

Tracing the epidemic history of HIV-1 CRF01_AE clusters using near-complete genome sequences

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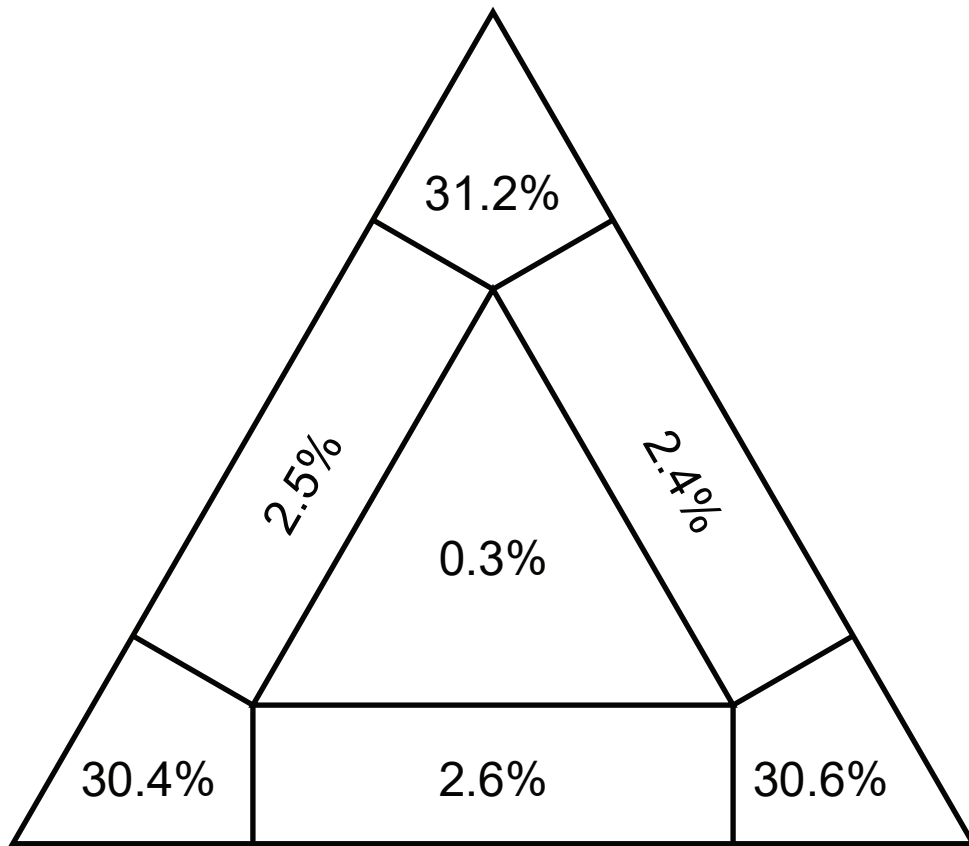
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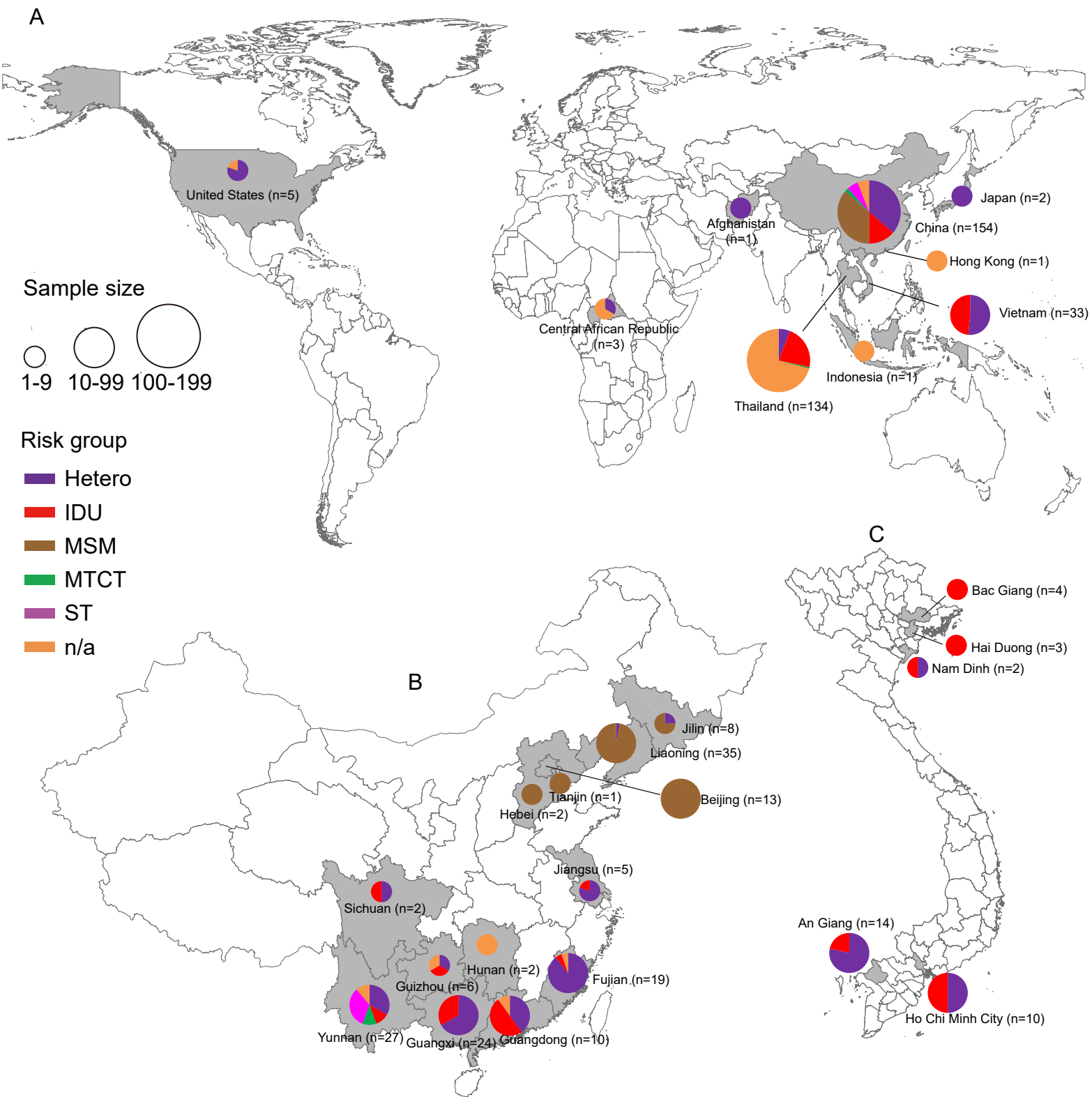


Supplementary Figure S1. Likelihood-mapping analyses of near-complete genome sequences of HIV-1 CRF01_AE. The likelihoods of the three tree topologies of each possible quartet (or of a random sample of quartets) are denoted by a data point in an equilateral triangle. The distribution of points in the seven areas of the triangle reflects the tree-likeness of the data. Specifically, the three corners represent fully resolved tree topologies; the center represents an unresolved (star) phylogeny; and the sides represent support for conflicting tree topologies.

