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Early feedback from a pilot of a cognitive computing system to analyze immunization data

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National Immunization Conference

May 16, 2018

Outline

- A few definitions
- Utilities of a cognitive computing system
- Building an immunization program cognitive computing system
- The system
- Next steps

Definition

- Cognitive computing
 - simulation of human thought processes in a computerized model
 - involves self-learning systems (machine learning) that use data mining, pattern recognition, natural language processing, and other means to mimic the way the human brain works



Definition

- Strongly worded definition
 - Computers don't mimic how the human brain works
 - Computers do not have cognitive functions



Definition

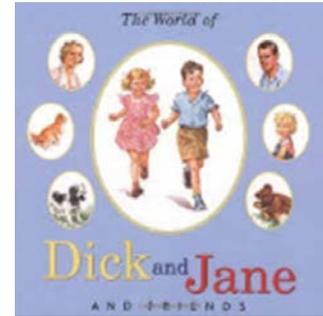
- Source
 - Wikipedia
- Search engine
 - Google





One more definition

- Lexicon - the vocabulary of a person, language, or branch of knowledge
 - Needed to “learn” to read and understand text data



Samuel Johnson, English author and poet,
18 September 1709 – 13 December 1784

Utilities of cognitive computing systems

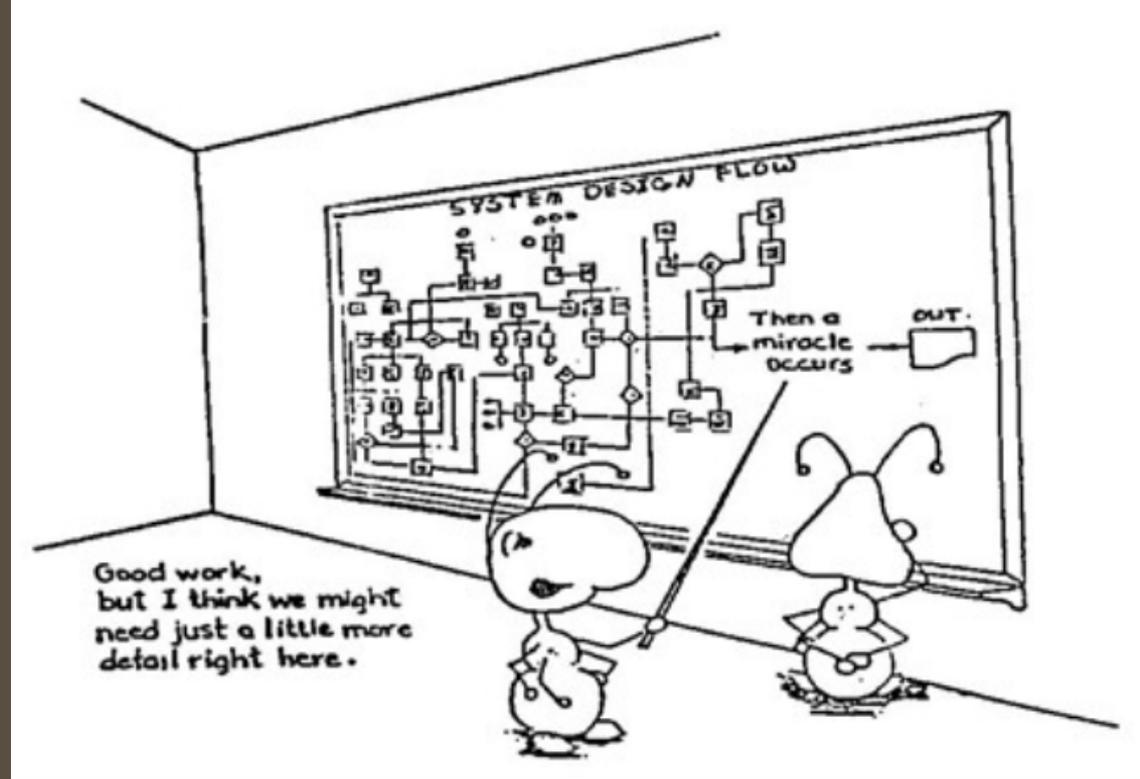
- Leverage automation for quantitative and qualitative data analysis
- Goal of immunization programs is to maintain or improve vaccination coverage to prevent diseases
 - Quantitative data
 - Disease surveillance data
 - Vaccination coverage surveys
 - Policy surveillance
 - Annual reports
 - Qualitative data
 - Funding applications
 - Site visit reports
 - Twitter
 - News reports
 - } Formal
 - } Informal

Objective

- Develop a cognitive computing system to analyze immunization program data.

