HOLOGIC®
The Science of Sure

With mRNA-based HPV testing,

the result comes straight from the messenger.

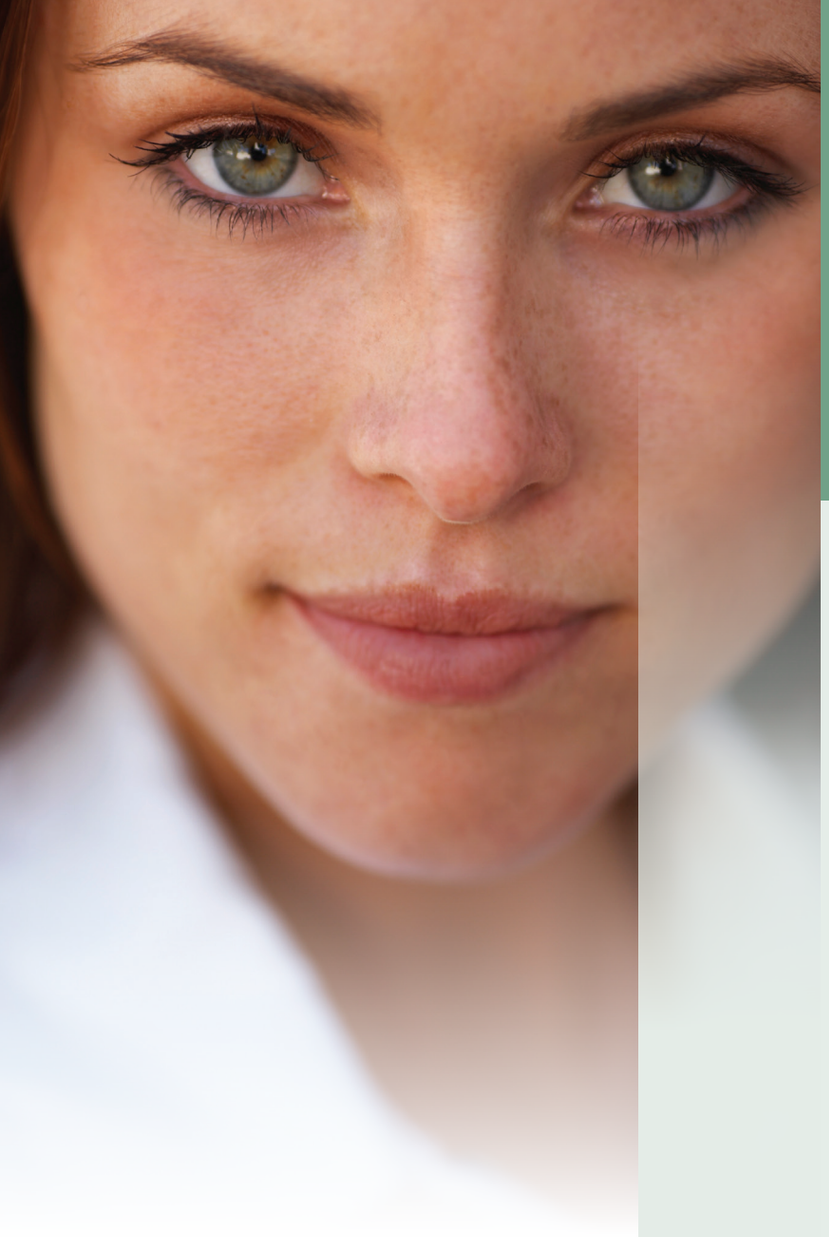
The Aptima HPV Assay:
Identifying the presence and activity of high-risk HPV infections.

The Aptima HPV 16 18/45 Genotype Assay:
The next-generation genotype test.

Worth it.

Aptima® HPV Assay

Aptima® HPV 16 18/45 Genotype Assay



The Aptima® HPV assay targets E6/E7 mRNA.

Identifies high-risk HPV infections that are present and active.