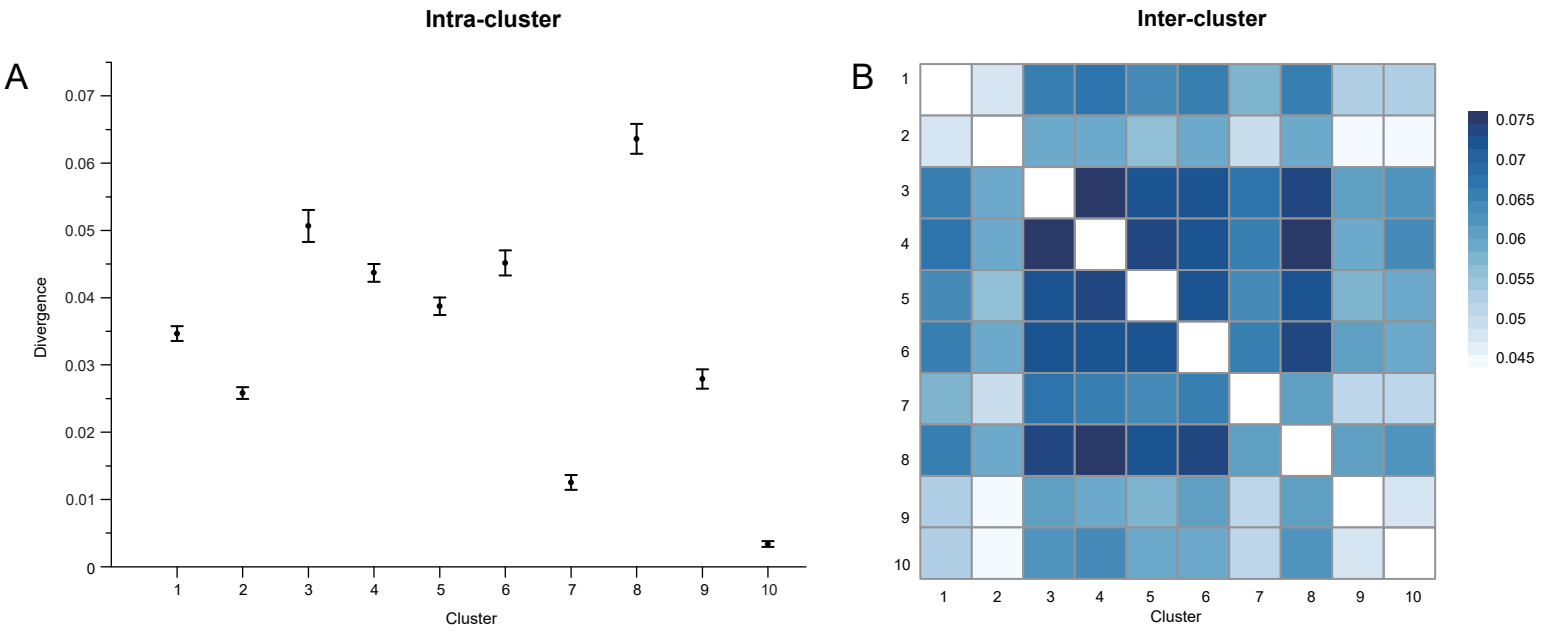


0.02

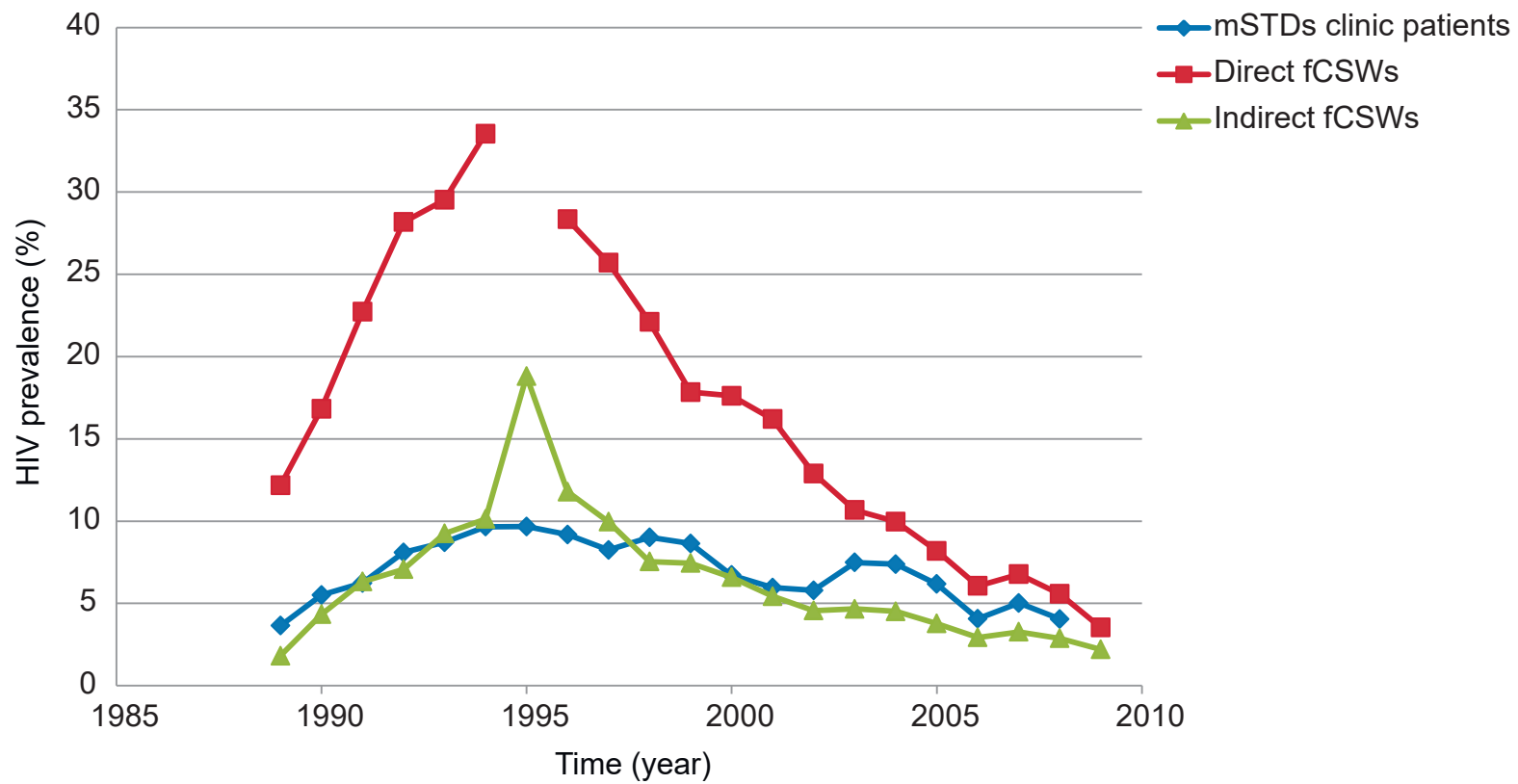
Supplementary Figure S2. Phylogenetic relationships of near-complete genome sequences from HIV-1 CRF01_AE. The tree was inferred using a maximum-likelihood analysis of 334 near-complete genome sequences of HIV-1 CRF01_AE plus four reference sequences of HIV-1 subtype B as outgroup. For visual clarity, only HIV-1 CRF01_AE strains are shown. Bootstrap value $\geq 90\%$ is shown at the node with black circle. Sequence names include accession number, geographic location, and year of sampling. The scale bar shows nucleotide substitutions per site. Shading indicates the delineation of 10 CRF01_AE clusters. TH = Thailand HIV-1 CRF01_AE; PAN = Pandemic HIV-1 CRF01_AE.