Google

- Readily available search engine
 - Includes pages that are actually sponsored advertisements
 - Includes pages that are intentionally optimized for the Google search engine
 - Includes a large amount of material that is not relevant
 - Need to analyze text data within the immunization program context
 - Analyze text where “shot” means vaccination and not a shot in the dark, a gunshot, worn out or weary ...



Building an Immunization Program Cognitive Computing System (IPCCS)

Data Inputs

- Formal language data
 - Vaccines for Children (VFC) policy and procedures, immunization-related websites, journals, and legislation
 - Scrapers and parsers used to automate data extraction
 - Location for each VFC Awardee
- Informal language data
 - Tweets, blogs, forums, news articles
 - Collected via a social media search platform, Sysomos
 - Input from approximately November 2016 to May 2018
 - Location information available for at least 60% of informal data.
 - Related to the user-profile, not the location of the Tweet.

Pre-Processing Data

- Automated through use of scripts
 - Removed links and Twitter usernames
 - Converted text to lowercase
 - Recognize a given word regardless of letter case (uppercase or lowercase)
 - Tokenized
 - Split text into “tokens”, units for analysis
 - Words
 - Removed stop words
 - Words that appeared frequently in text but were not substantial to any particular topic.
 - “the”, “and”, “a”
 - Lemmatization
 - Remove inflectional endings of words to reduce redundancy in results.
 - “performing”, “performed”, and “performs” become “perform”

Algorithms

- Infer meaning by assessing similarity
- IPCSS algorithms
 - Word2vec
 - Global vectors for word representation (GloVe)
 - Word Topic Mixture (WTM) Model



IPCCS: Login Page

Welcome to the lexicon

Username:

Password:

Login

IPCCS: Search Page

Social media lexicon - words

Social media lexicon - queries

Formal data lexicon - words

Formal data lexicon - queries

Logout

Social media lexicon - words

Formal data lexicon - words

Social media lexicon - queries

Formal data lexicon - queries

IPCCS: Informal Data Word Search

Social media lexicon - words

Social media lexicon - queries

Formal data lexicon - words

Formal data lexicon - queries

Logout

Social media lexicon - words

Query: Results number:

Location: Start date: End date:

Social media lexicon - words

Query: Results number: Location: Start date: End date:

Word2vec

1. dtap: 0.81
2. mmrv: 0.77
3. rubella: 0.73
4. revaccinated: 0.73
5. tdap: 0.72
6. dtp: 0.72
7. alpo4: 0.71
8. 18mo: 0.7
9. 12mo: 0.69
10. prevnar13: 0.68

Glove

1. vaccine: 2.33
2. measles: 2.3
3. vaccinated: 2.26
4. autism: 2.2
5. vaccination: 2.19
6. rubella: 2.08
7. mumps: 1.95
8. dtap: 1.9
9. varicella: 1.88
10. case: 1.73

WTM

1. mmrv: 0.82
2. meales: 0.8
3. dtp: 0.78
4. dtap: 0.76
5. dpt: 0.75
6. measels: 0.75
7. ipv: 0.72
8. hepB: 0.71
9. measles: 0.7
10. rubella: 0.7

IPCCS: Informal Data Word Search

Informal lexicon - words

Informal lexicon - paragraphs

Formal lexicon - words

Formal lexicon - paragraphs

Logout

Informal lexicon - words

Query:

Results number: 5



Location: United States



Start date: 05/08/2018

End date: 05/08/2018

Search



Social media lexicon - words

Query: Results number: Location: Start date: End date:

Word2vec

1. measles: 0.86
2. chickenpox: 0.71
3. meningitis: 0.69
4. measels: 0.69
5. measle: 0.68
6. mump: 0.68
7. pertussis: 0.68
8. rubeola: 0.66
9. easttown: 0.66
10. contagious: 0.64

Glove

1. measles: 2.58
2. case: 2.27
3. outbreak: 2.17
4. encephalitis: 2.03
5. rubella: 1.99
6. pertussis: 1.96
7. contagious: 1.84
8. cdc: 1.78
9. spread: 1.78
10. mononucleosis: 1.74