E6 E7

Nearly all sexually active men and women will have an HPV infection at some point in their lives. Very few will go on to develop cancer.[2]

The Aptima HPV assay targets high-risk HPV mRNA.[3]

Studies have shown mRNA identifies the presence and activity of a high-risk HPV infection.[3,4]

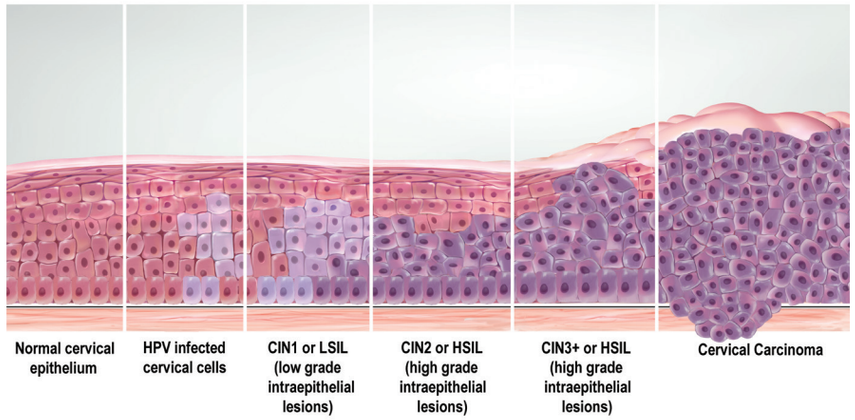
HPV DNA tests only identify the presence of any of the 14 high-risk HPV types.

"The optimal screening strategy should identify those cervical cancer precursors likely to progress to invasive cancers (maximizing the benefits of screening) and avoid the detection and unnecessary treatment of transient HPV infection and its associated benign lesions that are not destined to become cancerous (minimizing the potential harms of screening)."

— Saslow, et al.[1]

E6/E7 mRNA expression is indicative of the HPV infections most likely to lead to disease.[3,4]

mRNA and Cervical Disease



Because HPV DNA levels may decrease as infections progress toward cancer, some HPV DNA tests may provide false-negative results in more than 10% of the most severe cervical disease cases.[5]

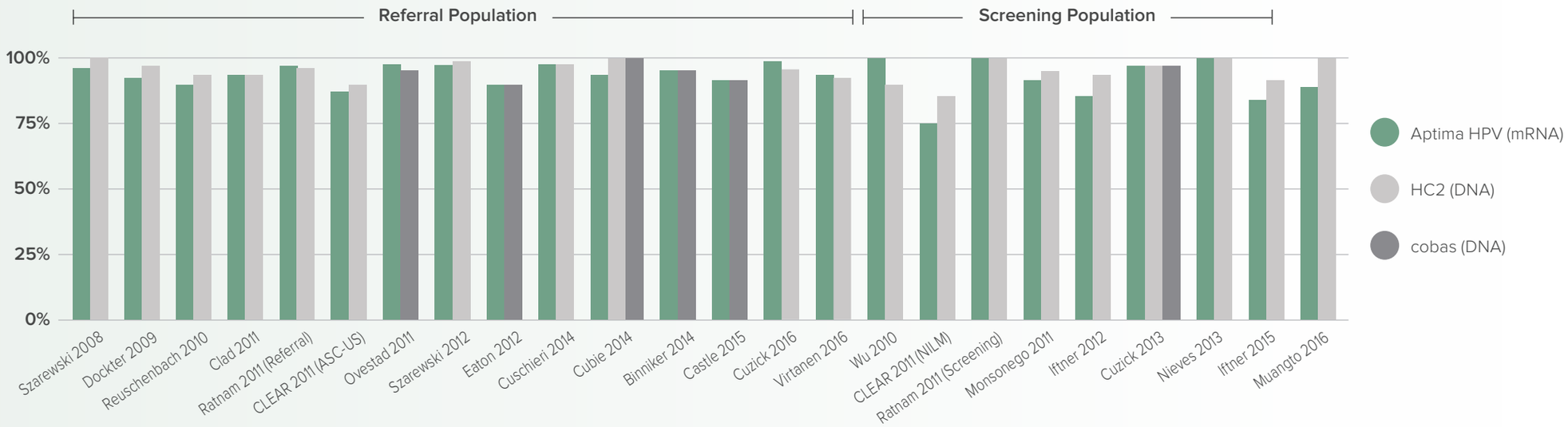
Maximizing the Benefits

With intervals between recommended screenings for cervical cancer extended, identifying those patients at risk becomes increasingly important. Excellent sensitivity means minimizing false-negative test results. The Aptima HPV assay, which targets mRNA, has shown the same excellent sensitivity as DNA-based tests:

The Aptima HPV assay provides the same excellent sensitivity you've come to expect from DNA-based tests.

