

Proposed Updates to Existing Measures for HEDIS^{®1} MY 2022: Roadmap for Electronic Clinical Data Systems Reporting Method

NCQA seeks comments on our roadmap for the HEDIS *Electronic Clinical Data Systems* (ECDS) reporting standard for Measurement Year (MY) 2022 and beyond. These efforts are part of a greater [strategy](#) to reorient HEDIS to more and better use of electronic clinical data and encourage health information exchange,² which will enhance our ability to measure and improve the quality of health care.

HEDIS ECDS Reporting Roadmap

ECDS is a HEDIS reporting standard introduced in 2015 that encourages the use and sharing of electronic clinical data across health care systems. It permits use of structured data from EHRs, health information exchanges and clinical registries, case management systems and administrative files, and provides a more standardized way of incorporating data that are “supplemental” under traditional HEDIS reporting rules. This allows measures that more specifically track quality of care and decrease the burden associated with manual record abstraction.

NCQA introduced a variety of measures for ECDS reporting over the last 5 years, including new measures addressing behavioral health and immunizations. For MY 2019, NCQA allowed voluntary ECDS reporting alongside traditional reporting for three existing HEDIS measures (*Breast Cancer Screening [BCS]*, *Follow-Up Care for Children Prescribed ADHD Medication [ADD]*, *Colorectal Cancer Screening [COL]*) so plans could assess their ECDS capabilities with familiar measures. Based on reporting results to date and extensive feedback from health plans and other stakeholders, NCQA seeks public comment on proposed next steps for the ECDS reporting standard.

Transition to ECDS Reporting for BCS, ADD and COL. For MY 2021, NCQA will continue optional ECDS reporting alongside traditional reporting, to give plans the opportunity to hone their ECDS capabilities. NCQA has outlined a proposed timeline to remove the Administrative reporting method for BCS and ADD for MY 2023 and for the Hybrid method in COL for MY 2024 (Figure 1). To ease the transition, we are exploring allowing plans to report ECDS only, without submitting the traditional administrative rates for MY 2022 (ADD and BCS) and MY 2023 (COL). This approach would reduce the burden of reporting both methods for plans that are ready to fully transition to ECDS reporting.

Figure 1. Proposed Transition to ECDS-Only Reporting for BCS, ADD and COL

	Current Publication MY 2020/2021	Next Publication MY 2022	MY 2023	MY 2024
<i>Breast Cancer Screening, ADHD Medication</i>	Optional ECDS reporting alongside Admin	Permit plans to choose ECDS or Admin	ECDS only (Admin removed)	
<i>Colorectal Cancer Screening</i>	Optional ECDS reporting alongside Hybrid		Permit plans to choose ECDS or Hybrid	ECDS only (Hybrid removed)

Expand ECDS Reporting to Additional Measures. For MY 2022, NCQA proposes to allow ECDS reporting for three additional HEDIS measures: *Childhood Immunization Status (CIS)*, *Immunizations for Adolescents (IMA)* and *Metabolic Monitoring for Children and Adolescents on Antipsychotics (APM)*. Additionally, NCQA has prioritized *Cervical Cancer Screening (CCS)* and may allow optional ECDS reporting for this measure in MY 2023.

¹ HEDIS[®] is a registered trademark of the National Committee for Quality Assurance (NCQA).

² The Office of the National Coordinator for Health Information Technology defines “health information exchange” as appropriate access and secure sharing of a patient’s medical information electronically by health care professionals and patients.

Measure selection was based on stakeholder interest and because much of the measure information (e.g., vaccinations) is captured in structured data. We also propose allowing voluntary ECDS reporting alongside traditional reporting for a period. Performance rates using the traditional reporting method (Administrative or Hybrid) will be used for programs and benchmarks. For future years, NCQA is exploring how measure concepts can be enhanced by leveraging clinical data captured during the course of care. For example, a new measure utilizing electronic clinical data to address obesity (e.g., using BMI) would be well-suited for the ECDS reporting standard.