Supplementary Figure S3. Geographic distribution of risk groups of HIV-1 CRF01_AE identified in the present study. Geographic distribution of risk groups of HIV-1 CRF01_AE is shown at the (A) country level, and at the provincial level for (B) China and (C) Vietnam. Each risk group of HIV-1 CRF01_AE identified in this study is color-coded, as shown on the left. The figure was created using Adobe Illustrator CS5 version 15.0.0 software, based on the maps obtained from Craft MAP website (<http://www.craftmap.box-i.net/>).



Supplementary Figure S4. Average pairwise genetic distances within and between HIV-1 CRF01_AE clusters. The number of base substitutions per site, averaged across all sequence pairs within (A) and between (B) HIV-1 CRF01_AE clusters.



Supplementary Figure S5. HIV prevalence among female commercial sex workers (fCSWs) and male sexually transmitted disease patients (mSTDs) in Thailand by year. HIV prevalence is given for brothel-based female commercial sex workers (direct fCSWs) and non-brothel-based female commercial sex workers (indirect fCSWs). Data were unavailable for direct fCSWs in Thailand in 1995. Data were obtained from the Bureau of Epidemiology, Thailand.

Supplementary Table S1. HIV-1 CRF01_AE sequences analysed in the present study.

| Acc. No. | Sequence name | Geographic source | Sampling year | Risk factor^a | CRF01_AE cluster | Data source |
|-----------------|----------------------|--------------------------|----------------------|--------------------------------|-------------------------|--------------------|
| GQ845124 | 05GX034 | Guangxi, China | 2005 | Hetero | CRF01_1AE | database |
| JX112835 | GX070143 | Guangxi, China | 2007 | Hetero | CRF01_1AE | database |
| JX112832 | GX070043 | Guangxi, China | 2007 | Hetero | CRF01_1AE | database |
| JX112834 | GX070076 | Guangxi, China | 2007 | Hetero | CRF01_1AE | database |
| GU564229 | 05GX162 | Guangxi, China | 2005 | Hetero | CRF01_1AE | database |
| JX112836 | GX070145 | Guangxi, China | 2007 | Hetero | CRF01_1AE | database |
| GU564224 | 05GX013 | Guangxi, China | 2005 | IDU | CRF01_1AE | database |
| GU564225 | 05GX014 | Guangxi, China | 2005 | Hetero | CRF01_1AE | database |
| JX112837 | GX070149 | Guangxi, China | 2007 | IDU | CRF01_1AE | database |
| JX112838 | GX070154 | Guangxi, China | 2007 | IDU | CRF01_1AE | database |
| JX112839 | GX070167 | Guangxi, China | 2007 | IDU | CRF01_1AE | database |
| JX112829 | GX070003 | Guangxi, China | 2007 | Hetero | CRF01_1AE | database |
| GQ845126 | 05GX128 | Guangxi, China | 2005 | Hetero | CRF01_1AE | database |
| GU564227 | 05GX142 | Guangxi, China | 2005 | Hetero | CRF01_1AE | database |
| GU564222 | 05GX002 | Guangxi, China | 2005 | Hetero | CRF01_1AE | database |
| GU564228 | 05GX156 | Guangxi, China | 2005 | IDU | CRF01_1AE | database |
| GU564223 | 05GX012 | Guangxi, China | 2005 | Hetero | CRF01_1AE | database |
| JX112831 | GX070006 | Guangxi, China | 2007 | IDU | CRF01_1AE | database |
| JX112819 | GD070010 | Guangdong, China | 2007 | Hetero | CRF01_1AE | database |
| JX112825 | GD070096 | Guangdong, China | 2007 | IDU | CRF01_1AE | database |
| JX112826 | GD070118 | Guangdong, China | 2007 | IDU | CRF01_1AE | database |
| JX112828 | GD070176 | Guangdong, China | 2007 | IDU | CRF01_1AE | database |
| JX112822 | GD070083 | Guangdong, China | 2007 | Hetero | CRF01_1AE | database |
| JX112823 | GD070090 | Guangdong, China | 2007 | IDU | CRF01_1AE | database |
| JX112824 | GD070092 | Guangdong, China | 2007 | IDU | CRF01_1AE | database |
| JX112809 | FJ070010 | Fujian, China | 2007 | Hetero | CRF01_1AE | database |
| JX112817 | FJ070040 | Fujian, China | 2007 | Hetero | CRF01_1AE | database |
| JX112814 | FJ070035 | Fujian, China | 2007 | Hetero | CRF01_1AE | database |
| JX112815 | FJ070037 | Fujian, China | 2007 | Hetero | CRF01_1AE | database |
| JX112811 | FJ070017 | Fujian, China | 2007 | Hetero | CRF01_1AE | database |
| JX112845 | GZ070127 | Guizhou, China | 2007 | Hetero | CRF01_1AE | database |
| JX112840 | GZ070004 | Guizhou, China | 2007 | IDU | CRF01_1AE | database |
| JX112841 | GZ070015 | Guizhou, China | 2007 | n/a | CRF01_1AE | database |
| JX112842 | GZ070016 | Guizhou, China | 2007 | IDU | CRF01_1AE | database |
| JX112851 | JS071001 | Jiangsu, China | 2007 | Hetero | CRF01_1AE | database |
| JX112852 | JS071004 | Jiangsu, China | 2007 | Hetero | CRF01_1AE | database |
| JX112857 | SC070062 | Sichuan, China | 2007 | IDU | CRF01_1AE | database |
| JX112858 | SC070064 | Sichuan, China | 2007 | Hetero | CRF01_1AE | database |
| JX112869 | ZK052 | Hunan, China | 2010 | n/a | CRF01_1AE | database |
| KP860670 | JL110056 | Jilin, China | 2011 | Hetero | CRF01_1AE | this study |
| AY008714 | 97CNGX2F | Guangxi, China | 1997 | IDU | CRF01_2AE | database |
| AY008718 | 97CNGX11F | Guangxi, China | 1997 | IDU | CRF01_2AE | database |
| GU564221 | 05GX001 | Guangxi, China | 2005 | Hetero | CRF01_2AE | database |
| GU564230 | 06GX239 | Guangxi, China | 2006 | Hetero | CRF01_2AE | database |
| JX112830 | GX070005 | Guangxi, China | 2007 | Hetero | CRF01_2AE | database |
| JX112833 | GX070044 | Guangxi, China | 2007 | Hetero | CRF01_2AE | database |
| JX112816 | FJ070039 | Fujian, China | 2007 | Hetero | CRF01_2AE | database |
| JX112810 | FJ070013 | Fujian, China | 2007 | Hetero | CRF01_2AE | database |
| JX112850 | JS070901 | Jiangsu, China | 2007 | Hetero | CRF01_2AE | database |
| FJ185238 | 97VNHCM302 | Hochiminh, Vietnam | 1997 | IDU | CRF01_2AE | database |
| FJ185239 | 97VNHCM303 | Hochiminh, Vietnam | 1997 | IDU | CRF01_2AE | database |

