

# Using HIV-ASSIST to Guide ART Decision-Making

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# Disclosures

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No conflicts of interest or relationships to disclose

# Outline

1. What is the HIV-ASSIST decision-support tool?
2. Use of HIV-ASSIST in different clinical scenarios

# HIV-ASSIST: Background

# What is HIV-ASSIST?

- A free, online, evidence-based decision support tool for ART selection
- Developed by ID experts
- Uses multiple criteria decision analysis theory and evidence- and guideline-based effectiveness to rank different ART combinations
- Incorporates viral attributes, patient characteristics and preference, comorbidities, and co-medications
- Draws from DHHS and IAS-USA guidelines, clinical trials, Stanford Resistance Database, National HIV Curriculum, Liverpool HIV Drug Interactions, and a scientific advisory panel

# Decision Support Tool for ART Selection

[www.hivassist.com](http://www.hivassist.com)

## Welcome to HIV-ASSIST

HIV-ASSIST is a free, interactive, educational tool to inform clinical decision making for ARV selection

Start Now →

Take the tour ↻

# HIV-ASSIST Inputs: Adding Case Characteristics

**Mutations**

Enter the patient's HIV mutations here, either with or without the mutated amino acid but using uppercase (eg, M184V or 184V). You can use "INSERTION" or "DELETION" as needed (eg, K67DELETION). Separate mutations with commas. Example: 184V, 65R

**Adherence**

Patients with pill aversion (prioritize smaller pills)

Patients who prefer once daily dosing

Patients with intermittent adherence

Increase prioritization of at least 3 active drugs

Penalize regimens with IV/IM dosing

Options for patients with poor adherence.

**Viral Load**

Suppressed (<50) for more than 6 months

Suppressed (<50) for less than 6 months or Low Level Viremia (<200)

Low (200 - 100,000)

High (100,000 - 500,000)

Very high ( $\geq 500,000$ )

Unknown

Select the patient's HIV viral load (if known).

**CD4 Cell Count**

$\leq 50$

$\leq 100$

$\leq 200$

$> 200$

Unknown

Select the patient's CD4 cell count (if known).

**HLA-B5701**

Positive (or unknown)

Negative

Select the patient's HLA-B5701 status (if known).

**Tropism**

R5 virus

X4 virus

Dual Tropic virus

Unknown

Select the patient's HIV tropism (if known).

**Comorbidities, ARV Side Effects, or Pregnancy**

Select the patient's comorbidities or side effects from current ARV medications, or if the patient is pregnant.

**Co-medications**

Select the patient's current medications.

**Treatment History (Prior Failing Regimens)**

Enter the patient's previous ART medications on which the patient had detectable viremia (i.e., failing regimen). Do not include the current regimen (if any).

**Current Regimen**

Enter the patient's current regimen (if any).

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- $\leq 50$
- $\leq 100$
- $\leq 200$
- $> 200$
- Unknown

Select the patient's CD4 cell count (if known).

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- Negative

Select the patient's HLA-B5701 status (if known).

### Tropism

- R5 virus
- X4 virus
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# HIV-ASSIST Inputs: Adding Case Characteristics

|  |  |   |   |
|--|--|---|---|
| <b>Mutations</b><br><input type="text"/><br>Enter the patient's HIV mutations here, either with or without the mutated amino acid but using uppercase (eg, M184V or 184V). You can use "INSERTION" or "DELETION" as needed (eg, K67DELETION). Separate mutations with commas. Example: 184V, 65R   | <b>Adherence</b><br><input type="checkbox"/> Patients with pill aversion (prioritize smaller pills)<br><input type="checkbox"/> Patients who prefer once daily dosing<br><input type="checkbox"/> Patients with intermittent adherence<br><input type="checkbox"/> Increase prioritization of at least 3 active drugs<br><input type="checkbox"/> Penalize regimens with IV/IM dosing<br>Options for patients with poor adherence. |   |   |
| <b>Viral Load</b><br><input type="radio"/> Suppressed (<50) for more than 6 months<br><input type="radio"/> Suppressed (<50) for less than 6 months or Low Level Viremia (<200)<br><input type="radio"/> Low (200 - 100,000)<br><input checked="" type="radio"/> High (100,000 - 500,000)<br><input type="radio"/> Very high (≥ 500,000)<br><input type="radio"/> Unknown<br>Select the patient's HIV viral load (if known). | <b>CD4 Cell Count</b><br><input type="radio"/> ≤ 50<br><input type="radio"/> ≤ 100<br><input type="radio"/> ≤ 200<br><input checked="" type="radio"/> > 200<br><input type="radio"/> Unknown<br>Select the patient's CD4 cell count (if known).  | <b>HLA-B5701</b><br><input type="radio"/> Positive (or unknown)<br><input checked="" type="radio"/> Negative<br>Select the patient's HLA-B5701 status (if known). | <b>Tropism</b><br><input type="radio"/> R5 virus<br><input type="radio"/> X4 virus<br><input type="radio"/> Dual Tropic virus<br><input checked="" type="radio"/> Unknown<br>Select the patient's HIV tropism (if known). |
| <b>Comorbidities, ARV Side Effects, or Pregnancy</b><br><input type="text"/><br>Select the patient's comorbidities or side effects from current ARV medications, or if the patient is pregnant.  | <b>Co-medications</b><br><input type="text"/><br>Select the patient's current medications.   |   |   |
| <b>Treatment History (Prior Failing Regimens)</b><br><input type="text"/><br>Enter the patient's previous ART medications on which the patient had detectable viremia (i.e., failing regimen). Do not include the current regimen (if any).  | <b>Current Regimen</b><br><input type="text"/><br>Enter the patient's current regimen (if any).  |   |   |

