

Lyme Disease Toolkit

This toolkit can be used to facilitate Lyme disease case investigations. Items in the toolkit include:

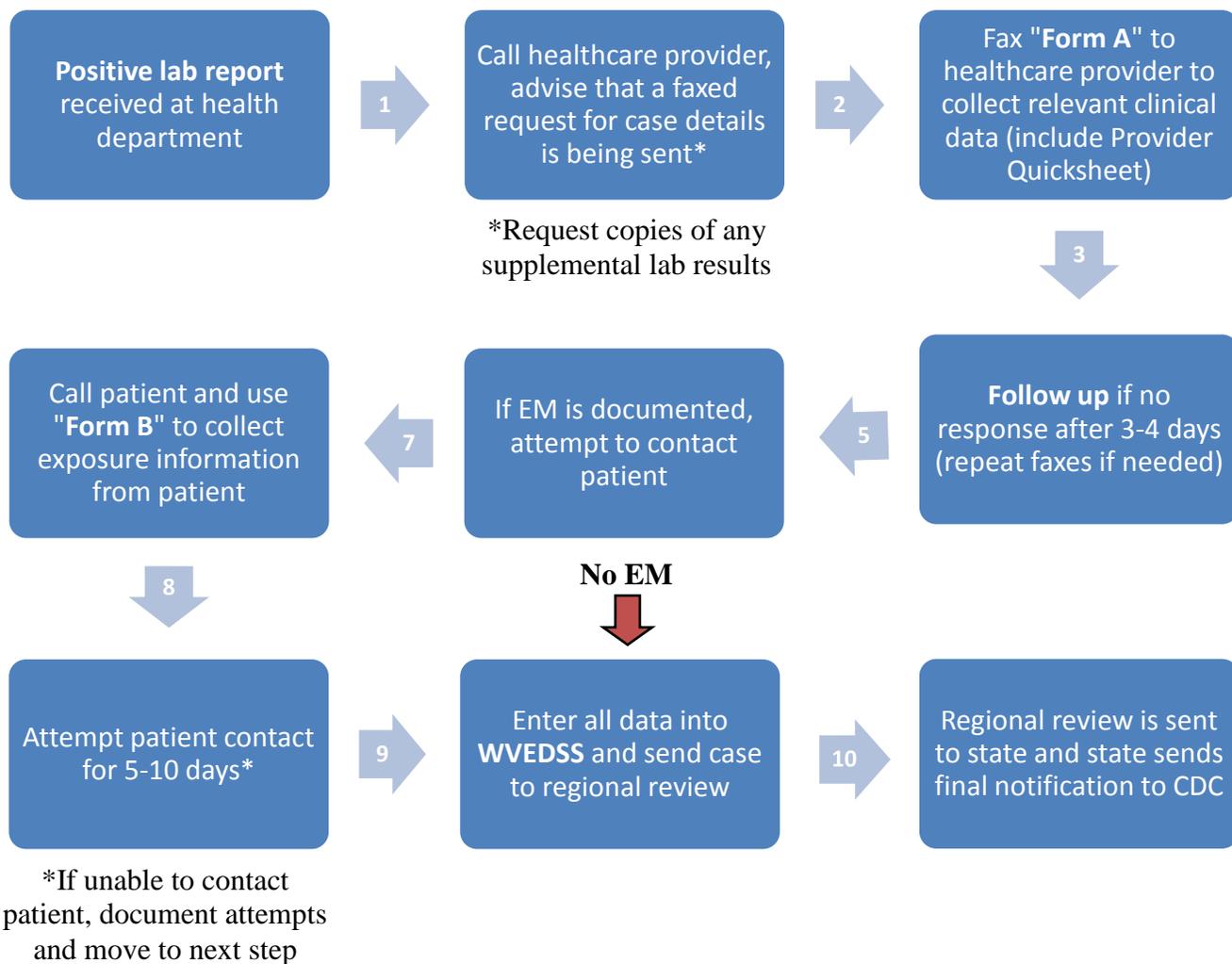
- **Case Investigation Diagram-** details the steps involved in Lyme disease case investigations
- **Form A-** used to obtain clinical information about patients from healthcare providers
- **Form B-** used to obtain exposure information from patients with EM
- **Case Ascertainment Guides-** three different guides that can assist with case assignment (all have the same information but are displayed in a different layout)
- **Interpreting IgG and IgM Western Blots-** provides information about reading Lyme disease Western blots
- **Provider Quicksheet-** provides information about Lyme disease and Lyme disease surveillance to healthcare providers

