

CHILDHOOD IMMUNIZATION STATUS AT AGASSIZ MEDICAL CENTRE

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INTRODUCTION:

Vaccines have saved more lives in Canada in the last century than any other medical intervention.¹ If vaccines are effective, the patient population receiving them will be immunized against pathogens that can cause significant burden to individuals health, population health and the health care system. Accordingly, the success of vaccinations have become the most effective and cost-efficient health interventions of modern times.¹ Infectious disease like diphtheria, polio and smallpox have essentially been eradicated due to successful childhood immunization programs.¹ However, for immunization programs to remain successful there needs to be a large percentage of the population receiving vaccinations. When the percentage of individuals who receive vaccinations decreases, there is a higher chance for the vaccine preventable disease to return.

Due to the importance and significant health advantages of childhood immunizations, Manitoba Health provides primary vaccinations to the population free of charge. Additionally, Manitoba has a surveillance system to track the immunization status of the population. In 2015 Manitoba changed to a surveillance system called Panorama, however there is not a published report for this time period yet. The year 2014 is the most recent published report on the immunization status of Manitobans using the former immunization surveillance system, Manitoba Immunization Monitoring System (MIMS). MIMS was established in 1988 to provide a complete report of immunizations in the province.² The 2014 report provides information on the percentage of patients immunized across the province and in specific regional health authorities (RHAs). According to this report, Southern Health – Santé Sud RHA had the lowest percentage of children immunized in numerous categories compared to the Manitoba average and other RHAs (Table S1, Appendix).³ Based on this data it is evident there is a discrepancy

between the Manitoba average and the Southern Health – Santé Sud RHA with regards to percentage of children immunized.

At over 197,000 residents, Southern Health – Santé Sud is the second largest by population RHA in Manitoba.⁴ Southern Health – Santé Sud is a very diverse region that consists of 20 Rural Municipalities, 7 Municipalities, 4 cities, 4 towns, 1 village and 1 unorganized territory.⁵ In addition to the public health team in the region, there are 36 primary care clinics (Table S2, Appendix) where patients can receive their immunizations. Due to the diverse nature of this RHA, and the numerous primary care clinics in the region, we proposed that the percentage of children immunized in the RHA may vary by community. To investigate this possibility, this study examined the immunization status of children that receive primary care at the Agassiz Medical Centre (AMC) in Morden, Manitoba.

Our clinical question was to determine if there is a difference between percentage of children immunized reported for the RHA and children who receive primary care at AMC. To answer this question, we used a retrospective chart review for children born between January 1 to December 31, 2014 from the AMC electronic medical record (EMR). We were specifically investigating the primary immunization schedule for children born in 2014 (Table 1). Accordingly, we included the status of following vaccinations in our patient population: Diphtheria, Tetanus, Pertussis, Polio, Haemophilus influenza type b (DTaP-IPV-Hib), Pneumococcal Conjugate 13 valent (Pneu-C-13), Measles, Mumps, Rubella, Varicella (MMRV), Meningococcal Conjugate C (Men-C-C).

Table 1: Manitoba’s Recommended Immunization Schedule for 2014 (adapted from Manitoba Annual Immunization Surveillance report 2014³)

Vaccine	2 months	4 months	6 months	12 months	18 months
DTaP-IPV-Hib	✓	✓	✓		✓
Pneu-C-13	✓	✓		✓	
MMRV				✓	
Men-C-C				✓	

CLINICAL QUESTION: How does the immunization status of children receiving primary care at Agassiz Medical Centre compare to the percentage reported for the Southern Health – Santé Sud region in the 2014 Manitoba Annual Immunization Surveillance report?

METHODS:

The Agassiz Medical Centre uses Accuro as an EMR system. This system has a built in filter features that can search the patient database for specific requirements. The specific filter features employed for this study were: 1) patients born in 2014 and 2) patients who received the following vaccinations: Diphtheria, Tetanus, Pertussis, Polio, Haemophilus influenza type b (DTaP-IPV-Hib), Pneumococcal Conjugate 13 valent (Pneu-C-13), Measles, Mumps, Rubella, Varicella (MMRV), Meningococcal Conjugate C (Men-C-C).