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|----------|------------|--------------------|------|--------|-----------|----------|
| FJ185259 | 97VNHCM306 | Hochiminh, Vietnam | 1997 | IDU | CRF01_2AE | database |
| FJ185260 | 97VNHCM309 | Hochiminh, Vietnam | 1997 | IDU | CRF01_2AE | database |
| FJ185240 | 97VNHCM310 | Hochiminh, Vietnam | 1997 | IDU | CRF01_2AE | database |
| FJ185228 | 98VNBG4 | Bacgiang, Vietnam | 1998 | IDU | CRF01_2AE | database |
| FJ185229 | 98VNBG5 | Bacgiang, Vietnam | 1998 | IDU | CRF01_2AE | database |
| FJ185230 | 98VNBG6 | Bacgiang, Vietnam | 1998 | IDU | CRF01_2AE | database |
| FJ185231 | 98VNBG7 | Bacgiang, Vietnam | 1998 | IDU | CRF01_2AE | database |
| FJ185245 | 97VNAG201 | Angiang, Vietnam | 1997 | IDU | CRF01_2AE | database |
| FJ185256 | 97VNAG220 | Angiang, Vietnam | 1997 | IDU | CRF01_2AE | database |
| FJ185257 | 97VNAG221 | Angiang, Vietnam | 1997 | IDU | CRF01_2AE | database |
| FJ185232 | 98VNHD9 | Haiduong, Vietnam | 1998 | IDU | CRF01_2AE | database |
| FJ185233 | 98VNHD10 | Haiduong, Vietnam | 1998 | IDU | CRF01_2AE | database |
| FJ185234 | 98VNHD11 | Haiduong, Vietnam | 1998 | IDU | CRF01_2AE | database |
| FJ185235 | 98VNND15 | Namdinh, Vietnam | 1998 | Hetero | CRF01_2AE | database |
| FJ185236 | 98VNND17 | Namdinh, Vietnam | 1998 | IDU | CRF01_2AE | database |
| EF036528 | FJ052 | Fujian, China | 2005 | IDU | CRF01_3AE | database |
| JX112827 | GD070120 | Guangdong, China | 2007 | n/a | CRF01_3AE | database |
| JX112843 | GZ070123 | Guizhou, China | 2007 | Hetero | CRF01_3AE | database |
| JX112796 | CYM059 | Beijing, China | 2010 | MSM | CRF01_4AE | database |
| JX112797 | CYM075 | Beijing, China | 2010 | MSM | CRF01_4AE | database |
| JX112799 | CYM124 | Beijing, China | 2010 | MSM | CRF01_4AE | database |
| JX112800 | CYM136 | Beijing, China | 2010 | MSM | CRF01_4AE | database |
| JX112801 | CYM138 | Beijing, China | 2010 | MSM | CRF01_4AE | database |
| JX112802 | CYM139 | Beijing, China | 2010 | MSM | CRF01_4AE | database |
| JX112806 | CYM149 | Beijing, China | 2010 | MSM | CRF01_4AE | database |
| JX112807 | CYM152 | Beijing, China | 2010 | MSM | CRF01_4AE | database |
| JX112808 | CYM154 | Beijing, China | 2010 | MSM | CRF01_4AE | database |
| JX112803 | CYM140 | Beijing, China | 2010 | MSM | CRF01_4AE | database |
| JX112805 | CYM147 | Beijing, China | 2010 | MSM | CRF01_4AE | database |
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| JX960609 | 10LNA124 | Liaoning, China | 2010 | MSM | CRF01_4AE | database |
| JX960610 | 10LNA819 | Liaoning, China | 2010 | MSM | CRF01_4AE | database |
| JX960604 | 09LNA008 | Liaoning, China | 2009 | MSM | CRF01_4AE | database |
| JX960605 | 09LNA011 | Liaoning, China | 2009 | MSM | CRF01_4AE | database |
| JX960606 | 08LNA003 | Liaoning, China | 2008 | MSM | CRF01_4AE | database |
| JX960607 | 09LNA340 | Liaoning, China | 2009 | MSM | CRF01_4AE | database |
| JX960608 | 10LNA103 | Liaoning, China | 2010 | MSM | CRF01_4AE | database |
| FJ441290 | 07JSWX045 | Jiangsu, China | 2007 | IDU | CRF01_4AE | database |
| JX112853 | JS071101 | Jiangsu, China | 2007 | Hetero | CRF01_4AE | database |
| JX112870 | ZK056 | Hunan, China | 2010 | n/a | CRF01_4AE | database |
| HQ215555 | 1109 | Hebei, China | 2009 | MSM | CRF01_4AE | database |
| JX112859 | TJ070003 | Tianjin, China | 2007 | MSM | CRF01_4AE | database |
| KF835542 | 07CNYN364 | Yunnan, China | 2007 | ST | CRF01_4AE | database |
| JX960612 | 08LNA002 | Liaoning, China | 2008 | MSM | CRF01_5AE | database |
| JX960614 | 09LNA230 | Liaoning, China | 2009 | MSM | CRF01_5AE | database |
| JX960613 | 09LNA020 | Liaoning, China | 2009 | MSM | CRF01_5AE | database |
| JX960615 | 09LNA040 | Liaoning, China | 2009 | MSM | CRF01_5AE | database |
| JX960616 | 10LNA821 | Liaoning, China | 2010 | MSM | CRF01_5AE | database |
| JX960617 | 08LNA004 | Liaoning, China | 2008 | MSM | CRF01_5AE | database |
| JX960618 | 09LNA041 | Liaoning, China | 2009 | MSM | CRF01_5AE | database |
| JX960619 | 10LNA294 | Liaoning, China | 2010 | MSM | CRF01_5AE | database |
| JX960620 | 10LNA918 | Liaoning, China | 2010 | MSM | CRF01_5AE | database |
| JX960621 | 09LNA425 | Liaoning, China | 2009 | MSM | CRF01_5AE | database |
| JX960622 | 10LNA264 | Liaoning, China | 2010 | MSM | CRF01_5AE | database |
| JX960623 | 09LNA013 | Liaoning, China | 2009 | MSM | CRF01_5AE | database |
| JX960624 | 10LNA669 | Liaoning, China | 2010 | MSM | CRF01_5AE | database |

