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# Supplementary Appendix 1: E-Visit Patient Questionnaires

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Pre Screen** |  |  |  |
|  |  |  | **Logic** | **Clinical Aid** |
|  | Do you have any of the following symptoms? -Difficulty Breathing-Shortness of Breath-Chest Pain-Difficulty swallowing-Very bad headache-Difficulty seeing or blurry vision-Difficulty talking or slurred speech-Difficulty standing or walking-Light headed or dizzy-High fever (>104F, 40C) | YesNo | If Yes:Due to the symptoms you are reporting, an E-Visit is not appropriate at this time. Insert standard 911/physician office language |  |
|  | Do you have problems with your blood or immune system that make it harder for you to fight infections (e.g. blood cancer, sickle cell disease, HIV or AIDS)? Are you taking medications that make it harder for you to fight infections (e.g. cancer chemotherapy, organ transplant medications, prednisone, steroids)?Have you had to stay in the hospital overnight for any reason in the past 30 days? | YesNo | If Yes:You have a serious health condition and an E-Visit is not appropriate at this time.Insert standard 911/physician office language |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  | **Cough or Flu Like Symptoms** |  |  |  |
| **#** | **Question** | **Answers** | **Logic** | **Clinical Aid** |
| 1 | Have you been in close contact with someone who has the flu? | YesNoI do not know |  |  |
| 2 | Have you been in close contact with someone who has been diagnosed with whooping cough or pertussis?  | YesNoI do not know |  | If yes, refer to clinic |
| 3 | Do you have a fever? | Yes, I have a low fever (100.3 to 101 degrees)Yes, I have a fever (101 degrees or more)No, I do not have a fever (less than 100.3)I do not know | If no or I do not know, skip to 5 |  |
|  |  |  |  |  |
| 4 | How long have you had a fever?  | 1-2 days3-4 days5-6 days7-10 days11-14 daysMore than 14 days |  | If 1-2 days, likely flu relatedIf 3-14 days, likely supportive care neededIf 14+ days, likely need to refer to clinic |
|  |  |  |  |  |
| 5 | Do you have shaking chills or sweats?  | YesNo | If no, skip to 7 |  |
|  |  |  |  |  |
| 6 | How long have you had shaking chills or sweats?  | 1-2 days3-4 days5-6 days7-10 days11-14 daysMore than 14 days |  |  |
|  |  |  |  |  |
| 7 | Do you have body aches (i.e. muscle aches in your whole body)?  | YesNo | If no, skip to 9 |  |
|  |  |  |  |  |
| 8 | How long have you had body aches (muscle aches)?  | 1-2 days3-4 days5-6 days7-10 days11-14 daysMore than 14 days |  |  |
|  |  |  |  |  |
| 9 | Are you coughing?  | YesNo | If no, skip to 20 |  |
|  |  |  |  |  |
| 10 | How long have you been coughing? | 1-2 days3-4 days5-6 days7-10 days11-14 daysMore than 14 days |   |  |
|  |  |  |  |  |
| 11 | Are you coughing up any mucus? | No, it's a dry coughI am coughing up a little bit of mucusI am coughing up a lot of mucus | If no, skip to 14 | If the patient is having no mucus, then supportive care. If the patient is having non-bloody mucus, then supportive care. If the patient is coughing up bloody mucus, then refer to clinic. This is NOT an indication to treat with antibiotics.  |
|  |  |  |  |  |
| 12 | What is the appearance of the mucus? | I am swallowing everything I cough upThe mucus is thinThe mucus is thick |  |  |
| 13 | Is the mucus bloody? | YesNoI don’t know |  |  |
|  |  |  |  |  |
| 14 | Have you been treated for a similar cough in the past? | YesNo | If no, skip to 19 |  |
|  |  |  |  |  |
| 15 | How long ago were you treated for similar cough in the past? | Less than 3 monthsMore than 3 months |  | If less than 3 months, consider refer back to clinic (underlying chronic issue?) |
| 16 | How many times in past year? | 1-23+ |  | If 3+ refer to clinic (? Possible Underlying chronic issue) |
| 17 | What treatments have worked in the past? What has not worked? | Free Text |  |  |
|  |  |  |  |  |
| 18 | Are you taking any medications now for your cough? | Free text |  |  |