After the filter search was employed on the EMR, specific exclusion criteria were identified to ensure the most accurate information was gathered for the chart audit. Since the goal of this study was to investigate the patient population who received primary care at AMC, we decided to exclude patient charts that appeared to not attend the clinic regularly. Therefore, charts were excluded if they had no phone number, no patient PHIN number, and only walk-in appointments at the AMC (Table 2).

Table 2: Study Exclusion Criteria

1) No phone number
2) No PHIN number
3) Walk-in only patients

The patient charts that were identified to be vaccinated through the filter search did not receive a full chart audit since there was a record of the vaccinations in the EMR. However, all patient charts that were identified as not vaccinated after applying the filter search and exclusion criteria received a full chart audit. The reasoning behind this is that the EMR does not automatically gather patient information from Manitoba e-chart or MIMS, and many patients receiving care at AMC choose to have their vaccinations with public health. Therefore, a chart audit was warranted for the non-vaccinated patients to determine if there was evidence in chart notes that the patient had vaccinations from public health. The chart audit entailed going through the progress notes, Rourke record or other information in the patient file to determine if the patients were actually vaccinated. If there was record in the chart that the child had received vaccinations, they were moved to the vaccinated patient population. The chart audit also allowed insight into some of the reasons parents chose to not vaccinate their children, which is discussed further below.

RESULTS

The original filter search identified a total of 626 patients, where 134 patients had vaccinations and 492 patients had no record of vaccinations in the Accuro EMR. However, 332 of the patient charts from the not vaccinated group met at least one of the exclusion criteria described in the methods section (Table 2) and thus were not included in the study. This reduced the number of patients in the not vaccinated group to 160. Thus, there was a total of 294 patients included in this study.

Since many patients that attend AMC receive their vaccinations with public health, all charts that were identified in the not vaccinated group were audited. The audit included going through the patient's progress notes and/or Rourke records to identify if there was any evidence that the patient had been vaccinated. Indeed, many patients that were in the not vaccinated group had a record of vaccinations in chart notes and/or Rourke record and therefore were moved to the vaccinated group. After the chart audit of the 160 patients in the not vaccinated group there were only 42 patients' charts remaining in the not vaccinated group (Figure 1).

Therefore, after the filter search, exclusion criteria and the chart audit were all applied there was a total of 252 patients that were vaccinated and 42 patients that were not vaccinated in the population of 294 patients included in the study. This translates to an immunization percentage of 85.7% and a non-immunized percentage of 14.3% for patients born in the year 2014 who receive primary care at the AMC (Figure 2).

A secondary outcome of the chart audit performed for this study was identifying reasons why parents choose not to vaccination their children. This qualitative information was gathered from the chart notes, Rourke records or other information from the patient charts. Table 3 provides a sampling of the reasons why patients were not immunized. Interestingly, the chart audit identified that many parents choose to deliberately delay their child's vaccinations until they are beyond 12, 18 or 24 months. In fact, there were 10 patient charts identified that stated the parents chose to have an alternative, delayed schedule that subsequently went on to vaccination their children with a modified, catch-up schedule. However, there were also 5 patient charts identified that stated they were delaying the children's vaccinations that never had a record of catching up these vaccinations. This highlights a potential unique patient population where further parental education could increase the percentage of patients vaccinated.