NCQA is updating traditional specifications for CIS and IMA that will be incorporated in the ECDS version as well:

- Beginning in MY 2021, we are removing Combinations 2, 4, 5, 6, 8 and 9 and maintaining Combinations 3, 7, and 10 in CIS.
- Beginning in MY 2022, previous optional exclusions for contraindications to vaccinations for CIS and IMA will be respecified as required exclusions or included in the numerator to better align with their clinical intent.

Resources and Technical Assistance to Support Adoption of ECDS. NCQA recognizes that health plans are in different stages of health IT integration. Barriers to using electronic clinical data include lack of standardized data formats across various systems, limited resources to validate and map data onto coding systems and pushback from providers and vendors in sharing data. NCQA continues to implement actions to support successful adoption of ECDS. We supported health plans with Learning Collaboratives as they worked to improve feasibility of reporting behavioral health measures. We launched the Digital Measurement Community,³ an online forum where stakeholders can learn from each other, share best practices and receive technical assistance. With stakeholder encouragement, NCQA is developing a toolkit highlighting best practices in ECDS reporting, as well as a report summarizing stakeholder feedback on the ECDS reporting standard. NCQA continually assesses ECDS reporting results to determine measure readiness for public reporting and has released performance benchmarks to HEDIS auditors.

Converting Digital Measures to FHIR®. NCQA is switching from the Quality Data Model to the Fast Healthcare Interoperability Resources data model, a Health Level Seven International® standard. FHIR will enable more efficient data exchange, reduce provider burden and align with other quality measurement use cases. In November 2020, NCQA released five draft FHIR-CQL HEDIS measures as an early preview to stakeholders.⁴ We will release the final set of FHIR-CQL HEDIS measures for MY 2022 (Appendix 1).

NCQA seeks general feedback on the proposed roadmap, and specifically on the following:

1. The proposed timeline for removing traditional reporting from measures currently specified for ECDS (BCS, ADD, COL).
2. Suggestions on measure concepts that would be well-suited for future ECDS reporting.
3. In addition to the activities discussed above, how can NCQA further support adoption of the ECDS reporting standard?

Supporting documents include the draft human readable specifications for the IMA measure proposed for ECDS reporting for HEDIS MY 2022. The draft specifications are intended to illustrate how a traditional HEDIS measure looks with ECDS reporting and using the FHIR data model.

NCQA acknowledges the contributions of the Technical Measurement Advisory Panel, the Digital Measures Collaborative and many other stakeholders who provided feedback on this work.

³ [digitalcommunity.NCQA.org](https://digitalcommunity.ncqa.org)

⁴ <http://store.ncqa.org/index.php/catalog/product/view/id/3927/s/hedis-my-2020-my-2021-digital-measures-bundle-for-ecds-and-traditional-reporting/#fhir>

Appendix 1. Digital Measures Planned for HEDIS MY 2022 Release

Measure		Reporting Method ¹		
		Traditional		ECDS
		Admin	Hybrid	
1	Depression Screening and Follow-up for Adolescents and Adults			✓
2	Utilization of the PHQ-9 to Monitor Depression Symptoms for Adolescents and Adults			✓
3	Depression Remission or Response for Adolescents and Adults			✓
4	Unhealthy Alcohol Use Screening and Follow-up			✓
5	Adult Immunization Status			✓
6	Prenatal Immunization Status			✓
7	Prenatal Depression Screening and Follow-Up			✓
8	Postpartum Depression Screening and Follow-Up			✓
9	Breast Cancer Screening	✓		✓
10	Follow-Up Care for Children Prescribed ADHD Medication	✓		✓
11	Metabolic Monitoring for Children and Adolescents on Antipsychotics ²	✓		✓
12	Colorectal Cancer Screening	✓	✓	✓
13	Childhood Immunization Status ²	✓	✓	✓
14	Immunizations for Adolescents ²	✓	✓	✓
15	Cervical Cancer Screening	✓	✓	
16	Non-Recommended PSA-Based Screening in Older Men	✓		
17	Appropriate Testing for Pharyngitis	✓		
18	Appropriate Treatment for Upper Respiratory Infection	✓		
19	Avoidance of Antibiotic Treatment for Acute Bronchitis/Bronchiolitis	✓		
20	Use of Opioids From Multiple Providers	✓		
21	New for MY 2022: Risk of Continued Opioid Use ³	✓		
22	New for MY 2022: Follow-Up After Emergency Department Visit for Mental Illness ³	✓		

