Corporate Medical Policy

Diagnostic Testing of Influenza AHS – G2119

Description of Procedure or Service

I. Policy Description

Influenza is an acute respiratory illness caused by influenza A or B viruses resulting in upper and lower respiratory tract infection, fever, malaise, headache, and weakness. It mainly occurs in outbreaks and epidemics during the winter season. It is associated with increased morbidity and mortality in certain high-risk populations (Dolin, 2018).

Rapid influenza diagnostic tests (RIDTs) refer to CLIA waived immunoassays that can detect influenza viruses during the outpatient visit (30 mins or less), giving results in a clinically relevant time period to inform treatment decisions (CDC, 2016, 2017). Besides RIDTs, influenza can be detected using polymerase chain reaction (PCR)-based assays as well as culture testing; however, the latter is not used in initial clinical management due to time constraints. Serologic testing is not used in outpatient settings for diagnosis (Dolin, 2017).

II. Scientific Background

The influenza virus causes seasonal epidemics that result in severe illnesses and deaths almost every year. Influenza characteristically begins with the abrupt onset of fever, headache, myalgia, and malaise (Dolin, 1976; Kilbourne & Loge, 1950; Loeb et al., 2012; Nicholson, 1992), accompanied by manifestations of respiratory tract illness, such as nonproductive cough, sore throat, and nasal discharge (Dolin, 2018).

High titers of influenza virus are often present in respiratory secretions of infected persons. Influenza is transmitted primarily via respiratory droplets produced from sneezing and coughing (Brankston, Gitterman, Hirji, Lemieux, & Gardam, 2007; Dolin, 2018; Mubareka et al., 2009) which requires close contact with an infected individual. The typical incubation period for influenza is one to four days (average two days) (CDC, 2017; Cox & Subbarao, 1999). The serial interval among household contacts is three to four days (Cowling et al., 2010).

When initiated promptly (within the first 24 to 30 hours), antiviral therapy can shorten the duration of influenza symptoms by approximately one-half to three days (Cooper et al., 2003; Dobson, Whitley, Pocock, & Monto, 2015; Hayden et al., 1997; Heneghan et al., 2014; Jefferson et al., 2014; Nicholson et al., 2000; Zachary, 2017).

In certain circumstances, the diagnosis of influenza can be made clinically, such as during an outbreak. At other times, it is important to establish the diagnosis using laboratory testing. Viral diagnostic test options include rapid antigen tests, immunofluorescence assays, and reverse-transcriptase polymerase chain reaction (RT-PCR)-based testing (CDC, 2017). Among these, RT-PCR is the most sensitive and specific (Dolin, 2017).
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Rapid influenza antigen tests are immunoassays that can identify influenza A and B viral nucleoprotein antigens in respiratory specimens (CDC, 2017) which yield qualitative results in approximately 15 minutes or less. However, they have much lower sensitivity (CDC, 2017; Harper et al., 2009; Hurt, Alexander, Hibbert, Deed, & Barr, 2007; Ikenaga et al., 2008). Recent meta-analysis found that the sensitivity was 62.3 percent and the specificity was 98.2 percent (Chartrand, Leerflang, Minion, Brewer, & Pai, 2012). Furthermore, detectable viral shedding in respiratory secretions peaks at 24 to 48 hours of illness and then rapidly declines (Dolin, 2017).

Decision analysis (Sintchenko, Gilbert, Coiera, & Dwyer, 2002) concluded that rapid diagnostic testing was appropriate first except during influenza epidemics. When the probability of a case being due to influenza reached 42 percent, the two strategies were equivalent. Meta-analysis found that rapid diagnostic testing did not add to the overall cost-effectiveness of treatment if the probability of influenza was greater than 25 to 30 percent (Call, Vollenweider, Hornung, Simel, & McKinney, 2005; Dolin, 2017).