| 19 | Are you experiencing any of the following? | Severe attacks or fits of coughing (e.g. where it is hard to catch your breath afterwards)A gasping or “whooping” sound after coughingVomiting after coughingNone of the above |  | Yes to any of these items raise suspicion for pertussis- refer to clinic. |
|  |  |  |  |  |
| 20 | Do you have a stuffy or runny nose?  | YesNo |  | Yes (in setting of non-productive or minimally productive cough with no pertussis features) indicates “Rhinorrhea Dominant Symptom” on our E-Visit Adult Cough and Flu Algorithm leading to dx of URI with/without postnasal drip. Answer of NO then cough dominant symptoms.  |
| 21 | Do you feel fluid or mucus dripping or draining down the back of your throat?  | YesNo |  |
| 22 | Are you vomiting? | YesNo | If no, skip to 26 if female or 28 if male |  |
|  |  |  |  |  |
| 23 | How often are you vomiting? | Not every dayOne time per dayTwo to four times per dayMore than four times per day |  |  |
| 24 | Are you able to keep down fluids? | Yes, I can keep down some fluidsNo, everything comes right back up |  | If no, refer to clinic (or ADTU) |
|  |  |  |  |  |
| 26 | Are you pregnant? | I am pregnantI am confident that I am not pregnantI think I may be pregnant | If sex is female or unknown |  |
| 27 | Are you breastfeeding? | YesNo | If sex is female or unknown |  |
| 28 | Anything else you would like to add? | Free Text |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Sinus Problems** |  |  |  |
|  | **Question** | **Answers** | **Logic** | **Clinical Aid** |
| 1 | Which of the following symptoms have experienced? | Congested nosePain or pressure around the nose and faceHeadacheEar painSwollen gland in neckThroat pain or pain with swallowingCoughNone of the above |  | Trigger referral to clinic:-Ear pain (possible ear infection)- Throat pain or pain with swallowing (possible strep) |
| 2 | Overall, would you say your symptoms are:  | MildModerateSevere |  | To aid in assessment of symptom severity in UM sinus guidelineSevere:-3-4 days of severe symptoms and fever-10 days of persistent/mild or moderate symptoms. |
| 3 | How long have you had these symptoms? | 1-2 days3-4 days5-6 days7-10 days11-14 daysMore than 14 days |  |  |
| 4 | Which of the following best describes your symptoms during this time? | My symptoms have stayed about the sameMy symptoms have gotten worse and worse each dayMy symptoms improved for several days but then got worseMy symptoms have improved |  | Assess “double sick” |
| 5 | Do you have a fever? | Yes, I have a low fever (100.3 to 101 degrees)Yes, I have a high fever (101 degrees or more)No, I do not have a fever (less than 100.3F)I do not know | If no, skip to 7 |  |
|  |  |  |  |  |
| 6 | How long have you had a fever? | 1-2 days3-4 days5-6 days7-10 days11-14 daysMore than 14 days |  |  |
|   |   |  |   |   |
| 7 | What comes out when you blow your nose? | -My nose is completely blocked (no air even passes through)-Some air but nothing else-A small amount of mucus-A large amount of mucus | If completely blocked or some air but nothing else, skip to 9 |  |
|  |  |  |  |  |
| 8 | What does the mucus that comes out of your nose look like?  | Thin or waterySlightly thickVery thick or stringy |  | Large amount of very thick mucus with either nasal obstruction ORfacial pain or pressure |
|  |  |  |  |  |
| 9 | Have you experienced similar problems in the past? | YesNo |   |  |
| 10 | What treatments have worked in the past? What has not worked? | Free Text |  |  |
|  |  |  |  |  |
| 11 | What medications are you currently taking for these symptoms? | DecongestantsPain medicineNose sprayNasal saline irrigation (or Neti-pot)AntibioticsNothingOther (Free text) |  |  |
| 12 | Please enter the names of any medications you are taking, or any other treatments you are trying. | Free Text |   |  |
| 13 | Do you have any antibiotic allergies? If yes, list antibiotic, reaction, and approximate date. | Free text |  |  |
|  |  |  |  |  |
| 14 | Are you pregnant? | I am pregnantI am confident that I am not pregnantI think I may be pregnant | If sex is female or unknown |  |
| 15 | Are you breastfeeding? | YesNo | If sex is female or unknown |  |
|  |  |  |  |  |
| 16 | Anything else you would like to add? | Free Text |   |  |