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| JX960625 | 09LNA527 | Liaoning, China | 2009 | MSM | CRF01_5AE | database |
| JX960626 | 10LNA105 | Liaoning, China | 2009 | MSM | CRF01_5AE | database |
| JX960627 | 09LNA007 | Liaoning, China | 2009 | MSM | CRF01_5AE | database |
| JX960628 | 09LNA353 | Liaoning, China | 2009 | MSM | CRF01_5AE | database |
| JX960629 | 10LNA016 | Liaoning, China | 2009 | MSM | CRF01_5AE | database |
| JX960630 | 09LNA005 | Liaoning, China | 2009 | MSM | CRF01_5AE | database |
| JX960631 | 09LNA136 | Liaoning, China | 2009 | MSM | CRF01_5AE | database |
| JX960632 | 10LNA976 | Liaoning, China | 2010 | MSM | CRF01_5AE | database |
| JX960633 | 10LNA057 | Liaoning, China | 2010 | MSM | CRF01_5AE | database |
| JX960634 | 09LNA025 | Liaoning, China | 2009 | MSM | CRF01_5AE | database |
| JX112854 | LN070008 | Liaoning, China | 2007 | MSM | CRF01_5AE | database |
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| JX112856 | LN070013 | Liaoning, China | 2007 | Hetero | CRF01_5AE | database |
| JX112846 | JL100005 | Jilin, China | 2010 | Hetero | CRF01_5AE | database |
| JX112847 | JL100007 | Jilin, China | 2010 | MSM | CRF01_5AE | database |
| JX112848 | JL100014 | Jilin, China | 2010 | MSM | CRF01_5AE | database |
| JX112849 | JL100020 | Jilin, China | 2010 | MSM | CRF01_5AE | database |
| KP860667 | JL100034 | Jilin, China | 2010 | MSM | CRF01_5AE | this study |
| KP860668 | JL100038 | Jilin, China | 2010 | MSM | CRF01_5AE | this study |
| KP860669 | JL110010 | Jilin, China | 2011 | MSM | CRF01_5AE | this study |
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| HQ215553 | 1119 | Hebei, China | 2009 | MSM | CRF01_5AE | database |
| JX447081 | AA033a_wg6a | Thailand | 2005 | n/a | CRF01_5AE | database |
| EF036527 | FJ055 | Fujian, China | 2005 | Hetero | CRF01_6AE | database |
| EF036530 | FJ057 | Fujian, China | 2005 | Hetero | CRF01_6AE | database |
| JX112812 | FJ070018 | Fujian, China | 2007 | Hetero | CRF01_6AE | database |
| JX112818 | FJ070043 | Fujian, China | 2007 | Hetero | CRF01_6AE | database |
| JX112860 | YN0203 | Yunnan, China | 2002 | Hetero | CRF01_7AE | database |
| JX112862 | YN0225 | Yunnan, China | 2002 | Hetero | CRF01_7AE | database |
| JX112865 | YN0235 | Yunnan, China | 2002 | Hetero | CRF01_7AE | database |
| KF835538 | 07CNYN359 | Yunnan, China | 2007 | Hetero | CRF01_8AE | database |
| KF835516 | 07CNYN329 | Yunnan, China | 2007 | n/a | CRF01_8AE | database |
| KF835536 | 07CNYN357 | Yunnan, China | 2007 | ST | CRF01_8AE | database |
| JX112820 | GD070058 | Guangdong, China | 2007 | Hetero | CRF01_8AE | database |
| JX112821 | GD070059 | Guangdong, China | 2007 | Hetero | CRF01_8AE | database |
| AY358049 | OUR258I | Thailand | 1999 | IDU | CRF01_9AE | database |
| AY358061 | OUR746I | Thailand | 2000 | IDU | CRF01_9AE | database |
| AY358051 | OUR422I | Thailand | 1999 | IDU | CRF01_9AE | database |
| AY358039 | OUR199I | Thailand | 1999 | IDU | CRF01_10AE | database |
| AY358047 | OUR202I | Thailand | 1999 | IDU | CRF01_10AE | database |
| AY358048 | OUR203I | Thailand | 1999 | IDU | CRF01_10AE | database |
| AY358066 | OUR200I | Thailand | 2000 | IDU | CRF01_10AE | database |
| AY358046 | OUR201I | Thailand | 2000 | IDU | CRF01_10AE | database |
| JX112867 | YN09P0011 | Yunnan, China | 2009 | Hetero | | database |
| JX112868 | YN09P0015 | Yunnan, China | 2009 | Hetero | | database |
| JX112861 | YN0221 | Yunnan, China | 2002 | IDU | | database |
| JX112863 | YN0229 | Yunnan, China | 2002 | IDU | | database |
| JX112864 | YN0232 | Yunnan, China | 2002 | Hetero | | database |
| JX112866 | YN0236 | Yunnan, China | 2002 | Hetero | | database |
| KF835499 | 07CNYN312 | Yunnan, China | 2007 | MTCT | | database |
| KF835502 | 07CNYN315 | Yunnan, China | 2007 | ST | | database |
| KF835503 | 07CNYN316 | Yunnan, China | 2007 | ST | | database |
| KF835504 | 07CNYN317 | Yunnan, China | 2007 | n/a | | database |
| KF835505 | 07CNYN318 | Yunnan, China | 2007 | MTCT | | database |
| KF835513 | 07CNYN326 | Yunnan, China | 2007 | Hetero | | database |

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|----------|------------|--------------------|------|--------|----------|
| KF835514 | 07CNYN327 | Yunnan, China | 2007 | IDU | database |
| KF835518 | 07CNYN332 | Yunnan, China | 2007 | ST | database |
| KF835519 | 07CNYN333 | Yunnan, China | 2007 | ST | database |
| KF835523 | 07CNYN337 | Yunnan, China | 2007 | MTCT | database |
| KF835527 | 07CNYN342 | Yunnan, China | 2007 | ST | database |
| KF835528 | 07CNYN343 | Yunnan, China | 2007 | n/a | database |
| KF835533 | 07CNYN354 | Yunnan, China | 2007 | ST | database |
| KF835543 | 07CNYN366 | Yunnan, China | 2007 | ST | database |
| DQ859179 | FJ053 | Fujian, China | 2005 | Hetero | database |
| DQ859178 | FJ051 | Fujian, China | 2005 | Hetero | database |
| DQ859180 | FJ054 | Fujian, China | 2006 | Hetero | database |
| EF036532 | FJ063 | Fujian, China | 2006 | Hetero | database |
| EF036534 | FJ065 | Fujian, China | 2005 | Hetero | database |
| EF036535 | FJ066 | Fujian, China | 2005 | Hetero | database |
| JX112813 | FJ070033 | Fujian, China | 2007 | n/a | database |
| JX960603 | 09LNA379 | Liaoning, China | 2009 | MSM | database |
| JX112844 | GZ070126 | Guizhou, China | 2007 | n/a | database |
| DQ234790 | HK001 | Hong Kong | 2004 | n/a | database |
| FJ185246 | 97VNAG202 | Angiang, Vietnam | 1997 | Hetero | database |
| FJ185252 | 97VNAG212 | Angiang, Vietnam | 1997 | Hetero | database |
| FJ185253 | 97VNAG214 | Angiang, Vietnam | 1997 | Hetero | database |
| FJ185254 | 97VNAG216 | Angiang, Vietnam | 1997 | Hetero | database |
| FJ185255 | 97VNAG218 | Angiang, Vietnam | 1997 | Hetero | database |
| FJ185258 | 97VNAG223 | Angiang, Vietnam | 1997 | Hetero | database |
| FJ185249 | 97VNAG207 | Angiang, Vietnam | 1997 | Hetero | database |
| FJ185250 | 97VNAG208 | Angiang, Vietnam | 1997 | Hetero | database |
| FJ185247 | 97VNAG204 | Angiang, Vietnam | 1997 | Hetero | database |
| FJ185248 | 97VNAG206 | Angiang, Vietnam | 1997 | Hetero | database |
| FJ185251 | 97VNAG210 | Angiang, Vietnam | 1997 | Hetero | database |
| FJ185237 | 97VNHCM301 | Hochiminh, Vietnam | 1997 | Hetero | database |
| FJ185241 | 97VNHCM314 | Hochiminh, Vietnam | 1997 | Hetero | database |
| FJ185242 | 97VNHCM319 | Hochiminh, Vietnam | 1997 | Hetero | database |
| FJ185243 | 97VNHCM343 | Hochiminh, Vietnam | 1997 | Hetero | database |
| FJ185244 | 97VNHCM345 | Hochiminh, Vietnam | 1997 | Hetero | database |
| AY358052 | OUR595I | Thailand | 2000 | IDU | database |
| AF164485 | 93TH9021 | Thailand | 1993 | n/a | database |
| JN248318 | 04TH107542 | Thailand | 2004 | n/a | database |
| JN248338 | 05TH127331 | Thailand | 2005 | n/a | database |
| AY945718 | 99TH_C2405 | Thailand | 1999 | n/a | database |
| AB032740 | 95TNIH022 | Thailand | 1995 | Hetero | database |
| AB032741 | 95TNIH047 | Thailand | 1995 | Hetero | database |
| AB220944 | 93TH051 | Thailand | 1993 | n/a | database |
| AB220945 | 93TH054 | Thailand | 1993 | n/a | database |
| AB220946 | 93TH060 | Thailand | 1993 | n/a | database |
| AB220947 | 93TH062 | Thailand | 1993 | n/a | database |
| AB220948 | 93TH065 | Thailand | 1993 | IDU | database |
| AB253424 | 93TH057 | Thailand | 1993 | IDU | database |
| AF259954 | CM235 | Thailand | 1990 | Hetero | database |
| AY125894 | 97TH6_107 | Thailand | 1997 | n/a | database |
| AY358036 | OUR786I | Thailand | 2001 | IDU | database |
| AY358037 | OUR737I | Thailand | 2002 | IDU | database |
| AY358038 | OUR674I | Thailand | 2001 | IDU | database |
| AY358040 | OUR609I | Thailand | 2001 | IDU | database |
| AY358041 | OUR642I | Thailand | 2001 | IDU | database |
| AY358042 | OUR044I | Thailand | 1999 | IDU | database |
| AY358043 | OUR066I | Thailand | 1999 | IDU | database |

