



January 13, 2021

Senator Ned Claxton, Chair
Committee on Health and Human Services
c/o Legislative Information
100 State House Station
Augusta, ME 04333

Representative Michele Meyer, Chair
Committee on Health and Human Services
c/o Legislative Information
100 State House Station
Augusta, ME 04333

Re: Maine Vaccine Board 2019/2020 Annual Report

Dear Chairpersons Claxton and Meyer:

I am forwarding with this letter the Annual Report of the Maine Vaccine Board ("MVB") as contemplated by statute, 22 M.R.S.A. 1066.8.

This report highlights some of the achievements obtained as well as contains the VaxFactsSM Maine 2019/2020 Report (Exhibit B) which we produce each year as a public-friendly report. This document reviews our mission, annual highlights, and key financial metrics while providing links to more detailed financial data on the website.

We have also continued to document the annual cost savings. The resultant analysis (Exhibit A) confirms that there, indeed, continues to be substantial health care cost savings from MVB's work and the universal vaccine program. We are pleased that MVB recognized almost \$6 Million in health care cost savings in Maine last year.

The wisdom of the legislature in establishing MVB is well documented in the Impact Analysis attached as Exhibit C. This independent report was chartered by MVB before the current pandemic. We are grateful to BerryDunn for completing this report and for each of the various constituents surveyed who supplied data to allow for a remarkably thorough job by BerryDunn.

If we can provide any further information helpful to your committees or you would like more detail on any aspect of MVB's operations, please do not hesitate to call. If I am unable to respond directly, I will be sure to forward your request to KidsVax[®] or Maine CDC for any necessary research and follow up.

Very truly yours,

Peter Gore
Chairman, Maine Vaccine Board

Enclosure



STATE OF MAINE

**Tenth Report
of the
MAINE VACCINE BOARD**

for the
State Fiscal Year ended June 30, 2020

December 2020

Peter Gore, Chair
Deborah Deatruck, MPH
Larry Losey, MD
Katherine Pelletreau, MPH
Forrest West, MD
Gary Connor, RN
(ex officio, interim) **Tonya Philbrick**

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EXECUTIVE SUMMARY

This is the tenth annual report of the Maine Vaccine Board (MVB). MVB assessment collections commenced on November 15, 2011. The MVB raises funds to support universal childhood vaccine purchases at the Maine Center for Disease Control and Prevention's (CDC) favorable rates by assessing insurers and other entities responsible for the health benefits afforded to Maine's children. Assessment compliance by insurers continues to be strong. Since inception of the program, compliance has increased steadily resulting in almost 100% of eligible payers participating in the program. The close of the 2019-20 fiscal year saw the MVB continuing to advance in organizational maturity and improved efficiency. The MVB has now completed nine full years of operation.

The MVB annually reviews the vaccine list and receives recommendations from the Maine CDC on which vaccines should be on the list available to Maine providers for orders. In May 2019, the Maine CDC recommended and the MVB approved Tetanus Diphtheria Toxoid's (Td) addition to the vaccine list as this was the only vaccine currently on the Vaccines for Children (VFC) contract not available for Maine providers. Accordingly, this is the first full year that vaccine has been available to providers with MVB funding.

At the core of MVB's mission is the desire to reduce the occurrences of vaccine preventable disease by increasing medically-appropriate use of vaccines for Maine's children. This year continues MVB's success in that goal. Maine's childhood immunization rates continue to improve. As noted in MVB's VaxFacts_{SM} for 2019-20, primary credit for this significant turnaround should go to the Maine CDC and Maine's pediatric care providers. But the contributions of the pharmaceutical industry and healthcare payers, directly and through MVB, should also be noted as significant. While assisting to advance this goal, MVB also enabled overall systemic cost savings to be realized for the provider community, the insurer community, and Maine families.

State vaccine purchases with MVB funds and distribution to providers began in January 2012. This report contains data for the fiscal year July 1, 2019 - June 30, 2020:

Fiscal Year 7/1/2019 - 6/30/2020	
Total Number of Payers (4-qtr average)	98
Total Assessments Raised	\$9,059,633
Average Monthly Child Covered Lives	139,371
Number of Meetings	6

All Board meetings are open to the public and afford opportunity for public comment. Both oral and written comments are welcome. The Board met on 07-11-2019, 09-20-2019, 11-14-2019, 01-09-2020, 05-29-2020, 06-26-2020. Detailed information about the MVB and its operations, including minutes of all board meetings, is available at www.MEvaccine.org.

HISTORY AND DESCRIPTION OF THE MAINE VACCINE BOARD

The history and information regarding the Maine Vaccine Board can be found on our website: www.MEvaccine.org.

THE VACCINE BOARD

The MVB was created by the 124th Legislature through the enactment of Public Law 595. That law took effect on August 2, 2010. The Board originally consisted of ten members, with representatives from the health insurance carrier community, the health provider community, the public health community, self-insuring employers, the pharmaceutical industry, the Maine Department of Health and Human Services, and the State Treasurer. In 2018, the 128th Legislature passed an amendment to the statute removing the Treasurer of State from the Board and the Board now consists of nine members. Peter M. Gore currently serves as Board chair. Tonya Philbrick has served as the interim designee for the Commissioner of the Department of Health and Human Services since the beginning of 2018. With the exception of the pharmaceutical manufacturing industry representative, who serves a one-year term, the terms of Board members are three years.

PROGRAM PROGRESS AND ASSESSMENT RATE HISTORY

The State of Maine began purchasing vaccines for non-VFC eligible children January 1, 2012. Maine became a universal vaccine purchasing state and purchased vaccines for all Maine children at the same favorable federal CDC contract rates negotiated with vaccine manufacturers for the VFC program. As the program has matured, the Maine Center for Disease Control and Prevention (Maine CDC) has worked to aid in enhancing the program.

MVB has adopted eight assessment rate changes since its formation. These rate changes occur each year. In 2015, the rate changes moved from a state fiscal year calculation to a calendar year calculation. The fluctuation in rates over the years is a response to many factors, some of which include: increased vaccine utilization, continuous effort by KidsVax® to broaden the assessment base, increased participation by the insurers, increased vaccine costs, new vaccine recommendations, and inventory management by Maine CDC.

On September 22, 2020, MVB voted to hold its assessment rate steady at \$7.96 per child covered life per month for 2021. Mindful of the numerous negative impacts of COVID-19 on Maine employers and healthcare services generally, the Board determined to release a portion of its reserves to mitigate some of the other forces pressing for healthcare cost increases. This 2021 assessment rate was approximately \$1 lower than MVB had estimated a year earlier. In order to assist with payer planning, MVB alerted the payers at the time of its notification that its best estimate of the 2022 assessment rate would be \$9.92 per child covered life per month. This assumes that rates return to a more normal pattern going forward. In 2016, for example, the rate had been \$9.19. For the entire period of 2017-2020, MVB has set annual rates at levels significantly below annual vaccine price increases from vaccine manufacturers.

MVB Assessment Rates	
2011/2012	\$6.98
2012/2013	\$6.81
2013/2014	\$8.16
2015*	\$8.16

2016	\$9.19
2017	\$3.17
2018	\$8.29
2019	\$4.56
2020	\$7.96

*An annual assessment review began in 2015 moving from a fiscal year assessment rate to a calendar year assessment rate. The assessment rate remained at \$8.16 of the remainder of calendar year 2014.

