ASSAYS TO SUPPORT

HIV Treatment Decisions

Monogram BIOSCIENCES
LabCorp Specialty Testing Group

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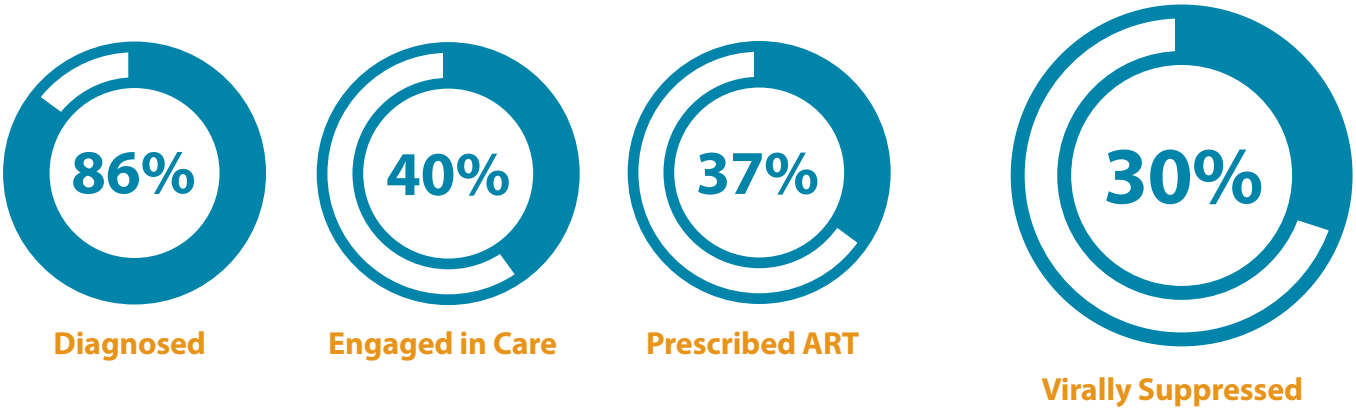
Human Immunodeficiency Virus (HIV)

HIV and AIDS remain a persistent problem for the United States and countries around the world. Efforts to identify HIV-positive individuals have improved, yet many remain undiagnosed. Of those diagnosed, fewer still are engaged in treatment, and of those prescribed antiretroviral therapy (ART), only 30% are virally suppressed.

Of the 1.2 million Americans living with HIV, only 30% are virally suppressed[1]



Newly diagnosed, as well as chronic HIV infected patients, now have the advantage of multiple treatment options and advanced laboratory technologies to help control their disease. LabCorp, with Monogram Biosciences, offer a comprehensive menu to help manage all types of patients affected by HIV.

Resistance Assays Most Commonly Used in HIV-1 Management

GenoSure Archive®

GenoSure Archive provides valuable information when considering regimen switches in virologically suppressed patients. Increasingly common today is the need for "fine tuning" regimens while maintaining a patient's viral suppression. Reasons for this include:

- Side effects
- Adverse events
- Regimen simplification
- Drug-drug interactions
- Concern for long-term toxicities
- Regimen intolerance

GenoSure PRIme® provides a complete picture of resistance to PIs, NRTIs, NNRTIs, and INIs to aid in selecting the optimal therapy for each patient

For Treatment-naïve Patients

Department of Health and Human Services (DHHS) guidelines recommend HIV drug-resistance testing for persons with HIV at entry into care to guide selection of the initial antiretroviral therapy (ART) regimen. When transmitted integrase inhibitor (INSTI) resistance is a concern, ensure resistance testing includes INSTI genotype testing.[2]

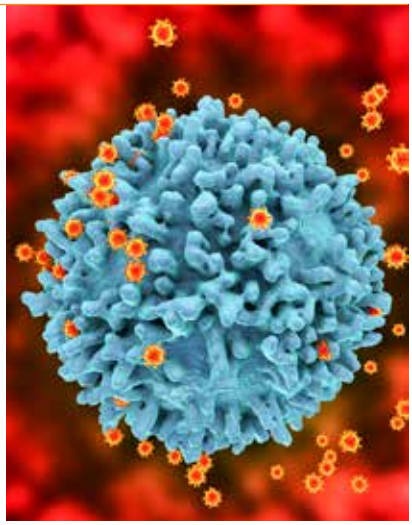
For Treatment-experienced Patients

The DHHS guidelines recommend genotypic testing as the preferred resistance test for patients experiencing suboptimal virologic response or virologic failure while on first- or second-line antiretroviral therapy.[2]

