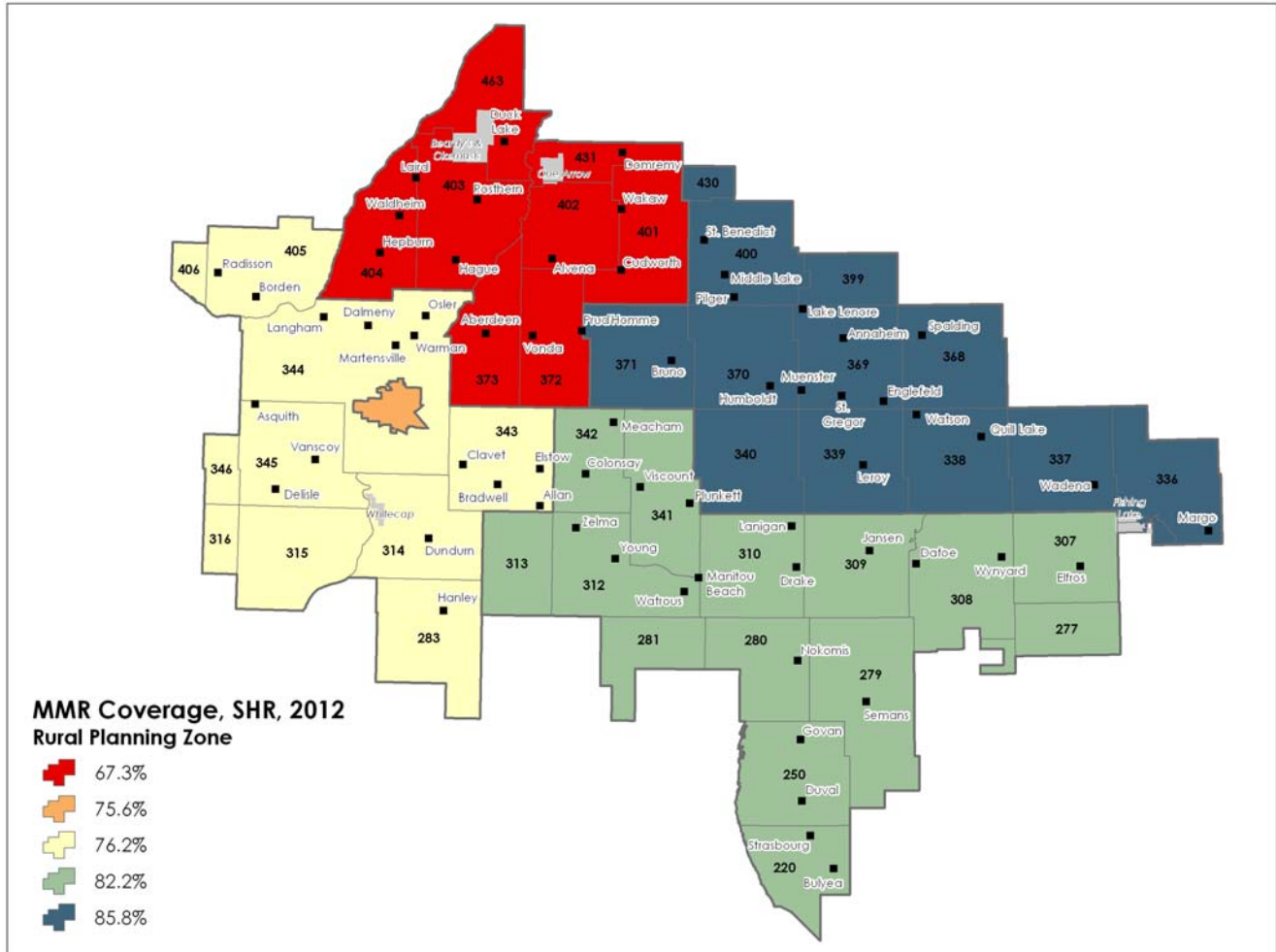
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**Appendix 8: Two year measles coverage by neighbourhood, 5 year average and 2012 coverage, with five year numerator and denominator, Saskatoon**

Neighbourhood	Five year coverage reported in 2011	2012 coverage	#of UTD Children Over 5 Years	Total Population Over 5 Year Period	Neighbourhood	Five year coverage reported in 2011	2012 coverage	#of UTD Children Over 5 Years	Total Population Over 5 Year Period
Kelsey/Woodlawn	46.34	60.0	19	41	Fairhaven	70.69	67.1	205	290
Mayfair	63.7	66.7	93	146	Confederation Park	70.19	76.8	292	416
Caswell Hill	62.70	55.1	116	185	City Park	78.00	80.0	78	100
Massey Place	63.41	76.4	130	205	Sutherland	72.20	68.8	187	259
Holiday Park	69.23	80.00	72	104	Exhibition	67.71	80.00	65	96
Mount Royal	65.66	65.3	130	198	Westview	78.15	70.2	186	238
North Park	73.68	75.00	56	76	Central Industrial	52.63	60.0	10	19



Appendix 9: Two Year Old Measles (2 doses) Rural SHR by Quadrant, 2012



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