WTM

1. measles: 0.85
2. rubeola: 0.82
3. pertussis: 0.77
4. rubella: 0.75
5. measels: 0.75
6. mmrv: 0.73
7. whooping: 0.72
8. rabies: 0.72
9. pertusis: 0.72
10. poliomyelitis: 0.7

IPCCS: Informal Language Query Search

Informal lexicon - words

Informal lexicon - paragraphs

Formal lexicon - words

Formal lexicon - paragraphs

Logout

Informal lexicon - paragraphs

Query:

Results number:

Location:

Start date:

End date:

Informal lexicon - paragraphs

Query: Results number: Location: Start date: End date:

Word2vec

1. SOURCE New York Blood Center NYBC Urges the Public to Donate to Replenish the Community's Critically Low Blood Supply NEW YORK To donate blood or for information on how to organize a blood drive: Call Toll Free: 1-800-933-2566 Visit: www.nybloodcenter.org/blood (Please see attached list to find the nearest blood drive in your area) In order to maintain a safe blood supply, a seven-day inventory of all types must be continually replenished. Companies, organizations, and community groups are also encouraged to step up and host a blood drive in July or August to help rebuild the blood supply. Hosting a blood drive is easy, and NYBC staff will help you every step of the way. O negative blood donors are considered "universal," and their blood type is needed most readily in trauma situations and emergency departments across the country. Due to its high demand, O negative blood is in short supply, and NYBC encourages individuals with this blood type to consider stepping forward and donating today. Our local blood supply has reached a critically low level, with under a two-day supply of O negative, B negative, and A negative blood. As we head into the summer months, we are reminded of how essential it is that our communities maintain steady participation in blood donation. The best preparation for an unpredictable tragedy is having blood on hospital shelves in advance. This is key to potentially saving lives. "By spreading the word or even hosting your own blood drive, inviting friends, family, and community organizations, you may save lives in your community," said Andrea Cefarelli Historically, during the summer months, blood centers have had to focus on building up the community's blood supply, as it tends to diminish due to seasonal factors. While summer months are marked by a long vacation period, with schools in

Glove

1. RT @GodlessApeMan: Dumbest? #YEC #MAGA #ResearchFlatEarth #AntiVax: 0.9679;
[Link](#); **Time**: 2018-02-19 21:17:41; **Sentiment**: NEUTRAL; **Author**: J5_Project; **Reach**: 504
2. 01:02 PM CDT: 0.9693;
[Link](http://www.arkansasmatters.com); **Time**: 2017-04-05 16:41:26; **Sentiment**: NONE; **Author**: <http://www.arkansasmatters.com>; **Reach**: 8640
3. RT @bengoldacre: Just to reiterate: Andrew Wakefield, struck-off fraudulent anti-vaccine godfather, is at Trump's inaugural ball...: 0.9741;
[Link](#); **Time**: 2017-01-21 10:10:28; **Sentiment**: NEGATIVE; **Author**: LiuLab4Virology; **Reach**: 168
4. RT @ChelseaClinton: Ironic that George Washington is on an anti-science anti-vax banner - he had the Continental Army vaccinated agains...: 0.9758;
[Link](#); **Time**: 2017-03-31 21:16:10; **Sentiment**: NEGATIVE; **Author**: TinaMorphis; **Reach**: 8231
5. RT @NFIDvaccines: #FF During #HeartMonth #GetVaccinated to #FightFlu @Texas_Heart @H_eHA @everettclinic @DrBGellin @iCubed_URI...: 0.9858;
[Link](#); **Time**: 2017-02-10 20:03:30; **Sentiment**: NEUTRAL; **Author**: ARAdultImmDoc; **Reach**: 1642
6. Spies, Scandals, and naughty liaisons:A RECKLESS REDEMPTION