As a result of, MVB's oversight of the universal vaccine program and collaborative efforts of Maine CDC, the payer community and many others, Maine continues to make progress in increasing the immunization rates in Maine as well as access for all Maine children. This is particularly important as a way to improve the health of all Mainers by reducing or eliminating vaccine-preventable diseases. In addition, there is a multiplier effect of childhood immunization dollars in reducing long term healthcare costs. Experts estimate the long-term financial cost reduction through disease avoidance at over \$10 for each \$1 of childhood immunization costs. This cost benefit to healthcare payers, of course, is in addition to the indirect benefits of improved health and decreased loss of work hours.

As MVB approached its tenth anniversary of operations, it chartered an independent impact analysis by the outside actuarial and accounting consulting firm BerryDunn.

BerryDunn was remarkably successful in marshaling survey participation by providers, payers, and other constituents across the State of Maine. One of the sub-analyses of the impact analysis was review of MVB's estimation of its annual cost savings. MVB's work, to hold down costs, had relied upon national reference data assembled annually by the CDC. BerryDunn was able to survey Maine payers covering well over 60% of all vaccine purchases statewide. That detailed analysis indicated cost savings slightly (i.e., under 3%) higher than those estimated by the MVB's less expensive methodology. That detailed validation and afforded helpful confirmation of the appropriateness of MVB's annual self-measurement tool.

Satisfaction with MVB's work was evident in all constituent groups. The report concluded:

"The evidence and data gathered during the course of this study supports that, a decade after its legislative enactment, the MVB has created an efficient mechanism for children to receive, and practitioners to provide, vaccines in Maine."

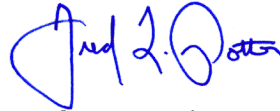
CONCLUSION

In conclusion, notwithstanding the implicit commendation of the independent Impact Analysis, MVB intends to continue to pursue avenues for improved program operations. The Impact Analysis certainly validates our annual "thank yous" to Board members and their employers who have allowed time for this service to this state without charge, as well as the staff of the Maine CDC, the Maine State Treasurer's Office, and the Office of Attorney General, all of whom have been supportive of this work.

MVB will continue to seek out avenues to increase the efficiency, equity, and effectiveness of the program for payers and providers. MVB is grateful for the support of its key constituents: payers, providers, and the Maine CDC.

Attached are Exhibits A, B, and C. These further illustrate the cost savings, increased access to immunizations and benefits of the universal vaccine purchasing program respectively.

Please note this report has been compiled by Fred L. Potter who serves the MVB as its servicing agent through a turnkey Executive Director and Administrative Services Agreement with KidsVax®, LLC. Fred is available to supply additional information and seek to answer any questions that may arise from this report.



Fred L. Potter | Managing Member



PO Box 1885 • Concord, NH 03302-1885

ph 1.855.KidsVax (543.7829) | fax 1.855.KidsFax (543.7329) | email fpotter@kidsvax.org

Exhibit A

MVB FYE 6/30/2020 Cost Summary Analysis



Administering Programs
to Fund Vaccines

December 31, 2020

Maine Vaccine Board
P.O. Box 1885
Concord, NH 03302-1885

MBV Program Savings Calculation for FYE 6/30/2020 & FYE 6/30/2019

Dear Directors,

Below is our calculation of the savings that the program has created in the fiscal years ended June 30, 2020 and June 30, 2019.

	(A) <u>FY 6/2020</u>	(B) <u>FY 6/2019</u>
A. CDC Survey Market Comparison costs: (Actual doses per brand x CDC market survey)	\$19,278,336	\$16,695,919
B. MVB Program costs:		
Cost of vaccine replenishments	\$13,254,805	\$11,732,696
+ Operating Cost	279,885	202,872
+ Leakage & Bad Debt	-	-
+/- Incremental Reserve Adj.	-	-
= Total Program Cost	<u>\$13,534,690</u>	<u>\$11,935,568</u>
C. MVB Program Savings (A - B = C)	\$5,743,646	\$4,760,351
D. Program Savings Percentage (C / A = D)	29.79%	28.51%
E. Savings per child covered life per year (Covered lives: FY2020= 139,371; FY2018= 139,739)	\$41.21	\$34.07

Notes:

1. In any program like this it is not possible to calculate savings with 100% accuracy. There are a number of reasons for this including the fact that some providers may continue to bill for some private supply.
2. The market comparison used for each dose is an average of prices given in response to the survey conducted annually by the CDC. Information is not provided on volume or location purchased. This CDC survey just addresses vaccine costs. It does not include other costs such as management fees, financing costs or other overhead, which some providers properly include in billings. Neither does it include normal payer administration costs for individual claims administration.
3. We believe this is a fair representation of the cost savings for the vaccines themselves. Payments to providers for administration of vaccines, of course, are completely outside of this system.
4. KidsVax.org will continue to track this metric periodically to aid the MVB in monitoring its program effectiveness.

Sincerely,

Peter M. Smith
Financial & Internal Control Analyst

cc: Fred L. Potter



Exhibit B--VaxFactsSM

The VaxFactsSM provides an overview of MVB activities for the past fiscal year along with high level financial summaries and links to MVB's website locations for more detailed financial data. A full-sized version of the VaxFactsSM report is available for viewing or download on MVB's home page at www.MEvaccine.org.



2019 - 2020

ME

VaxFactsSM

MVB | MAINE
VACCINE
BOARD

DEAR FRIENDS AND COLLEAGUES,

MVB was formed by legislative action in June of 2010. Mindful of the importance of public accountability, approaching its 10th anniversary, MVB chartered an independent study of its effectiveness.¹ The study results are gratifying. Not only have the objectives which prompted the legislative initiative been achieved, but also program constituents are pleased as well.



Thankfully, MVB had fully funded its reserve targets prior to calendar year 2020 which, due to COVID-19, has been particularly stressful on many organizations. MVB's operating financial model is self-correcting for volatility, so MVB has weathered the COVID-19 crisis well. Mindful of the strains experienced by others, the MVB voted to absorb another year of vaccine cost increases by holding assessment rates steady through 2021.

The study also validated the cost-savings methodology jointly developed by MVB and KidsVax® nearly a decade ago. With an extraordinarily high survey data coverage of over 60% of all vaccine purchases statewide, the independent study confirmed that financial savings for Maine healthcare payers consistently have been in the 20-28% range annually.

We remain grateful for the staff of the Maine CDC as well as healthcare providers and front-line workers statewide who administer vaccines funded by MVB. Their work truly has been heroic.

Peter Gore, Chair
Peter is Executive Vice President of the Maine State Chamber of Commerce. He serves on a volunteer basis as the Chair of the MVB.

¹ See www.mevaccine.org/impact

One of the most important outcomes of Maine's universal vaccine program are the health benefits achieved through improved immunization rates for Maine's children.

Most of the credit for this goes to Maine's healthcare providers, in cooperation with the Maine Center for Disease Control and Prevention's (CDC) vaccine distribution system, clinical expertise and technical support. The work of the Maine Vaccine Board (MVB) in overseeing the universal vaccine program has been aided by representatives of the Maine CDC, as well as the cooperation of employers and health insurers who do business in Maine.



