Supplementary Information:

A Human Papillomavirus Whole Genome Plasmid Repository: A Resource for HPV DNA Quality Control Reagents

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Materials and Methods

HPV DNA templates for construction of CDC HPV Plasmids

Plasmids for HPV6, HPV45 and HPV51 were received from the International HPV Reference Center hosted by German Cancer Research Center (Germany). Plasmids for HPV31, HPV35, HPV56, HPV58 and HPV59 were received from the International HPV Reference Center hosted by the Karolinska Institute (Sweden). Plasmids for HPV33, HPV39, HPV66 and HPV68 were received from the Pasteur Institute (France). Plasmids for HPV11, HPV16, HPV18 and HPV52 were received from American Type Culture Collection (USA). Non-CDC HPV plasmids were propagated by transformation into *E.coli* cells, plasmids were purified using QIAprep Spin Miniprep Kit (QIAGEN, Germany), and HPV insert sequences in plasmids were verified by restriction enzyme digestion followed by Sanger sequencing with HPV type specific primers. Small DNA fragments for HPV45 (nucleotides from 1-500 bp), HPV51 (nucleotides from 1-378 bp) and HPV59 (nucleotides from 1-545 bp) were synthesized and were directly used as template in PCR reactions. The synthetic DNA fragment of HPV51 was made to replace the missing 232 bp sequence from the non-CDC HPV51/pUC13 plasmid, and the synthetic fragments for HPV45 and 59 were made so that the PCR amplicon to be assembled with other DNA fragments was larger than 300 bp. All synthetic fragments were synthesized by Twist Biosciences (USA).

Construction of CDC HPV whole genome plasmids

Maps of the HPV whole genome plasmids with DNA fragments to be assembled were first generated in silico using SnapGene software. The new HPV plasmids were designed so that none of the HPV open reading frames are interrupted. The vector backbone of pGEMT Easy-01 plasmid was split into two DNA fragments, vector-bkb-1 (67-2045 bp) and vector-bkb-2 (68-2073 bp), at a region that encodes the ampicillin resistance gene so that the assembly of two

vector backbone fragments detected through antibiotic selection of bacterial colonies could be used as a proxy for successful assembly of DNA fragments. Primers for amplification of HPV DNA fragments were designed to contain an overlapping sequence (20-50 bp) between DNA fragments to be assembled (**Table S1**). DNA fragments for HPV and vector backbones with overlapping ends were synthesized using PCR. HPV fragments were generated using non-CDC HPV plasmids or synthetic HPV fragments as a template, and pGEMT Easy-01 plasmid was used as a template to generate vector-bkb-1 and vector-bkb-2 fragments. PCR reactions were conducted in a total volume of 20 µL and contained 10 ng of template, 0.5 µM primers and 10 µL of 2x PrimeSTAR Max DNA Polymerase master mix (Takara Bio, USA). PCR reactions were carried in Proflex thermocycler (ThemoFisher Scientific, USA) and typical cyclic conditions were initial denaturation at 98°C for 2 min, 33 cycles of 98°C for 15 sec, 55°C for 15 sec, extension at 72°C (10 sec/kb), and final extension at 72°C for 5 min. Primers for creating overlapping DNA fragments required optimization of annealing temperatures as some DNA fragments are longer than standard primers and the range of GC content and T_m among primers was wide.

PCR amplicons of desired length were purified from agarose gel using the Zymoclean Gel DNA recovery kit (Zymo Research, USA) following the manufacturer's instructions. Overlapping DNA fragments were assembled in a 20 µL reaction volume containing 0.025 pmol of vector-bkb-1, 0.025 pmol of vector-bkb-2, 0.05 pmol of each HPV DNA fragment and 10 µL of 2x NEBuilder HiFi DNA assembly master mix. The assembly reaction was carried out by incubation at 50°C for 60 min followed by transformation of 0.5 to 2 µL of reaction products into Mix and Go DH5α competent cells or Max Efficiency Stbl2 cells (ThermoFisher Scientific, USA) following the manufacturer's recommendation. Bacterial colonies were screened with

colony PCR using vector specific primers (pGEMT-F and pGEMT-R) to identify clones containing empty vector and HPV type specific primers to screen for HPV positive colonies (**Table S1**). DNA from bacterial colonies were prepared by resuspending individual colonies in a lysis buffer (10 mM Tris-HCl pH 8.0, 0.1% Triton X-100) followed by incubation at 95°C for 10 min. Colony PCR reactions were conducted in a total volume of 10 µL and contained 1 µL of bacterial lysate as template, 0.5 µM primers and 10 µL of 2x GoTaq Green master mix. Colony PCR conditions include initial denaturation at 95°C for 5 min, 25 cycles of 95°C for 30 sec, 55°C for 30 sec, extension at 72°C for 30 sec, and final extension at 72°C for 10 min. Bacterial clones showing PCR amplicons with only HPV type specific primers were selected. Plasmid DNA was purified using QIAprep Spin Miniprep, verified by restriction enzyme digestion and confirmed by Sanger sequencing following standard protocols. Large scale plasmid purification of all HPV whole genome plasmids was done using ZymoPure II Plasmid Maxiprep Kit (ZymoResearch, USA) following the manufacturer's protocol. HPV plasmids were diluted in nuclease-free DNA suspension buffer (10 mM Tris-HCl pH 8.0, 10 mM EDTA; Teknova Inc, USA). All plasmid preparations had A_{260}/A_{280} and A_{260}/A_{230} values greater than 1.8 as assessed with NanoDrop, and the HPV sequence from large preparations was verified by Sanger sequencing. Plasmid concentrations were determined using Qubit Fluorometer (ThermoScientific, USA).