Sensitivity†

Clinical Sensitivity for ≥ CIN3[6-27]



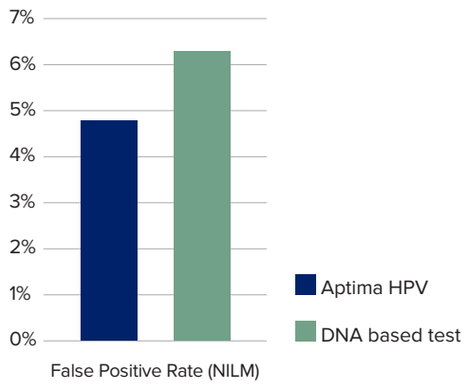
*Clinical sensitivity for ≥ CIN2

†This chart is a representation of clinical data from multiple published sources. The clinical studies represented within these sources were conducted using different study designs with various assays.

While **Minimizing** Potential Harms

Minimizing false-positives helps clinicians target the right patients for colposcopy. In the NILM arm of the CLEAR trial, the Aptima HPV assay showed 24%‡ fewer false-positive test results compared to a DNA-based test.[11]

Fewer False-Positive Results[11‡]



‡The graph above represents data adapted from the Aptima HPV Assay Package Insert Table 13.

Aptima® HPV Assay Showed:

24% fewer false-positive test results compared to a DNA-based test.[11]

- Minimizing difficult patient conversations
- Minimizing the potential for over-treatment

The **Aptima® HPV 16 18/45 Genotype** Assay: The next-generation genotype test.

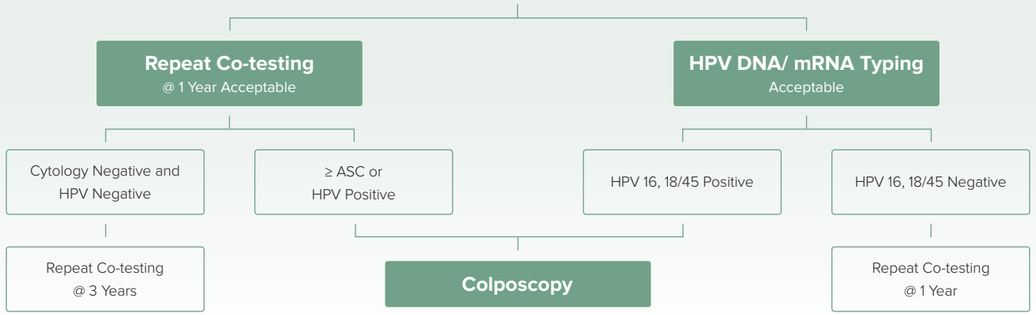
Amy D. (32 years)

- Routine screening
- No history of abnormal pap tests
- Undergoes testing with Pap+HPV together
- Screening result: normal cytology/positive hrHPV

What is the most appropriate next step?

Genotyping Algorithm

Management of Women ≥ Age 30 Who Are Cytology Negative, but HPV Positive*[27]



When Do Guidelines **Recommend Genotyping?**[27,28]

Only for women over 30 with a negative Pap and positive hrHPV test result.

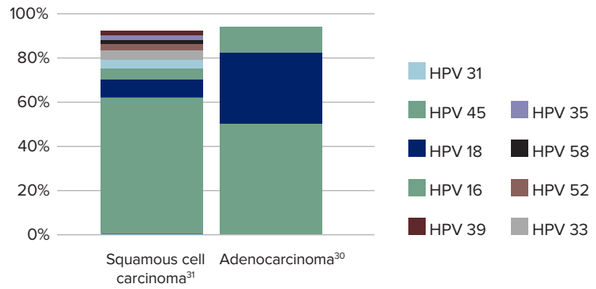
3.7%

Cytology-negative and HPV-Positive co-test results occurred in 3.7% of women older than 30 years.[29] – ACOG PB157

* Adapted from: American Society for Colposcopy and Cervical Pathology. 2012 Updated Consensus Guidelines for the Management of Abnormal Cervical Cancer Screening Test and Cancer Precursors. J Low Genit Tract Dis. 2013;17(5):S1-S27.