*2019 National Immunization Survey Childhood Report, published Oct. 2020

MVB has reduced administrative and financial burdens on health care providers. Instead of having to purchase vaccines up front and await repayment from insurance companies, provider offices now receive vaccines from the state free of charge.

MVB funds help support Maine's universal childhood vaccine purchasing program. The program yielded over \$41 in savings per child this year. That added up to almost \$6 million in total health care cost savings.

The Maine Universal Access to Childhood Vaccines Program is a joint public and private effort that provides all Maine children birth through age 18 access to vaccinations. The MVB gathers the funding from health insurance carriers and third party administrators, and, in collaboration with the Maine CDC, aids in improving immunization rates while lowering the costs of health care. The universal childhood immunization purchasing program administered by DHHS in partnership with the MVB allows the state to purchase all of the Advisory Committee on Immunization Practices' (ACIP) recommended childhood vaccines at substantially discounted rates.



Independent studies estimate that for all Maine children born in a given year who receive all childhood vaccines to protect them against vaccine preventable diseases and followed through the age of 6*:

135

LIVES ARE SAVED

600,000

CASES OF DISEASE ARE PREVENTED

\$43 million

IN DIRECT COSTS ARE SAVED

\$1 SPENT ON VACCINES = **\$10.10** SAVED IN DIRECT HEALTHCARE COSTS

*Data from Fangjun Zhou, PhD
Health scientist, CDC 2011 and
CDC FY2021 Reports to Congress



BOARD OF DIRECTORS

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Tonya Philbrick
Interim Commissioner Designee
Director, Division of Infectious Disease,
Maine CDC

A Message from Tonya Philbrick Senior Health Program Manager, Maine CDC

The COVID-19 pandemic has strained the Maine Immunization Program in ways which no one could have anticipated last year. Parental response to social distancing guidelines and stay-at-home recommendations, as well as certain school closings, understandably resulted in delays in important well-child health visits across the board and vaccination visits in particular. The professionalism and diligence of Maine's pediatric community is evident in that, as 2020 drew to a close, nearly all missed early childhood immunization appointments had been made up and we were back on track in our multi-year effort to improve meaningfully Maine's immunization rates. I am grateful for our hardworking team members who assured adequate inventory in provider offices, notwithstanding the hosts of ordering and delivery and general communication challenges presented by the pandemic. Thankfully, rock-solid operations of the Maine Vaccine Board, including appropriate advance reserve funding, assured that financial support was never a challenge in maintaining Maine's vaccine supply.

Now, as we shoulder, along with other public health and general Maine healthcare resources, the burden of COVID-19 vaccine distribution, I want to express my gratitude both for our team members and for new partners who are widening the broad provider partnerships we have established over the years.

Maine, thankfully, entered this crisis better positioned than many states. We look forward to assisting providers as they finish catching up on other vaccines over the months ahead and for resuming our work on long-term immunization rate improvements as we also simplify statewide COVID-19 vaccination efforts.

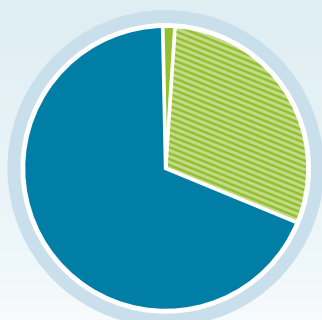
Tonya Philbrick

Tonya Philbrick
Senior Health Program Manager, Maine CDC

FINANCIALS

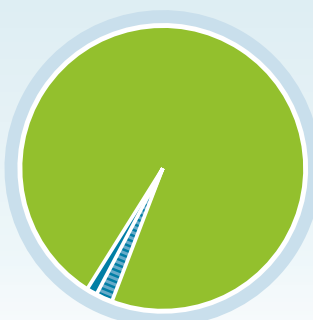
July 1, 2019 - June 30, 2020

Resources
\$13,534,690

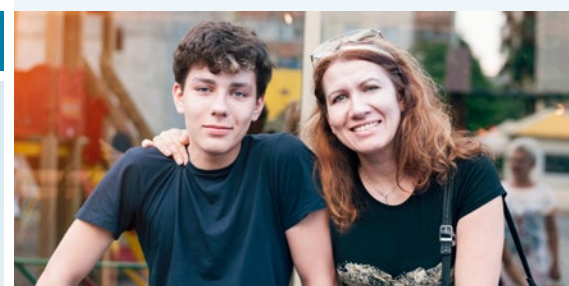


■ **67%** Assessments
■ **32%** Reserve Release
■ **1%** Interest

Expenditures
\$13,534,690



■ **98%** Vaccine Purchases
■ **1.1%** Service Agent
■ **0.7%** Legal
■ **0.2%** All Other



ADMINISTRATOR:

KidsVax

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Fred L. Potter
Managing Member

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Deputy Executive
Director

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CFO

Heather Veen
Executive Assistant

Matthew Miller
Client Services
Coordinator

Peter Smith, CPA
Financial Analyst

Exhibit C—BerryDunn Impact Analysis Report



**Impact Analysis
Maine Vaccine Board
Maine Universal Access to Childhood Vaccines**

September 22, 2020

Prepared for:

Maine Vaccine Board

Prepared by:

BerryDunn
100 Middle Street
Portland, ME 04101
Phone: 207-541-2200



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NOTE: This Impact Analysis does not address vaccines for the Coronavirus disease 2019 (COVID–19). At the time of publication, these vaccines remain under development with none available for public use.

1.0 Executive Summary

1.1 Vaccination and Public Health

The importance of vaccination¹ and its role in public health is well documented in medical literature, and as a result, efforts have been made worldwide to help ensure all children receive vaccinations. At its peak in the 1940s and 1950s, polio killed or paralyzed more than a half-million people worldwide each year, especially children and young adults.² Although polio is extremely rare today because of polio vaccination, the disease paralyzed more than 15,000 people every year in the United States (U.S.) during the 1950s.³ Many other diseases—such as diphtheria, tetanus, pertussis, measles, and pneumococcal disease—also cause significant morbidity and mortality, but can be prevented through widespread use of vaccinations. For that reason, vaccinations have been heralded as the 20th century’s most cost-effective public health achievements.⁴ Vaccinations have eradicated small pox, controlled the rate of polio with the hope of eradication, and allowed the U.S. to maintain its measles elimination status of nearly 20 years despite some recently imported cases from other countries.^{5,6} Consequently, the U.S. and many other countries have adopted methods to make vaccines more universally available to children.

1.2 History of the Maine Vaccine Board (MVB) and the Maine Universal Childhood Immunization Program (MUCIP)

In 2009, Maine Public Law 595 authorized the universal purchase of vaccines for Maine children through the establishment of the Maine Vaccine Board (MVB), with the goal of expanding vaccination access for Maine children. Pursuant to Title 22 Maine Revised Statutes Annotated (MRSA) §1066, the MVB oversees the MUCIP and has established a mechanism for the State of Maine (“the State”) to purchase all childhood vaccines for children who are not eligible for the Vaccines For Children (VFC)ⁱ program and distribute them to providers free of charge. Working in conjunction with the Maine Centers for Disease Control (Maine CDC), the MVB is a public-private collaboration focused on improving access to vaccines for Maine children while lowering the cost of healthcare.