Table S1 List of primers used for construction of CDC HPV whole genome plasmids

DNA Fragment	Forward Primer Reverse Primer	#Primer sequence (5'-3)	DNA Template
Vector-bkb-1 (1040 bp)	1-F-AmpR 1-R-pGEMT	**CCGCTGTTGAGATCCAGTTCGATGTAACC** GTGATTAATCGAATTCCCGCGGCCG	pGEMT Easy-01
Vector-bkb-2 (2006 bp)	2-F-pGEMT 2-R-AmpR	TAGTGAATTCGCGGCCGCCTG **GGTTACATCGAACTGGATCTCAACAGCGG**	pGEMT Easy-01
Vector fragment (258 bp)	pGEMT-F pGEMT-R	GTAACGCCAGGGTTTTCCCAG CAGCTATGACCATGATTACGCCAAG	DNA from bacterial clones
HPV6-F1 (4763 bp)	HPV6-F1-F HPV6-F1-R	**CCGCGGGAATTCGATTAATCAC**GTTAATAACAATCTTGGTTTAAAAAATAGGAGGGACC **AGACACAATAGATGGATCCGAAGGGGCCACAGGCTCCAC**CACCACAG	HPV6/pUC19
HPV6-F2 (3316 bp)	HPV6-F2-F HPV6-F2-R	**GTGGAGCCTGTGGCCCCTTCGGATCCATCTATTGTGTCT**TTAATTGAAGAATCGG **CAGGCGGCCGCGAATTCACTA**TATAAGAAGGAAATATGTAGGGTGTGGATAACCG	HPV6/pUC19
HPV6 fragment (318 bp)	HPV6-4525-44-F HPV6-4820-42-R	GTGGAGCACAACACCATTGC TGCAGGGGTAGTTGTTTCAGAGG	DNA from bacterial clones
HPV11-F1 (7117 bp)	HPV11-F1-F HPV11-F1-R	**CGGCCGCGGGAATTCGATTAATCAC**CTTAATAACAATCTTAGTTTAAAAAAGAGGAGG **CTCATATCCTTATAGGGATCCTGTTTTTCTTTTTCAGGTGTG**GGTTTCTG	HPV11/pBR322
HPV11-F2 (904 bp)	HPV11-F2-F HPV11-F2-R	**CACACCTGAAAAAGAAAAACAGGATCCCTATAAGGATATGAG**TTTTTGGGAGGT **CAGGCGGCCGCGAATTCACTA**TATAAGAAGGAAATATGTAGGGTGTGGGTAACC	HPV11/pBR322
HPV11 fragment (415 bp)	HPV11-6842-63-F HPV11-7234-56-R	GAATACATGCGCCATGTGGAGG GTTTTCGTTTGGGGGCTGTAGAG	DNA from bacterial clones
HPV16-F1 (6199 bp)	HPV16-F1-F HPV16-F1-R	**CGGCCGCGGGAATTCGATTAATCAC**ACTACAATAATTCATGTATAAAACTAAGGGCGTA **GCAACATTGGTACATGGGGATCCTTTGCCCCAGTGTTCCCCCTA**TAG	HPV16/ pBluescript SK-
HPV16-F2 (1796 bp)	HPV16-F2-F HPV16-F2-R	**TAGGGGAACACTGGGGCAAAGGATCCCCATGTACCAATGTTGC**AG **CAGGCGGCCGCGAATTCACTA**TTAGTATTATTATATAAGTTGCTTGTAAATGTGTAAC	HPV16/ pBluescript SK-
HPV16 fragment (337 bp)	HPV16-6036-57-F HPV16-6350-72-R	GTGCTTATGCAGCAAATGCAGG CTGTCGCCATATGGTTCTGACAC	DNA from bacterial clones
HPV18-F1 (2471 bp)	HPV18-F1-F HPV18-F1-R	**GCGGGAATTCGATTAATCAC**ATTAATACTTTTAACAATTGTAGTATATAAAAAGGGAG **CTAGTGGAATTCACAAATGATATTACTGC**TCCTTGTATAAAGTG	HPV18/pBR322
HPV18-F2 (5456 bp)	HPV18-F2-F HPV18-F2-R	**GCAGTAATATCATTTGTGAATTCCACTAG**TCATTTTTGGTTGGAACCG **CAGGCGGCCGCGAATTCACTA**GAAAAGTATAGTATGTGCTGCCCAACC	HPV18/pBR322
HPV18 fragment (405 bp)	HPV18-2260-82-F HPV18-2639-64-R	AGTGCAATTCCTGCGATACCAAC GGCCATCTATTATCCTTTGCTGGATG	DNA from bacterial clones
HPV31-F1 (3394 bp)	HPV31-F1-F HPV31-F1-R	**GCGGGAATTCGATTAATCAC**TAATAATAATAATCTTAGTATAAAAAAGTAGGGAGTGACCGAAAGTG **AGGTTTTGGAATTCGATGTGGTGGTGTTGTTGGCT**GTTGGTAGCTTTGTAAC	HPV31/pUC19
HPV31-F2 (2298 bp)	HPV31-F2-F HPV31-F2-R	**AGCCAACAACACCACCACATCGAATTCCAAAACCT**GCGCCTTGGGCACCAGTG **GTTACATATTCATCCGTGCTTACAACTTTAGACACT**GGGACAGGTGGTAAGTAGAC	HPV31/pUC19
HPV31-F3	HPV31-F3-F	**AGTGTCTAAAGTTGTAAGCACGGATGAATATGTAAC**ACGAACCAACATATATTATC	HPV31/pUC19

(2325 bp)	HPV31-F3-R	**CTGCAGGCGGCCGCGAATTCACTA**AGTATAAAAAGAACAATTGCTTGTAAAACTGTAAC	
HPV31 fragment (428 bp)	HPV31-3116-40-F HPV31-3522-43-R	GATGGCCAATGTACTGTTGTGGAAG GTTTGGTTTGTGCATGCAGCTG	DNA from bacterial clones
HPV33-F1 (2839 bp)	HPV33-F1-F HPV33-F1-R	**CGGCCGCGGGAATTCGATTAATCAC**GTAAACTATAATGCCAAGTTTTAAAAAAGTAGGGTGTAAC **ATCAGCTTCGTAAAGATC**TAGTATTTTCTCCTGCACTGCATTTAAACGTG	HPV33/ pLink322
HPV33-F2 (5157 bp)	HPV33-F2-F HPV33-F2-R	**ATGCAGTGCAGGAGAAAATACTAGATCTTTACGAAGCTGAT**AAAACTGATTTACCATC **CAGGCGGCCGCGAATTCACTA**TATTATATAAAGATTATAAATGACCAATATGACCTAAAACGGTTAGTC	HPV33/ pLink322
HPV33 fragment (392 bp)	HPV33-2640-66-F HPV33-3003-31-R	GATGAAAATGGTAACCCAGTGTATGCA GCAATGTCCATTGGCTTGTACTATACTG	DNA from bacterial clones
HPV35-F1 (1007 bp)	HPV35-F1-F HPV35-F1-R	**CGGCCGCGGGAATTCGATTAATCAC**CCCTATAAAAAAAACAGGGAGTGACCGAAAAC **CATTTTCGTCCTCTGACACTGGATCCCCCGTACGTCTACTAACTACTGC**TTC	HPV35/pBR322 Plasmid 2
HPV35-F2 (4130 bp)	HPV35-F2-F HPV35-F2-R	**GCAGTAGTTAGTAGACGTACGGGGGATCCAGTGTCAGAGGACGAAAATG**AAG **CTATAATGTCCATAAAGTCAGGATCCGGAGCTAAGCTAATATC**CTCATGCTC	HPV35/pBR322 Plasmid 1
HPV35-F3 (2880 bp)	HPV35-F3-F HPV35-F3-R	**GATATTAGCTTAGCTCCGGATCCTGACTTTATGGACATTATAG**CTTTACATAG **CAGGCGGCCGCGAATTCACTA**ATAATTGTTACTAACTATAATAAAAAGAAATGCTTATA	HPV35/pBR322 Plasmid 2
HPV35 fragment (411 bp)	HPV35-751-73-F HPV35-1139-61-R	GCGACACTACGTCTGTGTGTACA CACGCTGCTAAGTGGACTACTAG	DNA from bacterial clones
HPV39-F1 (6862 bp)	HPV39-F1-F HPV39-F1-R	**GCGGGAATTCGATTAATCAC**CTTATAACATTTTATAAGTATCTTGTTTAAAAAAAGGGA **GTCCAATATAGAGGAATTCATAGTGTGAATATAAGAC**ATAACATCAGTTGTTAATG	HPV39/pSP65
HPV39-F2 (1049 bp)	HPV39-F2-F HPV39-F2-R	**GTCTTATATTCACACTATGAATTCCTCTATATTGGAC**AATTGGAATTTTGCTGTAG **CAGGCGGCCGCGAATTCACTA**TAAAAGTATAGGTATGTATGCCCAACCTATTTCG	HPV39/pSP65
HPV39 fragment (246 bp)	HPV39-6912-37-F HPV39-6692-19-R	GCATCCTTTTGACATGTAATGGCTGC CATACCTTCTACATATGATCCTTCTAAG	DNA from bacterial clones
HPV45-F1 (546 bp)	HPV45-F1-F HPV45-F1-R	**GCCGCGGGAATTCGATTAATCAC**AATACTTTTAACAATTATACTACATAAAAAAGGGTG **CATGTATTACACTGCCCTCGGTACTGTCCAGCTATGCTGTGAAATC**TTC	HPV45 synthetic fragment
HPV45-F2 (3678 bp)	HPV45-F2-F HPV45-F2-R	**GATTTCACAGCATAGCTGGACAGTACCGAGGGCAGTGTAATACATG**TTG **TACACTGTACTGTACATTATAGTAATTATTGTATGGT**GTGTAAAGCATGCATATG	HPV45/ pGEM4
HPV45-F3 (3761 bp)	HPV45-F3-F HPV45-F3-R	**ACCATACAATAATTACTATAATGTACAGTACAGTGTA**ACATACCTGTGATGTG **CAGGCGGCCGCGAATTCACTA**AAGAAAAGGTATGTGTTATAGGGCCCAAC	HPV45/ pGEM4
HPV45 fragment (377 bp)	HPV45-3939-61-F HPV45-4291-15-R	TCTGTGTGCCTTTATGTGTGCTG CACGTACCGGATTGCTTACATGTTC	DNA from bacterial clones
HPV51-F1 (420 bp)	HPV51-F1-F HPV51-F1-R	**GCCGCGGGAATTCGATTAATCAC**AACAATTATCTTGTAAAAACTAGGGTGTAACCG **TCGATAAATCATATAAGCTTTTTTTTAGTAATTGCCTCTA**ATGTAGTACCATACACAG	HPV51 synthetic fragment
HPV51-F2 (3888 bp)	HPV51-F2-F HPV51-F2-R	**TAGAGGCAATTACTAAAAAAAGCTTATATGATTTATCGA**TAAGGTGTCATAGATGTC **GTACCTTCAACCTTATTCACAACATCAGGAGGACATGTACCAG**CAGCTTTG	HPV51/ pUC13
HPV51-F3 (3629 bp)	HPV51-F3-F HPV51-F3-R	**CTGGTACATGTCCTCCTGATGTTGTGAATAAGGTTGAAGGTAC**TACATTGGC **CAGGCGGCCGCGAATTCACTA**AAATGTTATAAGAAAAAATGTTGCAAGCATAGGC	HPV51/ pUC13
HPV51 fragment	HPV51-163-89-F	ATGCACAATATACAGGTAGTGTGTGTG	DNA from