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|----------|-------------|----------|------|--------|----------|
| AY358044 | OUR098I | Thailand | 1999 | IDU | database |
| AY358045 | OUR164I | Thailand | 1999 | IDU | database |
| AY358050 | OUR414I | Thailand | 2001 | Hetero | database |
| AY358056 | OUR647I | Thailand | 2001 | IDU | database |
| AY358057 | OUR661I | Thailand | 2000 | IDU | database |
| AY358059 | OUR702I | Thailand | 2001 | IDU | database |
| AY358060 | OUR724I | Thailand | 2000 | IDU | database |
| AY358062 | OUR769I | Thailand | 2002 | IDU | database |
| AY358063 | OUR810I | Thailand | 2000 | IDU | database |
| AY358064 | OUR830I | Thailand | 2001 | IDU | database |
| AY358065 | OUR008I | Thailand | 1999 | IDU | database |
| AY358067 | OUR721I | Thailand | 2000 | IDU | database |
| AY358068 | OUR788I | Thailand | 2001 | IDU | database |
| AY713419 | 97TH_NP1695 | Thailand | 1997 | n/a | database |
| AY713420 | 97TH_NP1525 | Thailand | 1997 | n/a | database |
| AY713421 | 96TH_NI1046 | Thailand | 1996 | n/a | database |
| AY713422 | 98TH_NP1251 | Thailand | 1998 | n/a | database |
| AY713423 | 99TH_NI1052 | Thailand | 1999 | n/a | database |
| AY713424 | 96TH_M02138 | Thailand | 1996 | n/a | database |
| AY713425 | 90TH_CM244 | Thailand | 1990 | n/a | database |
| AY945712 | 99TH_C1080 | Thailand | 1999 | Hetero | database |
| AY945713 | 01TH_C1436 | Thailand | 2001 | n/a | database |
| AY945716 | 00TH_C2101 | Thailand | 2000 | Hetero | database |
| AY945717 | 00TH_C2257 | Thailand | 2000 | n/a | database |
| AY945719 | 01TH_C2570 | Thailand | 2001 | n/a | database |
| AY945720 | 01TH_C3256 | Thailand | 2001 | n/a | database |
| AY945721 | 00TH_C3347 | Thailand | 2000 | n/a | database |
| AY945722 | 00TH_C4118 | Thailand | 2000 | n/a | database |
| AY945724 | 00TH_C4151 | Thailand | 2000 | n/a | database |
| AY945725 | 00TH_C4382 | Thailand | 2000 | n/a | database |
| AY945726 | 99TH_C4460 | Thailand | 1999 | n/a | database |
| AY945727 | 99TH_R1149 | Thailand | 1999 | Hetero | database |
| AY945728 | 98TH_R1166 | Thailand | 1998 | Hetero | database |
| AY945730 | 01TH_R2184 | Thailand | 2001 | Hetero | database |
| AY945731 | 99TH_R3006 | Thailand | 1999 | Hetero | database |
| AY945732 | 99TH_R3265 | Thailand | 1999 | Hetero | database |
| DQ314731 | BKD | Thailand | 2004 | MTCT | database |
| DQ314732 | BKM | Thailand | 2004 | n/a | database |
| DQ354117 | M114 | Thailand | 1996 | Hetero | database |
| DQ789392 | C1705 | Thailand | 2000 | n/a | database |
| JN248324 | 04TH328531 | Thailand | 2004 | n/a | database |
| JN248327 | 04TH427990 | Thailand | 2004 | n/a | database |
| JN248328 | 04TH505841 | Thailand | 2004 | n/a | database |
| JN248330 | 04TH613543 | Thailand | 2004 | n/a | database |
| JN248334 | 04TH807015 | Thailand | 2004 | n/a | database |
| JN248336 | 04TH817196 | Thailand | 2004 | n/a | database |
| JN248339 | 05TH130087 | Thailand | 2005 | n/a | database |
| JN248341 | 05TH327568 | Thailand | 2005 | n/a | database |
| JN248342 | 05TH342968 | Thailand | 2005 | n/a | database |
| JN248355 | 05TH741452 | Thailand | 2005 | n/a | database |
| JN248356 | 05TH841749 | Thailand | 2005 | n/a | database |
| JN860761 | MERLBDTRC2 | Thailand | 2007 | n/a | database |
| JN860763 | MERLBDTRC4 | Thailand | 2007 | n/a | database |
| JN860764 | MERLBDTRC5 | Thailand | 2007 | n/a | database |
| JN860766 | MERLBDTRC7 | Thailand | 2007 | n/a | database |
| JN860767 | MERLBDTRC8 | Thailand | 2007 | n/a | database |