The MVB determines the list of childhood vaccines available in the MUCIPⁱⁱ and facilitates universal purchase of vaccines for Maine children by working with the Maine CDC to purchase vaccines at the lowest possible cost negotiated by the U.S. Department of Health and

ⁱ The VFC program is a federally funded program that provides vaccines at no cost to children who might not otherwise be vaccinated because of inability to pay. Funding for the VFC program is approved by the Office of Management and Budget and allocated through the CDC.

ⁱⁱ Pursuant to Rule 95-695 Chapter 248, the Maine Department of Health and Human Services (Department) and the MVB are required to determine a list of vaccines to be provided by the MUCIP. In determining the list, the MVB considers the following: the Advisory Committee on Immunization Practices recommended Immunization Schedules; the recommendations of the Department based on its review of the Advisory Committee recommendations; and the clinical and cost-benefit analysis relating to potential vaccines.

Human Services, Centers for Disease Control and Prevention (CDC),ⁱⁱⁱ Through the collection of assessments from health plans and insurers and remitting the funds to the State for purchase of vaccines, the MVB makes it possible for:

- Physicians, clinics, and hospitals to receive State-supplied vaccines at no charge
- All Maine children who are not eligible for the VFC program to have access to critical vaccines at no charge
- All payers to participate in one system for purchasing and distributing childhood vaccines

Prior to 2009, Maine administered a program that provided a number of vaccines through a combination of federal and state funds and voluntary contributions from health insurers.⁷ Although this program improved childhood access to some vaccinations, its structure and funding was not sufficient to provide universal access to vaccines at no cost for children through 18 years of age. The MUCIP, with the MVB's oversight, was created to fully achieve these goals.^{iv}

1.3 Universal Access and Cost Savings

Providing universal access to vaccines for children required the MVB to create and maintain a sustainable and predictable financing system, used to fund the State's purchase of childhood vaccines, and distribute the vaccines to providers at no charge. A key goal of Maine's vaccine purchasing program is to reduce the administrative and financial burdens on providers who offer vaccination services.⁸ Healthcare providers surveyed for this study overwhelmingly commented on the ease of providing vaccinations to their patients because of the MUCIP. Universal access vaccination programs not only result in increased availability of vaccines to all children to prevent illness, but these programs also result in significant cost savings. It is estimated that for children born in the U.S. during 1994 – 2013, when coverage was near or above 90%, vaccinations will prevent an estimated 322 million illnesses, 21 million hospitalizations, and 732,000 deaths over the course of their lifetimes, at a net savings of \$295 billion in direct costs and \$1.38 trillion in total societal costs.⁹

The MUCIP purchases vaccines from the CDC at a cost per dose that is less than private (commercial insurance carrier) payer rates. In order to measure savings, BerryDunn compared the cost of the vaccines purchased by the MUCIP from the CDC—plus the MUCIP administrative costs—to vaccine costs based on a national survey of private payers and a local survey of Maine private payers. From April 2016 through March 2020, annual savings ranged

ⁱⁱⁱ "CDC" refers to the U.S. Centers for Disease Control and Prevention. "Maine CDC" refers to Maine Center for Disease Control & Prevention.

^{iv} Maine Public Law 595 authorizes the universal purchase of vaccines for the children of Maine through the established Maine Vaccine Board covering all privately insured Maine children. Funding from the federal VFC program is supplemented with both federal 317 funds and assessments on Maine private insurance companies. Section 317 of the Public Health Service Act authorized the federal purchase of vaccines to vaccinate children, adolescents, and adults. Section 317 discretionary funding also supports immunization program operations at the local, state, and national levels.

between 20% and 30%, averaging approximately \$4 million per year over the four-year study period. These savings accrue to the payers which lowers rates for purchasers of health insurance.

1.4 MVB Program Efficacy

The MUCIP provides all children from birth through 18 years of age in the State with access to a uniform set of vaccines as determined annually by the MVB, utilizing recommendations from the CDC Advisory Committee on Immunization Practices (ACIP). Funding for the MUCIP comes from the VFC program and an assessment on health plans, insurers, and third-party administrators (TPAs)^v, which allow Maine to be a universal state and provide vaccines at no cost for all Maine children, birth through 18 years of age.¹⁰ The vaccines currently offered through the program are identified in Appendix A. The MUCIP is administered by the Maine CDC, an office of the Maine Department of Health and Human Services in order to expand access to vaccinations against diseases as recommended by the ACIP. Title 22 MRSA §1066 stipulates that the MUCIP, in partnership with the MVB, should optimize public and private resources to lower the cost of providing vaccinations to children. This report summarizes key findings from stakeholder surveys and literature reviews and provides a cost analysis. It also notes challenges presented by vaccine policy and fluctuating exemption rates.

2.0 Background

The importance of vaccinating children against disease is widely recognized. Not only does vaccination reduce the burden of infectious disease, it also leads to increased life expectancy—only clean water performs better.¹¹ Vaccinations protect both individuals and the larger population, especially those who are immunocompromised.¹² Vaccinations also have significant economic benefits because they prevent disease and strengthen overall immunity. Improved health through vaccination leads to longer working lives, higher productivity, improved educational outcomes, greater social inclusion, and reduced healthcare costs.¹³ Vaccination is one of the most beneficial and cost-effective disease prevention measures.¹⁴

Prior to inception of the MUCIP, the State provided a select few vaccines^{vi} (i.e., DTaP, MMR, Polio, and the first dose of Varicella) through the Maine Immunization Program (MIP). The MIP was considered a “Universal Select” program, meaning it provided a limited number of vaccines, and as such, lacked all the ACIP-recommended vaccines. In addition, the MIP was difficult to implement for provider offices because they had to maintain separate stock and tracking mechanisms for VFC and non-VFC children.¹⁵

With the creation of the MUCIP in 2009, all Maine children from birth through 18 years of age have access to a uniform set of vaccines determined by the MVB, including vaccinations for all

^v Pursuant to 22 MRSA §1066, an “assessed entity” means a health insurance carrier licensed under Title 24-A or a third-party administrator registered under Title 24-A.

^{vi} DTaP (Diphtheria, Tetanus, Pertussis); MMR (Measles, Mumps, and Rubella).

of the targeted illnesses recommended by the ACIP.^{vii} The MVB consists of a nine-member volunteer board representing the State, health insurance carriers, providers, self-insured employers, and the pharmaceutical industry. The MVB also determines the annual assessment to payers.

The MVB engaged BerryDunn to provide an impact analysis of the MVB and its funding of the MUCIP. This report reflects an assessment of the MUCIP's impact since its inception, and identifies opportunities for improvement. To conduct this assessment, BerryDunn:

- Solicited stakeholder input by surveying insurance carriers, pharmaceutical representatives, healthcare providers, a public health representative, and a representative from the State of Maine
- Reviewed the Maine statutes and other relevant information about the MUCIP
- Conducted a literature review and national scan of other universal child vaccination programs
- Collected and analyzed the data provided

The report proceeds as follows: Section 3.0 reviews the cost savings over time, and Section 4.0 reviews program efficacy.

