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| **Supplementary Digital Content 2. Countries included in each region in EuroSIDA** |
| **Southern Europe** | **Central Western Europe** | **Northern Europe** | **Central Eastern Europe** | **Eastern Europe** | **Argentina** |
| Spain | France | United Kingdom | Poland | Estonia | Argentina |
| Portugal | Belgium | Ireland | the Czech Republic | Latvia |  |
| Italy | South Germany | the Netherlands | Slovakia | Lithuania |  |
| Greece | Luxembourg | North Germany | Hungary | Belarus |  |
| Israel | Switzerland | Denmark | Romania | Ukraine |  |
|  | Austria | Sweden | Serbia | the Russian Federation |  |
|  |  | Norway | Bulgaria |  |  |
|  |  | Finland | Croatia |  |  |



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| **Supplementary Digital Content 4. Factors associated with having a resistance test after VF** |
|   |   | **Unadjusted** | **Adjusted1,2** |  |
|  |  | **OR (95% CI)** | **P-value** | **OR (95% CI)** | **P-value** | **Global P-value** |
| Age (per 10 year increase |   | 1.26 (1.22 - 1.31) | <.001 | 1.03 (0.99 - 1.08) | 0.10 | 0.12 |
| CD4 at failure, per 100 increase2 |   | 0.99 (0.97 - 1.00) | 0.09 | 1.01 (1.00 - 1.03) | 0.07 | 0.08 |
| Gender | *Male* |   |   |   |   | 0.75 |
|   | *Female* | 0.86 (0.79 - 0.95) | 0.002 | 0.98 (0.89 - 1.08) | 0.75 |  |
| Ethnic Group | *White* |   |   |   |   |  |
|   | *Non-white* | 1.16 (1.04 - 1.30) | 0.01 | 0.83 (0.75 - 0.92) | <.001 | <.001 |
| Risk Group | *MSM* |   |   |   |   |  |
|   | *IDU* | 0.68 (0.61 - 0.75) | <.001 | 0.91 (0.82 - 1.00) | 0.05 | 0.03 |
|   | *Heterosexual* | 0.88 (0.80 - 0.97) | 0.01 | 1.03 (0.93 - 1.14) | 0.54 |  |
|   | *Other* | 1.03 (0.89 - 1.20) | 0.68 | 1.10 (0.96 - 1.26) | 0.19 |  |
| Region | *South* |   |   |   |   | <.001 |
|   | *Central West* | 1.56 (1.40 - 1.72) | <.001 | 1.66 (1.51 - 1.82) | <.001 |  |
|   | *North* | 2.03 (1.84 - 2.24) | <.001 | 2.15 (1.96 - 2.36) | <.001 |  |
|   | *Central East* | 0.98 (0.84 - 1.15) | 0.82 | 0.94 (0.81 - 1.09) | 0.41 |  |
|   | *East* | 0.55 (0.42 - 0.71) | <.001 | 0.72 (0.55 - 0.94) | 0.02 |  |
| ARVs used at failure | *PI (boosted)* |   |   |   |   | 0.01 |
|   | *PI (unboosted)* | 0.67 (0.58 - 0.76) | <.001 | 0.92 (0.80 - 1.05) | 0.202 |  |
|   | *NNRTI* | 1.08 (0.91 - 1.29) | 0.36 | 1.11 (0.93 - 1.33) | 0.24 |  |
|   | *PI and NNRTI* | 1.76 (1.58 - 1.96) | <.001 | 0.96 (0.86 - 1.07) | 0.49 |  |
|   | *Neither PI or NNRTI* | 0.50 (0.60 - 0.42) | <.001 | 0.77 (0.65 - 0.91) | 0.003 |  |
| History of mono/dual therapy | *No* |   |   |   |   | 0.48 |
|   | *Yes* | 1.27 (1.15 - 1.40) | <.001 | 0.96 (0.86 - 1.07) | 0.47 |  |
| RNA at failure | *<1000* |   |   |   |   | <.001 |
|   | *1000-10000* | 1.91 (1.71 - 2.14) | <.001 | 2.10 (1.86 - 2.37) | <.001 |  |
|   | *10000-50000* | 2.38 (2.12 - 2.67) | <.001 | 2.74 (2.43 - 3.10) | <.001 |  |
|   | *>50000* | 2.48 (2.18 - 2.82) | <.001 | 2.68 (2.34 - 3.07) | <.001 |  |
| Previous Resistance Test | *None* |   |   |   |   | <.001 |
|   | *1* | 10.32 (9.26 - 11.51) | <.001 | 6.26 (5.51 - 7.12) | <.001 |  |
|   | *2-4* | 11.19 (9.72 - 12.89) | <.001 | 6.76 (5.75 - 7.93) | <.001 |  |
|   | *>4* | 14.85 (9.59 - 22.99) | <.001 | 11.23 (7.04 - 17.92) | <.001 |  |
| Previous Virological failure | *No* |   |   |   |   | 0.002 |
|   | *Yes* | 3.16 (2.88 - 3.46) | <.001 | 1.19 (1.06 - 1.33) | 0.003 |  |
| Calendar Year | *97-98* | 0.08 (0.07 - 0.10) | <.001 | 0.11 (0.09 - 0.14) | <.001 | <.001 |
|   | *99-00* | 0.39 (0.36 - 0.44) | <.001 | 0.49 (0.43 - 0.55) | <.001 |  |
|   | *01-02* | 0.75 (0.68 - 0.82) | <.001 | 0.85 (0.76 - 0.95) | 0.003 |  |
|   | *03-04* |   |   |   |   |  |
|   | *05-06* | 0.84 (0.75 - 0.94) | 0.002 | 0.77 (0.68 - 0.89) | <.001 |  |
|   | *07-08* | 0.52 (0.45 - 0.60) | <.001 | 0.46 (0.39 - 0.54) | <.001 |  |
|   | *09-10* | 0.32 (0.26 - 0.39) | <.001 | 0.33 (0.27 - 0.41) | <.001 |  |
|   | *11-12* | 0.22 (0.17 - 0.28) | <.001 | 0.25 (0.19 - 0.32) | <.001 |  |