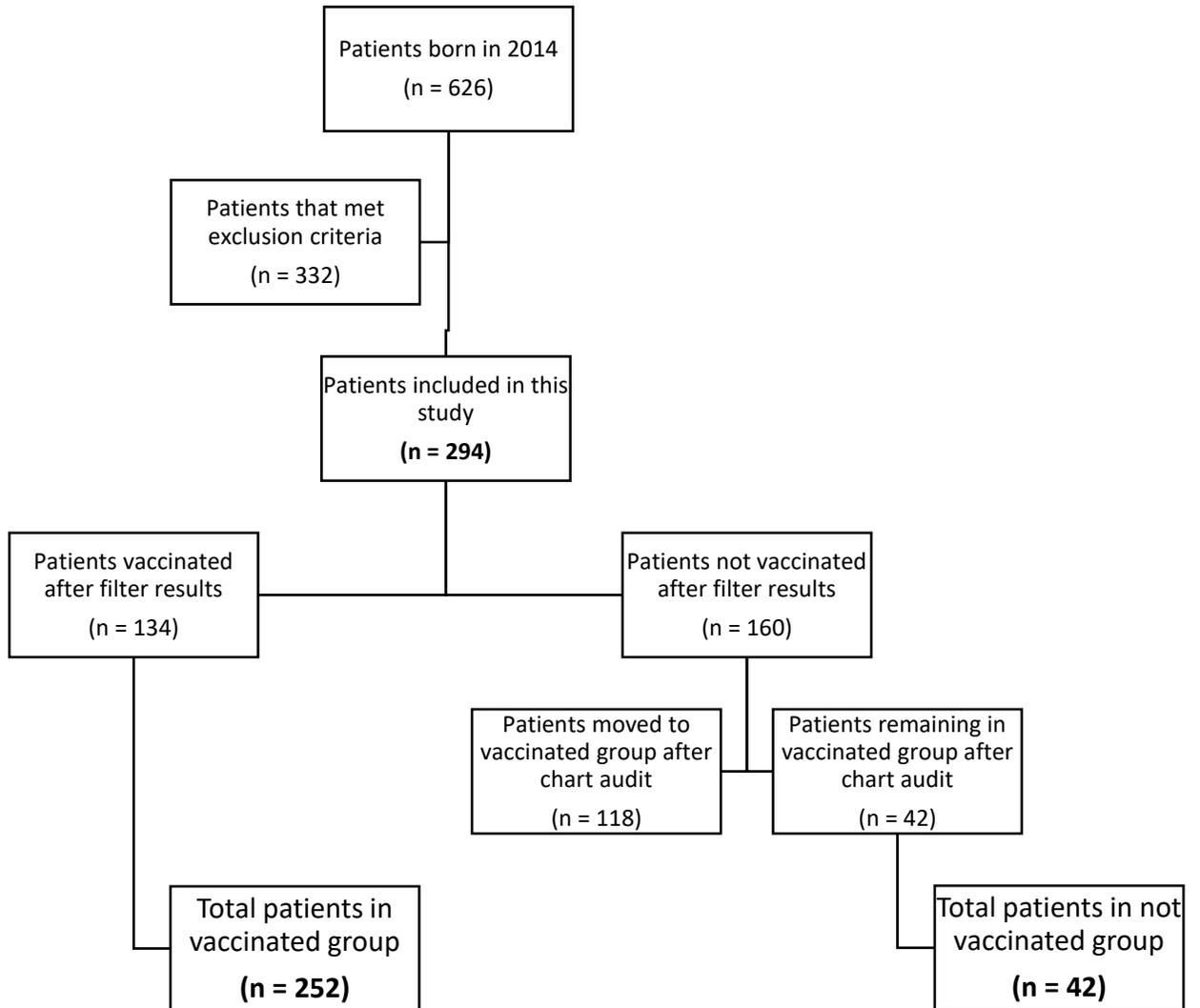


Figure 1: Flowchart of the Study Patient Population

A schematic representation of the patient population included in this study. The original search identified 626 patients, however exclusion criteria eliminated 332 patients. Thus the total patient population for this study was 294. A chart audit was performed on the patients identified as not vaccinated resulting in 118 patients moving into the vaccinated group.