Division of Infectious Disease Epidemiology

350 Capitol Street, Room 125, Charleston, WV 25301-3715

Phone: 304.558.5358 or (800)-423-1271 Fax: 304.558.6335 (www.dide.wv.gov)

Lyme disease Case Investigation Flow Chart



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Form A: – Tool to assess clinical characteristics of Lyme disease for healthcare providers



Dear Healthcare Provider:

The _____ County Health Department has been notified of a positive laboratory report of Lyme disease for patient _____ (DOB: ____/____/____). In order to comply with state and federal infectious disease reporting requirements, we are requesting the following clinical details about this patient’s Lyme disease (LD) symptoms, if present. Please respond to the following questions and return this completed sheet via fax to (304)____ - _____ within 72 hours of receipt.

A. Date of first symptom onset (month/day/year): ____ / ____ / _____

B. Was an erythema migrans measuring at least 5 cm in diameter documented for this patient?

YES NO

C. Did patient exhibit any of the following symptoms of late-stage Lyme disease?

I. **Rheumatologic/musculoskeletal** (mark one):

- Migratory pain in joints, bone, or muscle Brief arthritis attacks
- Prolonged arthritis Chronic arthritis
- No rheumatologic/musculoskeletal symptoms associated with LD were observed

II. **Neurologic** (mark all that apply):

- Meningitis Bell’s palsy Cranial neuritis
- Radiculoneuritis Encephalopathy Polyneuropathy
- Leukoencephalitis No neurologic symptoms associated with LD were observed

III. **Cardiovascular** (mark one):

- Myopericarditis Pancarditis Atrioventricular block
- No cardiac symptoms associated with LD were observed

D. Was this patient diagnosed with Lyme disease? YES NO

E. Why was the Lyme disease test ordered for this patient? Mark all that apply.

- Patient had clinical evidence of infection Patient requested Lyme testing
- Patient had exposure to tick habitats Other: _____

F. Was an antibiotic prescribed? YES NO

If yes, indicate type of antibiotic and # of days: _____

Comments: _____

Thank you for your cooperation.

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**Form B: - tool to assess patient exposure
(call patients with EM)**



**** THIS STEP SHOULD BE LIMITED TO CASES WITH DOCUMENTED EM BY HEALTHCARE PROVIDER**

Optional Script

“Hello, this is (**your name**), a (**nurse/sanitarian**) from (**county name**) County Health Department. I am following up on a recent report our department received about (**case name**)’s Lyme disease illness. In order for us to better understand the risk for Lyme disease in our county, I would like to ask you a few questions about the time leading up to your illness.”

A. One what date were symptoms first noticed? (month/day/year): ____/____/_____

B. Did you travel outside of your home county within 30 days of the start of your symptoms?
 YES NO

a. If yes, report travel information:

Destination (city, state)	Date of departure (month/day/year)	Date of return (month/day/year)

C. Did you recall finding any ticks on your body during the 30 days prior to the start of your symptoms?
 YES NO

b. If yes, enter tick bite details:

Patient’s location when tick found (city, state)	Was tick attached? (yes/no/unknown)	Date tick found (month/day/year)

Thank the patient, and end the call.