# Supplementary Appendix 2: E-visit provider responses with phrase templates

**EVISITVIRALURI**

Thank you for submitting an E-Visit request. Based on your responses, I believe you have a viral upper respiratory tract infection, otherwise known as the common cold.

What is a viral upper respiratory tract infection?

More than 200 viruses can cause the common cold, with adults getting a cold 2-3 times yearly. When you have a cold, mucus fills up your nose, causing runny nose, congestion, and mucus to drip down your throat (post-nasal drip), which can cause a sore throat and cough. At first, your mucus is clear, helping wash away the germs. After a few days, the mucus may change to white, yellow, or green. This is normal, and part of the immune response. Typically, the symptoms become the worst in 2-3 days, and then slowly get better, lasting for up to 10-14 days.

Antibiotics do not treat viruses, and antibiotics can do more harm than good if we use them when they aren't needed. Antibiotics can have unwanted side effects, such as diarrhea and rash, including a very serious, sometimes deadly form of diarrhea called *Clostridium difficile*. Instead, I would recommend other things to help you feel better.

What can you do to feel better?

-Rest

-Drink plenty of fluids (water is best, but tea, Gatorade, or other non-sugared sports drink is acceptable)

-Use Ibuprofen (i.e. Motrin or Advil) as needed for pain or discomfort.

* You should follow the recommended dosing on the package.
* If your doctor or another provider has previously told you that you should not take ibuprofen due to bleeding risk or warfarin use, chronic kidney disease, peptic ulcer disease, or other reasons, you may consider using acetaminophen.
* If your doctor or another provider has previously told you that you should not take acetaminophen, please contact your provider for recommendations for alternative pain relievers.

-Consider using nasal saline irrigation washes. If using this option, I recommend doing so with sterile water.

-Consider using a clean humidifier.

-Consider using nasal steroid sprays.

-Consider using honey if coughing at night.

-Other over-the-counter symptom relief strategies include:

* Decongestants (to relieve stuffiness):
	+ Pseudoephedrine
	+ Oxymetazoline (i.e. Afrin) 0.05% (do not use more than 3 days)
* Antihistamines (largely to help treat allergies):
* Diphenhydramine (i.e. Benadryl)
* Loratadine (i.e. Claritin)

When should you call your doctor?

-If your symptoms continue more than 10 days

-If your symptoms worse after getting better at first

-If you are feeling confused

-If you have a new onset shortness of breath or chest pain

As always, if you require immediate medical assistance, please dial 911 or go to the nearest Emergency Department.

Your E-Visit was completed by @MECREDENTIAL@.

**EVISITACUTEBACTERIALSINUSITIS**

Thank you for submitting an E-Visit request. Based on the symptoms you reported, I believe you have acute bacterial sinusitis.

Acute sinusitis is typically caused by a viral infection. However, there are some signs and symptoms that make a bacterial infection more likely:

* High fevers and severe illness from the start of symptoms for 3-4 days with no improvement.
* Persistence of symptoms for more than 10 days with no improvement.
* Worsening of symptoms after initial improvement.

Based on your report of {severe initial illness; persistence of symptoms for more than 10 days without any improvement/worsening after initial improvement}, I believe your symptoms are consistent with a possible bacterial infection and would recommend antibiotics, in addition to other things to help you feel better.

I have prescribed {Amoxicillin/clavulanate 875mg by mouth twice daily; doxycycline 100mg by mouth twice daily} for 5 days (take with food to decrease upset stomach). The prescription will be sent to the pharmacy you indicated when you initiated the E-Visit.

Recommendations to help you feel better:

* Rest.
* Drink plenty of fluids (water is best, but tea, Gatorade, or other non-sugared sports drink is acceptable).
* Use Ibuprofen (i.e. Motrin or Advil) as needed for pain or discomfort.
	+ You should follow the recommended dosing on the package.
	+ If your doctor or another provider has previously told you that you should not take ibuprofen due to bleeding risk or warfarin use, chronic kidney disease, peptic ulcer disease, or other reasons, you may consider using acetaminophen.
	+ If your doctor or another provider has previously told you that you should not take acetaminophen, please contact your provider for recommendations for alternative pain relievers.
* Consider using nasal saline irrigation washes. If using this option, I recommend doing so with sterile water.
* Consider using nasal steroid sprays.
* Other over-the-counter symptom relief strategies include:
* Decongestants (to relieve stuffiness)
	+ Pseudoephedrine (avoid if history of hypertension)
	+ Oxymetazoline (i.e. Afrin) 0.05% (do not use more than 3 days)
* Antihistamines (largely to help treat allergies)
	+ Diphenhydramine (i.e. Benadryl) (Use as directed: do not take if taking any other medications that aid in sleep, do not take before driving).
	+ Loratadine (i.e. Claritin)

Warning signs to call your doctor:

* Symptoms not improving within 3-5 days.
* Worsening of symptoms.
* Potential antibiotic side effects (rash, diarrhea, nausea and vomiting).
* Confusion.

As always, if you require immediate medical assistance, please dial 911 or go to the nearest Emergency Department.

Your E-Visit was completed by @MECREDENTIAL@.

**EVISITALLERGICRHINITIS**

Thank you for submitting an E-Visit request. Based on the symptoms you reported of clear nasal drainage and eye itching with no fever, I believe you have allergic rhinitis.

Recommendations to help feel better:

* You should try to avoid things you are allergic to.
* If you already are doing that (or if you are unable to avoid allergens), I'd first recommend an over-the-counter antihistamine. Generic brands are equally effective.
	+ Loratadine (Claritin)
	+ Cetirizine (Zyrtec)
	+ Fexofenadine (Allegra)

Follow the directions for dosing on the box.