Analytical Validity

Viral culture is a gold standard for diagnosis, but it is very time-consuming with an average 7-day turnaround time whereas real-time RT-PCR and shell vial (SV) testing require only an average of 4 hours and 48 hours, respectively. A study by Lopez Roa and colleagues compared real-time RT-PCR and SV against conventional cell culture to detect pandemic influenza A H1N1. The sensitivity of RT-PCR as compared to viral culture testing was 96.5%, and SV had a sensitivity of 73.3% and 65.1%, depending on the use of either A549 cells or MDCK cells, respectively. The authors conclude, “Real-time RE-PCR displayed high sensitivity and specificity for the detection of influenza A H1N1 in adult patients when compared with conventional techniques (Lopez Roa et al., 2011).”

Clinical Validity and Utility

In 2017, Yoon and colleagues investigated the use of saliva specimens for detecting influenza A and B using RIDTs (Yoon, Yun, Nam, Choi, & Lim, 2017). They used both saliva and nasopharyngeal swab (NPS) samples from 385 patients and assays each sample using four different RIDTs—the Sofia Influenza A+B Fluorescence Immunoassay, ichroma TRIAS Influenza A+B, SD Bioline Influenza Ag, and BinaxNOW Influenza A/B antigen kit—as well as real-time reverse transcriptase PCR (RT-PCR). Using RT-PCR as a standard, 31.2% of the patients tested positive for influenza A and 7.5% for influenza B. All four RIDTS had “slightly higher” diagnostic sensitivity in NPS samples than saliva samples; however, both Sofia and ichroma “were significantly superior to those of the other conventional influenza RIDTs with both types of sample.” They authors note that the sensitivity of diagnosis improves if both saliva and NPS testing is performed (from 10% to 13% and from 10.3% to 17.2% for A and B, respectively). They conclude, “This study demonstrates that saliva is a useful specimen for influenza detection, and that the combination of saliva and NPS could improve the sensitivities of influenza RIDTs (Yoon et al., 2017).”

Ryu and associates investigated the efficacy of using instrument-based digital readout systems with RIDTs. In their 2016 paper (Ryu et al., 2016), they included 314 NPS samples from patients with suspected influenza and tested each sample with the Sofia Influenza A+B Fluorescence Immunoassay and BD Veritor System Flu A+B, which use instrument-based digital readout systems, as well as the SD Bioline assay (a traditional immunochromatographic assay) and PCR, the standard. Relative to the RT-PCR standard, for influenza A, the sensitivities for the Sofia, BD Veritor, and SD Bioline assays were 74.2%, 73.0%, and 53.9%, respectively; likewise, for influenza B, the sensitivities, respectively, were 82.5%, 72.8%, and 71.0%. All RIDTS show 100% specificities for both subtypes A and B. They authors conclude, “Digital-based readout systems for the detection of the influenza virus can be applied for more sensitive diagnosis in clinical settings than conventional [RIDTs] (Ryu et al., 2016).” They performed similar research
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in 2018 on NPS using RIDTs with digital readout systems—Sofia and Veritor as before along with BUDDI—as compared to standard RT-PCR and the SD Bioline immunochromatographic assay (n=218). They also tested the four RIDTs with diluted solutions from the National Institute for Biological Standards and Control (NIBSC) to probe lower detection limits for each testing method. Again, the digital-based assays have higher sensitivity for influenza. “Sofia showed the highest sensitivity for influenza A and B detection. BUDDI and Veritor showed higher detection sensitivity than a conventional RIDT for influenza A detection. Further study is needed to compare the test performance of RIDTs according to specific, prevalent influenza subtypes (Ryu et al., 2018).”

Another study compared the Alere iNAT, a rapid isothermal nucleic acid amplification assay, to the Sofia Influenza A+B and the BinaxNOW Influenza A&B immunochromatographic (ICT) assay. Using RT-PCR as the standard for 202 NPS samples, the “Alere iNAT detected 75% of those positive by RT-PCR, versus 33.3% and 25.0% for Sofia and BinaxNOW, respectively. The specificity of Alere iNAT was 100% for influenza A and 99% for influenza B (Hazelton et al., 2015).” BinaxNOW also had a sensitivity of only 69% for influenza as compared to RT-PCR in another study of 520 NPS from children under the age of 5 (Moesker et al., 2016).