WTM

1. The Flu Vaccine Is Working Better Than Expected, C.D.C. Finds <https://t.co/w0apyR12lv>: 1.3159;
[Link](#); **Time**: 2018-02-16 16:09:22; **Sentiment**: POSITIVE; **Author**: buckyball360; **Reach**: 334
2. RT @D_J_Oz4: @CDCgov @OANN STOP telling ppl to get their flu shot. It's only going to #KILL people who HAVE the flu! They've ALREADY declared that they predicted the WRONG STRAIN of flu #vaccine What is the point? #RefugeeCrisis Side Effects: 1.3171;
[Link](#); **Time**: 2018-02-18 04:31:55; **Sentiment**: NEGATIVE; **Author**: dwlove9; **Reach**: 2335
3. RT @doritmi: #BeHPVfreeFL #FLImmsummit Dr. Michael Brown: we can guarantee no flu if get #vaccines. Working on it - none yet. But better than none...: 1.3206;
[Link](#); **Time**: 2017-02-03 21:15:37; **Sentiment**: NEUTRAL; **Author**: ARAdultImmDoc; **Reach**: 1642
4. I added a video to a @YouTube playlist <https://t.co/VWXRYuHfwl> The Undying Mythology of Tetanus - Dr Tim O'Shea: 1.3242;
[Link](#); **Time**: 2018-01-03 23:01:15; **Sentiment**: NEUTRAL; **Author**: SteveCherry3000; **Reach**: 124
5. RT @MicrobiomDigest: The Flu Vaccine Is Working Better Than Expected C.D.C. Finds <https://t.co/rfXQ0Rxil>: 1.3259;
[Link](#); **Time**: 2018-02-16 00:10:44; **Sentiment**: POSITIVE; **Author**:

IPCCS: Formal Language Data Word Search

Social media lexicon - words

Social media lexicon - queries

Formal data lexicon - words

Formal data lexicon - queries

Logout

Formal data lexicon - words

Query:

Results number:

Location:

Formal data lexicon - words

Query:

Results number:

Location:

Word2vec

1. nonmedical: 0.83
2. philosophical: 0.8
3. religious: 0.8
4. waiver: 0.73
5. objection: 0.73
6. philosophic: 0.72
7. conscientious: 0.71
8. process: 0.7
9. safe: 0.69
10. pbe: 0.69

Glove

1. et: 3.48
2. al: 3.47
3. vaccination: 3.07
4. required: 3.05
5. religious: 2.62
6. regulation: 2.58
7. 1: 2.54
8. health: 2.46
9. 2: 2.44
10. 2009: 2.42

WTM

1. religious: 0.89
2. required: 0.86
3. philosophical: 0.85
4. nonmedical: 0.84
5. philosophic: 0.84
6. conscientious: 0.83
7. must: 0.83
8. homeschooling: 0.82
9. homeschool: 0.82
10. timetable: 0.82

Formal data lexicon - words

Query:

Results number:

Location:

Word2vec

1. No results: query is too selective!

Glove

1. immunization: 1.43
2. 5: 1.4
3. may: 1.32
4. based: 1.14
5. health: 1.13

WTM

1. preemployment: 0.73
2. immunization: 0.72

IPCCS: Formal Language Data Query Search

Social media lexicon - words

Social media lexicon - queries

Formal data lexicon - words

Formal data lexicon - queries

Logout

Formal data lexicon - queries

Aggregate per state

Query:

Results:

- vaccine AND exemption**
- vaccine exemption requirements**
- vaccine exemption**
- vaccine AND exemption AND requirements**
- vaccine exemption**
- vaccine OR exemption OR requirements**

Formal data lexicon - queries

Aggregate per state Query: Results number: Location:

Word2vec

1. and ol o der : 1.2631
2. 1080 Emeline Ave., Santa Cruz, CA 95060 : 1.2673
3. 2240 E. Gonzales Rd Suite 160, Oxnard, CA 93036 : 1.2737
4. GPO SANGUÍNEO Y RH: : 1.2748
5. 1062 S. K Street, Tulare, CA 93274 : 1.2789
6. 225 West 37th Ave. Rm 113, San Mateo, CA 94403 : 1.2794
7. 12750 Erickson Ave., Downey, CA 90242 : 1.2828
8. 1270 Natividad Road, Salinas, CA 93906 : 1.2999
9. EDMUND G. BROWN JR. : 1.3178
10. 2500 Alhambra Ave. Rm 209, Martinez, CA 94553 : 1.3484

Glove

1. and ol o der : 1.0963
2. FECHA DE NACIMIENTO—Mes/Día/Año : 1.1042
3. SARAPIÓN, RUBÉOLA Y PAROTIDITIS : 1.1933
4. AFILIACIÓN / MATRÍCULA / EXPEDIENTE: UNIDAD MEDICA: CONSULTORIO NO. : 1.2182
5. Napa / Marin / Solano / Yolo : 1.2339
6. Balamuthia Acanthamoeba and Nagleria : 1.3772
7. Balamuthia Acanthamoeba and Nagleria : 1.3772
8. Balamuthia Acanthamoeba and Nagleria : 1.3772
9. MUNICIPIO O DELEGACIÓN / ENTIDAD FEDERATIVA : 1.4573
10. MUNICIPIO O DELEGACIÓN / ENTIDAD FEDERATIVA : 1.4573