3.0 Cost Savings Over Time

Providing universal access to vaccines for children required the MVB to create and maintain a sustainable and predictable financing system, then partner with the State to establish mechanisms for the State to purchase childhood vaccines and distribute them to providers at no charge. Universal access vaccination programs not only result in the availability of vaccines to all children to prevent disease, but they also provide to significant cost savings.

3.1 Payer

Each year, the MUCIP staff estimate the number of vaccine dosages needed for the coming year. Estimations take into account vaccine trends, administered vaccines for the current year, and the latest ACIP recommendations. Vaccines are then purchased from the CDC at a cost per dose that is lower than private payer rates. In order to measure savings, BerryDunn compared the cost of the vaccines purchased by the MUCIP from the CDC to the cost that would have been incurred by private payers. It is important to note that the MUCIP provides vaccines free of charge to providers. Providers also charge a fee to administer the vaccines which is not

^{vii} Pursuant to Rule 95-695 Chapter 248, the Maine Department of Health and Human Services (Department) and the MVB are required to determine a list of vaccines to be provided by the MUCIP. In determining the list, the MVB considers the following: the Advisory Committee on Immunization Practices recommended Immunization Schedules; the recommendations of the Department based on its review of the Advisory Committee recommendations; and the clinical and cost-benefit analysis relating to potential vaccines.

included, and is covered by payers. This cost savings analysis focused only on the cost of vaccines. In order to determine cost savings, BerryDunn took the following steps.

Step One: Comparison of the MUCIP costs to the CDC private survey costs

BerryDunn compared the MUCIP cost to the cost of vaccines based on an annual CDC survey of private payers. The national survey provides average private-payer-per-dose cost for each vaccine brand. The survey does not include information on volume or location, nor does it include vaccination administration fees or payer administration cost.

Every April 1, the CDC increases its cost per dose for childhood vaccines. The increases are due to increased costs from the vaccine manufacturers. Therefore, BerryDunn reviewed four recent CDC fiscal years to observe cost savings. For each of the four fiscal years, BerryDunn compared the MUCIP cost to vaccine cost based on the private payer survey. The cost-per-dose amounts from the private payer survey for each vaccine brand were multiplied by the annual number of doses and summed to determine an annual cost. The MUCIP costs were calculated using the CDC cost-per-dose rates, which were multiplied by the number of vaccines and summed. The MUCIP operational costs were added to the vaccine cost to calculate a total MUCIP cost. The operational costs increased over time due to increases in banking and legal fees as well as increases in the servicing agent's administrative fees. The differences between the survey-based private payer vaccine cost and the total MUCIP cost are the MUCIP payer savings, which are shown in Table 1.

Table 1: MUCIP Savings Based on CDC National Survey

Federal Fiscal Year	April 2019 – March 2020	April 2018 – March 2019	April 2017 – March 2018	April 2016 – March 2017
Number of Doses	234,838	205,451	215,323	216,528
Private Vaccine Cost	\$17,392,853	\$15,277,481	\$16,126,125	\$16,509,740
MUCIP Vaccine Cost	\$13,627,265	\$11,324,363	\$11,991,752	\$11,752,335
MUCIP Operational Cost	\$202,872	\$189,790	\$152,594	\$157,626
Total MUCIP Cost	\$13,830,137	\$11,514,153	\$12,144,346	\$11,909,961
Savings	\$3,562,716	\$3,763,329	\$3,981,780	\$4,599,779
% Savings	20.5%	24.6%	24.7%	27.9%

Step 2: Comparison of the MUCIP vaccine costs to Maine private payer survey vaccine costs

BerryDunn compared the MUCIP cost to the cost of vaccines based on a survey of private payers in Maine. Using the number of covered lives (children) in the MUCIP, BerryDunn surveyed the six largest private payers in Maine. These payers represent approximately 85% of the children in the MUCIP. Four carriers responded to the survey, representing between 63% and 71% of the non VFC eligible children participating in the MUCIP. This variation is caused by

changes in the number of groups and members that purchased health insurance and were enrolled with the payers participating in the survey.

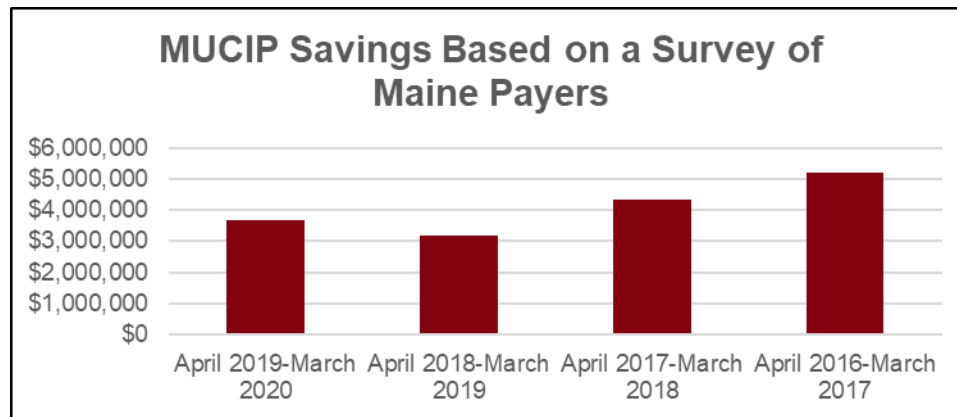
BerryDunn collected cost-per-dose data for each vaccine included in the MUCIP. For each vaccine, a weighted average cost-per-dose was developed by using the number of children for each payer. The cost-per-dose amounts for each vaccine were multiplied by the annual number of doses and summed to determine an annual cost based on the Maine private payer payment rates. The MUCIP costs were calculated using the CDC cost-per-dose rates, which were multiplied by the number of vaccines and summed. The MUCIP operational costs were added to the vaccine cost to calculate a total MUCIP cost. The differences between the private payer cost and the total MUCIP cost are the savings.

The Maine survey data collected has limitations. Because most vaccines are covered by the MUCIP, data sets collected by the Maine private payers were small, and the provider mix by private payer varied significantly from month to month. Because cost-per-dose rates vary by provider, the cost data collected is volatile from month to month as well. Unlike the CDC prices that gradually increase over time, the Maine private payer data collected had multiple periods of increasing and decreasing costs during the study period. Because of this limitation, BerryDunn developed an average cost-per-dose from the four-year study period for each vaccine brand. The long-term average Maine private payer vaccine costs reported in the survey were close to the national private payer survey vaccine costs, so BerryDunn used the long-term average to develop the estimated savings. Results are shown in Table 2. Annual savings amounts are shown graphically in Figure 1.