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Lyme Disease Case Ascertainment Guide A (REVISED 2013 VERSION)

Legend:

Clinical Lab Epi

Scenario 1

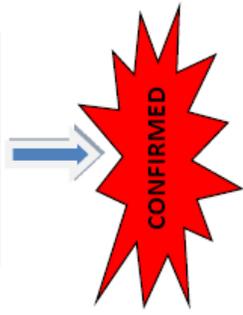
Physician-diagnosed EM¹ at least 5 cm in diameter

AND

(+) or equivocal EIA or IFA² - AND - (+) IgM WB³ ≤30 days from onset date
 OR
 (+) IgG WB
 OR
 (+) *Borrelia burgdorferi* culture
 OR
 CSF antibody positive for *B. burgdorferi* by EIA or IFA when the titer is higher than it was in serum

OR

(+) "Exposure"⁴



Scenario 2

1 or more "late manifestations" of Lyme disease:
Musculoskeletal: recurrent, brief attacks of joint swelling, followed by chronic arthritis
Nervous system: meningitis, cranial neuritis, facial palsy, radiculoneuritis.
Cardiovascular: 2nd - 3rd grade atrioventricular conduction defects that resolve in days to weeks

AND

(+) EIA or equivocal IFA AND (+) IgM WB ≤30 days from onset date
 OR
 (+) IgG WB
 OR
 (+) *Borrelia burgdorferi* culture
 OR
 CSF antibody positive for *B. burgdorferi* by EIA or IFA when the titer is higher than it was in serum



Scenario 3

"Physician-diagnosed" Lyme disease lacking clinical criteria of a confirmed case

AND

(+) or equivocal EIA or IFA² - AND - (+) IgM WB³ ≤30 days from onset date
 OR
 (+) IgG WB
 OR
 (+) *Borrelia burgdorferi* culture
 OR
 CSF antibody positive for *B. burgdorferi* by EIA or IFA when the titer is higher than it was in serum



Scenario 4

Physician-diagnosed EM¹ at least 5 cm in diameter

AND

NO "Exposure"⁴

AND

NO lab evidence

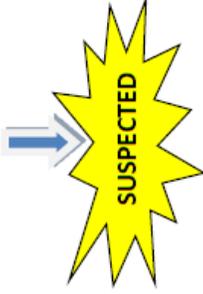


Scenario 5

(+) or equivocal EIA or IFA² AND (+) IgM WB³ ≤30 days from onset date
 OR
 (+) IgG WB
 OR
 (+) *Borrelia burgdorferi* culture
 OR
 CSF antibody positive for *B. burgdorferi* by EIA or IFA when the titer is higher than it was in serum