| | | | | | |
|----------|----------------|---------------|------|--------|----------|
| JN860768 | MERLBDTRC9 | Thailand | 2008 | n/a | database |
| JX446666 | AA002a_WG1 | Thailand | 2006 | n/a | database |
| JX446712 | AA004a_wg4a | Thailand | 2005 | n/a | database |
| JX446736 | AA006a02 | Thailand | 2006 | n/a | database |
| JX446756 | AA007a_WG10 | Thailand | 2008 | n/a | database |
| JX446855 | AA014a01 | Thailand | 2006 | n/a | database |
| JX446877 | AA015a_WG4 | Thailand | 2007 | n/a | database |
| JX446899 | AA017a_wg1 | Thailand | 2006 | n/a | database |
| JX446918 | AA019a_WG11 | Thailand | 2007 | n/a | database |
| JX446994 | AA024a04 | Thailand | 2007 | n/a | database |
| JX447025 | AA027a_wg1a | Thailand | 2004 | n/a | database |
| JX447028 | AA028a_wg3 | Thailand | 2007 | n/a | database |
| JX447057 | AA030a04 | Thailand | 2007 | n/a | database |
| JX447064 | AA031a02 | Thailand | 2007 | n/a | database |
| JX447074 | AA032a04 | Thailand | 2008 | n/a | database |
| JX447089 | AA034a_wg2 | Thailand | 2006 | n/a | database |
| JX447127 | AA037a_WG6 | Thailand | 2008 | n/a | database |
| JX447132 | AA038a_WG3 | Thailand | 2006 | n/a | database |
| JX447268 | AA049a_WG13 | Thailand | 2005 | n/a | database |
| JX447283 | AA050a_WG7 | Thailand | 2007 | n/a | database |
| JX447303 | AA052a08 | Thailand | 2008 | n/a | database |
| JX447308 | AA054a06 | Thailand | 2008 | n/a | database |
| JX447312 | AA055a_WG4 | Thailand | 2006 | n/a | database |
| JX447316 | AA056a_WG5 | Thailand | 2006 | n/a | database |
| JX447358 | AA059a_WG9 | Thailand | 2006 | n/a | database |
| JX447359 | AA060a_WG1 | Thailand | 2008 | n/a | database |
| JX447409 | AA063a_WG37 | Thailand | 2006 | n/a | database |
| JX447413 | AA064a_WG2 | Thailand | 2005 | n/a | database |
| JX447458 | AA067a_WG12 | Thailand | 2008 | n/a | database |
| JX447465 | AA068a_14 | Thailand | 2006 | n/a | database |
| JX447503 | AA072a03 | Thailand | 2007 | n/a | database |
| JX447542 | AA075a_WG7 | Thailand | 2004 | n/a | database |
| JX447592 | AA079a_WG4 | Thailand | 2005 | n/a | database |
| JX447619 | AA081a14 | Thailand | 2005 | n/a | database |
| JX447646 | AA082a_WG9 | Thailand | 2006 | n/a | database |
| JX447682 | AA085a_wg2 | Thailand | 2006 | n/a | database |
| JX447712 | AA088a_wg14 | Thailand | 2006 | n/a | database |
| JX447721 | AA089a05 | Thailand | 2007 | n/a | database |
| JX447727 | AA090a_WG11 | Thailand | 2009 | n/a | database |
| JX447891 | AA099a_WG9 | Thailand | 2006 | n/a | database |
| JX447936 | AA101a_WG1 | Thailand | 2005 | n/a | database |
| JX448022 | AA107a_wg4 | Thailand | 2005 | n/a | database |
| JX448028 | AA108a_WG6 | Thailand | 2008 | n/a | database |
| JX448059 | AA111a_WG11 | Thailand | 2009 | n/a | database |
| U51189 | 93TH253 | Thailand | 1993 | Hetero | database |
| AY713426 | 96TH_NI1149 | Thailand | 1996 | n/a | database |
| U54771 | CM240 | Thailand | 1990 | Hetero | database |
| AY444803 | 98US_MSC1120 | United States | 1998 | Hetero | database |
| AY444806 | 98US_MSC3012 | United States | 1998 | Hetero | database |
| JX863920 | 306163_FL | United States | 2005 | n/a | database |
| AY444804 | 00US_MSC1164 | United States | 2000 | Hetero | database |
| AY444805 | 98US_MSC2008 | United States | 1998 | Hetero | database |
| AB052995 | 93JP_NH1 | Japan | 1993 | Hetero | database |
| AB070352 | NH25_93JPNH25T | Japan | 1993 | Hetero | database |
| AB485652 | ID17 | Indonesia | 1993 | n/a | database |
| GQ477441 | 569M | Afghanistan | 2007 | Hetero | database |

| | | | | | |
|----------|--------------------|------------------|------|--------|----------|
| AF197340 | 90CF11697 | ^b CAR | 1990 | n/a | database |
| AF197341 | 90CF4071 | ^b CAR | 1990 | n/a | database |
| U51188 | 90CR402_CAR_E_4002 | ^b CAR | 1990 | Hetero | database |

^aRisk group: Hetero, heterosexual; IDU, injecting drug user; MSM, men who have sex with men; MTCT, mother-to-child transmission; ST, sexual transmission, unspecified type; n/a, not available.

^bCAR represents Central African Republic.

Supplementary Table S2. Estimated time to the most recent common ancestor of each HIV-1 CRF01_AE cluster.

| CRF01_AE cluster | Time to the most recent common ancestor in years (median and 95% credibility interval) |
|-------------------------------|---|
| CRF01_1AE | 1995.39 (1994.29, 1996.38) |
| CRF01_2AE | 1990.71 (1989.93, 1991.49) |
| CRF01_3AE | 1993.17 (1991.41, 1994.97) |
| CRF01_4AE | 1993.30 (1992.07, 1994.54) |
| CRF01_5AE | 1994.89 (1993.57, 1996.10) |
| CRF01_6AE | 1993.43 (1991.39, 1995.25) |
| CRF01_7AE | 1998.55 (1997.71, 1999.37) |
| CRF01_8AE | 1987.50 (1986.24, 1988.86) |
| CRF01_9AE | 1990.75 (1989.31, 1992.13) |
| CRF01_10AE | 1998.83 (1998.51, 1999.08) |
| TH (Thailand HIV-1 CRF01_AE) | 1981.45 (1979.92, 1982.89) |
| PAN (Pandemic HIV-1 CRF01_AE) | 1983.73 (1982.70, 1984.73) |

Supplementary Table S3. Statistical analysis of the geographic location of CRF01_AE (China is divided into regions).

| Statistic | No. of sequences | Observed mean (95% CI) | Null mean (95% CI) | P-value |
|----------------------------|-------------------------|-------------------------------|---------------------------|----------------|
| AI | | 18.3 (17.4, 19.1) | 29.9 (28.1, 31.8) | <0.001* |
| PS | | 125.6 (124.0, 128.0) | 180.2 (174.0, 186.0) | <0.001* |
| MC (AF) | 1 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (CF) | 3 | 1.8 (1.0, 2.0) | 1.0 (1.0, 1.0) | 0.003* |
| MC (Central of China) | 2 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (Eastern of China) | 50 | 2.0 (2.0, 2.0) | 2.1 (1.5, 3.0) | 0.804 |
| MC (Northeastern of China) | 43 | 3.0 (3.0, 3.0) | 2.0 (1.1, 3.0) | 0.048* |
| MC (Southwestern of China) | 59 | 3.0 (3.0, 3.0) | 2.3 (2.0, 3.0) | 0.128 |
| MC (HK) | 1 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (ID) | 1 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (JP) | 2 | 2.0 (2.0, 2.0) | 1.0 (1.0, 1.0) | 0.002* |
| MC (TH) | 134 | 40.0 (40.0, 40.0) | 3.9 (3.0, 5.96) | 0.001* |
| MC (US) | 5 | 2.0 (2.0, 2.0) | 1.0 (1.0, 1.0) | 0.011* |
| MC (VN) | 33 | 5.0 (5.0, 5.0) | 1.7 (1.0, 2.1) | 0.001* |

AI, association index.

PS, parsimony score.

MC, monophyletic clade statistic.

95% CI, 95% credibility interval.

*Statistically significant ($P < 0.05$).

N/A, not available because of the observed 95% CI contains the null 95% CI.

Supplementary Table S4. Statistical analysis of the geographic location of CRF01_AE (China is divided into provinces).

| Statistic | No. of sequences | Observed mean (95% CI) | Null mean (95% CI) | <i>P</i>-value |
|------------------|-------------------------|-------------------------------|---------------------------|-----------------------|
| AI | | 19.4 (18.5, 20.3) | 31.8 (30.0, 33.5) | <0.001* |
| PS | | 135.7 (134.0, 138.0) | 190.4 (185.9, 194.5) | <0.001* |
| MC (AF) | 1 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (CF) | 3 | 1.8 (1.0, 2.0) | 1.0 (1.0, 1.0) | 0.003* |
| MC (Beijing) | 13 | 2.0 (2.0, 2.0) | 1.2 (1.0, 2.0) | 0.077 |
| MC (Fujian) | 19 | 2.0 (2.0, 2.0) | 1.3 (1.0, 2.0) | 0.138 |
| MC (Hebei) | 2 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (Hunan) | 2 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (Guangdong) | 10 | 2.0 (2.0, 2.0) | 1.1 (1.0, 2.0) | 0.04* |
| MC (Guangxi) | 24 | 3.0 (3.0, 3.0) | 1.5 (1.0, 2.0) | 0.009* |
| MC (Guizhou) | 6 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (Jiangsu) | 5 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (Jilin) | 8 | 1.2 (1.0, 2.0) | 1.1 (1.0, 1.8) | N/A |
| MC (Liaoning) | 35 | 3.0 (3.0, 3.0) | 1.8 (1.0, 2.4) | 0.021* |
| MC (Sichuan) | 2 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (Tianjin) | 1 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (Yunnan) | 27 | 1.5 (1.0, 2.0) | 1.6 (1.0, 2.0) | N/A |
| MC (HK) | 1 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (ID) | 1 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (JP) | 2 | 2.0 (2.0, 2.0) | 1.0 (1.0, 1.0) | 0.004* |
| MC (TH) | 134 | 40.0 (40.0, 40.0) | 3.9 (3.0, 6.0) | 0.001* |
| MC (US) | 5 | 2.0 (2.0, 2.0) | 1.0 (1.0, 1.0) | 0.006* |
| MC (VN) | 33 | 5.0 (5.0, 5.0) | 1.7 (1.0, 2.2) | 0.001* |

AI, association index.