(358 bp)	HPV51-501-20-R	GTTGCCAGCAATTAGCGCAT	bacterial clones
HPV52-F1 (3395 bp)	HPV52-F1-F HPV52-F1-R	**GCCGCGGGAATTCGATTAATCAC**TAAATTATAATCTTATACTAGTAAAAAATAGGGTGTAACCGAAAACG **AGCAGTTTCAGTAGTGGATACTTCGTTACTAGATACAGATG**CAGGACAAAC	HPV52/pUC19
HPV52-F2 (4235 bp)	HPV52-F2-F HPV52-F2-R	**CATCTGTATCTAGTAACGAAGTATCCACTACTGAAACTGCT**GTCCAC **GACCAACCGAATTCGGTTAGGATTTAAAATGGTGGAT**AGTACAAAATG	HPV52/ pUC19
HPV52-F3 (429 bp)	HPV52-F3-F HPV52-F3-R	**ATCCACCATTTTAAATCCTAACCGAATTCGGTTGGTC**TTGGCACAACTTTG **CAGGCGGCCGCGAATTCACTA**TAATTATAAAAAAAGTGGTTGTGGGTACGGTAAC	HPV52/ pUC19
HPV52 fragment (337 bp)	HPV52-3159-87-F HPV52-3469-95-R	ACTTGGTGAGTGTGAATGTACAATTGTAG GTACTTGGTGTTTCTGGAGTCTGTGAC	DNA from bacterial clones
HPV56-F1 (5555 bp)	HPV56-F1-F HPV56-F1-R	**CGCGGGAATTCGATTAATCAC**GAAAGTTTCAATCATACTTTATATATTGGGAGTGACC **CAAAGGAGGATCCCTGTATATATACATCAT**GGGTAACATCATAAGGAGAC	HPV56/pT713
HPV56-F2 (2362 bp)	HPV56-F2-F HPV56-F2-R	**ATGATGTATATATACAGGGATCCTCCTTTG**CATTATGGCCTGTGTATTTTTTTAG **CAGGCGGCCGCGAATTCACTA**AACAATTAAAAGAAACCTGTTTTTGCACGAC	HPV56/pT713
HPV56 fragment (355 bp)	HPV56-5304-27-F HPV56-5634-58-R	TGTCTAGCCAGTCAGTTGCTACAC CCTTTGAAACAGGTGTTGGAGGTAG	DNA from bacterial clones
HPV58-F1 (7053 bp)	HPV58-F1-F HPV58-F1-R	**CCGCGGGAATTCGATTAATCAC**CTAAACTATAATGCCAAATCTTGTAAAAACTAGGGTG **CAAAGGAAACTGATCTAGATCTGCAGAAAACTTTTCCTTTAAGT**TAACCTCC	HPV58/pLink
HPV58-F2 (858 bp)	HPV58-F2-F HPV58-F2-R	**ACTTAAAGGAAAAGTTTTCTGCAGATCTAGATCAGTTTCCTTTG**GGACGAAAG **CAGGCGGCCGCGAATTCACTA**TATTATATAAAATGTTGAAACATGAACAATGTGACCCA	HPV58/pLink
HPV58 fragment (232 bp)	HPV58-6868-89-F HPV58-7077-99-R	CGTCTGCCAGTTTACAGGACAC GTAGTAGGGGCCGAACGTTTTAG	DNA from bacterial clones
HPV59-F1 (588 bp)	HPV59-F1-F HPV59-F1-R	**CGGCCGCGGGAATTCGATTAATCAC**GTTAAGACCGAAAACGGTGCATATAAAGGTAG **GTGTTGCTTTTGGTCCATGCATTGTTTTACACCAGTGT**TTCACTACG	HPV59 synthetic fragment
HPV59-F2 (4012 bp)	HPV59-F2-F HPV59-F2-R	**ACACTGGTGTAAAACAATGCATGGACCAAAAGCAACAC**TTTGTGAC **TAGATGGATCTGTAGGTCCAACAGGTTCAATAACTACTG**GTGGTTTAGCAGGC	HPV59/pUC9
HPV59-F3 (3420 bp)	HPV59-F3-F HPV59-F3-R	**CAGTAGTTATTGAACCTGTTGGACCTACAGATCCATCTA**TAGTTACATTAG **CAGGCGGCCGCGAATTCACTA**CGTTTTCGGTTACACCCTTTTTTATTACTATGA	HPV59/pUC9
HPV59 fragment (369 bp)	HPV59-4360-82-F HPV59-4705-28-R	ATATTGCAGTGGACCAGCCTAGG GACAGAAGGGTCTGTAAATGCAGG	DNA from bacterial clones
HPV66-F1 (3581 bp)	HPV66-F1-F HPV66-F1-R	**CGGCCGCGGGAATTCGATTAATCAC**GAAAGTTTCAATCATACTTTATTATATTGGGAGTAACCGAAATGGGTTTAGGAC **ACTTCTACTGTTGGCGTTGTTACTGATGTCTGTGTCTGTTGTG**ACACAGTGTGCGTAG	HPV66/pBR322
HPV66-F2 (3989 bp)	HPV66-F2-F HPV66-F2-R	**CACAACAGACACAGACATCAGTAACAACGCCAACAGTAGAAGT**CCAC **AGGCTAGGCAACCGAATTCGGTTGCATGCATAAAATG**GCGTAC	HPV66/pBR322
HPV66-F3 (380 bp)	HPV66-F3-F HPV66-F3-R	**CATTTTATGCATGCAACCGAATTCGGTTGCCTAGCCT**TTTGTC **CAGGCGGCCGCGAATTCACTA**AACAATTAAAAGAAACCTGTTTTAGCACGACC	HPV66/pBR322
HPV66 fragment (462 bp)	HPV66-3312-36-F HPV66-3752-73-R	GTCCTGACTCTGTGTCTAGTACCTG AGGTGTCCCGTTGTGTTTCATC	DNA from bacterial clones