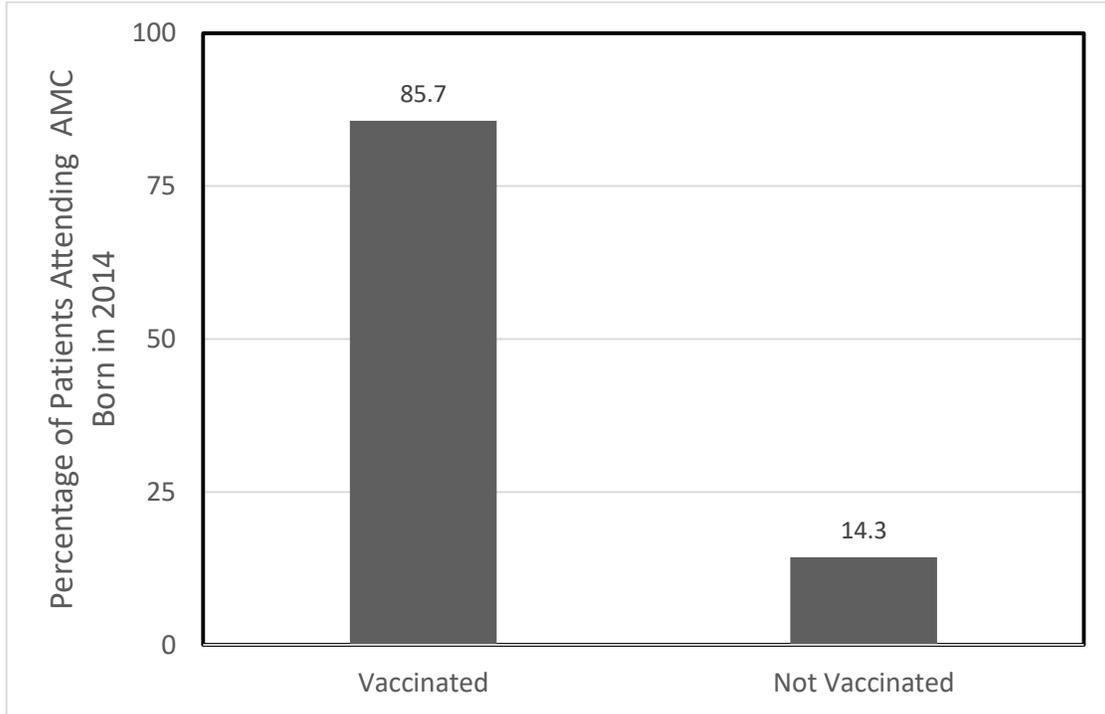


Figure 2: Percentage of Patients Attending AMC born in 2014 that Received Vaccinations
Bar graph depicting the percentage of patients born in 2014 that are vaccinated (85.7%) and the percentage of patient that were not vaccinated (14.3%), as determined through a retrospective chart review.

Table 3: Reasons Parents Gave Physicians on Why They Choose Not to Vaccination Their Children

Parental decision
Delayed due to other health concerns (urgent surgical procedure)
Delayed vaccination until after infancy
Religious reasons
Father declined
Mother declined
Health condition preventing vaccinations (genetic defects)
Mother worried that vaccination will affect brain development
Too many vaccinations at the same time
Parents not interested in vaccinations
Need to think about it
Parents deny because their child has allergies (although no proven allergies to vaccination ingredients)
Parents are undecided
Wants to delay till 2 years of age

DISCUSSION

This study sought to identify if there was a difference in childhood immunization status for patients who receive primary care at AMC compared to the Southern Health – Santé Sud RHA average. Through a retrospective chart review using the Accuro EMR filter search, exclusion criteria and a chart audit we determined that patients of AMC have a higher percentage of patients immunized compared to RHA average. More specifically, patients born in 2014 whom attend AMC had an 85.7% rate of childhood immunizations, compared to the RHA average of 67.3% for age 1 and 56.1% for age 2 (Table S1, Appendix). We further identified several reasons why parent decide to not vaccinate their children through the chart audit, such as for religious reasons, needing to think further about vaccinations and wanting an alternative vaccination schedule (Table 3). The results of this study may have identified crucial parental education opportunities when a delayed schedule is requested for childhood immunizations (discussed below). Furthermore, due to the higher percentage of patients immunized compared to the RHA we have identified there are likely other communities in the region that could benefit from additional parental education and conversations about the success of childhood vaccinations.