PhenoSense GT® Plus Integrase and PhenoSense GT®: Combined Phenotypic and Genotypic Testing

The DHHS Guidelines note the following: "Addition of phenotypic to genotypic testing is generally preferred for persons with known or suspected complex drug-resistance mutation patterns".[2] Together, complementary information from phenotypic and genotypic data provides a more comprehensive picture of your patient's ARV options compared to either technology alone.[3]

- Phenotyping is a direct, quantitative measure of drug susceptibility based on differences in ARV drug concentration required to inhibit viral replication. It can also provide drug resensitization and hypersusceptibility information.[4]
- Genotyping identifies a comprehensive list of mutations, including key resistance-associated mutations, and can identify mixtures of wild-type and drug-resistant viruses.



Other Tests Related to HIV Management

Test No	Test Name	Use/Additional Information
006926	HLA B*57:01, Abacavir Hypersensitivity HLA Association	The presence of the HLA-B*57:01 allele increases the susceptibility to abacavir hypersensitivity in several populations studied.
322744	Hepatitis Panel, Acute	Hepatitis A antibody, IgM; hepatitis B core antibody, IgM; hepatitis B surface antigen; hepatitis C virus antibody.
037215	Hepatitis B Virus (HBV) Evaluation Profile	Determine HBV infection status.
144050	Hepatitis C Virus (HCV) Antibody With Reflex to Quantitative Real-time PCR	Diagnosis of active hepatitis C virus infection.
182873	QuantiFERON®-TB Gold	The QuantiFERON®-TB Gold test is an in vitro assay to aid in the diagnosis of both latent and active infection with *Mycobacterium tuberculosis*.
505271	CD4:CD8 Ratio Profile	In HIV-1 seropositive patients, enumeration of CD4 T cells may be used for prognostic purposes and to monitor disease progression and antiretroviral therapy.
550420	Human Immunodeficiency Virus 1 (HIV-1), Quantitative, Real-time PCR (Graphical)	Detect and quantitate HIV-1 in plasma.