Table 2: MUCIP Savings Based on a Survey of Maine Payers

Federal Fiscal Year	April 2019 - March 2020	April 2018 - March 2019	April 2017 - March 2018	April 2016 - March 2017
Number of Doses	234,838	205,451	215,323	216,528
Private Vaccine Cost	\$17,502,480	\$14,705,611	\$16,491,465	\$17,119,764
MUCIP Vaccine Cost	\$13,627,265	\$11,324,363	\$11,991,752	\$11,752,335
Operation Cost	\$202,872	\$189,790	\$152,594	\$157,626
Total MUCIP Cost	\$13,830,137	\$11,514,153	\$12,144,346	\$11,909,961
Savings	\$3,672,343	\$3,191,459	\$4,347,120	\$5,209,803
% Savings	21.0%	21.7%	26.4%	30.4%

Figure 1: MUCIP Savings Based on a Survey of Maine Payers



Due to data limitations, it is not possible to calculate exact savings, but the data strongly suggest that the MUCIP generates significant savings to immunize the children covered by private payers in Maine. Annual savings ranged between 21% and 30%, and annual savings averaged approximately \$4 million over the four-year study period. These savings accrue to the payers which lowers rates for purchasers of health insurance. The MUCIP annual costs increased each year with the exception of the fiscal year ending in March 2019. The reduction was due to a significant drop in the number of doses (because of an increase in combination vaccines), in addition to the annual cost from the private payer surveys being lower in that fiscal year. In the fiscal year ending March 2018, there was a slight reduction in the number of doses. The increase in the cost per dose from the private payer surveys was small, and combined with the reduction in doses, there was a reduction in the private payer annual cost in that fiscal year.

3.2 Providers

Results from a survey administered by BerryDunn to Maine providers indicated that providers have reduced costs and improved efficiency as the result of the MUCIP.¹⁶ Prior to the MUCIP, providers were required to order and keep two vaccine supplies: one for children eligible for VFC^{viii} and one for commercially insured children. Under the MUCIP, vaccines for commercially insured children are purchased by the Maine CDC, along with the VFC vaccines. Because of a single supply, providers have experienced time efficiencies, including reduced time in ordering vaccines, managing the stock of vaccines, correcting errors arising from administering a vaccine from the wrong supply, and easier logging of the correct manufacturer lot number. Under the current system, regardless of insurance status, every Maine child qualifies for a vaccination. In a study of pediatric practices in Colorado—a state that does not have a universal access

^{viii} The Vaccines for Children (VFC) program is a federally funded program that provides vaccines at no cost to children who might not otherwise be vaccinated because of inability to pay. The CDC buys vaccines at a discount and distributes them to state health departments, which in turn distribute them at no charge to private physicians' offices and public health clinics registered as VFC providers. Children who are eligible* for VFC vaccines are entitled to receive those vaccines recommended by the ACIP.

program—virtually all practices used some type of “just-in-time” inventory method^{ix}, taking advantage of manufacturers’ special pricing and ordering vaccines based on patients’ needs in the near term.¹⁷ However, such a “just-in-time” system carries a heavy administrative burden.

In response to the survey administered by BerryDunn, one provider commented that the streamlined process for insurance eligibility screening saves a significant amount of administrative time. In addition, the MUCIP eliminated the cost of potentially giving privately purchased vaccines to VFC-eligible children. Prior to the MUCIP, there would have been no reimbursement for that cost, and one provider estimated it could easily be as much as 1% of total vaccine doses.

Consolidation of vaccines to one supply reduces both administrative and storage costs. Before having a single source of vaccines, providers were required to store vaccines acquired from the State for VFC-eligible children separately from those used for children with private insurance. Depending on the size needed, an acceptable vaccine refrigerator costs between \$1,000 and \$3,000. There are also decreased costs tied to vaccine supply by reducing vaccine wastage and eliminating the costs associated with vaccines purchased, but not paid for, by insurer or patient. The ability to combine the storage of vaccines also reduced the administrative burden on practices to account for vaccines coming from two different sources.

While providers were not able to quantify savings in dollars, the survey results strongly indicated that providers have experienced cost savings and increased efficiency as a result of the MUCIP. These benefits have been realized by having a single vaccine source, decreased administrative time related to insurance and vaccine stocking and storage, and decreased vaccine wastage. The majority of the providers surveyed reported positive experience with the MUCIP program.

4.0 MVB Program Efficacy

The MVB facilitates universal purchase of vaccines by collecting payments from health plans, insurers, and other payers, and then remitting the funds to the State.¹⁸ Through the MVB:

- Providers can receive State-supplied vaccines at no charge.
- Children have improved access to vaccines.
- All payers participate in an efficient, cost-effective system for purchasing and distributing childhood vaccines.

Beyond ensuring a single standard of vaccination care for all children, universal purchase provides benefits to a number of constituencies:

^{ix} Just-in-time (JIT) is a common inventory management technique and type of lean methodology designed to increase efficiency, cut costs, and decrease waste by receiving goods only as they are needed.

Table 3: Benefits of Universal Access Vaccination Programs¹⁹

Families	Providers	Public Health	Payers
Removes cost barrier from vaccination decisions	Supplies vaccines at no charge	Reduces risk of certain communicable diseases	Offers vaccines at favorable rates
Protects children against vaccine-preventable diseases	Eliminates significant cash expenditure required for private purchase	Streamlines vaccine management and quality assurance	Reduces claims for diseases that could have been prevented
Enables children to be vaccinated by their own pediatrician or healthcare provider	Avoids separate storage of privately purchased and federally funded vaccines	Helps ensure access to vaccines in children's medical homes	Preserves an efficient purchase and distribution system
Lowers healthcare costs due to illness prevention	Reduces administrative burdens	Reduces illness burden	Lowers healthcare cost due to illness prevention

4.1 Program Administration

The MUCIP is administered by the Maine CDC with support from the MVB. As set forth in the MUCIP vision and mission, the MUCIP "...strives to ensure full protection of all Maine children and adults from vaccine-preventable disease."²⁰ Providers surveyed for this study commented on the ease of acquiring vaccines from the MUCIP. All respondents to the survey agreed with the approach taken by the MVB to choose vaccines every year. A few respondents suggested that Tetanus-Diphtheria (Td) be added to the approved vaccine list because it would help address the needs of under-vaccinated children. After the survey used in this study was released, the MVB voted at the July 11, 2019, directors meeting to add Td to the approved list of vaccines.²¹

4.2 Impact on Providers

Through the MVB, providers in Maine have a single source for their vaccine supply. Prior to the creation of the MVB, program healthcare providers received vaccines from multiple sources, creating an administrative burden. The MVB, and its establishment of a universal access program, have greatly simplified the acquisition of vaccines for providers. The MUCIP is a voluntary program, and according to the State's response to BerryDunn's survey conducted for this study, there are few non-participating providers. Providers who responded to a similar survey unanimously commented favorably regarding the administrative simplicity of the current program, as noted in Section 3.0. Providers reported that the MVB has improved vaccine availability, and several providers believe some parents would forgo vaccination without readily available, no-cost vaccines.

4.3 Opportunities for Improvement

Based on responses received from all stakeholder groups, BerryDunn received few recommendations for improvement. Suggestions included greater promotion and education regarding the MVB and the MUCIP—such as what they do, and why they are important—and an explanation of the program's public health benefits.

One respondent suggested an extension of the program to adults. Except for a limited supply for high-risk adults, Maine does not offer adult vaccines. Some states, such as Rhode Island and Vermont, include adults in their universal vaccine programs.

Some respondents expressed the need to address coverage for cross-border children. New Hampshire is also a universal state, and its providers vaccinate any child, regardless of their state of residency. However, according to Maine law, only Maine residents are covered by the MUCIP.

The MVB is working with the New Hampshire Vaccine Association to execute a memorandum of understanding to address these cross-border issues. In addition to these efforts, based on the other responses received, the MVB might want to explore potential future program modifications.