¹HEDIS reporting methods are:

Admin = Administrative only method (i.e., claims and enrollment data).

Hybrid = Administrative data with medical record review for a sample of the eligible population.

ECDS = Standardized data from ECDS; includes claims.

²Planned for new ECDS reporting for MY 2022. (Inclusion of these measures is subject to change.)

³Planned for new digital specification for MY 2022. (Inclusion of these measures is subject to change.)

Measure title	Immunizations for Adolescents*	Measure ID	IMA, IMA-E
Description	The percentage of adolescents 13 years of age who had one dose of meningococcal vaccine and one tetanus, diphtheria toxoids and acellular pertussis (Tdap) vaccine, and have completed the human papillomavirus (HPV) vaccine series by their 13th birthday. The measure calculates a rate for each vaccine and two combination rates.		
Measurement period	January 1–December 31.		
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	<p>The American Medical Association holds a copyright to the CPT® codes contained in the measure specifications.</p> <p>The American Hospital Association holds a copyright to the Uniform Billing Codes (“UB”) contained in the measure specifications. The UB Codes in the HEDIS specifications are included with the permission of the AHA. The UB Codes contained in the HEDIS specifications may be used by health plans and other health care delivery organizations for the purpose of calculating and reporting HEDIS measure results or using HEDIS measure results for their internal quality improvement purposes. All other uses of the UB Codes require a license from the AHA. Anyone desiring to use the UB Codes in a commercial Product(s) to generate HEDIS results, or for any other commercial use, must obtain a commercial use license directly from the AHA. To inquire about licensing, contact ub04@aha.org.</p> <p>Some measure specifications contain coding from LOINC® (http://loinc.org). The LOINC table, LOINC codes, LOINC panels and form file, LOINC linguistic variants file, LOINC/RSNA Radiology Playbook, and LOINC/IEEE Medical Device Code Mapping Table are copyright © 1995–2020 Regenstrief Institute, Inc. and the Logical Observation Identifiers Names and Codes (LOINC) Committee and are available at no cost under the license at http://loinc.org/terms-of-use.</p> <p>“SNOMED” and “SNOMED CT” are registered trademarks of the International Health Terminology Standards Development Organisation (IHTSDO).</p> <p>“HL7” is the registered trademark of Health Level Seven International.</p> <p>© 2020 by the National Committee for Quality Assurance 1100 13th Street NW, Third Floor Washington, DC 20005</p> <p>NCQA Customer Support: 888-275-7585 NCQA Fax: 202-955-3599 NCQA Website: www.ncqa.org Submit policy clarification support questions via My NCQA (http://my.ncqa.org)</p>
<p>Clinical recommendation statement</p>	<p><i>HPV:</i> The Advisory Committee on Immunization Practices (ACIP) recommends routine HPV vaccination for adolescents at age 11 or 12 years; vaccination may be given starting at age 9 years. In a two-dose schedule of HPV vaccine, the minimum interval between the first and second doses is 5 months. Persons who initiated vaccination with 9vHPV, 4vHPV or 2vHPV before their 15th birthday and received 2 doses of any HPV vaccine at the recommended dosing schedule (0, 6–12 months), or received three doses of any HPV vaccine at the recommended dosing schedule (0, 1–2, 6 months), are considered adequately vaccinated (Meites, Kempe, and Markowitz 2016).</p> <p><i>Tdap:</i> ACIP recommends a single dose of vaccine be administered at age 11 or 12 years (Liang et al. 2018).</p> <p><i>Meningococcal:</i> ACIP recommends a single dose of vaccine be administered at age 11 or 12 years (Cohn et al. 2013).</p>
<p>Reference</p>	<p>Cohn, A.C., J.R. MacNeil, T.A. Clark, I.R. Ortega-Sanchez, E.Z. Briere, H.C. Meissner, C.J. Baker, N.E. Messonnier, Centers for Disease Control and Prevention (CDC). 2013. “Prevention and Control of Meningococcal Disease: Recommendations of the Advisory Committee on Immunization Practices (ACIP).” <i>MMWR Recomm Rep</i> 62(RR-2):1–28.</p>