The **Next-generation** Genotype Test

HPV Genotypes In Invasive Cervical Cancer[30]



HPV Type 45:

- Is uncommon and only prevalent in 0.4% of women with normal cytology.[30]
- Is the third most common HPV type in invasive cervical cancer.[30-31]
- Adenocarcinoma is associated with types 16, 18 and 45.[32-33]

The Aptima HPV 16 18/45 genotype assay targets these genotypes. These genotypes identify more women at risk with minimal impact to colposcopy rates.[30]

HPV types 16, 18, and 45 are associated with up to

94%

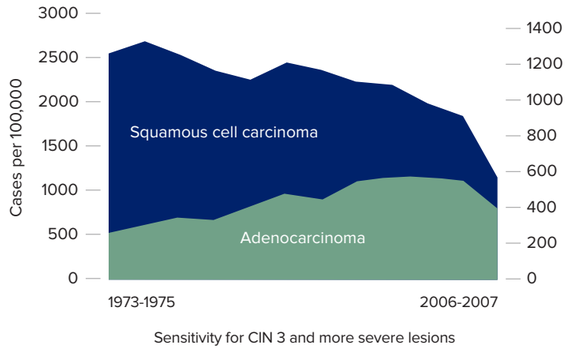
of HPV-related cervical adenocarcinomas.[30]

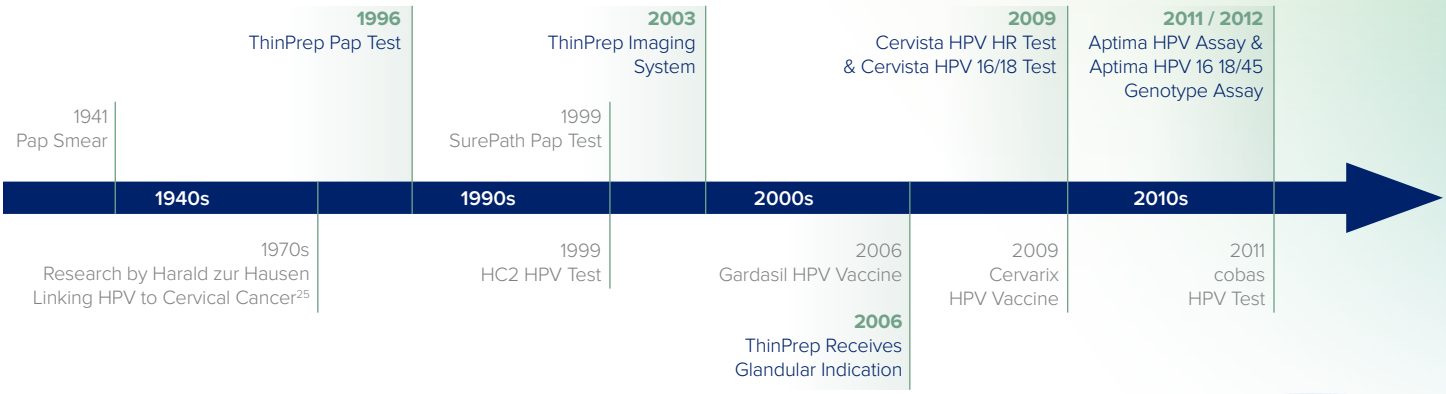
Adenocarcinoma is on the Rise[34]

Pap+HPV Together™ (co-testing) can help identify patients at risk for cervical adenocarcinoma.[34]

Between 1973 and 2007[34]:

- 61% decrease in squamous cell carcinoma
- 32% increase in adenocarcinoma





ThinPrep® Pap test:

The only liquid-based Pap test with FDA approval/ clearance for sample collection of Pap, HPV, chlamydia/gonorrhea and trichomoniasis testing from the same vial.