4.4 Current Challenges Facing the MVB

Although the MVB has created an efficient and effective mechanism to help ensure Maine children are vaccinated, the MVB cannot impact parental decisions to opt out of vaccinations for their children. According to federal guidelines, vaccine exemptions should be rare. For example, these exemptions are generally reserved only for children who are allergic to the components of a vaccine and for children who are immunocompromised. However, at the time this report was written, 45 states and Washington D.C. allow parents to opt out of vaccinations for their children because of religious reasons, and 15 states allow philosophical exemptions based on personal, moral, and other beliefs.²²

Despite these guidelines and the evidence that vaccines are one of the most important measures of preventative medicine, there have been recent trends among some parents who hesitate to vaccinate their children due to a number of reasons.^{23,24}

The MVB was created to work in partnership with the Maine CDC in the creation of the MUCIP and to provide access to vaccines, with no direct expectation that the program would increase vaccination rates. Although vaccination rates should not be used as a measure of the MVB's success, a response to the survey performed by BerryDunn from the pharmaceutical industry expressed a concern that universal purchase programs have not demonstrated an increase in vaccination rates with the use of assessments for vaccine purchasing.

Vaccination requirements are set forth in the Maine rules adopted pursuant to 20-A MRSA §6359, requiring students to be immunized.^x School vaccination requirements ensure that children who are behind in childhood vaccinations are to be vaccinated before school entry, and the school vaccination assessments allow the MIP to identify schools and communities where focused action could improve vaccination coverage to help ensure that more children can benefit from the protection offered by vaccines.²⁵

The MVB has been successful in ensuring access. However, allowing broad categories for vaccination exemptions has been demonstrated to adversely impact vaccination rates. Prior to the passage of Public Law, Ch. 154 (introduced as LD 798), which limits vaccination exemptions, Maine allowed medical, religious, and philosophical exemptions to vaccination.²⁶ This new law will not take effect until September 1, 2021. Until then, the broad exemptions for Maine children remain in effect.²⁷ These broad exemptions are likely the cause of Maine's rate of pertussis being eight times the national average in 2018.²⁸ In California, where a law was passed that bars parents from citing personal or religious beliefs to exempt their children from vaccinations, the percentage of vaccinated kindergarteners rose two years after the law's enactment, from 92.9% in the 2015 – 2017 school year to 95.1% in the 2017 – 2018 school year.²⁹ The 2018 – 2019 MIP school exemption rates for kindergarten are set forth in Appendix B.

5.0 Conclusion

Through the purchase of vaccines from the CDC at the most favorable rates, the MUCIP generates significant savings to immunize children covered by private payers in Maine. Annual savings range between 20% and 30%, and savings average approximately \$4 million per year. While the MUCIP was not designed to directly impact vaccination rates, it has improved vaccination access and efficiency, and has reduced costs for providers. By having a single supply, providers spend less time ordering vaccines, managing stock, and correcting errors resulting from administering vaccine from the wrong supply. In addition, the streamlined process for insurance eligibility screening saves a significant amount of administrative time for providers, eliminating potential delays in vaccinating children. Provider practices no longer need a second vaccine refrigerator, saving space and between \$1,000 and \$3,000 per refrigerator. Providers also reported savings due to a reduction in vaccine wastage.

It is also important to note that, although the Affordable Care Act (ACA) requires health plans and insurance policies to provide coverage without cost-sharing for certain preventive services, certain provisions in the ACA allow for up to a one-year delay for coverage of newly recommended vaccines by the ACIP.³⁰ The MVB prevents these potential delays in coverage by ensuring that all children who are not VFC eligible receive vaccines at no cost.

^x Department of Education, Chapter 126: Immunization Requirements for School Children and Department of Health and Humans Services, Chapter 261: Immunization Requirements for School Children.

According to the CDC, the “successful delivery of vaccines to children of all income levels relies on participation of public and private health-care providers, insurance companies, state and federal public health officials, vaccine manufacturers, and parents.”³¹ The evidence and data gathered during the course of this study supports that, a decade after its legislative enactment, the MVB has created an efficient and effective mechanism for children to receive, and practitioners to provide, vaccines in Maine.

Appendix A: MVP-Approved Vaccine List

1.DTaP Vaccines (Diphtheria, Tetanus, acellular Pertussis)

- a.Daptacel® (Sanofi Pasteur)
- b.Infanrix® (GSK)

2.Hepatitis A Vaccines

- a.Vaqta® (Merck)
- b.Havrix® (GSK)

3.Hepatitis B Vaccines

- a.Engerix B® (GSK)
- b.Recombivax® (Merck)

4.Polio Vaccine

- a.IPOL® (Sanofi Pasteur)

5.Hib Vaccines (Haemophilus influenzae type b)

- a.ActHIB® (Sanofi Pasteur)
- b.Pedvax HIB® (Merck)
- c.Hiberix® (GSK)

6.HPV Vaccines (Human Papillomavirus)

- a.Gardasil-9® (Merck)

7.Pneumococcal Vaccines

- a.Prevnar 13® (Wyeth)
- b.Pneumovax 23® (Merck)

8.Meningococcal Conjugate Vaccines

- a.Menactra® (Sanofi Pasteur)
- b.Menveo® (Novartis)

9.Meningococcal Group B

- a.Bexero® (GlaxoSmithKline)
- b.Trumenba® (Pfizer)

10.Measles, Mumps and Rubella Vaccine

a.MMRII[®] (Merck)

11.Rotavirus Vaccines

a.Rotarix[®] (GSK)

b.RotaTeq[®] (Merck)

12.Tdap Vaccines (Tetanus Toxoid, Reduced Diphtheria Toxoid and acellular Pertussis – adolescent formulation)

a.Boostrix[®] (GSK)

b.Adacel[®] (Sanofi Pasteur)

13.Td Vaccine (Tetanus and Diphtheria Toxoid)

a.Tenivac[®] (Sanofi Pasteur), single dose syringe presentation

b.Tenivac[®] (Sanofi Pasteur), single dose vial presentation

14.Varicella Vaccine

a.Varivax[®] (Merck)

15.Combination Vaccines

a.Kinrix[®] (GSK)

b.Pediarix[®] (GSK)

c.Pentacel[®] (Sanofi Pasteur)

d.ProQuad[®] (Merck)

e.Quadracel[®] (Sanofi Pasteur)

16.Influenza Vaccines

a.At least one preservative free, single dose injectable presentation

b.FluMist[®] (AstraZeneca), nasal presentation

Reviewed: 07-11-2019, effective until next review by MVB.