Jiang, J.L., T. Tiwari, P. Moro, N.E. Messonnier, A. Reingold, M. Sawyer, T.A. Clark. 2018. "Prevention of Pertussis, Tetanus, and Diphtheria with Vaccines in the United States: Recommendations of the Advisory Committee on Immunization Practices (ACIP)." *MMWR Morb Mortal Wkly Rep* 67(2):1–44. doi: 10.15585/mmwr.rr6702a1.

Meites, E., A. Kempe, L.E. Markowitz. 2016. "Use of a 2-Dose Schedule for Human Papillomavirus Vaccination—Updated Recommendations of the Advisory Committee on Immunization Practices." *MMWR Morb Mortal Wkly Rep* 65:1405-08. doi: <http://dx.doi.org/10.15585/mmwr.mm6549a5>.

Characteristics

Scoring	Proportion.
Type	Process.
Item count	Person.
Stratification	<ol style="list-style-type: none"> 1. Commercial*. 2. Medicaid.
	<p>*Note that "Commercial" plans can be identified via the "Private Health Insurance" Direct Reference Code.</p>
Risk adjustment	None.
Improvement notation	A higher rate indicates better performance.
Guidance	<ul style="list-style-type: none"> • To align with ACIP recommendations, only the quadrivalent meningococcal vaccine (serogroups A, C, W and Y) is included in the measure. • To align with ACIP recommendations, the minimum interval for the two-dose HPV vaccination schedule is 150 days (5 months), with a 4-day grace period (146 days).
	<p>Allocation:</p> <p>The member was enrolled with a medical benefit throughout the Participation Period.</p>
	<ul style="list-style-type: none"> • No more than one gap in enrollment of up to 45 days during the Participation Period. • The member must be enrolled on their 13th birthday.

Definitions	
Participation	The identifiers and descriptors for each organization’s coverage used to define members’ eligibility for measure reporting. Allocation for reporting is based on eligibility during the Participation Period.
Participation Period	12 months prior to the member’s 13th birthday.
Initial Population	Adolescents who turn 13 years of age during the Measurement Period who also meet criteria for Participation.
Exclusions	Members in hospice or using hospice services during the Measurement Period.
Denominator	The Initial Population, minus Exclusions.
Rate—Meningococcal Serogroups A, C, W, Y (Population Criteria 1)	<p>Numerator 1 Members with either of the following meet criteria:</p> <ul style="list-style-type: none"> • At least one meningococcal serogroups A, C, W, Y vaccine with a date of service on or between the member’s 11th and 13th birthdays. • Anaphylaxis due to the meningococcal vaccine any time on or before the member’s 13th birthday.
Rate—Tdap (Population Criteria 2)	<p>Numerator 2 Members with any of the following meet criteria:</p> <ul style="list-style-type: none"> • At least one tetanus, diphtheria toxoids and acellular pertussis (Tdap) vaccine with a date of service on or between the member’s 10th and 13th birthdays. • Anaphylaxis due to the tetanus, diphtheria or pertussis vaccine any time on or before the member’s 13th birthday. • Encephalitis due to the tetanus, diphtheria or pertussis vaccine any time on or before the member’s 13th birthday.
Rate—HPV (Population Criteria 3)	<p>Numerator 3 Members with any of the following meet criteria:</p> <ul style="list-style-type: none"> • At least two HPV vaccines with dates of service at least 146 days apart and on or between the member’s 9th and 13th birthdays. For example, if the service date for the first vaccine was March 1, then the service date for the second vaccine must be on or after July 25. • At least three HPV vaccines with different days of service on or between the member’s 9th and 13th birthdays. • Anaphylaxis due to the HPV vaccine any time on or before the member’s 13th birthday.