FDA Approved

- ThinPrep® Pap test • Cervista® HPV HR test • Cervista® HPV 16/18 test
- Aptima® HPV assay • Aptima® HPV 16 18/45 genotype assay
- cobas® HPV test • cobas® AMPLICOR CT/NG test • Hybrid Capture 2 HPV test

FDA Cleared

- Aptima Combo 2® assay • Aptima® *Trichomonas vaginalis* assay
- ProbeTec® *Chlamydia trachomatis* (CT) assay
- ProbeTec® *Neisseria gonorrhoeae* (GC) assay

References: 1. Saslow D, et al. American Cancer Society, American Society for Colposcopy and Cervical Pathology, and American Society for Clinical Pathology Screening Guidelines for the Prevention and Early Detection of Cervical Cancer. Am J Clin Pathol 2012;137:516-542. **2.** Genital HPV Infection - CDC Fact Sheet. https://www.cdc.gov/std/hpv/HPV-FS-July-2017.pdf. Published July 2017. Accessed January 15, 2018. **3.** Tinelli A, et al. HPV viral activity by mRNA HPV molecular analysis to screen the transforming infections in precancer cervical lesions. Curr Pharm Biotechnol. 2009;10(8):767-771. **4.** Cuschieri K, et al. Human Papillomavirus Type Specific DNA and RNA Persistence–Implications for Cervical Disease Progression and Monitoring. J Med Virol. 2004;73(1):65-70.doi:10.1002/jmv.20062. **5.** Wright C, et al. The ATHENA human papillomavirus study: design, methods & baseline results. Am J Obstet Gynecol.2012;206(1):46.e1-46.e11. (Study included cobas® HPV, Hybrid Capture® 2 assay). **6.** Szarewski A, et al. Comparison of predictors for highgrade cervical intraepithelial neoplasia in women with abnormal smears. Cancer Epidemiol Biomarkers Prev. 2008;17(11):3033-3042. **7.** Dockter J, et al. Clinical performance of the APTIMA HPV Assay for the detection of high-risk HPV and high-grade cervical lesions. J Clin Virol. 2009;45(S1):S55-S61. **8.** Reuschenbach M, et al. Performance of p16INK4a-cytology, HPV mRNA, and HPV DNA testing to identify high grade cervical dysplasia in women with abnormal screening results. Gynecol Oncol. 2010;119(1):98-105. **9.** Clad A, et al. Performance of the Aptima high-risk human papillomavirus mRNA assay in a referral population in comparison with Hybrid Capture 2 and cytology. J Clin Microbiol. 2011;49(3):1071- 1076. **10.** Ratnam S, et al. Aptima HPV E6/E7 mRNA test is as sensitive as Hybrid Capture 2 assay but more specific at detecting cervical precancer and cancer. J Clin Microbiol. 2011;49(2):557-564. **11.** Aptima HPV Assay [package insert]. AW-12820, Rev.002. San Diego, CA; Hologic, Inc., 2017. Table #13. **12.** Ovestad IT, et al. Comparison of different commercial methods for HPV detection in follow-up cytology after ASCUS/LSIL, prediction of CIN2-3 in follow up biopsies and spontaneous regression of CIN2-3. Gynecol Oncol. 2011;123(2):278-283. **13.** Szarewski A, et al. Comparison of seven tests for highgrade cervical intraepithelial neoplasia in women with abnormal smears: the Predictors 2 study. J Clin Microbiol. 2012; 50(6):1867-1873. **14.** Eaton, et al. Comparison of the Aptima HPV assay and the cobas HPV test in an ASC-US population [abstract]. Paper presented at: 28th International Papillomavirus Conference. November 30-December 6, 2017. San Juan, Puerto Rico. **15.** Cuschieri K, et al. Clinical performance of RNA and DNA based HPV testing in a colposcopy setting: Influence of assay target, cut off and age. J Clin Virol. 2014;59(2):104-108. **16.** Cubie HA, et al. Evaluation of commercial HPV assays in the context of post-treatment follow-up: Scottish Test of Cure Study (STOCS-H). J Clin Pathol. 2014;67(6):458-463. **17.** Binniker M, et al. Comparative evaluation of three commercial systems for the detection of high-risk human papillomavirus in cervical and vaginal ThinPrep PreservCyt samples with biopsy correlation. J Clin Microbiol. 