* Nasal fluticasone spray (Flonase), 2 sprays into each nostril once daily, should help.
	+ When you use the fluticasone spray for the first time, you must prime the spray. Press down fully the top of the pump 6 times or until a fine spray comes out. Prime the spray if it has not been used for more than 7 days (fluticasone propionate) or 30 days (Veramyst®) or if the cap has been left off the bottle for 5 days or longer. Shake the medicine well before each use.
	+ Gently blow your nose before using the spray. Lift your head back slightly and insert the tip of the nose piece into your nostril.
	+ Close the opposite nostril with a finger. Release 1 spray and at the same time, breathe in gently through the nostril.
	+ Hold your breath for a few seconds then breathe out slowly through your mouth.
	+ Spray the opposite nostril using the same steps.
	+ Do not blow your nose or tip your head back after using the spray.
	+ Wipe the tip of the outside of the nose piece with a clean, dry tissue or cloth and put the cap back on.
	+ Throw this medicine away after you use 120 sprays.
* Consider using nasal saline irrigation washes. If using this option, I recommend doing so with sterile water.
* Other over-the-counter symptom relief strategies include:
* Decongestants (to relieve stuffiness)
	+ Pseudoephedrine (avoid if history of hypertension)
	+ Oxymetazoline (i.e. Afrin) 0.05% (do not use more than 3 days)
* Antihistamines (largely to help treat allergies)
	+ Diphenhydramine (i.e. Benadryl) (Use as directed: do not take if taking any other medications that aid in sleep, do not take before driving).
	+ Loratadine (i.e. Claritin)

Warning signs to call your doctor:

* Symptoms not improving within 3-5 days
* Worsening of symptoms
* New fever (temperature greater than 100.4 degrees F)
* Confusion

As always, if you require immediate medical assistance, please dial 911 or go to the nearest Emergency Department.

Your E-Visit was completed by @MECREDENTIAL@.

**EVISITCOUGH**

Thank you for submitting an E-Visit request for your cough. Based on your symptoms and medical history, this sounds most like {eVisit cough diagnoses:34558}.

Recommendations to help you feel better:

* Rest
* Drink plenty of fluids (water is best, but tea, Gatorade, or other non-sugared sports drink is acceptable)
* Use Ibuprofen (i.e. Motrin or Advil) as needed for pain or discomfort.
	+ You should follow the recommended dosing on the package.
	+ If your doctor or another provider has previously told you that you should not take ibuprofen due to bleeding risk or warfarin use, chronic kidney disease, peptic ulcer disease, or other reasons, you may consider using acetaminophen.
	+ If your doctor or another provider has previously told you that you should not take acetaminophen, please contact your provider for recommendations for alternative pain relievers.
* Consider taking Guaifenesin (i.e. Mucinex) to help break up the mucous.
* Consider using a clean humidifier.
* Consider taking one of the following to help decrease your cough:
* Dextromethorphan
* Lozenges
* Honey

Hygiene Tips:

* Wash hands and arm with soap and water after contact with cold sufferers and objects and surfaces they may have contaminated.
* Keep fingers out of the eyes and nose.
* Cover your mouth and nose with a tissue when coughing or sneezing. Put used tissues directly into the bin. If you don't have a tissue, cough or sneeze into the upper part of your arm.

Warning signs to call your doctor:

* New fever (temperature greater than 100.4 degrees F)
* Worsening or new productive cough
* Worsening sinus drainage
* New tooth pain
* Difficulty breathing

As always, if you require immediate medical assistance, please dial 911 or go to the nearest Emergency Department.

Your E-Visit was completed by @MECREDENTIAL@.

**EVISITFLU**

Thank you for submitting an E-Visit request for your flu symptoms. Based on your symptoms and medical history, there is a {eVisit flu likelihood:37875} that you have influenza ("the flu").

For your flu, I am prescribing Tamiflu (oseltamivir) {eVisit tamiflu dosing:37876}. Make sure you take the entire prescription, regardless of whether you begin to feel better quickly. The prescription has been sent to the pharmacy you indicated when you initiated the E-Visit.

Recommendations to help you feel better:

* Stay hydrated (water is best, but tea, Gatorade, or other non-sugared sports drink is acceptable).
* Get plenty of rest.
* Use ibuprofen (i.e. Motrin or Advil) or acetaminophen (i.e. Tylenol) as needed for pain.
	+ Generic brands are equally effective.
	+ You may want to use a "cold and flu" formulation.
	+ You should follow the recommended dosing on the package.
	+ If your doctor or another provider has previously told you that you should not take ibuprofen or acetaminophen, please contact your provider for recommendations for alternative pain relievers.
* If at all possible, stay home from work or school and avoid crowded areas (such as grocery stores, malls, or daycare centers) until you have been fever-free for 24 hours without the use of Tylenol or Motrin or other fever-reducing medication.
* Wash your hands thoroughly with soap and water or use an alcohol-based hand sanitizer (e.g. Purell) every time you blow your nose or touch your face.
* Make sure to cover your cough by coughing into the crook of your arm or a tissue.