PS, parsimony score.

MC, monophyletic clade statistic.

95% CI, 95% credibility interval.

*Statistically significant ($P < 0.05$).

N/A, not available because of the observed 95% CI contains the null 95% CI.

Supplementary Table S5. Statistical analysis of the geographic location of CRF01_AE (China and Vietnam are divided into provinces).

| Statistic | No. of sequences | Observed mean (95% CI) | Null mean (95% CI) | P-value |
|------------------|-------------------------|-------------------------------|---------------------------|----------------|
| AI | | 20.1 (19.3, 21.1) | 32.2 (30.4, 33.7) | <0.001* |
| PS | | 143.8 (141.0, 146.0) | 192.1 (187.9, 195.9) | <0.001* |
| MC (AF) | 1 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (CF) | 3 | 1.8 (1.0, 2.0) | 1.0 (1.0, 1.0) | 0.003* |
| MC (Beijing) | 13 | 2.0 (2.0, 2.0) | 1.1 (1.0, 2.0) | 0.055 |
| MC (Fujian) | 19 | 2.0 (2.0, 2.0) | 1.3 (1.0, 2.0) | 0.141 |
| MC (Hebei) | 2 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (Hunan) | 2 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (Guangdong) | 10 | 2.0 (2.0, 2.0) | 1.1 (1.0, 1.9) | 0.031* |
| MC (Guangxi) | 24 | 3.0 (3.0, 3.0) | 1.4 (1.0, 2.0) | 0.008* |
| MC (Guizhou) | 6 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (Jiangsu) | 5 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (Jilin) | 8 | 1.2 (1.0, 2.0) | 1.1 (1.0, 1.5) | N/A |
| MC (Liaoning) | 35 | 3.0 (3.0, 3.0) | 1.8 (1.0, 2.2) | 0.018* |
| MC (Sichuan) | 2 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (Tianjin) | 1 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (Yunnan) | 27 | 1.5 (1.0, 2.0) | 1.6 (1.0, 2.0) | N/A |
| MC (HK) | 1 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (ID) | 1 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (JP) | 2 | 2.0 (2.0, 2.0) | 1.0 (1.0, 1.0) | 0.002* |
| MC (TH) | 134 | 40.0 (40.0, 40.0) | 4.0 (2.9, 6.0) | 0.001* |
| MC (US) | 5 | 2.0 (2.0, 2.0) | 1.0 (1.0, 1.0) | 0.008* |
| MC (An Giang) | 14 | 5.0 (5.0, 5.0) | 1.2 (1.0, 2.0) | 0.001* |
| MC (Bac Giang) | 4 | 2.0 (2.0, 2.0) | 1.0 (1.0, 1.0) | 0.004* |
| MC (Hai Duong) | 3 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |
| MC (Ho Chi Minh) | 10 | 3.0 (3.0, 3.0) | 1.1 (1.0, 2.0) | 0.001* |
| MC (Nam Dinh) | 2 | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | N/A |

AI, association index.

PS, parsimony score.

MC, monophyletic clade statistic.

95% CI, 95% credibility interval.

*Statistically significant ($P < 0.05$).

N/A, not available because of the observed 95% CI contains the null 95% CI.

Supplementary Table S6. International tourist arrivals to Thailand by Chinese nationals^a.

| Year | Number | %Shared^b | %Δ^c | Rank^d |
|-------------|---------------|----------------------------|---|-------------------------|
| 2014 | 4623806 | 18.66 | -0.29 | 1 |
| 2013 | 4637335 | 17.47 | 66.40 | 1 |
| 2012 | 2786860 | 12.47 | 61.91 | 1 |
| 2011 | 1721247 | 8.95 | 53.38 | 2 |
| 2010 | 1122219 | 7.04 | 44.34 | 2 |
| 2009 | 777508 | 5.49 | -5.95 | 4 |
| 2008 | 826660 | 5.67 | -8.87 | 4 |
| 2007 | 907117 | 6.27 | -4.43 | 4 |
| 2006 | 949117 | 6.87 | 0.22 | 4 |
| 2005 | 776792 | 6.72 | 6.43 | 4 |
| 2004 | 729848 | 6.22 | 0.20 | 5 |
| 2003 | 606635 | 6.02 | -23.98 | 5 |
| 2002 | 797976 | 7.34 | -0.42 | 3 |
| 2001 | 801362 | 7.91 | 6.31 | 3 |
| 2000 | 753781 | 7.87 | -7.35 | 3 |
| 1999 | 813596 | 9.40 | 34.60 | 3 |
| 1998 | 604472 | 7.71 | 33.58 | 3 |
| 1997 | 452510 | 6.20 | | 3 |

^aSource of data: Immigration Bureau, Police Department, Thailand.

^b%Shared: the proportion of international tourist arrivals to Thailand by Chinese nationals.

^c% Δ : the difference between the number of current year's and last year's Chinese

^dRank: rank China by the source of international tourist arrivals to Thailand.

Supplementary Table S7. Description of the reference near-complete genome sequences for HIV-1 CRF01_AE clusters.

| CRF01_AE cluster | Sequence name | Acc. No. | Sampling year | Sampling Country (origin) | Reference |
|-------------------------|----------------------|-----------------|----------------------|----------------------------------|--|
| CRF01_1AE | 05GX034 | GQ845124 | 2005 | China | Li, L. <i>ARHR</i> 26 : 699-704 (2010) |
| CRF01_2AE | 97VNHCM310 | FJ185240 | 1997 | Vietnam | Liao, H. <i>Virology</i> 391 : 51-56 (2009) |
| CRF01_3AE | GZ070123 | JX112843 | 2007 | China | Feng, Y. <i>AIDS</i> 27 : 1793-1802 (2013) |
| CRF01_4AE | 07CNYN364 | KF835542 | 2007 | China | Liu, Y. unpublished |
| CRF01_5AE | AA033a_wg6a | JX447081 | 2005 | Thailand | Rolland, M. <i>Nature</i> 490 : 417-420 (2012) |
| CRF01_6AE | Fj057 | EF036530 | 2005 | China | Huang, H.L. <i>ARHR</i> 23 : 569-574 (2007) |
| CRF01_7AE | YN0235 | JX112865 | 2002 | China | Feng, Y. <i>AIDS</i> 27 : 1793-1802 (2013) |
| CRF01_8AE | GD070059 | JX112821 | 2007 | China | Feng, Y. <i>AIDS</i> 27 : 1793-1802 (2013) |
| CRF01_9AE | OUR422I | AY358051 | 1999 | Thailand | Tovanabutra, S. <i>ARHR</i> 20 : 465-475 (2013) |
| CRF01_10AE | OUR200I | AY358066 | 2000 | Thailand | Tovanabutra, S. <i>ARHR</i> 20 : 465-475 (2013) |