HPV68-F1 (719 bp)	HPV68-F1-F HPV68-F1-R	**CGGCCGCGGGAATTCGATTAATCAC**ATGGCGCTATTTCACAACCCTGAGGAAC **TACAACACAGACACTGAATTCTGTGACGCTGTTGTTCGTCCCGTC**	HPV68/ pBluescript SK-
HPV68-F2 (3562 bp)	HPV68-F2-F HPV68-F2-R	**ACGGGACGAACAACAGCGTCACAGAATTCAGTGTCTGTGTTGTA**AGTGTAACAAGG **AGTACCTTCAACCTTATTTATAACATCAGAAGGACATGTCCCTGATTG**TTTAC	HPV68/ pBluescript SK-
HPV68-F3 (3680 bp)	HPV68-F3-F HPV68-F3-R	**CAATCAGGGACATGTCCTTCTGATGTTATAAATAAGGTTGAAGGTACT**ACACTTGCAG **CAGGCGGCCGCGAATTCACTA**TAGTATAGAGAACTGCTGTGTTCAGCTTTATATAC	HPV68/ pBluescript SK-
HPV68 fragment (366 bp)	HPV68-448-72-F HPV68-792-13-R	AGACGCATACGTCAAGAAACACAAG CTGGGTTTCAGTTGCACACCAC	DNA from bacterial clones

[#]Overlapping sequence in each primer is highlighted in bold and is used for creating overlapping DNA fragments.

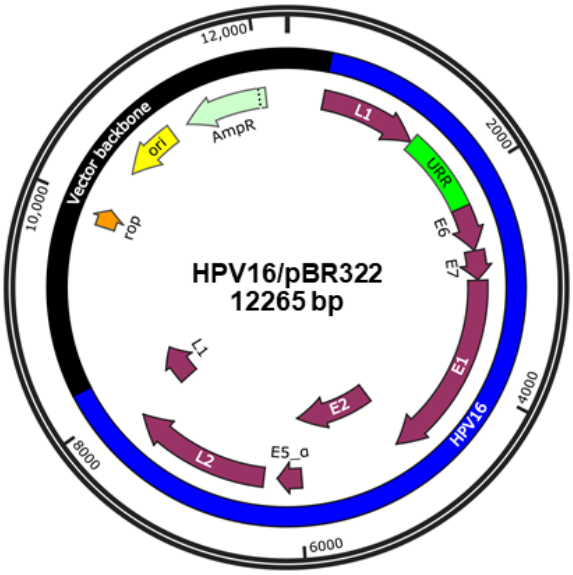

Figure S1. Map of plasmid (HPV16/pBR22) used for generating HPV16 International Standard. The plasmid contains full-length HPV16 genome which is cloned into pBR322 backbone using unique BamHI site. The L1 gene is split into two regions of the vector backbone.

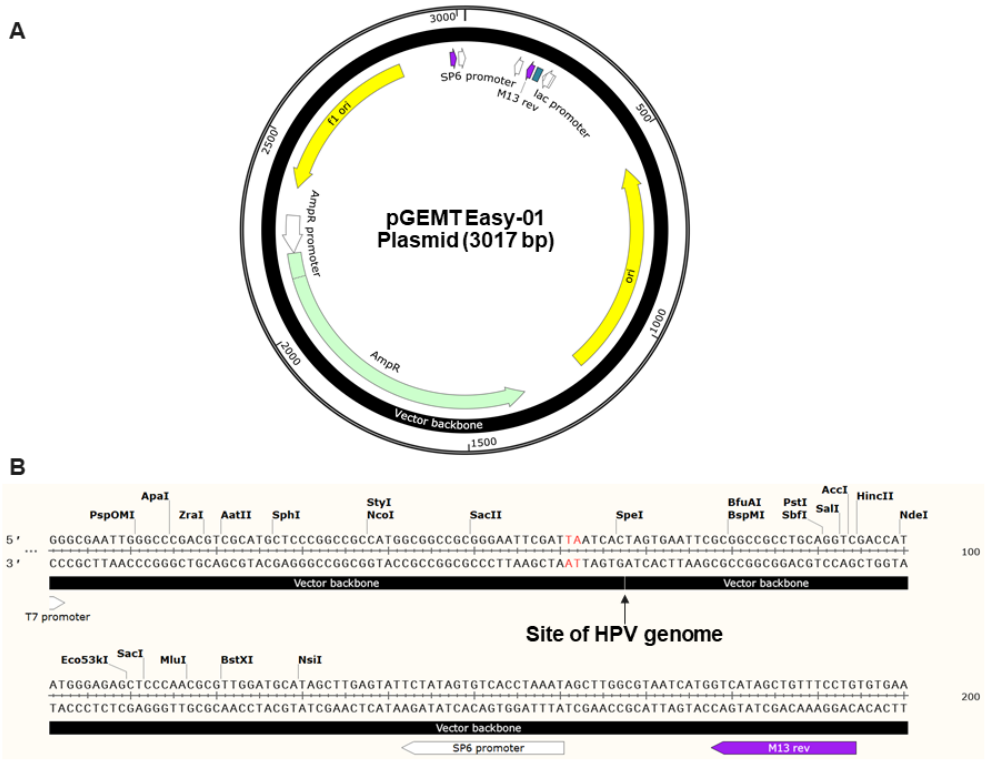

Figure S2. (**A**) Map of pGEMT Easy-01 plasmid. The plasmid is used as vector backbone to construct CDC HPV whole genome plasmids. (**B**) Multiple cloning site of pGEMT Easy-01 plasmid is shown. The plasmid is a derivative of pGEMT Easy vector and was made by addition of two nucleotides, TA (highlighted in red). The HPV genomes of different HPV types are cloned between C67 and T68 nucleotides and position is shown by arrow.

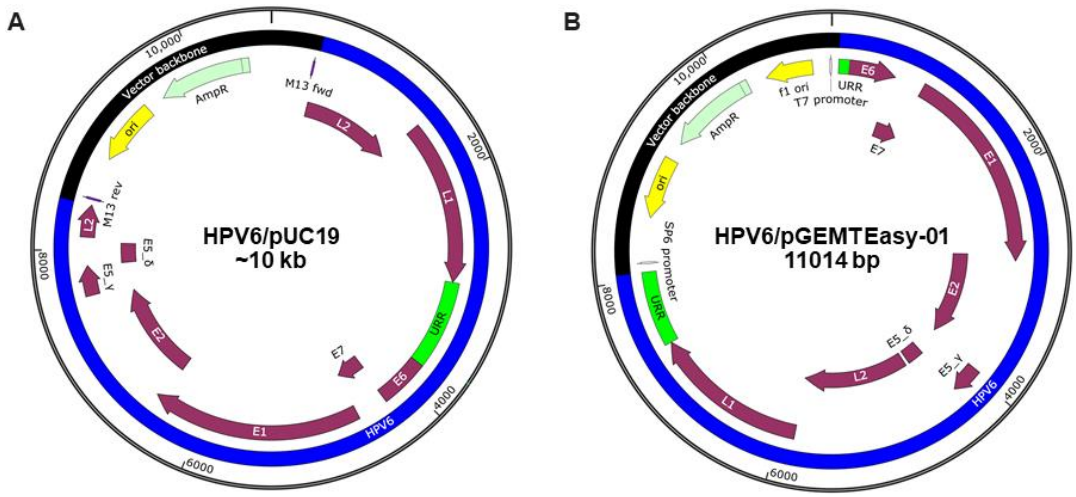

Figure S3. (**A**) Map of non-CDC HPV6 (HPV6/pUC19) plasmid. The L2 gene is split into two regions of the vector backbone. (**B**) Map of CDC HPV6 (HPV6/pGEMT Easy-01) whole genome plasmid without interruption of coding genes.