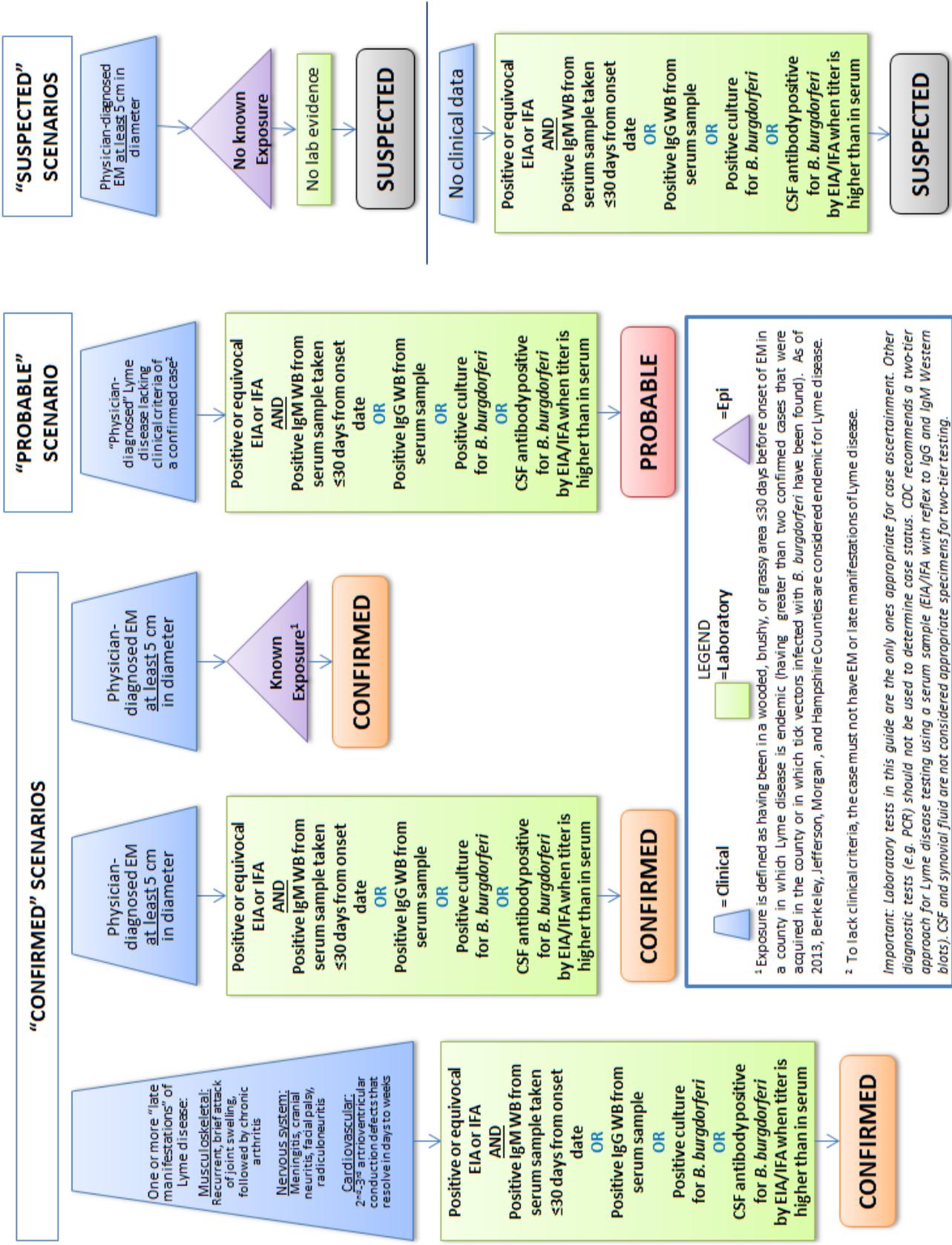
AND

NO clinical data

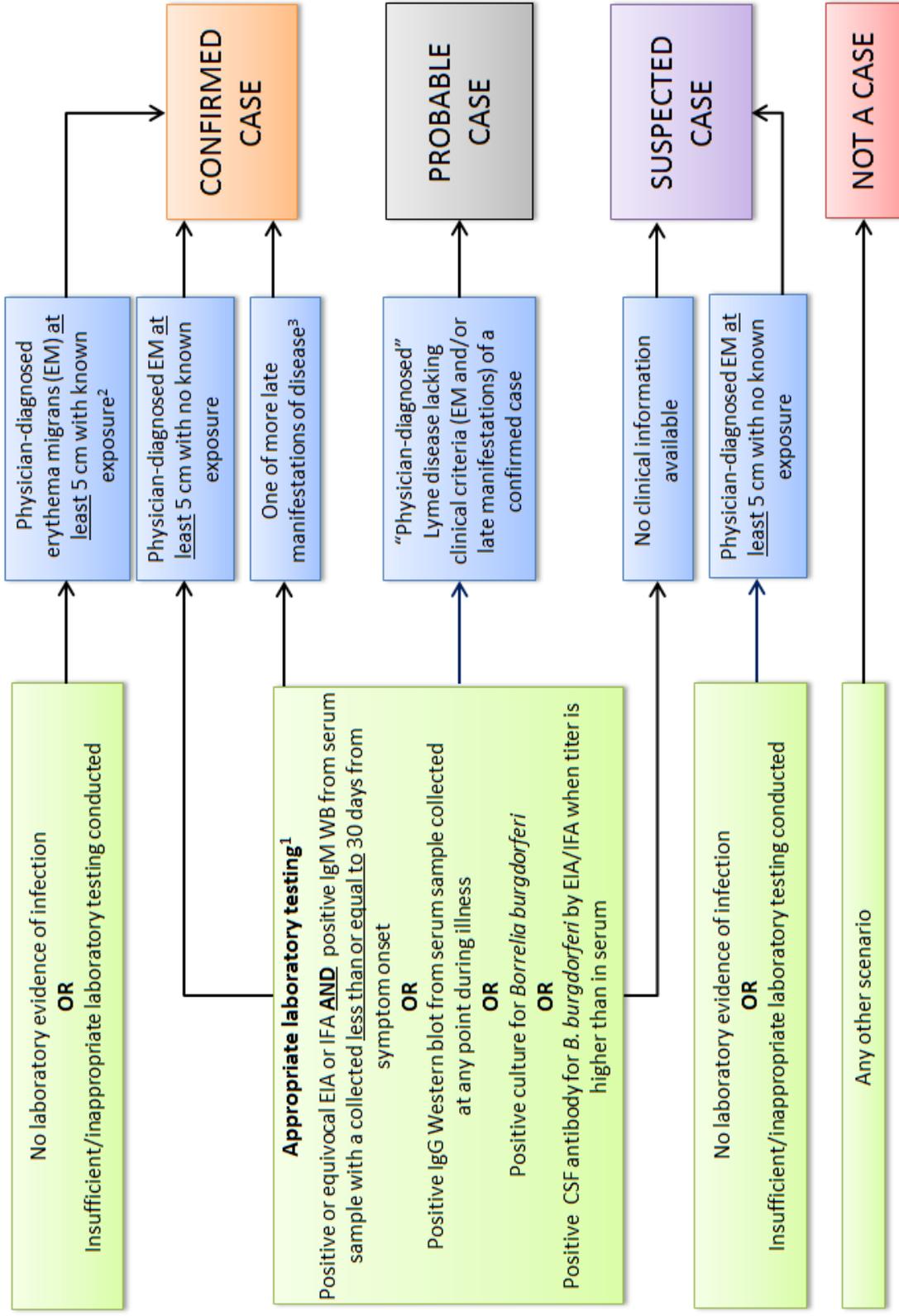


¹EM: Erythema migrans
²EIA or IFA: Enzyme immunoassay, or indirect fluorescent assay
³WB: Western blot
⁴Exposure: CDC defines exposure as "having been (≤30 days before onset of EM) in wooded, brushy, or grassy areas...in a county in which Lyme disease is endemic. A history of tick bite is not required." Additionally, CDC defines endemicity as "A county in which...at least 2 confirmed cases have been acquired in the county or in which established populations of a known tick vector are infected with *B. burgdorferi*." Endemic counties in West Virginia are currently defined as: Berkeley, Hampshire, Jefferson, and Morgan Counties.

Lyme Disease Case Ascertainment Guide B (2013 Version)



Lyme Disease Case Ascertainment Guide C (2013 Version)



¹Laboratory tests in this guide are the only ones appropriate for case ascertainment. Other diagnostic tests (e.g., PCR) should not be used to determine case status. CDC recommends a two-tier approach for Lyme disease testing using serum (EIA/IFA with reflex to Western blot), CSF, and synovial fluid are not considered appropriate specimens for two-tier testing.

²Exposure is defined as having been in a wooded, brushy, or grassy area less than 30 days before onset of EM in a county where Lyme disease is endemic (having greater than 2 confirmed cases that were acquired in the county or in which tick vectors infected with *B. burgdorferi* have been found). As of 2013, Berkeley, Hampshire, Jefferson, and Morgan Counties are considered endemic for Lyme disease.