Young and colleagues investigated the accuracy of using point-of-care (POC) NAAT-based assays on NPS as compared to the FDA-cleared in vitro PCR test, GenMark Dx Respiratory Viral Panel (Young, Illescas, Nicasio, & Sickler, 2017). Their study consisted of 87 NPS from adults. As compared to the RT-PCR gold standard, the cobas Liat Influenza A/B POC test had an overall sensitivity and specificity of 97.9% and 97.5%, respectively, whereas the Alere i Flu Influenza A&B POC test’s sensitivity was only 63.8% with a specificity of 97.5%. Taken together, the authors conclude that “the cobas Influenza A/B assay demonstrated performance equivalent to laboratory-based PCR, and could replace rapid antigen tests (Young et al., 2017).” These results are corroborated by another study that measured the specificity of the cobas POC assay as 100% for influenza A/B with a sensitivity of 96% for influenza A and 100% for influenza B (Melchers, Kuijpers, Sickler, & Rahamat-Langendoen, 2017). Another study reported a 6.5% invalid rate (as defined by as a failure on a first-run assay) by the cobas POC assay; however, “the sensitivities and specificities for all assays [cobas, Xpert Xpress Flu/RSV, and Aries Flu A/B & RSV] were 96.0 to 100.0% and 99.3 to 100% for all three virus [influenza A, influenza B, and respiratory syncytial virus] (Ling et al., 2018)”.

III. State and Federal Regulations, as applicable

On 1/12/2017, the FDA released the following concerning the reclassification of influenza testing systems: “The Food and Drug Administration (FDA) is reclassifying antigen based rapid influenza virus antigen detection test systems intended to detect influenza virus directly from clinical specimens that are currently regulated as influenza virus serological reagents from class I into class II with special controls and into a new device classification regulation (Kux, 2017).” The effective date is 2/13/2017. This reclassification now requires new minimum standards and annual reactivity testing. “Consequently, many previously available RIDTs can no longer be purchased in the United States (Azar & Landry, 2018).”

A list of tests granted waived status under CLIA (Clinical Laboratory Improvement Amendments of 1988) according to CPT codes is maintained by the Centers for Medicare & Medicaid Services (CMS) website (CMS, 2018). As of 7/24/2018, 27 different influenza tests are listed with the 87804 CPT code for influenza immunoassay with direct optical observation. A search of the FDA’s Device Database on 7/24/2018 yielded 108 approved records for “influenza”(FDA, 2018).

Additionally, many labs have developed specific tests that they must validate and perform in house. These laboratory-developed tests (LDTs) are regulated by the Centers for Medicare and Medicaid (CMS) as high-complexity tests under the Clinical Laboratory Improvement Amendments of 1988 (CLIA ’88). As an LDT, the U. S. Food and Drug Administration has not
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approved or cleared this test; however, FDA clearance or approval is not currently required for clinical use.

***Note: This Medical Policy is complex and technical. For questions concerning the technical language and/or specific clinical indications for its use, please consult your physician.

Policy

BCBSNC will provide coverage for diagnostic testing of influenza when it is determined the medical criteria or reimbursement guidelines below are met.

Benefits Application

This medical policy relates only to the services or supplies described herein. Please refer to the Member's Benefit Booklet for availability of benefits. Member's benefits may vary according to benefit design; therefore member benefit language should be reviewed before applying the terms of this medical policy.

When diagnostic testing of influenza is covered

Reimbursement for one single rapid flu test-including either a point-of-contact rapid nucleic acid amplification test (NAAT) or a rapid antigen test-OR one single traditional NAAT in the outpatient setting for a patient in a single visit, but not both an antigen and NAAT for a single patient in a single visit, is allowed for diagnosis of patients who present with signs and symptoms consistent with influenza disease (See Note 1 below) when influenza activity has been documented in the community or geographic area.