CONFIDENT TREATMENT DECISIONS START HERE

	Test Name	Clinical Utility
Newly Diagnosed Treatment Naïve 1st and 2nd failures	**GenoSure PRIme®**	• Genotypic assay to detect resistance in HIV-1 to four classes of commonly prescribed antiretroviral drugs: NRT • The DHHS guidelines recommend genotypic testing as the preferred resistance testing to guide therapy in an changing regimens in patients experiencing virologic failure.[2]
	GenoSure® MG	• Genotypic assay to detect resistance in HIV-1 to three classes of commonly prescribed antiretroviral drugs: NR • The DHHS Panel on Antiretroviral Guidelines for Adults and Adolescents recommends genotypic testing as th antiretroviral-naïve patients, and specifically recommends genotyping for all pregnant women prior to initiati • The guidelines also recommend resistance testing when changing regimens in patients experiencing virologi
Complex Known or Suspected Drug Resistance	**PhenoSense®**	• Determines phenotypic resistance to NRTIs, NNRTIs, PIs. Viral replication capacity is also included. • The DHHS guidelines note that the addition of phenotypic to genotypic testing "is generally preferred for tho drug-resistance mutation patterns."[2]
	PhenoSense GT®	• Includes both a genotypic and phenotypic assay for nucleoside reverse transcriptase inhibitors (NRTIs), nonnu (NNRTIs), and protease Inhibitors (PIs). • The DHHS guidelines note that the addition of phenotypic to genotypic testing "is generally preferred for tho drug-resistance mutation patterns"[2]
	PhenoSense GT® *Plus* Integrase	• Includes both a genotypic and phenotypic assay for NRTIs, NNRTIs, PIs, and integrase inhibitors (INIs). • The DHHS guidelines note that the addition of phenotypic to genotypic testing "is generally preferred for tho drug-resistance mutation patterns"[2]
Virologically Suppressed Undetectable Viral Load	**GenoSure Archive®**	• Designed to provide HIV-1 antiretroviral (ARV) drug resistance data when a patient's viral load is suppressed c • Provides susceptibility assessments for PIs, NRTIs, NNRTIs, and INIs in cell-associated viral DNA.
	Trofile® DNA	• Detects HIV-1 coreceptor tropism in patients with undetectable viral load; used to determine eligibility for CC • DHHS guidelines note that "coreceptor usage can be determined from proviral DNA" in patients with undetec • DHHS guidelines note that "a coreceptor tropism assay should be performed whenever the use of a CCR5 anta • The guidelines recommend phenotyping as generally preferred for coreceptor tropism screening.[2]
Additional Assays	**GenoSure® Integrase**	• Genotypic assay to detect resistance of HIV-1 to integrase inhibitors • DHHS guidelines note that in ART-naïve patients in whom transmitted integrase inihbitor (INSTI) resistance is supplement standard genotypic resistance (NRTIs, NNRTIs, PIs) testing.[2] • The guidelines also note that in patients failing INSTI regimens, genotyping can help determine whether to inclu
	PhenoSense Integrase®	• A phenotypic resistance test used to determine the susceptibility of a patient's HIV to integrase inhibitors. Int preventing the virus from integrating into the host cell's DNA.
	Trofile®	• Detects HIV-1 coreceptor tropism; used to determine eligibility for CCR5 antagonist therapy such as maraviro • DHHS guidelines note that "a coreceptor tropism assay should be performed whenever the use of a CCR5 anta • The guidelines also note that this testing should also be considered for patients "who exhibit virologic failure • The guidelines recommend phenotyping as generally preferred for coreceptor tropism screening.[2]
	Trofile® Select	• Trofile® Select allows for the ordering of HIV-1 coreceptor tropism status to be completed using the appropria results of an initial prescreening viral assessment • The coreceptor tropism status may be used to determine eligibility for CCR5 antagonist therapy, such as mara

For additional test information, including specimen requirements, CPT coding and RUO/IUO status, consult the Online Test Menu at www.LabCorp.com.

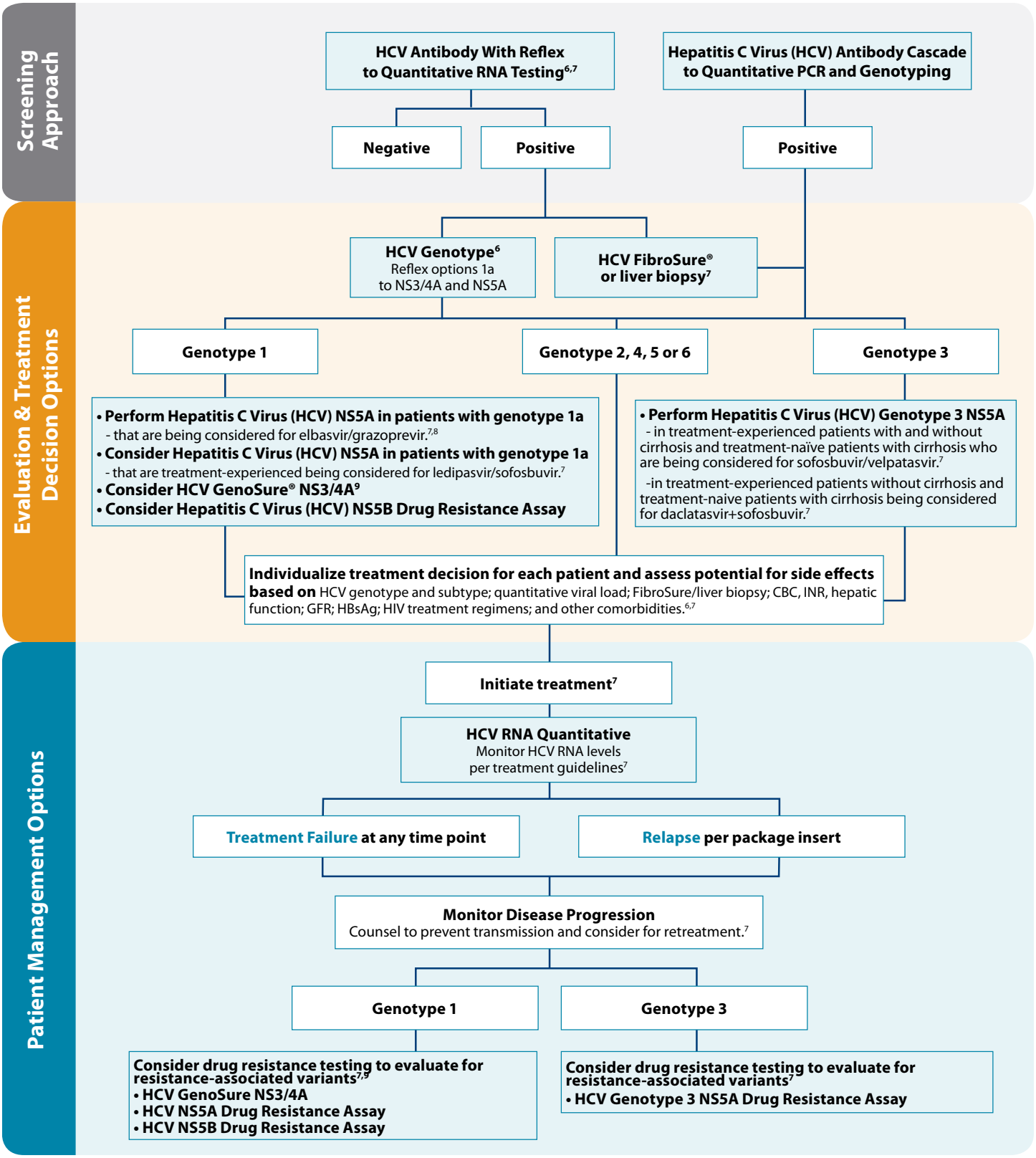
LabCorp's HIV resistance and specialty assays offer comprehensive and accurate information.