Rate— Combination 1: Meningococcal, Tdap (Population Criteria 4)	Numerator 4 Adolescents who are Numerator compliant for both the Meningococcal and Tdap indicators.
Rate— Combination 2: Meningococcal, Tdap, HPV (Population Criteria 5)	Numerator 5 Adolescents who are Numerator compliant for all three indicators (Meningococcal, Tdap, HPV).

Data Elements for IDSS Reporting

Organizations that submit data to NCQA must provide the following data elements in a specified file.

Table IMA-E-: 1/2 Data Elements for Immunizations for Adolescents (ECDS Reporting)

Indicator	Data Element
Meningococcal serogroups A, C, W, Y	Measurement Year
Tdap	Initial Population
HPV	Exclusions
Combination 1 (Meningococcal, Tdap)	Denominator
Combination 2 (Meningococcal, Tdap, HPV)	Numerator by EHR/PHR
	Numerator by Case Management
	Numerator by HIE Registry
	Numerator by Admin
	Numerator
	Rate

library IMAE_HEDIS_MY2022 version '1.0.0'

using FHIR version '4.0.1'

include NCQA_HealthPlanEnrollment version '1.0.0' called Enrollment
include FHIRHelpers version '4.0.0' called FHIRHelpers
include NCQA_Hospice version '1.0.0' called Hospice
include NCQA_FHIRBase version '1.0.0' called FHIRBase
include NCQA_Immunization version '1.0.0' called Immunization
include NCQA_Status version '1.0.0' called Status

codesystem "SNOMEDCT": 'http://snomed.info/sct'

valueset "HPV Immunization": 'https://www.ncqa.org/fhir/valueset/2.16.840.1.113883.3.464.1004.1763'
valueset "Meningococcal Immunization": 'https://www.ncqa.org/fhir/valueset/2.16.840.1.113883.3.464.1004.1777'
valueset "Tdap Immunization": 'https://www.ncqa.org/fhir/valueset/2.16.840.1.113883.3.464.1004.1791'
valueset "HPV Vaccine Procedure": 'https://www.ncqa.org/fhir/valueset/2.16.840.1.113883.3.464.1004.1764'
valueset "Meningococcal Vaccine Procedure":
'https://www.ncqa.org/fhir/valueset/2.16.840.1.113883.3.464.1004.1778'
valueset "Tdap Vaccine Procedure": 'https://www.ncqa.org/fhir/valueset/2.16.840.1.113883.3.464.1004.1792'
valueset "Anaphylactic Reaction to Diphtheria, Tetanus or Pertussis Vaccine":
'https://www.ncqa.org/fhir/valueset/2.16.840.1.113883.3.464.1004.2240'
valueset "Encephalitis Due to Diphtheria, Tetanus or Pertussis Vaccine":
'https://www.ncqa.org/fhir/valueset/2.16.840.1.113883.3.464.1004.2241'

code "Anaphylaxis due to meningococcal vaccine (disorder)": '428301000124106' from "SNOMEDCT" display
'Anaphylaxis due to meningococcal vaccine (disorder)'