WTM

1. 695 Oleander, Chico, CA 95926 : 1.1209
2. 2500 Alhambra Ave. Rm 209, Martinez, CA 94553 : 1.1227
3. 0-100% FPG 101-200% FPG >200% FPG : 1.1267
4. 0-100% FPG 101-200% FPG >200% FPG : 1.1267
5. Napa / Marin / Solano / Yolo : 1.1532
6. Enero Febrero Marzo Abril Mayo Junio Julio Agosto Septiembre Octubre Noviembre Diciembre Mes(es) Año(s) Al nacer Próxima : 1.1561
7. MUNICIPIO O DELEGACIÓN / ENTIDAD FEDERATIVA : 1.157
8. MUNICIPIO O DELEGACIÓN / ENTIDAD FEDERATIVA : 1.157
9. and ol o der : 1.1634
10. 315 N. Camino Del Remedio Rm 262, , Santa Cruz, CA 95060 : 1.1653

Formal data lexicon - queries

Aggregate per state Query: Results number: Location:

Word2vec

1. DOMICILIO: CALLE Y NÚMERO COLONIA / LOCALIDAD C.P. : 1.0627
2. Cara M. Christ, MD, MS | Director P | 602-364-3630 : 1.1027
3. F O O T N O T E S : 1.1048
4. F O O T N O T E S : 1.1048
5. Enero Febrero Marzo Abril Mayo Junio Julio Agosto Septiembre Octubre Noviembre Diciembre Mes(es) Año(s) Al nacer Próxima : 1.1251
6. 11. "Body fluid" means semen, vaginal secretion, tissue, cerebrospinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, amniotic fluid, urine, blood, lymph, or saliva. : 1.1574
7. F | 602-364-3285 : 1.2193
8. MUNICIPIO O DELEGACIÓN / ENTIDAD FEDERATIVA : 1.2375
9. MUNICIPIO O DELEGACIÓN / ENTIDAD

Glove

1. Persona de contacto en la Escuela:_____Número de teléfono de la Escuela:_____ En conformidad con la Ley del Estado de Arizona, los estudiantes deben tener prueba de todas las vacunas requeridas, o un formulario de exención válida, para poder asistir a la escuela. Falta de documentación adecuada puede resultar en que su hijo sea excluido de la escuela hasta que la documentación se proporcione a la oficina de salud escolar. Hay que traer a la escuela la cartilla de vacunación de su hijo con las vacunas que le faltan o traer un formulario de exención válida: : 1.0258
2. No. de Certificado de Nacimiento : 1.0351
3. Nombre de la escuela: : 1.0464
4. GPO SANGUÍNEO Y RH: : 1.0524
5. ESQUEMA DE VACUNACIÓN FOTOGRAFÍA : 1.0704

WTM

1. LUGAR Y FECHA DE NACIMIENTO: LOCALIDAD : 1.0597
2. de nacimiento, la fecha en que se recibieron las dosis y el nombre del médico o de la agencia de salud que le administró las vacunas. : 1.0637
3. No. de Certificado de Nacimiento : 1.0674
4. ESQUEMA DE VACUNACIÓN FOTOGRAFÍA : 1.068
5. DOMICILIO: CALLE Y NÚMERO COLONIA / LOCALIDAD C.P. : 1.1003
6. MUNICIPIO O DELEGACIÓN SABIN : 1.108
7. Robles Ramos Maria INFLUENZA : 1.1139
8. Enero Febrero Marzo Abril Mayo Junio Julio Agosto Septiembre Octubre Noviembre Diciembre Mes(es) Año(s) Al nacer Próxima : 1.1561
9. MUNICIPIO O DELEGACIÓN / ENTIDAD FEDERATIVA : 1.157

IPCCS Limitations

- Algorithm functionality
- Language relevance
 - MMR can mean measles, mumps, and rubella vaccine or Match Making Rank, a rating system used in online gaming
 - Shingles can mean herpes zoster or roofing material
- Needs regular additions of new data to update the algorithms and remain relevant