	Test Number	Viral Load Requirement	Specimen Requirement
TIs, NNRTIs, PIs, and INIs ntiretroviral-naïve patients, as well as when	551700 (MGRM-P5000)	≥ 500 copies/mL plasma	Collect specimen in two lavender-top (EDTA) or PPT tubes; centrifuge within 6 hours, transfer 5 mL plasma to screw-cap transport tube, and freeze. Ship **frozen.**
RTIs, NNRTIs, and PIs e preferred resistance testing to guide therapy in on of therapy.[2] c failure.[2]	551697 (MGRM-G5000)	≥ 500 copies/mL plasma	Collect specimen in two lavender-top (EDTA), PPT, or yellow-top (ACD) tubes; centrifuge within 2 hours, transfer 5 mL plasma to screw-cap transport tube, and freeze. Ship **frozen.**
se with known or suspected complex	551800 (MGRM-V3200)	≥ 500 copies/mL plasma	Collect specimen in two lavender-top (EDTA) or PPT tubes; centrifuge within 6 hours, transfer 3 mL plasma to screw-cap transport tube, and freeze. Ship **frozen.**
ucleoside reverse transcriptase Inhibitors se with known or suspected complex	551690 (MGRM-V7000)	≥ 500 copies/mL plasma	Collect specimen in two lavender-top (EDTA) or PPT tubes; centrifuge within 6 hours, transfer 3 mL plasma to screw-cap transport tube, and freeze. Ship **frozen.**
se with known or suspected complex	551920 (MGRM-M7000)	≥ 500 copies/mL plasma	Collect specimen in three lavender-top (EDTA) or PPT tubes; centrifuge within 6 hours, transfer 5mL plasma to screw-cap transport tube, and freeze. Ship **frozen.**
r too low for standard resistance testing	551776 (MGRM-R6000)	Undetectable viral load	Collect whole blood specimen in 4mL lavender top (EDTA) top tube. Do not centrifuge. Ship **frozen.**
R5 antagonist therapy such as maraviroc table viral load.[2] agonist is being considered."[2]	829670 (MGRM-E3600)	Undetectable viral load	Collect whole blood specimen in 4mL lavender top (EDTA) top tube. Do not centrifuge. Ship **frozen.**
a concern, this testing can be used to ude drugs from this class in subsequent regimens.[2]	551871	≥ 500 copies/mL plasma	Collect specimen in two lavender-top (EDTA), yellow-top (ACD), or PPT tubes; centrifuge within 6 hours, transfer 5 mL plasma to a screw-cap transport tube, and freeze. Ship **frozen.**
egrase inhibitors block HIV replication by	550230 (MGRM-S3200)	≥ 500 copies/mL plasma	Collect specimen in two lavender-top (EDTA) or PPT tubes; centrifuge within 6 hours, transfer 3 mL plasma to screw-cap transport tube, and freeze. Ship **frozen.**
c agonist is being considered."[2] on a CCR5 antagonist."[2]	553100 (MGRM-E3100)	≥ 1,000 copies/mL plasma	Collect specimen in two lavender-top (EDTA) or PPT tubes; centrifuge within 6 hours, transfer 3 mL plasma to screw-cap transport tube, and freeze. Ship **frozen.**
te assay, Trofile or Trofile DNA, based on the viroc (Selzentry®).	553355 (MGRM-E3000T)	Use when viral load is unknown	**Both** frozen plasma **and** frozen whole blood are required. Draw **four** lavender-top (EDTA) tubes. PLASMA: Centrifuge three tubes within six hours of collection. Transfer plasma to screw-cap tubes and freeze. Ship **frozen.** WHOLE BLOOD: Do **not** centrifuge. Freeze tube immediately after draw. Ship **frozen.**