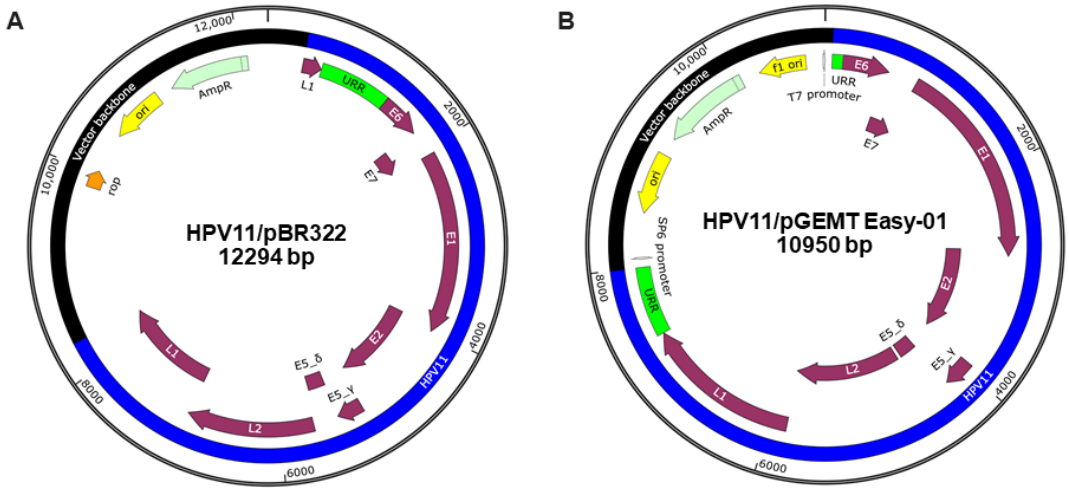

Figure S4. (**A**) Map of non-CDC HPV11 (HPV11/pBR322) plasmid. The L1 gene is split into two regions of the vector backbone. (**B**) Map of CDC HPV11 (HPV11/pGEMT Easy-01) whole genome plasmid without interruption of coding genes.

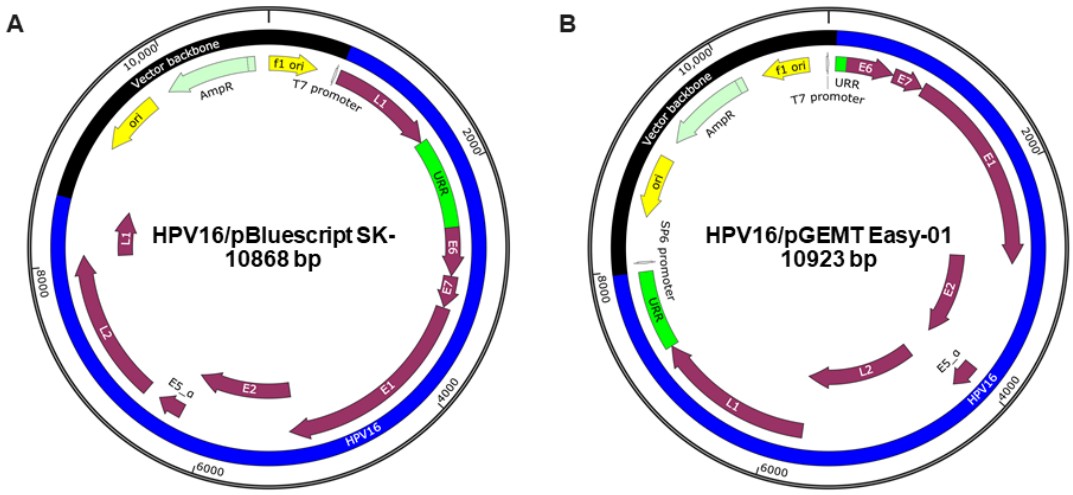

Figure S5. (**A**) Map of non-CDC HPV16 (HPV16/pBluescript SK-) plasmid. The L1 gene is split into two regions of the vector backbone. (**B**) Map of CDC HPV16 (HPV16/pGEMT Easy-01) whole genome plasmid without interruption of coding genes.

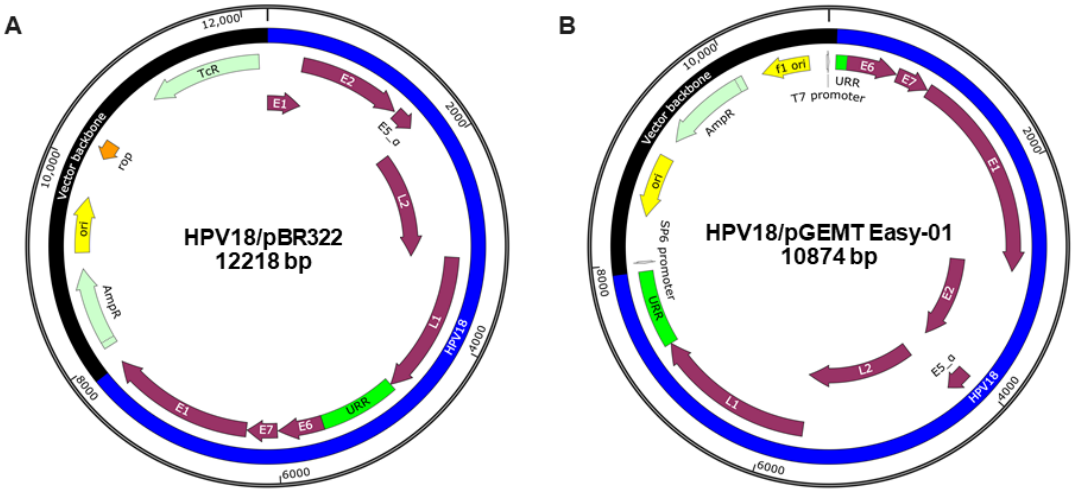

Figure S6. (**A**) Map of non-CDC HPV18 (HPV18/pBR322) plasmid. The E1 gene is split into two regions of the vector backbone. (**B**) Map of CDC HPV18 (HPV18/pGEMT Easy-01) whole genome plasmid without interruption of coding genes.