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### Current Regimen

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# HIV-ASSIST Inputs

## Exclude these ARVs

- |   |   |  |
|---|---|--|
| <input type="checkbox"/> 3TC (Lamivudine/Epivir)              | <input checked="" type="checkbox"/> LPV/r (Lopinavir-ritonavir/Kaletra)               | <input checked="" type="checkbox"/> ATV (Atazanavir/Reyataz)             |
| <input type="checkbox"/> FTC (Emtricitabine/Emtriva)          | <input checked="" type="checkbox"/> FPV/r (Fosamprenavir-ritonavir/Lexiva and Norvir) | <input type="checkbox"/> DRV (Darunavir/Prezista)                        |
| <input type="checkbox"/> ABC (Abacavir/Ziagen)                | <input checked="" type="checkbox"/> TPV/r (Tipranavir-ritonavir/Aptivus and Norvir)   | <input type="checkbox"/> DRV/r (Darunavir-ritonavir/Prezista and Norvir) |
| <input type="checkbox"/> TAF (Tenofovir/Vemlidy)              | <input checked="" type="checkbox"/> SQV/r (Saquinavir-ritonavir/Invirase and Norvir)  | <input type="checkbox"/> DRV/c (Darunavir-cobicistat/Prezcobix)          |
| <input checked="" type="checkbox"/> TDF (Tenofovir/Viread)    | <input checked="" type="checkbox"/> SQV/r (Saquinavir-ritonavir/Invirase and Norvir)  | <input type="checkbox"/> RAL (Raltegravir/Isentress)                     |
| <input checked="" type="checkbox"/> AZT (Zidovudine/Generic)  | <input checked="" type="checkbox"/> IDV/r (Indinavir-ritonavir/Crixivan and Norvir)   | <input type="checkbox"/> EVG/c (Elvitegravir-cobicistat/Vitekta)         |
| <input checked="" type="checkbox"/> D4T (Stavudine/Zerit)     | <input checked="" type="checkbox"/> NFV (Nelfinavir/Viracept)                         | <input type="checkbox"/> DTG (Dolutegravir/Tivicay)                      |
| <input checked="" type="checkbox"/> DDI (Didanosine/Videx)    | <input checked="" type="checkbox"/> ATV/r (Atazanavir-ritonavir/Reyataz and Norvir)   | <input type="checkbox"/> BIC (Bictegravir/Biktarvy)                      |
| <input type="checkbox"/> EFV (Efavirenz/Sustiva)              | <input checked="" type="checkbox"/> ATV/c (Atazanavir-cobicistat/Evotaz)              | <input type="checkbox"/> CAB (Cabotegravir/Cabenuva)                     |
| <input type="checkbox"/> ETR (Etravirine/Intence)             |   | <input type="checkbox"/> MVC (Maraviroc/Selzentry)                       |
| <input type="checkbox"/> RPV (Rilpivirine/Edurant)            |   | <input type="checkbox"/> IBA (Ibalizumab/Trogarzo)                       |
| <input checked="" type="checkbox"/> NVP (Nevirapine/Viramune) |   | <input type="checkbox"/> FOS (Fostemsavir/Rukobia)                       |
| <input type="checkbox"/> DOR (Doravirine/Pifeltro)            |   |  |

Check any ARVs you would like to exclude due to Allergies, Side Effects or other reasons. Older and less preferred ARVs are pre-selected for exclusion. This will exclude any regimens that include the checked ARVs from the results. ARVs that are in the current regimen will not be excluded.

## What is your preferred regimen?

Select the ART regimen you are considering for this patient.

Submit



# HIV-ASSIST: Regimen Outputs

**Mutations:** None  
**Comorbidities:** None  
**Comedications:** None  
**Treatment history:** None  
**Current regimen:** None

**Adherence:** No options selected  
**CD4:** > 200  
**Viral load:** High (100,000 - 500,000)  
**HLA-B5701:** Negative  
**Tropism:** Unknown

[View results](#)

Instructions (Click to expand)

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HIV-ASSIST Expert Guidance

[Report](#)

[Additional Information](#) ▾

| Regimen       | Weighted Score <sup>▲</sup> | Active Drugs | Total Pills | Frequency (x/day) |
|---------------|-----------------------------|--------------|-------------|-------------------|
| BIC/TAF/FTC   | 1                           | 3            | 1           | 1                 |
| DTG/ABC/3TC   | 1                           | 3            | 1           | 1                 |
| DTG+TAF/FTC   | 1                           | 3            | 2           | 1                 |
| DTG/3TC       | 1                           | 2            | 1           | 1                 |
| DRV/c/TAF/FTC | 1.5                         | 3            | 1           | 1                 |
| EVG/c/TAF/FTC | 1.5                         | 3            | 1           | 1                 |
| DOR+TAF/FTC   | 1.5                         | 3            | 2           | 1                 |