HIV/HCV Co-infection

Hepatitis C

According to the CDC, about one quarter of HIV-infected persons in the United States are also infected with Hepatitis C virus (HCV). [5] HCV is one of the most important causes of chronic liver disease in the United States and HCV infection progresses more rapidly to liver damage in HIV-infected persons.[5] HCV infection may also impact the course and management of HIV infection.[5] The Department of Health and Human Services (DHHS) guidelines recommend that all HIV-infected persons be screened for HCV infection.[2]



PrEP (pre-exposure prophylaxis)

Pre-exposure prophylaxis (PrEP) reduces the chance of becoming infected with HIV for individuals at risk.[10] High-risk individuals following a PrEP regimen should be evaluated per PrEP guidelines.

Laboratory Tests to Manage Patients on PrEP[10,11]

Test No.	Test Name
Initial PrEP Screening	
Confirmation of HIV negative status	
083935	Human Immunodeficiency Virus 1/O/2 (HIV-1/O/2) Antigen/Antibody (Fourth Generation) Preliminary Test With Cascade Reflex to Supplementary Testing
Evaluation for HBV	
037215	Hepatitis B Virus (HBV) Evaluation Profile
PrEP Monitoring	
Monitor renal function	
003004	Creatinine Clearance
Routine testing for HIV	
083935	Human Immunodeficiency Virus 1/O/2 (HIV-1/O/2) Antigen/Antibody (Fourth Generation) Preliminary Test With Cascade Reflex to Supplementary Testing
Routine testing for other STIs	
183194	*Chlamydia/Gonococcus*, NAA (urine)
188698	*Chlamydia/Gonococcus*, Pharyngeal Swab, NAA
188672	*Chlamydia/Gonococcus*, Rectal Swab, NAA
082345	*Treponema pallidum* (Syphilis) Screening Cascade

Visit the online Test Menu at www.LabCorp.com for full test information, including CPT codes and specimen collection requirements.