IPCCS

- Quickly searches informal and formal language data relevant to immunization programs
 - Informal language data
 - May be used to assess types of information being shared during an outbreak or other emergencies
 - Formal language data
 - May be helpful in identifying program activities associated with changes in vaccination coverage

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 - OCOO – Charles Martin
- Abt Associates: Sarah Ball, William Campbell, Alison Thaung, Ben Holland, Jason Brinkley, Sarah Hamad
- Temple University: Marija Stanojevic, Fang Zhou, Zoran Obradovic

Clarke's three laws:

1. When a distinguished but elderly scientist states that something is possible, he is almost certainly right. When he states that something is impossible, he is very probably wrong.
2. The only way of discovering the limits of the possible is to venture a little way past them into the impossible.
3. Any sufficiently advanced technology is indistinguishable from magic.

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.



**Department
of Health**

Communication Strategies to Raise Awareness of a New School Requirement, New York State 2016

Elizabeth Rausch-Phung, MD, MPH

Background

- In NYS, the vaccines required for public, private and parochial schools are established by the State Legislature
- The NYSDOH may promulgate regulations clarifying the legislation, e.g., numbers of doses required, minimum ages and intervals, etc.
 - Previously updated in 2014 and 2015
- > 3 million children in NYS schools
 - Estimated 231,409 in grade 7 in the 2016-17 school year and estimated 192,763 in grade 12

Background

- Parents are responsible for providing proof of immunity or medical or religious exemptions for their children
 - Children without evidence of immunity or exemptions must be excluded after 14 days of school entry
- The principal or person in charge of each school is responsible for ensuring compliance of children in the school
 - NYSDOH monitors compliance with annual surveys of all students and audits of selected schools
 - The NYSDOH may place schools under legal stipulation and order for non-compliance and may fine schools up to \$2000 per violation

2015-16 School Year

New York State Immunization Requirements for School Entrance/Attendance¹

NOTES: Children in a prekindergarten setting should be age-appropriately immunized. The number of doses depends on the schedule recommended by the Advisory Committee for Immunization Practices (ACIP).

For grades Pre-k through 7, intervals between doses of vaccine should be in accordance with the ACIP-recommended immunization schedule for persons 0 through 18 years of age. (Exception: intervals between doses of polio vaccine need to be reviewed only for grades kindergarten, 1, 6 and 7.) Doses received before the minimum age or intervals are not valid and do not count toward the number of doses listed below. Intervals between doses of vaccine DO NOT need to be reviewed for grades 8 through 12. See footnotes for specific information for each vaccine. Children who are enrolling in grade-less classes should meet the immunization requirements of the grades for which they are age equivalent.

Dose requirements MUST be read with the footnotes of this schedule.

Vaccines	Prekindergarten (Day Care, Head Start, Nursery or Pre-k)	Kindergarten through Grade 1	Grades 2 through 5	Grades 6 through 7	Grades 8 through 12
Diphtheria and Tetanus toxoid-containing vaccine and Pertussis vaccine (DTaP/DTP/Tdap) ²	4 doses	5 doses or 4 doses if the 4th dose was received at 4 years of age or older or 3 doses if the series is started at 7 years of age or older		3 doses	
Tetanus and Diphtheria toxoid-containing vaccine and Pertussis vaccine booster (Tdap) ³	Not applicable			1 dose	
Polio vaccine (IPV/OPV) ⁴	3 doses	4 doses or 3 doses if the 3rd dose was received at 4 years of age or older	3 doses	4 doses or 3 doses if the 3rd dose was received at 4 years of age or older	3 doses
Measles, Mumps and Rubella vaccine (MMR) ⁵	1 dose	2 doses			
Hepatitis B vaccine ⁶	3 doses	3 doses or 2 doses of adult hepatitis B vaccine (Recombivax) for children who received the doses at least 4 months apart between the ages of 11 through 15 years of age			
Varicella (Chickenpox) vaccine ⁷	1 dose	2 doses	1 dose	2 doses	1 dose
Haemophilus influenzae type b conjugate vaccine (Hib) ⁸	1 to 4 doses	Not applicable			
Pneumococcal Conjugate vaccine (PCV) ⁹	1 to 4 doses	Not applicable			