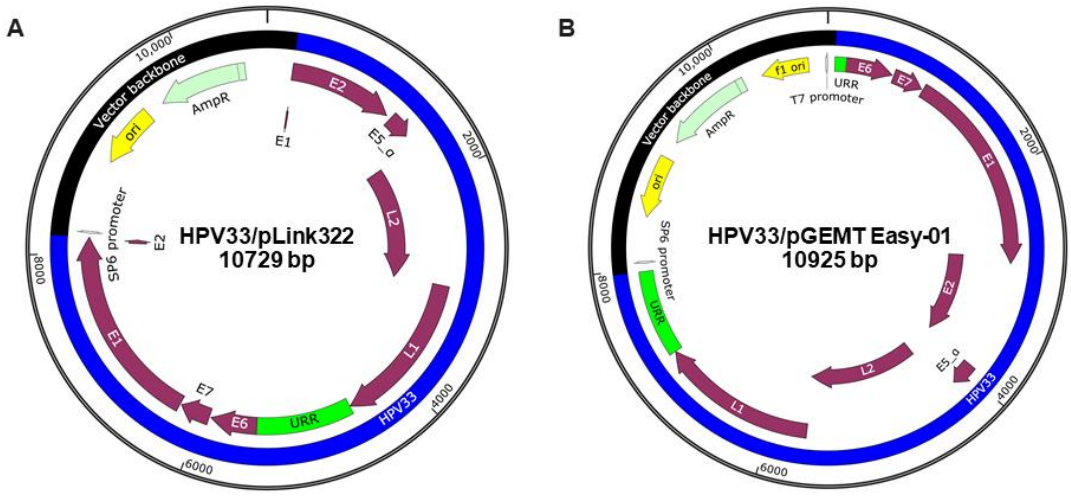

Figure S7. (**A**) Map of non-CDC HPV33 (HPV33/pLink322) plasmid. The E1 and E2 genes are split into two regions of the vector backbone. (**B**) Map of CDC HPV33 (HPV33/pGEMT Easy-01) whole genome plasmid without interruption of coding genes.

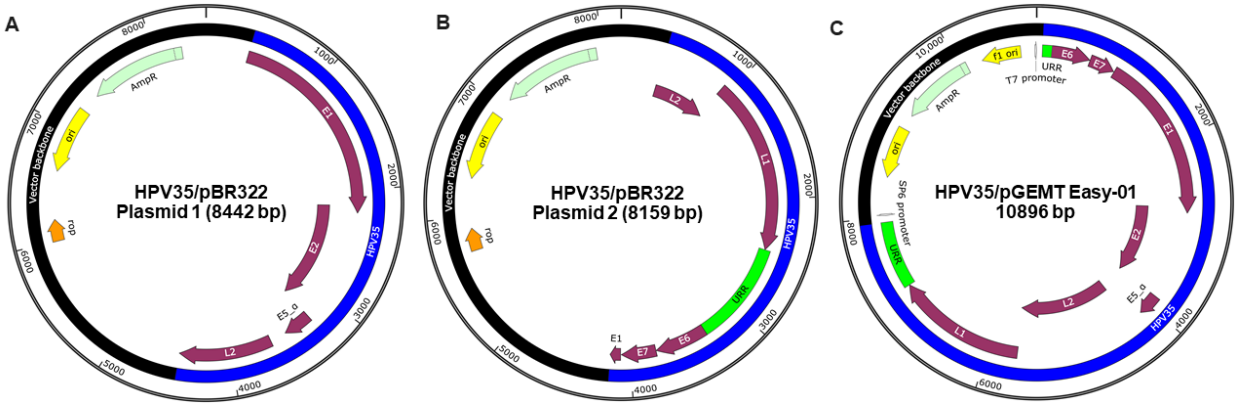

Figure S8. (**A**) Map of partial genome non-CDC HPV35 (HPV35/pBR322) plasmid 1. The plasmid contains partial sequence of E1 and L2 genes. (**B**) Map of partial genome non-CDC HPV35 (HPV35/pBR322) plasmid 2. The plasmid contains partial sequence of E1 and L2 genes. (**B**) Map of CDC HPV35 (HPV35/pGEMT Easy-01) whole genome plasmid without interruption of coding genes.

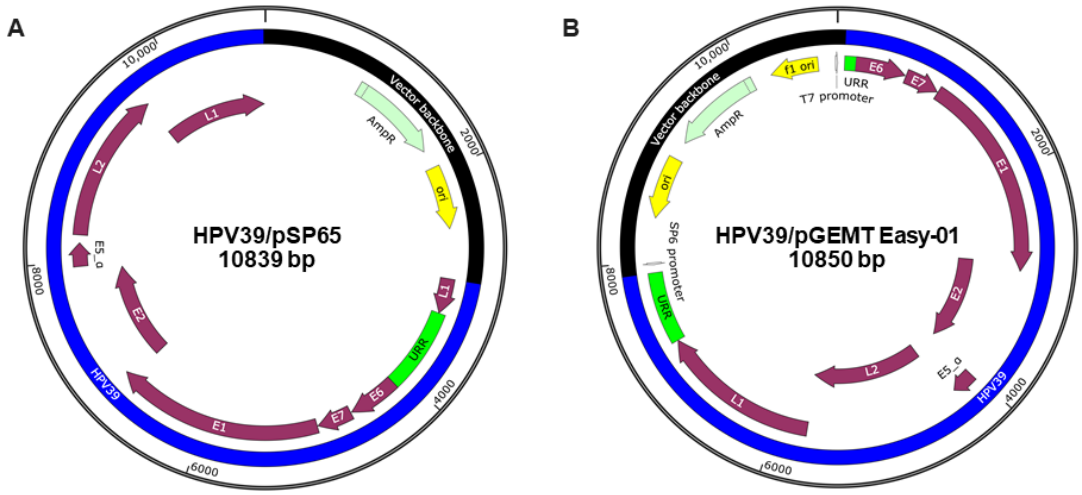

Figure S9. (**A**) Map of non-CDC HPV39 (HPV39/pSP65) plasmid. The L1 gene is split into two regions of the vector backbone. (**B**) Map of CDC HPV39 (HPV39/pGEMT Easy-01) whole genome plasmid without interruption of coding genes.

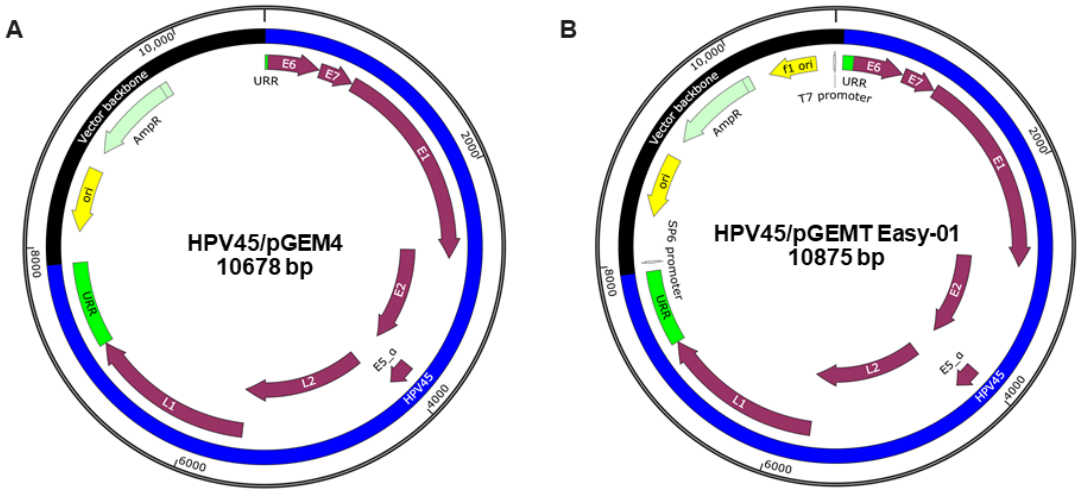

Figure S10. (**A**) Map of non-CDC HPV45 (HPV45/pGEM4) plasmid. (**B**) Map of CDC HPV45 (HPV45/pGEMT Easy-01) whole genome plasmid without interruption of coding genes.