Although we have identified there is a difference between patients of AMC compared to the RHAs immunization average, this comparison should be taken with caution. It should be noted that the results of this study were performed using different methods than the MIMS 2014 report and thus are not directly comparable. A weakness of this study is that only the AMC EMR was accessed for the chart audit, and therefore information may be limited. Currently, whenever a patient receives a vaccination it is recorded into Panorama and Manitoba e-Chart, and we did not access these resources for this study. Therefore, there is the potential that patients that were

identified as not vaccinated after the chart audit were in fact vaccinated and there is just no record in the patient chart at AMC. To try to mitigate this weakness we identified specific exclusion criteria to ensure that the patient population included in this study regularly attend AMC and had multiple opportunities to have such information recorded in the patients' chart. Another weakness is when performing the chart audit for the not vaccinated patients, whenever there was a clinical note such as "Vaccination up to date", "Immunizations with public health" the patient was moved to the vaccinated group. These brief clinical notes do not list all the vaccinations that the child has received and it's not possible to determine the exact vaccinations the patient has received. However, physicians at the AMC are all aware of the primary immunization schedule therefore it likely identifies that the patient has received all the vaccinations. Finally, the patient population for this study was patients born in 2014, whereas the MIMS report had all patients for age 1 and age 2. Therefore, the patient population are different between the two studies and direct comparisons should be taken with caution.

This study identified a group of parents that request an alteration in their child's vaccination schedule. Other studies have shown that as many as 1 of 10 parents of young children are currently using an alternative vaccination schedule.⁶ In fact, there are several resources on the internet or through other media that advice parents how to adjust their child's vaccination schedule. For example, Dr. Robert Sears wrote a book "The Vaccine Book: Making the Right Decision for Your Children" and suggested two different vaccination schedules for parents who are hesitant about vaccinations, a selective schedule and an alternative schedule.⁷ The selective schedule is for parents who want to decline or delay vaccines and as a result parents might be refusing measles, mumps, rubella, varicella, polio and pertussis vaccines.⁷ The alternative schedule is geared towards parents who worry their child is receiving too many

vaccines at one time. The alternative schedule suggested by Dr. Sears delays certain vaccines to ensure that the child does not receive more than 2 shots at one visit.⁷ This significantly increases the number of office visits and the age at which vaccines are administered. It is not difficult to imagine that an increase in office visits might result in a higher no-show rate, and therefore adopting this schedule may even further result in an under immunized population. Interestingly, other studies have shown the majority of parents who choose to adopt an alternative vaccination schedule do so based on their own decisions or recommendations from a friend.⁶

Studies have shown that the parents that are most likely to adopt an alternative vaccination schedule are those without a primary care physician.⁶ Therefore, there is a chance that the results of our study may under represent this patient population as we were only looking at patients who had a family physician at AMC. Regardless, it is critical to have conversations with the parents who want to delay their child's vaccinations as they may change their mind if they receive advice from a physician. For example, telling parents that an alternative vaccination has been shown to result in a high rate of under immunization and therefore a higher spread of preventable diseases may influence their decision.⁶ Some parents are concerned about the pain that may be inflicted on their children during vaccinations. However, this concern may be due to the parents' fear of needles, as it is estimated that 25% of adults have a fear of needles.⁸ There are clinical guidelines that have strategies to address the concerns of the pain associated with vaccinations.⁸ For example, evidence has shown for infants who are receiving vaccinations, breastfeeding reduces pain at the time of injection. For infants who are not being breastfed, administering sweet-tasting solutions reduces pain at the time of injection.⁸ Additionally, it is important to administer the most painful vaccination last to reduce the pain at the time of injection.⁸

After performing this study, we have some proposed recommendations for physicians and other health care providers who are involved in childhood primary immunization administration. It is imperative to continue to have conversations with parents who chose to delay their child's vaccinations. Although some of these conversations may be difficult, this study identified some evidence that the majority of the time these patients do go on to receive vaccinations. Furthermore, use every opportunity possible to discuss with hesitant parents about the success of childhood vaccinations. Ask them their reservations about vaccinations and provide them with reliable educational material they can take home to further think about this important decision. Finally, advise parents that when administering vaccinations there is adherence to clinical guidelines that have been shown to reduce the pain associated with vaccinations.