code "Anaphylaxis due to human papillomavirus vaccine (disorder)": '428241000124101' from "SNOMEDCT"
display 'Anaphylaxis due to human papillomavirus vaccine (disorder)'

parameter "Measurement Period" Interval<DateTime>

context Patient

Population Criteria 1

- **Initial Population 1**
 - "Meets Initial Population Criteria"
- **Denominator 1**
 - "Initial Population 1"
- **Exclusions 1**
 - Hospice."Hospice Intervention or Encounter"
- **Numerator 1**
 - "Meets Meningococcal Vaccination Criteria"
 - or "Has Anaphylaxis Due to Meningococcal Vaccine"

Population Criteria 2

- **Initial Population 2**
 - "Initial Population 1"
- **Denominator 2**
 - "Initial Population 1"
- **Exclusions 2**
 - "Exclusions 1"

- **Numerator 2**
 - "Meets Tdap Vaccination Criteria"
 - or "Has Anaphylaxis Due to the Tetanus, Diphtheria or Pertussis Vaccine"
 - or "Has Encephalitis Due to the Tetanus, Diphtheria or Pertussis Vaccine"

Population Criteria 3

- **Initial Population 3**
 - "Initial Population 1"
- **Denominator 3**
 - "Initial Population 1"
- **Exclusions 3**
 - "Exclusions 1"
- **Numerator 3**
 - "Meets HPV Vaccinations Criteria"
 - or "Has Anaphylaxis Due to HPV Vaccine"

Population Criteria 4

- **Initial Population 4**
 - "Initial Population 1"
- **Denominator 4**
 - "Initial Population 1"
- **Exclusions 4**
 - "Exclusions 1"
- **Numerator 4**
 - "Numerator 1"
 - and "Numerator 2"

Population Criteria 5

- **Initial Population 5**
 - "Initial Population 1"
- **Denominator 5**
 - "Initial Population 1"
- **Exclusions 5**
 - "Exclusions 1"
- **Numerator 5**
 - "Numerator 1"
 - and "Numerator 2"
 - and "Numerator 3"

Definitions

- **Date of Thirteenth Birthday**
 - Patient.birthDate + 13 years
- **Vaccine Administration Interval: Between Age 11 and 13**

- Interval[Patient.birthDate + 11 years, "Date of Thirteenth Birthday"]
- **Vaccine Administration Interval: Between Age 10 and 13**
 - Interval[Patient.birthDate + 10 years, "Date of Thirteenth Birthday"]
- **Vaccine Administration Interval: Between Age 9 and 13**
 - Interval[Patient.birthDate + 9 years, "Date of Thirteenth Birthday"]
- **Participation Period**
 - Interval[Patient.birthDate + 12 years, Patient.birthDate + 13 years]
- **Enrolled During Participation Period**
 - Enrollment."Health Plan Enrollment Criteria"("Member Coverage", "Date of Thirteenth Birthday", "Participation Period", 45)
- **Meets Initial Population Criteria**
 - AgeInYearsAt(date from end of "Measurement Period")= 13
 - and "Enrolled During Participation Period"
- **Member Coverage**
 - [Coverage] C
 - where C.period overlaps "Participation Period"
- **Initial Population 1**
 - "Meets Initial Population Criteria"
- **Initial Population 2**
 - "Initial Population 1"
- **Initial Population 3**
 - "Initial Population 1"
- **Initial Population 4**
 - "Initial Population 1"
- **Initial Population 5**
 - "Initial Population 1"
- **Denominator 1**
 - "Initial Population 1"
- **Denominator 2**
 - "Initial Population 1"
- **Denominator 3**
 - "Initial Population 1"
- **Denominator 4**
 - "Initial Population 1"
- **Denominator 5**
 - "Initial Population 1"
- **Exclusions 1**
 - Hospice."Hospice Intervention or Encounter"
- **Exclusions 2**
 - "Exclusions 1"