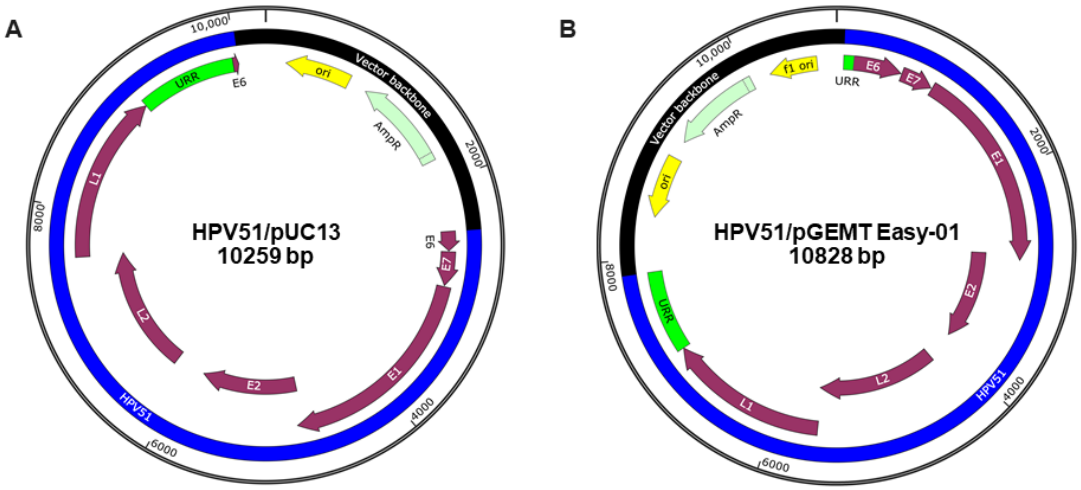

Figure S11. (**A**) Map of partial genome non-CDC HPV51 (HPV51/pUC13) plasmid. The E6 gene is split into two regions of the vector backbone and is missing 232 bp of sequence from its open reading frame. (**B**) Map of CDC HPV51 (HPV51/pGEMT Easy-01) whole genome plasmid without interruption of coding genes.

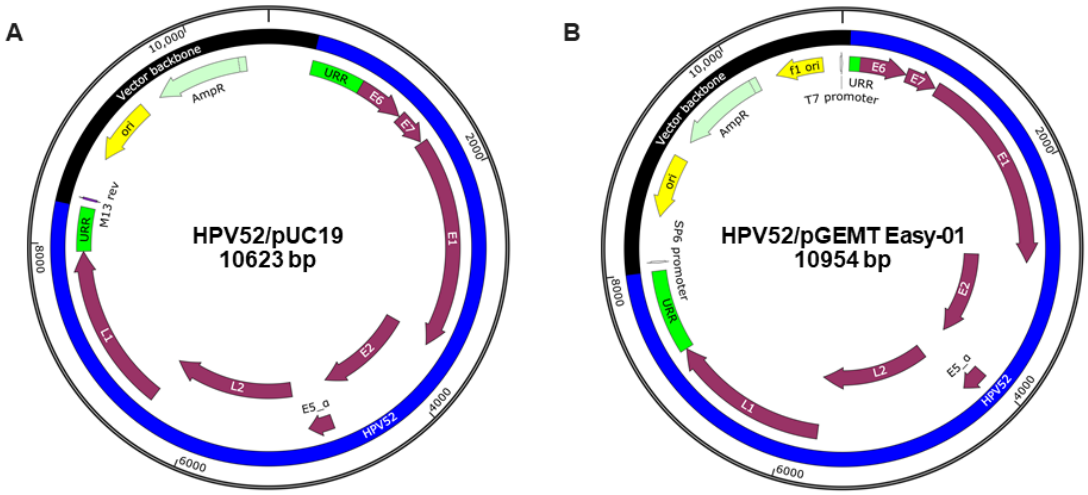

Figure S12. (**A**) Map of non-CDC HPV52 (HPV52/pUC19) plasmid. (**B**) Map of CDC HPV52 (HPV52/pGEMT Easy-01) whole genome plasmid without interruption of coding genes.

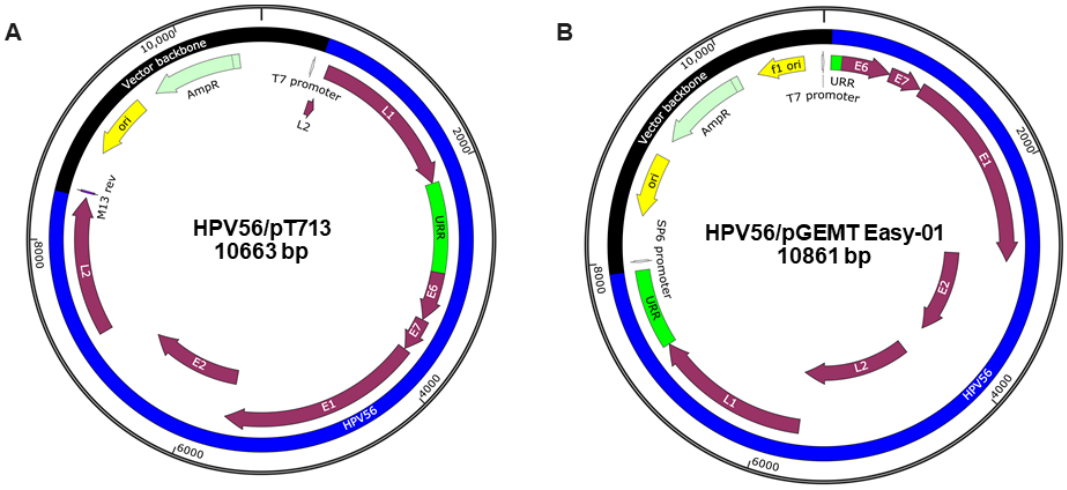

Figure S13. (**A**) Map of non-CDC HPV56 (HPV56/pT713) plasmid. The L2 gene is split into two regions of the vector backbone. (**B**) Map of CDC HPV56 (HPV56/pGEMT Easy-01) whole genome plasmid without interruption of coding genes.

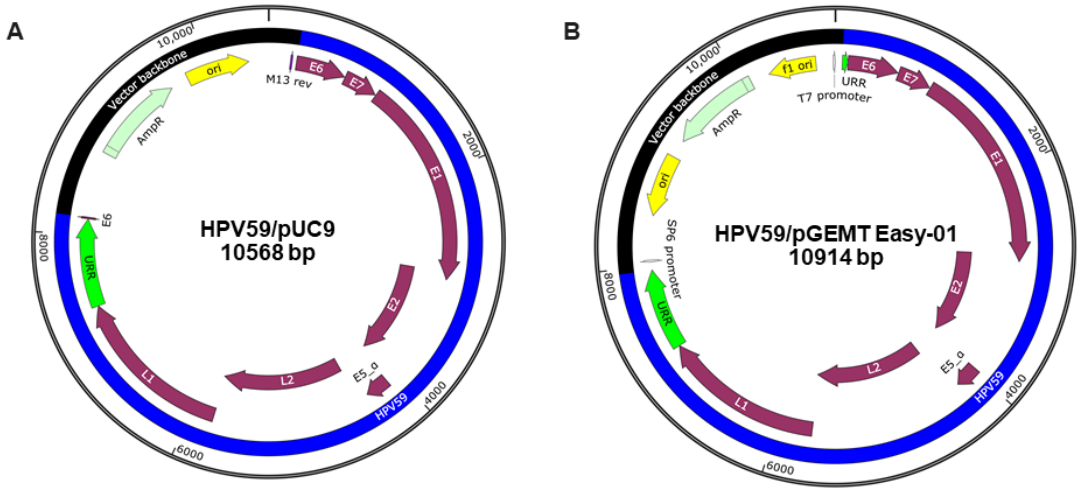

Figure S14. (**A**) Map of non-CDC HPV59 (HPV59/pUC9) plasmid. The E6 gene is split into two regions of the vector backbone. (**B**) Map of CDC HPV59 (HPV59/pGEMT Easy-01) whole genome plasmid without interruption of coding genes.