Appendix B: 2018 – 2019 MIP School Exemption and Immunization Rates, Kindergarten

2018 – 2019 School Exemption and Immunization Rates By Individual Vaccine, Kindergarten ³²							
Vaccine	Number of Students Surveyed	Number of Missing Records	Missing Records Rates	Total Exemptions (Medical, Religious, & Philosophical)	Total Exemption Rates	Total Students Immune by Vaccine/Disease	Total Vaccination Rates
DTaP	12875	88	0.7%	616	4.8%	12171	94.5%
MMR	12875	124	1.0%	674	5.2%	12077	93.8%
Polio	12875	83	0.6%	623	4.8%	12169	94.5%
Varicella	12875	37	0.3%	493	3.8%	12345	95.9%

Endnotes

- ¹ The CDC defines vaccination as the act of introducing a vaccine into the body to produce immunity to a specific disease and immunization as a process by which a person becomes protected against a disease through vaccination. “Immunization” is often used interchangeably with vaccination or inoculation.
- ² Ending Polio’s Reign of Terror. University of Pittsburgh. Kumerfield C. Remembering the polio epidemic of the 1950’s: Part 1. Published August 21, 2017. Accessed 4 August 2020: <https://www.225.pitt.edu/story/ending-polio%27s-reign-terror>.
- ³ Your Child’s First Vaccines. Vaccine Information Statements. CDC. Published November 15, 2015. Accessed 8 October 2019: <https://www.cdc.gov/vaccines/hcp/vis/vis-statements/multi.html#know>.
- ⁴ Immunization policy issues overview. National Conference of State Legislatures. Published May 22, 2019. Accessed 30 September 2019: <http://www.ncsl.org/research/health/immunizations-policy-issues-overview.aspx>.
- ⁵ Pickering LK, Baker CJ, Freed SA, et al. Immunization programs for infants, children, adolescents, and adults: clinical practice guidelines by the Infectious Diseases Society of America. IDSA Immunizations Guidelines. Clinical Infectious Diseases 2009;49 (15 September) Accessed 30 September 2019: <https://academic.oup.com/cid/article/49/6/817/333393>.
- ⁶ U.S. Department of Health & Human Services. CDC. Measles Elimination. Accessed 4 August 2020: <https://www.cdc.gov/measles/elimination.html>.
- ⁷ Johnson KA. Immunization Policies and Funding in Maine. Johnson Group Consulting, Inc. Accessed 31 July 2020: https://www.nap.edu/resource/case_studies/maine.pdf.
- ⁸ Maine Vaccine Board Annual Report. 2013-2014 VaxFacts. Accessed 16 April 2019: [https://www.mevaccine.org/mevaccine.nsf/documents/2013-14MVBAAnnualReport.html/\\$File/2014-12-15%20VaxFactsME%20\(FINAL\).pdf](https://www.mevaccine.org/mevaccine.nsf/documents/2013-14MVBAAnnualReport.html/$File/2014-12-15%20VaxFactsME%20(FINAL).pdf).
- ⁹ Whitney CG, Zhou F, Singleton J, Schuchat A. Benefits from Immunization During the Vaccines for Children Program Era – United States, 1994-2013. 25 April 2014 / 63(16; 352-355 Centers for Disease Control and Prevention. Accessed 2 October 2019: <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6316a4.htm>.
- ¹⁰ Maine Immunization Program Policy and Procedure Provider Manual 2019. Accessed 2 October 2019: <https://www.maine.gov/dhhs/mecdc/infectious-disease/immunization/documents/MIP-Policies-and-Procedures.pdf>.
- ¹¹ Andre FE, Booy R, Bock HL, et al. Vaccination greatly reduces disease, disability, death and inequity worldwide. Bulletin of the World Health Organization. February 2008, 86(2). Accessed 30 September 2019: <https://www.scielo.org/pdf/bwho/2008.v86n2/140-146/>.
- ¹² *Op.cit.* Immunization policy issues overview. National Conference of State Legislatures.
- ¹³ Rémy V, Langeron N, Quilici S, Carroll S. The economic value of vaccination: why prevention is wealth. J Mark Access Health Policy. 2015;3:10.3402/jmahp.v3.29284. Published 2015 Aug 12. Accessed 4 August 2020: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4802701/>.
- ¹⁴ Immunization program for infants. Immunization programs for Infants and Children. Accessed 9/30/2019: <https://academic.oup.com/cid/article/49/6/817/333393>.

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- ¹⁵ The Universal Childhood Immunization Program: Implementing Public Law 2009-595 in Maine. Accessed 2 October: <https://www.maine.gov/dhhs/mecdc/infectious-disease/immunization/providers/presentations/Universal-Childhood-Immunization-Program-Becomes-Law-in-Maine.pdf>.
- ¹⁶ BerryDunn surveyed 10 Maine providers, and eight responded. In order to get a statewide representative sample of providers, we surveyed a variety of practice sizes addressing geographic distribution as well as including both pediatric and family practice providers.
- ¹⁷ Glazner JE, Beaty B and Berman S. Cost of Vaccine Administration Among Pediatric Patients. Pediatrics December 2009, Volume 124/Issue Supplement 5. Accessed 2 October 2019: https://pediatrics.aappublications.org/content/124/Supplement_5/S492.full.
- ¹⁸ Welcome to the Maine Vaccine Board's Website. Accessed 9 September 2019: www.mevaccine.org/mevaccine.nsf/pages/home.html.
- ¹⁹ New Hampshire Vaccine Association. A 10-Year review. October 30, 2012. Accessed 30 September 2019: [https://www.kidsvax.org/kidsvax.nsf/documents/nhva_10yr_review.html/\\$File/2012-10-31%20NHVA_10YearReview_FNL3.pdf](https://www.kidsvax.org/kidsvax.nsf/documents/nhva_10yr_review.html/$File/2012-10-31%20NHVA_10YearReview_FNL3.pdf).
- ²⁰ *Op. cit.* Maine Immunization Program Policy and Procedure Provider Manual 2019.
- ²¹ Maine Vaccine Board, 2019 Calendar, July 11 MVB Directors Meeting, Minutes, <https://www.mevaccine.org/mevaccine.nsf/WebEvents/F86EE2F7CD56EAE88525838D00595FB7>.
- ²² National Conference of State Legislatures. States With Religious and Philosophical Exemptions From School Immunization Requirements. 6 June 2020. Accessed 11 September 2020: <https://www.ncsl.org/research/health/school-immunization-exemption-state-laws.aspx>.
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- ²⁴ *Op. cit.* Vaccination greatly reduces disease, disability, death and inequity worldwide.
- ²⁵ 2018-2019 Maine School Immunization Assessment Report. Accessed 10 October 2019: <https://www.maine.gov/dhhs/mecdc/infectious-disease/immunization/publications/2018-2019-School-Age-Immunization-Assessment-Report.pdf>.
- ²⁶ *Op.cit.* 2018-2019 Maine School Immunization Assessment Report.
- ²⁷ Maine Center for Disease Control & Prevention. Maine.gov. Maine Vaccine Exemption Law Change 2019. Accessed 4 August 2020: <https://www.maine.gov/dhhs/mecdc/infectious-disease/immunization/maine-vaccine-exemption-law-changes.shtml>.
- ²⁸ Lawlor J. Worst-in-nation puts attention on vaccines. Maine Sunday Telegram March 24, 2019. Accessed 30 September 2019: <https://www.pressherald.com/2019/03/24/worst-in-nation-status-for-pertussis-rates-focuses-attention-on-vaccines/>.
- ²⁹ *Op. cit.* Measles cases are on the rise.
- ³⁰ *Op. cit.* Immunization policy issues overview.

³¹ *Op. cit.* Whitney CG, Zhou F, Singleton J, Schuchat A. Benefits from Immunization During the Vaccines for Children Program Era – United States, 1994-2013. 25 April 2014 / 63(16; 352-355 Centers for Disease Control and Prevention.

³² *Op. cit.* 2018-2019 Maine School Immunization Assessment report.