When diagnostic testing of influenza is not covered

Reimbursement is not allowed for viral culture testing for influenza in an outpatient setting. Reimbursement is not allowed for outpatient influenza testing, including rapid antigen flu tests, rapid NAAT or RT-PCR tests, traditional RT-PCR tests, and viral culture testing in asymptomatic patients.

Reimbursement is not allowed for serology testing under any circumstance.

Policy Guidelines

Note 1: Typical Influenza Signs and Symptoms (CDC, 2018a)

- Fever: A 100.4°F or higher temperature or feeling feverish/chills AND one or more:
  - Cough
  - Sore throat
  - Headaches and/or body aches
  - Difficulty breathing or shortness of breath
  - Fatigue
  - Runny or stuffy nose

A. Guidelines and Recommendations

Practice Guidelines and Position Statements

Centers for Disease Control and Prevention (CDC)

The CDC gives two sets of guidelines concerning testing for influenza. If influenza is known to be circulating in the community, they give the algorithm displayed in the figure below (CDC, 2018b):
If the patient is asymptomatic for influenza, then they do not recommend testing. If the patient is symptomatic and is being admitted to the hospital, then they recommend testing; on the other hand, if a symptomatic patient is not being admitted to the hospital, they recommend testing if the results of the test will influence clinical management. Otherwise, if the test results are not going to influence the clinical management, then do not test but do administer empiric antiviral treatment for any patient in high-risk categories (CDC, 2018b). [For a list of typical signs and symptoms of influenza according to the CDC, please refer to Note 1 within the Coverage criteria section below (CDC, 2018a).]

For possible outbreaks in a closed setting or institution, the CDC issued the guideline algorithm in the figure below (CDC, 2018c):
If only one person is showing signs and symptoms of influenza, then testing is not recommended but he/she should be closely monitored. If multiple people are showing signs of influenza, then RT-PCR testing is recommended if the results would change control strategies or if there are persons at high risk of complications within the facility or closed setting (CDC, 2018c). [For a list of signs and symptoms and a list of high-risk populations, please see Notes 1 and 2, respectively, in the Coverage criteria section below (CDC, 2018a).]

The CDC notes the usefulness of RIDT influenza testing given the rapid testing time (less than 15 minutes on the average) and that some have been cleared for point-of-care use, but they note the limited sensitivity to detect influenza as compared to the reference standards for laboratory confirmation testing, RT-PCR or viral culture. Disadvantages of RIDTs include high false negative results, especially during outbreaks, false positive results during times when influenza activity is low, and the lack of parity in RIDTs in detecting viral antigens. “Testing is not needed for all patients with signs and symptoms of influenza to make antiviral treatment decisions (See Figures 1-4). Once influenza activity has been documented in the community or geographic area, a clinical diagnosis of influenza can be made for outpatients with signs and symptoms consistent with suspected influenza, especially during periods of peak influenza activity in the community (CDC, 2016).”

The CDC notes the practicality of using RIDTs to detect possible influenza outbreaks, especially in closed settings. “RIDTs can be useful to identify influenza virus infection as a cause of respiratory outbreaks in any setting, but especially in institutions (i.e., nursing homes, chronic care facilities, and hospitals), cruise ships, summer camps, schools, etc. Positive RIDT results from one or more ill persons with suspected influenza can support decisions to promptly implement infection prevention and control measures for influenza outbreaks. However, negative RIDT results do not exclude influenza virus infection as a cause of a respiratory outbreak because of the limited sensitivity of these tests. Testing respiratory specimens from several persons with suspected influenza will increase the likelihood of detecting influenza virus infection if influenza...
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virus is the cause of the outbreak, and use of molecular assays such as RT-PCR is recommended if the cause of the outbreak is not determined and influenza is suspected. Public health authorities should be notified promptly of any suspected institutional outbreak and respiratory specimens should be collected from ill persons (whether positive or negative by RIDT) and sent to a public health laboratory for more accurate influenza testing by molecular assays and viral culture.” The CDC recommends using a molecular assay, such as RT-PCR, to test any hospitalized individual with suspected influenza rather than using an RIDT (CDC, 2016).