³Late manifestations include musculoskeletal (recurrent, brief attacks of joint swelling followed by chronic arthritis), nervous system (meningitis, cranial neuritis, facial palsy, and radiculoneuritis), and cardiovascular (2nd-3rd atrioventricular conduction defects that resolve in days to weeks) signs of disease.

Interpreting IgG and IgM Western Blots

IgM Western Blot

An IgM immunoblot should be considered positive if **two of the following three bands**

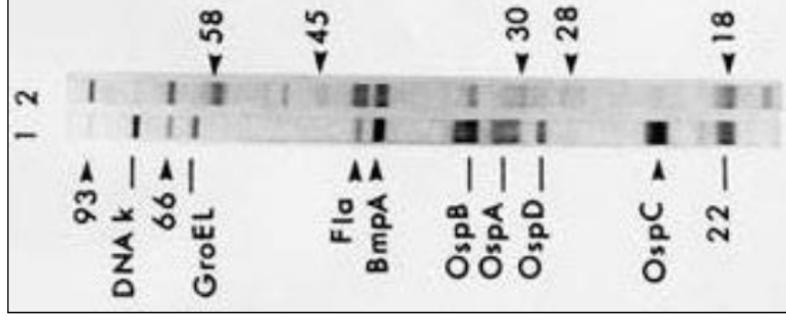
are present:

- 24 kDa (OspC) band
- 39 kDa (BmpA) band
- 41 kDa (Fla) band

IgG Western Blot

An IgG immunoblot should be considered positive if **five of the following ten bands** are present:

- 18 kDa band
- 21 kDa (OspC) band
- 28 kDa band
- 30 kDa band
- 39 kDa (BmpA) band
- 41 kDa (Fla) band
- 58 kDa band
- 66 kDa band
- 93 kDa band



Sample Western blot

Visit the CDC's Lyme disease testing page for more information:
<http://www.cdc.gov/lyme/diagnosis/testing/index.html>

April 2013

PROVIDER QUICKSHEET: LYME DISEASE



IMPORTANT INFORMATION ABOUT SELECTING LABORATORY TESTS

1. CDC recommends a two-tier approach for testing serological specimens: IFA/EIA antibody screen, followed by IgM and IgG western blot if IFA/EIA is positive or equivocal.
2. Other CDC recommended diagnostic assays for Lyme disease include:
 - a. A positive culture for *Borrelia burgdorferi*
 - b. Single-tier IgG western blot
 - c. CSF antibody positive for *B. burgdorferi* by EIA or IFA, when the titer is higher than it was in serum

THE USE OF SINGLE-TIER IGM WESTERN BLOT TESTING IS NOT RECOMMENDED

RESOURCES FOR PATIENTS

- CDC website has several brochures and info sheets for patients: <http://www.cdc.gov/lyme/>.
- MedLine Plus website contains several categories of information from credible sources: <http://www.nlm.nih.gov/medlineplus/lymedisease.html>.

RESOURCES FOR HEALTHCARE PROVIDERS

- CDC has a “Resources for Clinicians” page available at: <http://www.cdc.gov/lyme/healthcare/clinicians.html>
- Information about two-tier testing for Lyme disease is available at: <http://www.cdc.gov/lyme/diagnostictesting/LabTest/TwoStep/index.html>
- The Infectious Disease Society of America (IDSA) has developed a FREE online CME case study about the diagnosis and management of Lyme disease available at: <http://lymecourse.idsociety.org/>
- The American Academy of Family Physicians (AAFP) provides a diagnostic guideline to aid healthcare providers in diagnosing Lyme disease available at: <http://www.aafp.org/afp/2005/0715/p297.pdf>
- The West Virginia Department of Health and Resources provides information about the state’s Lyme disease surveillance system as well as links to useful resources available at: <http://www.dhhr.wv.gov/oeps/disease/Zoonosis/Tick/Pages/Lyme.aspx>

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