**\*\*\*(May delete below as applicable; otherwise, delete this phrase)\*\*\***

* For nausea and vomiting, I am prescribing Zofran ODT (ondansetron) 8 mg by mouth every 8 hours as needed. The prescription has been sent to the pharmacy you indicated when you initiated the eVisit. If you are unable to keep any food or liquids down due to vomiting, please contact your primary health provider immediately.

**\*\*\*(May delete above as applicable; otherwise, delete this phrase)\*\*\***

Warning signs to call your doctor:

* Worsening of symptoms.
* Unable to stay hydrated, not urinating at least every 8 hours.
* Chest pain.
* Difficulty breathing.
* Confusion.
* Severe body aches with darkening urine.
* Decreased alertness.

As always, if you require immediate medical assistance, please dial 911 or go to the nearest Emergency Department.

Your E-Visit was completed by @MECREDENTIAL@.

**EVISITACUTEBRONCHITIS**

Thank you for submitting an E-Visit request. Based on your responses, I believe you have acute bronchitis. Acute bronchitis occurs when the airways swell and produce mucous, which makes you cough. You may also experience tiredness, sore chest, watery eyes, mild headache and body aches, and sore throat. It can last for up to 3 weeks.

Most of the time, acute bronchitis is caused by a virus. Bacteria can sometimes cause acute bronchitis, but antibiotics are not recommended as they will not help you get better more quickly.

The good news is that acute bronchitis almost always gets better on its own, without antibiotics. Antibiotics can do more harm than good if we use them when they aren’t needed. Antibiotics can have unwanted side effects, such as diarrhea and rash, including a very serious, sometimes deadly form of diarrhea called *Clostridium difficile*.

Recommendations to help you feel better:

* Rest.
* Drink plenty of fluids (water is best, but tea, Gatorade, or other non-sugared sports drink is acceptable)
* Use ibuprofen (i.e. Motrin or Advil) or acetaminophen (i.e. Tylenol) as needed for pain.
	+ Generic brands are equally effective.
	+ You should follow the recommended dosing on the package.
	+ If your doctor or another provider has previously told you that you should not take ibuprofen or acetaminophen, please contact your provider for recommendations for alternative pain relievers.
* Consider taking Guaifenesin (i.e. Mucinex) to help break up the mucous
* Consider using a clean humidifier
* Consider taking one of the following to help decrease your cough:
* Dextromethorphan
* Lozenges
* Honey

Warning signs to call your doctor:

* New fever (temperature greater than 100.4 degrees F)
* Worsening or new productive cough
* Worsening sinus drainage
* New tooth pain
* Difficulty breathing or wheezing
* Chest pain

As always, if you require immediate medical assistance, please dial 911 or go to the nearest Emergency Department.

Your E-Visit was completed by @MECREDENTIAL@.

**Cough and Flu: EVISITASTHMAEXACERBATION**

Thank you for submitting an E-Visit request. Based on your responses and prior asthma diagnosis, it sounds like you are having an asthma exacerbation. You should continue to follow the asthma action plan developed by your primary care provider.

Asthma exacerbations are usually treated with inhalers (bronchodilators) and corticosteroids. There is no "best" steroid course of treatment, but I usually prescribe {eVisit Asthma Steroids:34628:o} and an albuterol inhaler. The prescriptions will be sent to the pharmacy you indicated when you initiated the eVisit. You should take the entire prescription, even if you are feeling better after a few days. If you are not familiar with how to use an inhaler, please ask the pharmacist to demonstrate how to use it appropriately. You should take 1-2 puffs of the inhaler every 4 to 6 hours as needed for wheezing, cough, or shortness of breath.

If you continue to feel short of breath or have continued cough after a few days, or if the albuterol inhaler does not improve your cough, you should contact your healthcare provider directly for further evaluation and instruction. If you feel better after a few days, please remember to continue taking the steroid prescription until it is completed, as asthma exacerbations may recur if not treated adequately.

As always, if you require immediate medical assistance, please dial 911 or go to the nearest Emergency Department.

Your E-Visit was completed by @MECREDENTIAL@.

**EVISITNOCHARGE**

Thank you for submitting an E-Visit request for {eVisit Chief Complaint:34556:o}.

Based on your symptoms and medical history, I believe you should be evaluated by your primary care physician in the office. I have notified your doctor's office, who should be contacting you to schedule an appointment. If you do not hear from your doctor's office within the next business day, please contact them directly. As always, if you require immediate medical assistance, please dial 911 or go to the nearest Emergency Department. You will not be charged for this E-Visit.

Your E-Visit was addressed by @MECREDENTIAL@.