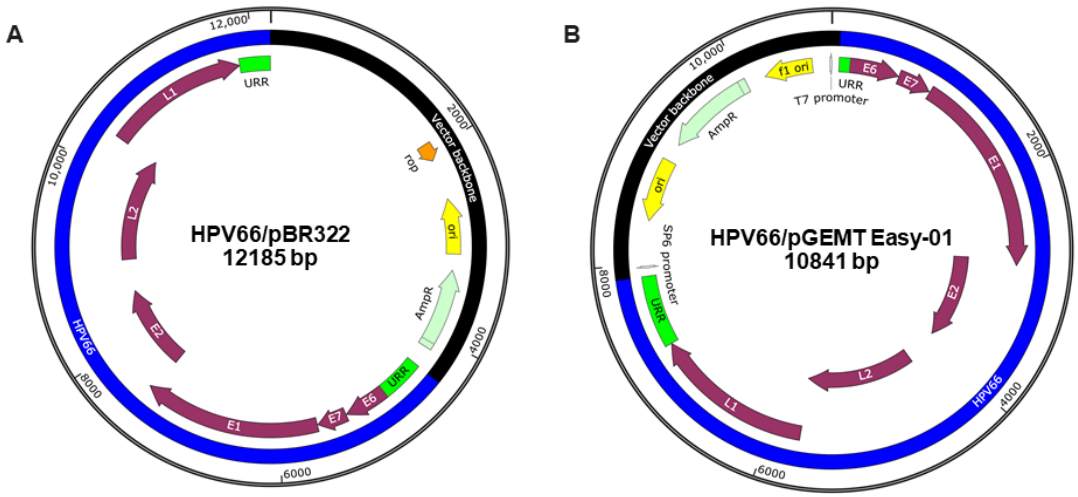

Figure S15. (**A**) Map of non-CDC HPV66 (HPV66/pBR322) plasmid. (**B**) Map of CDC HPV66 (HPV66/pGEMT Easy-01) whole genome plasmid without interruption of coding genes.

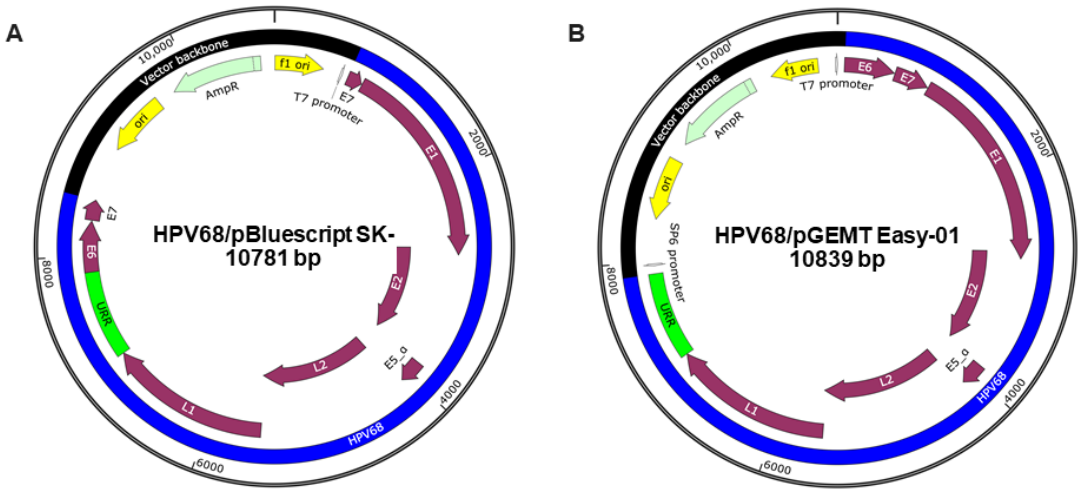

Figure S16. (**A**) Map of non-CDC HPV68 (HPV68/pBluescript SK-) plasmid. (**B**) Map of CDC HPV68 (HPV68/pGEMT Easy-01) whole genome plasmid without interruption of coding genes.

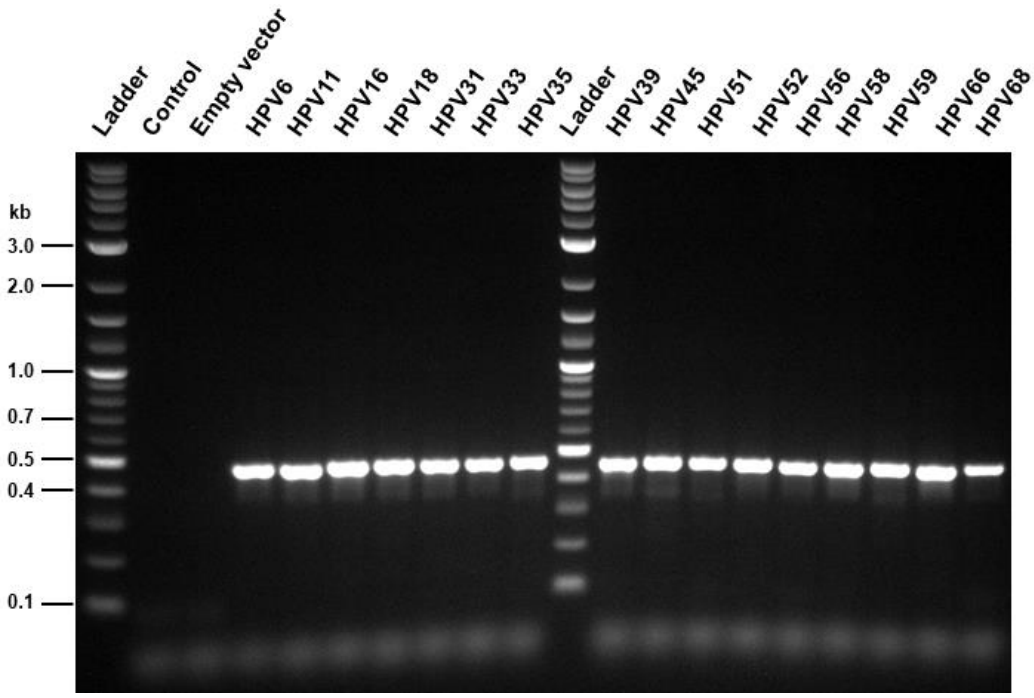

Figure S17. PCR with PGMY primers using CDC HPV whole genome plasmids as DNA template. Lane 1 and lane 11: DNA standard, lane 2: control PCR reaction without DNA template and lane 3: PCR reaction with empty vector backbone, and remaining lanes correspond to PCR reaction with CDC HPV plasmids resulting in ~450 bp PCR amplicon.

Table S2 DNA yield from large scale purification of CDC HPV plasmids

CDC Plasmids	~ DNA yield from 300 mL *E.coli* culture (µg)
HPV6	665
HPV11	770
HPV16	320
HPV18	145
HPV31	380
HPV33	330
HPV35	250
HPV39	435
HPV45	660
HPV51	480
HPV52	390
HPV56	315
HPV58	630
HPV59	770
HPV66	510
HPV68	278