Background, Continued

- June 2015: Amendments to PHL 2164, requiring meningococcal vaccine for students entering grades 7 and 12 in accordance with ACIP recommendations, passed the NYS legislature with effective date of September 1, 2016
 - Signed into law by NYS Governor October 2015
- August 2016: Amendments to NYS school immunization regulations adopted
 - 1 dose MenACWY for grade 7
 - 2 doses MenACWY, or 1 on or after the 16th birthday, for grade 12



Baseline immunization coverage assessment

- 2014 NIS-Teen:
 - 79.6% (\pm 4.2%) 1-dose MenACWY coverage among NYS teens aged 13-17 years
 - 86.2% (\pm 3.1%) in 2015 NIS-Teen
 - 29% (\pm 2.8%) 2-dose coverage among US 17 year olds
 - 33.3% (\pm 2.7%) in 2015 NIS-Teen
- NYSIIS, December 2015:
 - 61.0% 1-dose coverage among 12 year olds
 - 35.7% 2-dose (or 1 dose on or after 16 years of age) among 17 year olds

Challenge

- Raise school, parent, adolescent and healthcare provider (HCP) awareness of new school meningococcal vaccine requirements
 - 12th graders of particular concern
 - Low baseline 2-dose coverage rates
 - Loss of too many days of school could impede graduation

Multi-Media Campaign

- First flight: February 22 – April 10, 2016
 - Broadcast TV and radio
 - Streaming video and radio ads
 - Banner ads, sponsored Facebook posts, and sponsored Google search results
- Second flight: May 10 – May 29, 2016
 - Broadcast TV and streaming video
- Target audience: parents of NYS adolescents
 - Secondary target: adults aged 25-54 years
- Budget \$1,850,000

Campaign Objectives

- Raise parental awareness of new school meningococcal vaccine requirement
- Encourage them to schedule a doctor appointment for vaccination
- Encourage them to learn more at health.ny.gov/immunize

New for
2016-17
School Year

Parents:

All kids entering 7th and 12th grade must have the **meningococcal vaccine**.

Without it, they can't start school.

About the Vaccine:

- It's not a new vaccine. It's been recommended for a decade.
- Most parents already choose to vaccinate their children.
- What's new is that the vaccine will be **required** for school entry as of Sept. 1, 2016.

About Meningococcal Disease:

- It causes **bacterial meningitis** and other serious diseases.
- Teens and young adults are at greater risk.
- It comes on quickly and without warning.
- Its symptoms are similar to the flu.
- Every case of this disease can result in death or long-term disability.

Check with your doctor. Even kids who have had a shot before may need a booster to start school.

To learn more, visit health.ny.gov/immunize

Immunization is Protection.



Department
of Health

Meningococcal School Vaccine Requirement PSA



0:24 / 0:30

Meningococcal School Vaccine Requirement

Attention
Parents!



THIS
SEPTEMBER

0:02 / 0:15

NEW YORK
STATE OF
OPPORTUNITY.

Department
of Health

Supplemental Materials

- Initial brief notices to HCP and schools November 2015
- Detailed notices June 2016
- Webinars for HCP January 2016 and for schools March 2016
- Letters to HCPs February 2016
- Monthly brief electronic reminders to HCP, March–Sept 2016
- Updated school immunization requirements chart and annual school survey
- FAQ for healthcare providers and schools
- Meningococcal fact sheet for public



Results – Traditional Media

- Television ads delivered 37.9 million impressions, at an estimated reach of 90% and an estimated frequency of 14.5
 - Streaming video delivered another 2.3 M impressions; estimated reach 11%; estimated frequency 6
 - 68% of the media budget
- Traditional radio ads delivered 6.2 M impressions, at an estimated reach of 60% and an estimated frequency of 8.5
 - Streaming audio delivered another 5.6 M impressions
 - 14% of the media budget