**EVISITNOCHARGENOTPT**

Thank you for submitting an E-Visit request. It sounds like you have submitted this E-Visit for someone other than yourself. E-Visits are a part of your medical record and should only be submitted for yourself.

I am unable to provide treatment via this E-Visit and you will not be charged.

Pediatric E-Visits are available for children with a Michigan Medicine Primary Care Physician. To submit a Pediatric E-Visit, you must have proxy access for the child.

If you already have proxy access for the child, you must submit the Pediatric E-Visit by navigating to the proxy account in the header of your MyUofMHealth patient portal.

If you have questions about E-Visits or proxy access, please contact Health Information Management at 734-615-0872 or HIM-PatientPortal@med.umich.edu.

Your E-Visit was addressed by @MECREDENTIAL@.

# Supplementary Appendix 3: ICD-10 codes for “antibiotic never appropriate” diagnoses[[1]](#footnote-1)

|  |
| --- |
| Abdominal bloating [787.3] |
| Abdominal cramps [789.00] |
| Acute blood loss anemia [285.1] |
| Acute bronchitis, unspecified organism [466.0] |
| Acute ear pain, unspecified laterality [388.70], |
| Acute laryngitis [464.00] |
| Acute low back pain, unspecified back pain laterality, unspecified whether sciatica present [] |
| Acute pain of right shoulder [719.41] |
| Acute pharyngitis, unspecified etiology [462] |
| Acute rhinitis [460] |
| Acute sore throat [] |
| Acute upper respiratory infection, unspecified [465.9] |
| Acute viral bronchitis [466.0] |
| Acute viral pharyngitis [462] |
| Acute viral sinusitis [] |
| Acute viral syndrome [079.99] |
| Allergic rhinitis due to animal hair and dander [477.2] |
| Allergic rhinitis due to other allergic trigger, unspecified seasonality [] |
| Allergic rhinitis, unspecified seasonality, unspecified trigger [] |
| Allergic rhinoconjunctivitis [477.9, 372.05] |
| Allergic state, initial encounter [995.3] |
| Anosmia [781.1] |
| Anxiety [300.00] |
| Anxiety about health [300.09] |
| Asthma exacerbation, mild [493.92] |
| Asthma, allergic, mild intermittent, uncomplicated [493.00] |
| Atrial fibrillation and flutter (CMS/HCC) [427.31, 427.32] |
| Atypical chest pain [786.59] |
| Benign paroxysmal positional vertigo, unspecified laterality [386.11] |
| Body aches [780.96] |
| BPPV (benign paroxysmal positional vertigo), unspecified laterality [386.11] |
| Bronchitis [490] |
| Bronchitis due to COVID-19 virus [] |
| Bronchospasm [519.11] |
| Cervical lymphadenitis [289.3] |
| Chest congestion [786.9] |
| Chest pain, unspecified type [786.50] |
| Chest pressure [786.59] |
| Chest tightness [786.59] |
| Chills [780.64] |
| Chronic cough [786.2] |
| Chronic low back pain with sciatica, sciatica laterality unspecified, unspecified back pain laterality [724.2, 724.3, 338.29] |
| Close exposure to COVID-19 virus [] |
| Cold sore [054.9] |
| Concern about disease without diagnosis [V65.5] |
| Contact dermatitis, unspecified contact dermatitis type, unspecified trigger [692.9] |
| Contact with and (suspected) exposure to other viral communicable diseases [V01.79] |
| Contact with hot food as cause of accidental injury [E924.0] |
| Costochondral chest pain [786.52] |
| Cough [786.2] |
| Cough in adult [] |
| Cough, persistent [786.2], |
| Coughing [786.2] |
| COVID-19 [] |
| COVID-19 virus infection [] |
| Current smoker [305.1], |
| Diarrhea due to drug [787.91, E980.5] |
| Diarrhea in adult patient [787.91], |
| Diarrhea, unspecified type [787.91] |
| Dizziness [780.4] |
| Dizziness of unknown cause [780.4] |
| Dizziness of unknown etiology [], |
| Dizzy [780.4] |
| Dry cough [786.2] |
| Dysfunction of Eustachian tube, unspecified laterality [381.81] |
| Dysfunction of left eustachian tube [381.81] |
| Dyspnea on exertion [786.09] |
| Dyspnea, unspecified type [786.09] |
| Ear fullness, bilateral [388.8] |
| Ear infection [382.9] |
| Ear itch [698.9] |
| Ear pain, unspecified laterality [388.70] |
| Educated about COVID-19 virus infection [] |
| Encounter by telehealth for suspected COVID-19 [] |
| Encounter for laboratory testing for COVID-19 virus [] |
| Encounter for screening laboratory testing for COVID-19 virus [] |
| Encounter to obtain excuse from work [V68.89], |
| Environmental allergies [V15.09] |
| Eustachian tube disorder, unspecified laterality [381.9] |
| Eustachian tube dysfunction, bilateral [381.81] |
| Eustachian tube dysfunction, right [381.81] |
| Eustachian tube dysfunction, unspecified laterality [381.81] |
| Exacerbation of asthma, unspecified asthma severity, unspecified whether persistent [] |
| Exposure to 2019 novel coronavirus [] |
| Exposure to COVID-19 virus [] |
| Exposure to influenza [V01.79] |
| Exposure to intestinal infectious disease [] |
| Facial pressure [780.99] |
| Fatigue, unspecified type [780.79] |
| Feared complaint without diagnosis [V65.5] |
| Fever and chills [780.60], |
| Fever in adult [780.60] |