2014;52(10):3763-8. **18.** Castle P, et al. Comparison of human papillomavirus detection by Aptima HPV and cobas HPV Tests in a population of women referred for colposcopy following detection of atypical squamous cells of undetermined significance by pap cytology. J Clin Microbiol. 2015;53(4):1277-1281. **19.** Cuzick J, et al. A comparison of different human papillomavirus tests in PreservCyt versus SurePath in a referral population—PREDICTORS 4. J Clin Virology. 2016;82:145-151. **20.** Virtanen E, et al. Performance of mRNA- and DNA-based high-risk human papillomavirus assays in detection of high-grade cervical lesions. Acta Obstetricia et Gynecologica Scandinavica. 2017; 96(1):61-68. **21.** Wu R, et al. Human papillomavirus messenger RNA assay for cervical cancer screening: the Shenzhen Cervical Cancer Screening Trial I. Intl J Gynecol Cancer. 2010;20(8):1411-1414. **22.** Monsonego J, et al. Evaluation of oncogenic human papillomavirus RNA and DNA tests with liquid-based cytology in primary cervical cancer screening: the FASE study. Intl J Cancer. 2011;129(3):691-701. **23.** Iftner, et al. Comparison of Aptima and HC2 in a routine screening trial in Germany with follow up [abstract]. Paper presented at: 28th International Papillomavirus Conference; November 30-December 6, 2012; San Juan, Puerto Rico. **24.** Cuzick J, et al. Comparing the performance of six human papillomavirus tests in a screening population. Br J Cancer. 2013;108:908-913. **25.** Nieves L, et al. Primary cervical cancer screening and triage using an mRNA human papillomavirus assay and visual inspection. Int J Gynecol Cancer. 2013;23(3):513-518. **26.** Iftner T, et al. Head-to-Head Comparison of the RNA-Based Aptima Human Papillomavirus (HPV) Assay and the DNA-Based Hybrid Capture 2 HPV Test in a Routine Screening Population of Women Aged 30 to 60 Years in Germany. J Clin Microbiol. 2015;53(8):2509-2516. **27.** American Society for Colposcopy and Cervical Pathology. 2012 Updated Consensus Guidelines for the Management of Abnormal Cervical Cancer Screening Tests and Cancer Precursors. J Low Genit Tract Dis. 2013;17(5):S1-S27. **28.** ACOG. Practice Bulletin No. 140: management of abnormal cervical cancer screening test results and cervical cancer precursors. Obstet Gynecol. 2013;122(6):1338-67. doi:10.1097/01.AOG.0000438960.31355.9e. **29.** ACOG. Practice Bulletin No. 157: Cervical Cancer Screening and Prevention. 2016;127(1):e1-e20. doi:10.1097/AOG.0000000000001263. **30.** de Sanjose S, et al. Human papillomavirus genotype attribution in invasive cervical cancer: a retrospective cross-sectional worldwide study. Lancet Oncol. 2010;11(11):1048-1056. **31.** Hopenhayn C, et al. Prevalence of Human Papillomavirus Types in Invasive Cervical Cancers From 7 US Cancer Registries Before Vaccine Introduction. J of Low Genit Tract Dis. 2014;18(3):182-9. **32.** Tjalma WA, et al. Differences in human papillomavirus type distribution in high-grade cervical intraepithelial neoplasia and invasive cervical cancer in Europe. Int. J. Cancer. 2013;132(4):854–867. **33.** Guan P, et al. Human papillomavirus types in 115,789 HPV-positive women: a meta-analysis from cervical infection to cancer. Intl. J Cancer. 2012;131(10):2349-2359. **34.** Adegoke O, et al. Cervical Cancer Trends in the United States: A 35-Year Population-Based Analysis. J Women's Health 2012;21(10):1031-1037.

Aptima® HPV Assay

Aptima® HPV 16 18/45 Genotype Assay

HealthDxS.com | hologic.com | diagnostic.solutions@hologic.com | 1.888.484.4747