*1. The multivariable model is adjusted for all the variables listed in the table.*

*2. 26 individuals were excluded from the model with CD4 count as an exposure as well as the multivariable model due to missing CD4 counts.*

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| **Supplementary Digital Content 5. Prevalence of testing and resistance using different inclusion criteria** |  |
|  | **Definition A1** | **Definition B2** | **Definition C3** | **Definition D4** | **Definition E5** | **Definition F6** | **Definition G7** |
|  | **N *(%)*** | **N *(%)*** | **N *(%)*** | **N  *(%)*** | **N *(%)*** | **N *(%)*** | **N *(%)*** |
| Failing | 8468 | 6017 | 9661 | 7828 | 1894 | 5748 | 3776 |
| Resistance test/individual | 2676 (*31.6)* | 2204 (*36.6)* | 2210 (22.9) | 2547 (3*2.5)* | 823 *(43.5)* | 1863 *(32.4)* | 1767 *(46.8)* |
| Detected resistance/test | 2431 (*77.9)* | 2078 (*81.1)* | 1886 (76.3) | 2299 *(78.4)* | 268 (*84.8)* | 1788 *(76.5)* | 638 *(81.6)* |

1. *Primary definitions.*
2. *Defining VF as at least 2 consecutive measures >500 instead of a single value, after at least 6 months on ART.*
3. *Defining VF as a single value above the detection limit of the test used after at least 6 months on ART.*
4. *Defining VF as a single VL >1000 (instead of >500) after at least 6 months on ART.*
5. *Restricting the analysis to individuals with adherence data, and excluding individuals with poor adherence (“<75%”) in a given year as reported by the treating physician and using the primary definitions.*
6. *Defining failure as a single viral load >500, requiring an individual to supress to <500 before a subsequent failure was included in the analysis.*
7. *Defining VF as a single viral load >500 followed by a switch to a drug belonging to a class that was not included in the regimen started >6 months earlier.*