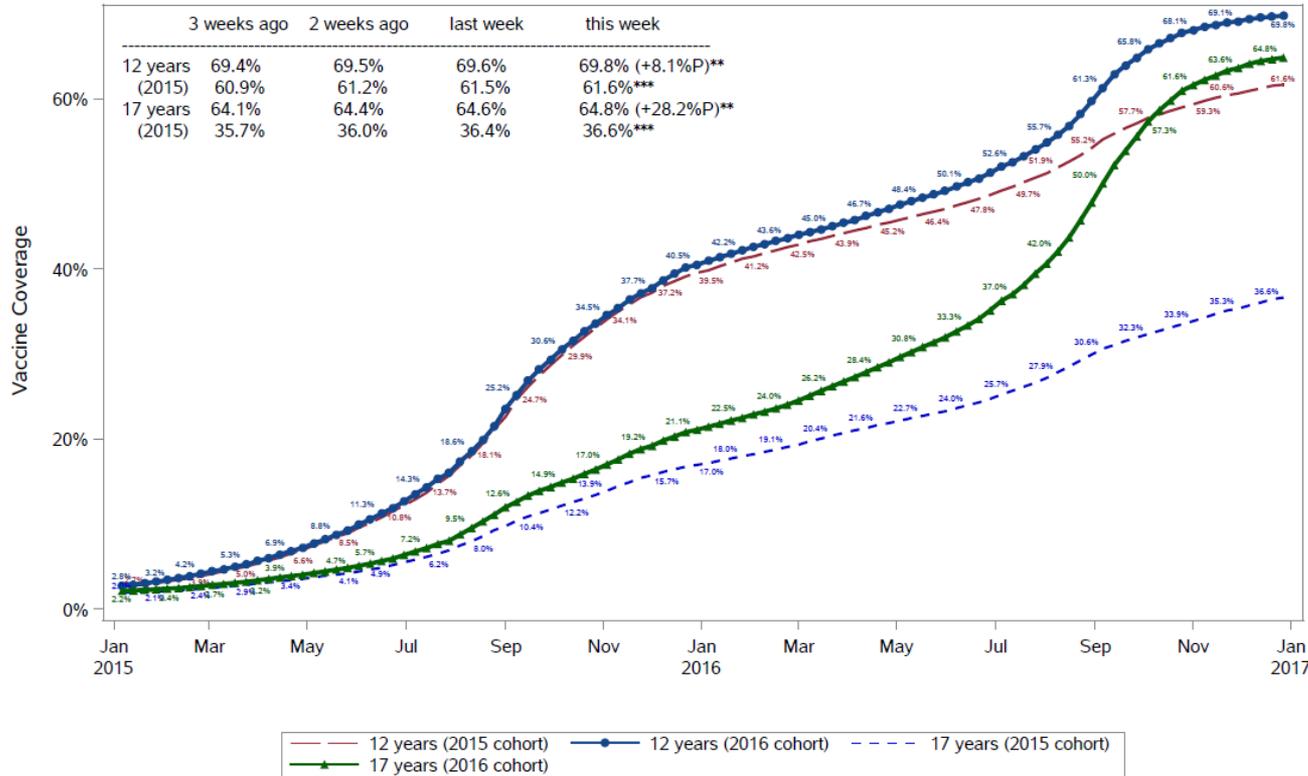
Results – Digital Media

- 15% of the media budget
- Banner ads delivered 49.2 million impressions and over 140,000 click-throughs to the health.ny.gov/immunize web page
- Rich media ads delivered 3.2 million impressions but only 624 unique click-throughs
- Sponsored Google search results delivered 68,511 impressions at a 4.84% click-through rate
- Facebook posts delivered 11.1 million impressions, over 23,000 click throughs, and high rates of likes, shares, and comments
 - Primarily positive comments

Meningococcal Vaccine Coverage*: Weekly Trend

As of 12/28/2016

2016 Cohort: Children aged 12/17 years as of 12/1/2016 in NYS outside NYC
 2015 Cohort: Children aged 12/17 years as of 12/1/2015 in NYS outside NYC



NYS school
 MenACWY
 immunization
 coverage, 2016-17:

- Grade 7: 97%
- Grade 12: 95%

* 12 years: receiving at least 1 dose of meningococcal, 17 years: receiving 2 or more doses or at least one dose on or after the 16th birthday.
 Date vaccinated <= 12/28/2016, Date entered to NYSIIS <= 12/28/2016
 ** Compared to 2015 cohort
 *** Coverage for 2015 cohort is based on immunization records one year prior to 2016 cohort (using 2014-2015 records)



Lessons Learned

- Early and open communication with the public, schools, and HCP was critical to ensure smooth and timely implementation
- Local health departments were key partners to work with schools and HCP to get students vaccinated
- NYSIIS data allowed us to monitor trends in MenACWY coverage in near real-time during the months leading up to implementation
- Digital media is a relatively low-cost option but performed at least as well as traditional media

Questions?

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