- **Exclusions 3**
 - "Exclusions 1"
- **Exclusions 4**
 - "Exclusions 1"
- **Exclusions 5**
 - "Exclusions 1"
- **Numerator 1**
 - "Meets Meningococcal Vaccination Criteria"
 - or "Has Anaphylaxis Due to Meningococcal Vaccine"
- **Meets Meningococcal Vaccination Criteria**
 - Immunization."Meets Required Vaccination Threshold"("Meningococcal Vaccinations",
 - "Vaccine Administration Interval: Between Age 11 and 13", 1)
- **Meningococcal Vaccinations**
 - Status."Completed Immunization"([Immunization: "Meningococcal Immunization"])
 - union Status."Completed Procedure"([Procedure: "Meningococcal Vaccine Procedure"])
- **Has Anaphylaxis Due to Meningococcal Vaccine**
 - exists Immunization."Has A Diagnosis On or Before Last Vaccination Date"(Status."Active Condition"([Condition: "Anaphylaxis due to meningococcal vaccine (disorder)"]),
 - "Date of Thirteenth Birthday")
- **Numerator 2**
 - "Meets Tdap Vaccination Criteria"
 - or "Has Anaphylaxis Due to the Tetanus, Diphtheria or Pertussis Vaccine"
 - or "Has Encephalitis Due to the Tetanus, Diphtheria or Pertussis Vaccine"
- **Meets Tdap Vaccination Criteria**
 - Immunization."Meets Required Vaccination Threshold"("Tdap Vaccinations",
 - "Vaccine Administration Interval: Between Age 10 and 13", 1)
- **Tdap Vaccinations**
 - Status."Completed Immunization"([Immunization: "Tdap Immunization"])
 - union Status."Completed Procedure"([Procedure: "Tdap Vaccine Procedure"])
- **Has Anaphylaxis Due to the Tetanus, Diphtheria or Pertussis Vaccine**
 - exists Immunization."Has A Diagnosis On or Before Last Vaccination Date"(Status."Active Condition"([Condition: "Anaphylactic Reaction to Diphtheria, Tetanus or Pertussis Vaccine"])),
 - "Date of Thirteenth Birthday")
- **Has Encephalitis Due to the Tetanus, Diphtheria or Pertussis Vaccine**
 - exists Immunization."Has A Diagnosis On or Before Last Vaccination Date"(Status."Active Condition"([Condition: "Encephalitis Due to Diphtheria, Tetanus or Pertussis Vaccine"])),
 - "Date of Thirteenth Birthday")
- **Numerator 3**
 - "Meets HPV Vaccinations Criteria"
 - or "Has Anaphylaxis Due to HPV Vaccine"
- **Meets HPV Vaccinations Criteria**
 - Immunization."Meets Required Vaccination Threshold"("HPV Vaccinations",
 - "Vaccine Administration Interval: Between Age 9 and 13", 3)
 - or "Meets 2 Dose HPV Vaccination Criteria"

- **Meets 2 Dose HPV Vaccination Criteria**
 - Immunization."Meets Required Threshold With Variable Days Apart"("HPV Vaccinations",
 - "Vaccine Administration Interval: Between Age 9 and 13", 2, 146)
- **HPV Vaccinations**
 - Status."Completed Immunization"([Immunization: "HPV Immunization"])
 - union Status."Completed Procedure"([Procedure: "HPV Vaccine Procedure"])
- **Has Anaphylaxis Due to HPV Vaccine**
 - exists Immunization."Has A Diagnosis On or Before Last Vaccination Date"(Status."Active Condition"([Condition: "Anaphylaxis due to human papillomavirus vaccine (disorder)"]),
 - "Date of Thirteenth Birthday")
- **Numerator 4**
 - "Numerator 1"
 - and "Numerator 2"
- **Numerator 5**
 - "Numerator 1"
 - and "Numerator 2"
 - and "Numerator 3"

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