| Fever in other diseases [780.61] |
| Fever, unspecified fever cause [780.60] |
| Flu-like symptoms [780.99], |
| Gastroenteritis [558.9] |
| Gastroesophageal reflux disease with esophagitis [530.11] |
| Gastroesophageal reflux disease without esophagitis [530.81] |
| Generalized anxiety disorder [300.02] |
| Generalized body aches [] |
| Generalized muscle ache [729.1] |
| GERD with esophagitis [530.11] |
| Herpes labialis [054.9] |
| Herpes zoster without complication [053.9] |
| History of 2019 novel coronavirus disease (COVID-19) [] |
| History presenting hazard to health [V15.9] |
| HSV-2 (herpes simplex virus 2) infection [054.9] |
| Influenza [487.1] |
| Influenza in adult [] |
| Influenza-like illness [799.89] |
| Influenza-like symptoms [780.99] |
| Iron deficiency anemia due to chronic blood loss [280.0] |
| Laryngitis [464.00] |
| Lightheadedness [780.4] |
| Low grade fever [780.60] |
| Lymph node enlargement [785.6] |
| Malaise [780.79] |
| Malaise and fatigue [780.79] |
| Marijuana user [] |
| Mild asthma exacerbation [493.92] |
| Mild episode of recurrent major depressive disorder (CMS/HCC) [296.31] |
| Mild intermittent asthma with exacerbation [493.92] |
| Mild intermittent asthma without complication [493.90] |
| Mild persistent asthma with acute exacerbation [493.92], |
| Mild persistent asthma with exacerbation [493.92] |
| Mild persistent asthma without complication [493.90] |
| Moderate persistent asthma with exacerbation [493.92] |
| Moderate persistent asthma, uncomplicated [493.90], |
| Muscle strain [848.9] |
| Myalgia [729.1] |
| Nasal congestion [478.19] |
| Nasal vestibulitis [478.19], |
| Nausea [787.02] |
| Nausea and vomiting, intractability of vomiting not specified, unspecified vomiting type [787.01] |
| No problem, feared complaint unfounded [V65.5] |
| Non-intractable vomiting with nausea, unspecified vomiting type [787.01], |
| Non-intractable vomiting, presence of nausea not specified, unspecified vomiting type [787.03] |
| Non-productive cough [786.2] |
| Non-seasonal allergic rhinitis, unspecified trigger [] |
| Nonintractable headache, unspecified chronicity pattern, unspecified headache type [784.0], |
| Nonspecific syndrome suggestive of viral illness [079.99], |
| Occupational exposure to chemicals [V87.2] |
| Oral thrush [112.0] |
| OSA (obstructive sleep apnea) [327.23] |
| Otalgia, unspecified laterality [388.70] |
| Other fatigue [780.79] |
| Other headache syndrome [339.89], |
| Perioral dermatitis [695.3] |
| Persistent asthma without complication, unspecified asthma severity [] |
| Pertussis-like syndrome [033.9] |
| Pharyngeal irritation [478.29] |
| Pharyngitis, unspecified etiology [462] |
| Post-nasal drainage [473.9] |
| Post-nasal drip [784.91] |
| Post-viral cough syndrome [786.2] |
| Postviral syndrome [780.79] |
| Pregnancy, unspecified gestational age [V22.2] |
| Rash [782.1] |
| Rash and nonspecific skin eruption [782.1] |
| Recurrent cold sores [054.9] |
| Rhinitis, unspecified type [472.0] |
| Seasonal allergic rhinitis due to pollen [477.0] |
| Seasonal allergic rhinitis, unspecified trigger [] |
| Seasonal allergies [477.9] |
| Sensation of chest tightness [786.59] |
| Sensation of fullness in both ears [388.8] |
| Shaking chills [780.64] |
| Shortness of breath [786.05] |
| Sinus complaint [786.9] |
| Sinus congestion [478.19] |
| Sinus disease [473.9] |
| Sinus problem [473.9] |
| SOB (shortness of breath) [786.05] |
| SOB (shortness of breath) on exertion [786.05] |
| Sore throat (viral) [462] |
| Sore throat [462] |
| Sore throat and laryngitis [465.0] |
| Sore throat due to virus [] |
| Stomach flu [487.8], |
| Suspected 2019 novel coronavirus infection [] |
| Suspected COVID-19 virus infection [] |
| Symptoms of upper respiratory infection (URI) [786.09] |
| Temporomandibular joint-pain-dysfunction syndrome (TMJ) [524.69] |
| Throat irritation [478.29], |
| Thrush [112.0] |
| Tinea corporis [110.5] |
| Tinnitus, unspecified laterality [388.30] |
| Tonsillolith [474.8] |
| Type A influenza [487.1] |
| Uncomplicated asthma, unspecified asthma severity, unspecified whether persistent [] |
| Upper respiratory disease [478.9] |
| Upper respiratory infection, viral [465.9] |
| Upper respiratory tract infection, unspecified type [465.9] |
| Viral bronchitis [466.0] |
| Viral conjunctivitis [077.99] |
| Viral gastroenteritis [008.8] |
| Viral illness [079.99] |
| Viral infection [079.99] |
| Viral pharyngitis [462] |
| Viral sinusitis [473.9, 079.99] |
| Viral syndrome [079.99] |
| Viral upper respiratory illness [465.9] |
| Viral upper respiratory infection [465.9] |
| Viral upper respiratory tract infection [465.9] |
| Viral upper respiratory tract infection with cough [465.9] |
| Viral URI [465.9] |
| Viral URI with cough [465.9] |
| Vomiting, intractability of vomiting not specified, presence of nausea not specified, unspecified vomiting type [787.03] |
| Wheezing [786.07] |
| Worried well [V65.5] |