Infectious Diseases Society of America

IDSA Guidelines on seasonal influenza in adults and children (Harper et al., 2009) stated that “The currently available antigen detection tests provide results in 10–30 min but exhibit decreased sensitivity (70%–90% in children and <40% to 60% in adults), compared with RT-PCR and with viral culture. Performance of these assays depends heavily on patient age, duration of illness, sample type, and perhaps viral type. Given the lower sensitivity of immunofluorescence and commercial rapid tests, follow-up testing with RT-PCR and/or viral culture should be considered to confirm negative test results (Harper et al., 2009).”

The 2018 IDSA guidelines for the diagnosis of infectious diseases by microbiology laboratories (Miller et al., 2018) under viral pneumonia respiratory infections, specifically including influenza, state: “Rapid antigen tests for respiratory virus detection lack sensitivity and depending upon the product, specificity. A recent meta-analysis of rapid influenza antigen tests showed a pooled sensitivity of 62.3% and a pooled specificity of 98.2%. They should be considered as screening tests only. At a minimum, a negative result should be verified by another method… Several US Food and Drug Administration (FDA)-cleared NAAT platforms are currently available and vary in their approved specimen requirements and range of analytes detected (Miller et al., 2018).” Moreover, they state that the “IDSA/American Thoracic Society (ATS) practice guidelines (currently under revision) consider diagnostic testing as optional for the patient who is not hospitalized.” For children, though, they do recommend testing for viral pathogens in both outpatient and inpatient settings. In the section on general influenza virus infection, again they recommend the use of rapid testing assays, noting the higher sensitivity of the NAAT-based methods over the rapid antigen detection assays. They also state: Serologic testing is not useful for the routine diagnosis of influenza due to high rates of vaccination and/or prior exposure (Miller et al., 2018).”

American Academy of Emergency Medicine (AAEM)

The AAEM gives a “Level B” recommendation that states: “Testing for influenza should only be performed if the results will change clinical management. If a RAD [rapid antigen diagnostic] testing method is utilized, the provider should be aware of the limited sensitivity and the potential for false negatives. If clinical suspicion is moderate to high and RAD test is negative, one should consider sending a confirmatory RT-PCR or proceeding with empiric treatment for suspected influenza (Abraham, Perkins, Vilke, & Coyne, 2016).”

Billing/Coding/Physician Documentation Information

This policy may apply to the following codes. Inclusion of a code in this section does not guarantee that it will be reimbursed. For further information on reimbursement guidelines, please see Administrative Policies on the Blue Cross Blue Shield of North Carolina web site at www.bcbsnc.com. They are listed in the Category Search on the Medical Policy search page.

Applicable service codes: 87804, 87400, 87501, 87502, 87503, 86710, 87275, 87276, 87631, 87632, 87633, 87254
BCBSNC may request medical records for determination of medical necessity. When medical records are requested, letters of support and/or explanation are often useful, but are not sufficient documentation unless all specific information needed to make a medical necessity determination is included.

**Scientific Background and Reference Sources**


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Policy Implementation/Update Information

1/1/19  New policy developed. BCBSNC will provide coverage for diagnostic testing of influenza when it is determined to be medically necessary because the medical criteria and guidelines are met. Medical Director review 1/1/2019. Policy noticed 1/1/2019 for effective date 4/1/2019. (sk)

10/29/19 Wording in the Policy, When Covered, and/or Not Covered section(s) changed from Medical Necessity to Reimbursement language, where needed

12/10/19 Reviewed by Avalon 3rd Quarter CAB. No changes to policy. (sk)


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