In conclusion, our study identified that patients born in 2014 whom attend AMC have a higher percentage of childhood immunization compared to the Southern Health – Santé Sud average as reported by MIMS. Due to the large and diverse population in the Southern Health – Santé Sud RHA these results imply there are other communities that may benefit more from enhanced immunization promotion and education. Future studies could look at other communities in the RHA to try and determine which areas have a lower rate of childhood immunizations. However, continued education and vaccination promotion at the AMC is imperative to maintain a high percentage of immunization rate in the community served by AMC.

APPENDIX

Table S1: Categories that Southern Health – Santé Sud had the lowest percentage of children immunized compared to the provincial average and other RHAs in 2014. (Data collected from Manitoba Annual Immunization Surveillance Report 2014³)

Category	Manitoba Average (% children immunized)	Southern Health – Santé Sud (% children immunized)
Overall vaccine schedule for age 1	77.9%	67.3%
Diphtheria vaccination, age 1	79.2%	68.4%
Tetanus vaccination, age 1	79.2%	68.4%
Pertussis vaccination, age 1	79.1%	68.4%
Haemophilus influenza type b, age 1	79.7%	68.1%
Polio, age 1	88.3%	76.9%
Pneumococcal conjugate 13 valent, age 1	86.2%	75.0%
Overall vaccine schedule for age 2	65.5%	56.1%
Diphtheria vaccination, age 2	71.0%	62.6%
Tetanus vaccination, age 2	71.0%	62.6%
Pertussis vaccination, age 2	70.9%	62.6%
Haemophilus influenza type b, age 2	70.4%	62.2%
Polio, age 2	87.6%	78.1%
Pneumococcal conjugate 13 valent, age 2	84.0%	71.7%
Measles, age 2	86.3%	75.8%
Mumps, age 2	86.2%	75.8%
Rubella, age 2	86.2%	75.8%
Varicella, age 2	83.2%	71.5%
Meningococcal conjugate C, age 2	84.8%	74.1%

Table S2: Primary Care Clinics in Southern Health – Santé Sud. (Information gathered from Southern Health –Santé Sud website⁹)

Clinic Name	Location
Altona Clinic	Altona, MB
Carman Medical Group	Carman, MB
Medical Clinic – Carman Community Health Centre	Carman, MB
Rock Lake Clinic	Crystal City, MB
Cartier Health Centre Medical Clinic	Elie, MB
Medical Clinic – Emerson	Emerson, MB
Ginew Medical Clinic	Ginew, MB
Medical Clinic – Gladstone	Gladstone, MB
Medical Clinic – Île des Chêne	Île des Chêne, MB
La Salle Medical Centre	La Salle, MB
Medical Clinic – MacGregor	MacGregor, MB
Medical Clinic – Manitou	Manitou, MB
Sandy Bay Ojibway First Nation Clinic	Marius, MB
Miami Medical Clinic	Miami, MB
Agassiz Medical Centre	Morden, MB
Medical Clinic – Morris	Morris, MB
Niverville Medical Clinic	Niverville, MB
Clinique Notre-Dame Clinic	Notre Dame de Lourdes, MB
Travel Health Clinic – Niverville	Niverville, MB
PCI Teen Clinic	Portage la Prairie, MB
Portage Clinic	Portage la Prairie, MB
Travel Health Clinic – Portage la Prairie	Portage la Prairie, MB
Medical Clinic – Place Somerset Place	Somerset, MB
Medical Clinic – Centre de bien-être St. Claude & Haywood Wellness Centre	St. Claude, MB
Medical Clinic – Centre de santé Montcalm Health Centre	St. Jean Baptiste, MB
Medical Clinic – St. Pierre	St. Pierre-Jolys, MB
Centred Medical Seine	Ste. Anne, MB
Clearspring Medical Clinic	Steinbach, MB
Oasis Medical Centre Ltd.	Steinbach, MB
QuickCare Clinic	Steinbach, MB
Steinbach Family Medical Clinic	Steinbach, MB
Steinbach Regional Secondary School Health Clinic	Steinbach, MB
Swan Lake Doctor’s Clinic	Swan Lake, MB
Vita Medical Clinic	Vita, MB
Dr. C.W. Wiebe Medical Centre	Winkler, MB
Travel Health Clinic – Morden/Winkler	Winkler, MB

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