# Supplementary Appendix 4: Sinusitis-related ICD-10 codes

|  |
| --- |
| Acute bacterial sinusitis [461.9] |
| Acute frontal sinusitis, recurrence not specified [461.1] |
| Acute maxillary sinusitis, recurrence not specified [461.0] |
| Acute non-recurrent frontal sinusitis [461.1] |
| Acute non-recurrent maxillary sinusitis [461.0] |
| Acute non-recurrent pansinusitis [461.8] |
| Acute non-recurrent sinusitis of other sinus [461.8] |
| Acute non-recurrent sinusitis, unspecified location [461.9] |
| Acute pansinusitis, recurrence not specified [461.8] |
| Acute recurrent frontal sinusitis [461.1] |
| Acute recurrent maxillary sinusitis [461.0] |
| Acute recurrent pansinusitis [461.8] |
| Acute recurrent sinusitis, unspecified location [461.9] |
| Acute sinusitis treated with antibiotics in the past 60 days [461.9] |
| Acute sinusitis with symptoms > 10 days [461.9] |
| Acute sinusitis with symptoms greater than 10 days [461.9] |
| Acute sinusitis, recurrence not specified, unspecified location [461.9] |
| Bacterial sinusitis [473.9, 041.9] |
| Bacterial URI [465.9, 041.9] |
| Chronic maxillary sinusitis [473.0] |
| Chronic sinusitis, unspecified location [473.9] |
| Frontal sinusitis, unspecified chronicity [473.1] |
| Maxillary sinusitis, unspecified chronicity [473.0] |
| Other acute recurrent sinusitis [461.9] |
| Other acute sinusitis, recurrence not specified [461.8] |
| Other sinusitis, unspecified chronicity [473.8] |
| Other subacute sinusitis [461.8] |
| Pansinusitis, unspecified chronicity [473.8] |
| Recurrent sinusitis [473.9] |
| Rhinosinusitis [473.9] |
| Sinusitis, bacterial [473.9, 041.9] |
| Sinusitis, unspecified chronicity, unspecified location [473.9] |
| Subacute frontal sinusitis [461.1] |
| Subacute maxillary sinusitis [461.0] |
| Subacute pansinusitis [461.8] |
| Subacute sinusitis, unspecified location [461.9] |

# Supplementary Table 1: Pre-intervention antibiotic prescriptions for URTIs

|  |  |  |  |
| --- | --- | --- | --- |
| **Antibiotic** | **Number of scripts** | **Percentage of total** | **Median duration (days)** |
| Amoxicillin/clavulanic acid | 215 | 44.7% | 10 |
| Amoxicillin | 104 | 21.6% | 10 |
| Doxycycline | 83 | 17.3% | 10 |
| Azithromycin | 61 | 12.7% | 5 |
| Levofloxacin | 5 | 1.0% | 14 |
| TMP-SMX | 6 | 1.2% | 10 |
| Cephalexin | 4 | 0.8% | 10 |
| Clarithromycin | 3 | 0.6% | 10 |
|  |  |  |  |
| Total | 481 |  |  |

1. Some visits with multiple “antibiotic never appropriate” diagnosis codes [↑](#footnote-ref-1)