Count on LabCorp

as your single-source solution for HIV diagnostics

Unsurpassed Scientific Expertise

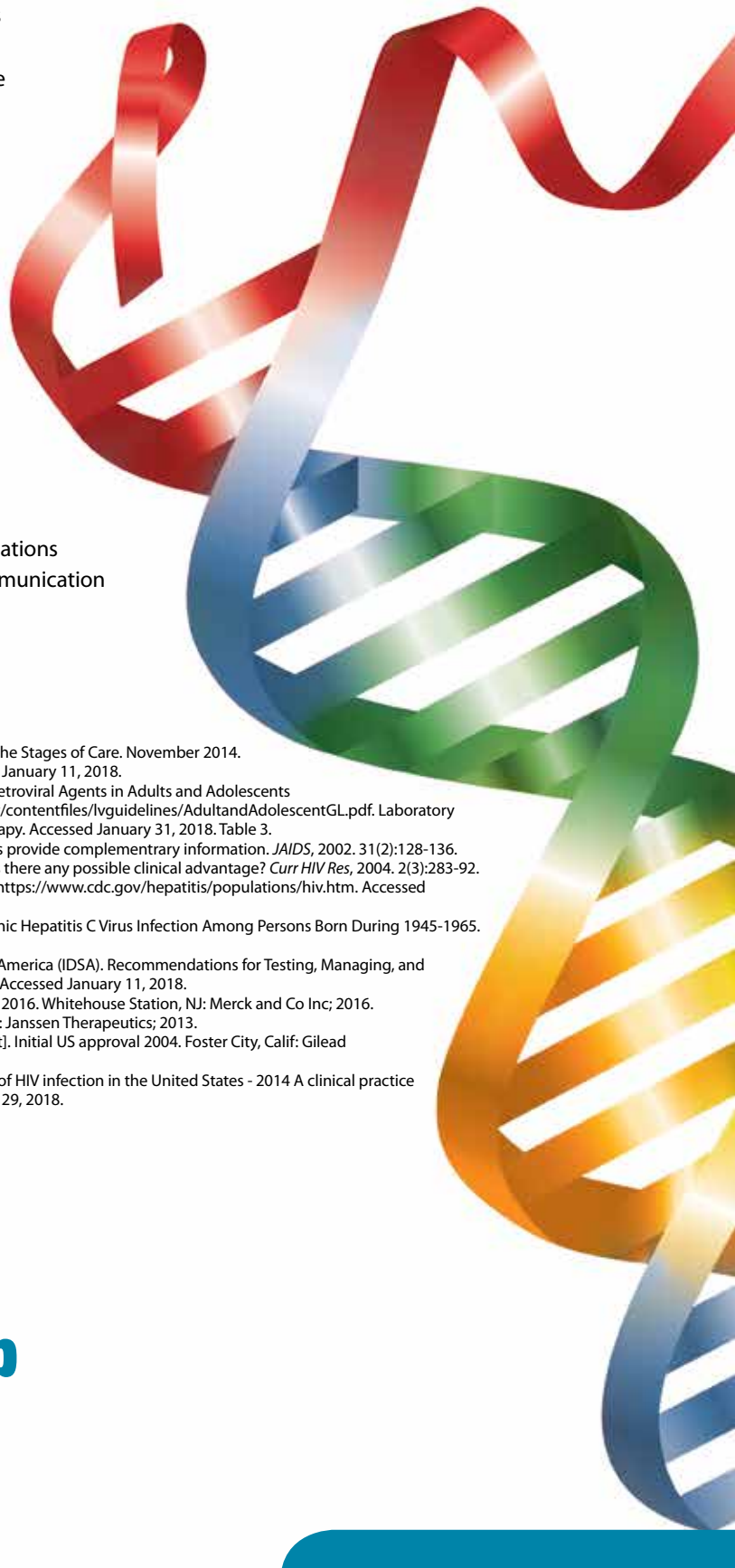
- With the added strengths of Monogram Biosciences®— an acknowledged world leader in HIV resistance and tropism testing—LabCorp now brings an incomparable level of scientific expertise to HIV diagnostics.
- Our uniquely qualified team includes renowned MD- and PhD- level scientists committed to advancing HIV diagnostics and the success of individualized treatment.
- Monogram's experienced medical affairs professionals are available for consultations and educational programs.

A History of Vision and Innovation

- Pioneers in polymerase chain reaction (PCR) and molecular diagnostics
- First-to-market companion diagnostics for integrase inhibitors, fusion inhibitors (enfuvirtide), and CCR5 antagonists (maraviroc)
- Ongoing collaborations with leading pharmaceutical companies to help bring additional therapeutic innovations to market

Superior Service every step of the way

- A committed staff and a national infrastructure of more than 1,700 patient service centers
- Connectivity solutions ranging from easy-to-use Web-based applications to sophisticated integrations that allow efficient and effective communication
- Dedicated infectious disease client services
  - Center for Esoteric Testing - 800-788-9223
  - Monogram Biosciences - 800-777-0177



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