# Instructions on How to Interpret Outputs

Home / ARV Selection Tool / Results

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**Comorbidities:** None  
**Comedications:** None  
**Treatment history:** None  
**Current regimen:** None

**Adherence:** No options selected  
**CD4:** > 200  
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**Instructions (Click to expand)**

HIV-ASSIST calculates a regimen's weighted score on a scale of 1 to 10, in which lower values represent preferred regimens based upon current IAS and DHHS guidelines, while factoring in treatment history, comorbidities, co-medications, and other factors entered on the input page. The weighting system utilizes standardized utility weights based on current literature evidence and expert opinion. HIV-ASSIST is an educational tool and not a substitute for clinical judgement. Click on a regimen and 'Rationale' to see all steps leading to the presented weighted score. Please note that rankings would differ if some factors were weighed more or less than those applied within HIV-ASSIST algorithms.

| HIV-ASSIST Score | Efficacy (likelihood of viral suppression) | Tolerability (side-effects and pill burden) | Notes   |
|------------------|--|---|---|
| ≤ 1.5            | Strong evidence                            | Strong evidence                             | Reserved for fully- or near fully- active regimens.   |
| 1.5 - 2.5        | Strong or moderate evidence                | Strong or moderate evidence                 | Includes regimens that started at better rank but were impacted by mutations, comorbidities, and drug interactions. |
| 2.5 - 4.0        | Moderate evidence                          | Moderate evidence                           | As above. Additionally, most treatment-experienced patients will see regimens in this category.                     |
| 4.0 - 6.0        | Moderate to poor evidence                  | Moderate or poor evidence                   | As above. Additionally, most treatment-experienced patients will see regimens in this category.                     |
| ≥ 6.0            | Poor evidence                              | Poor evidence                               | As above. Additionally, these represent salvage regimens in patients with limited options.                          |
| !                | !  | !   | Signifies that there may be additional regimen warnings.  |

Note: We do not show regimens for which there is evidence against usage.

# Double Click on Regimen for Educational Sheet



HIV-ASSIST Expert Guidance Report [beta] Additional Information Take the tour Save Start Discussion Start Over

| Regimen       | Weighted Score <span>▲</span> | Active Drugs | Total Pills | Frequency (x/day) |
|---------------|-------------------------------|--------------|-------------|-------------------|
| BIC/TAF/FTC   | 1                             | 3            | 1           | 1                 |
| DTG/ABC/3TC   | 1                             | 3            | 1           | 1                 |
| DTG+TAF/FTC   | 1                             | 3            | 2           | 1                 |
| DTG/3TC       | 1                             | 2            | 1           | 1                 |
| DRV/c/TAF/FTC |                               |              |             |                   |
| EVG/c/TAF/FTC |                               |              |             |                   |
| DOR+TAF/FTC   |                               |              |             |                   |
| DRV/r+TAF/FTC |                               |              |             |                   |
| RAL+TAF/FTC   |                               |              |             |                   |
| DTG+DRV/c     |                               |              |             |                   |
| DRV/c+ABC/3TC |                               |              |             |                   |
| DRV/c+3TC     |                               |              |             |                   |

### Education Sheet for BIC/TAF/FTC

Info Sheet Dosing Info ! Rationale

This is a generic educational information sheet for 2 NRTIs + 1 INSTI regimens.

Overview

Regimens containing one INSTI (i.e. RAL, EVG/c, and DTG, BIC) combined with 2 NRTI are well-studied and supported in literature. Current recommendations by DHHS (2019) and IAS-USA (2018) suggest that an INSTI + 2NRTI are “Recommended as an initial regimen” in most treatment naïve patients. **DTG with TAF/FTC or TDF/FTC, and BIC/TAF/FTC, and DTG/ABC/3TC are considered the preferred regimens within HIVASSIST for treatment naïve patients.** EVG/c/TAF/FTC and EVG/c/TDF/FTC are also available coformulated, but have the disadvantage of including an INSTI with a lower barrier to resistance and inclusion of a booster which can have drug interactions. Consequently, EVG/c regimens are no longer preferred in most instances. While RAL containing regimens (with TAF/FTC or TDF/FTC) are still recommended regimens for most people with HIV, RAL containing regimens are ranked lower within HIVASSIST owing to a lower barrier to resistance and the potential for treatment emergent virus after failure.

# Education Sheet: Efficacy in Clinical Trials

| TREATMENT NAÏVE DTG or BIC |                               |                    |   |
|----------------------------|-------------------------------|--------------------|---|
| Trial Name                 | Drugs Compared                | Participants       | Study Results   |
| SINGLE                     | ABC/3TC/DTG vs. TDF/FTC/EFV   | 833 tx-naive       | At week 48, the proportion of participants with an HIV-1 RNA level of less than 50 copies per milliliter was significantly higher in the ABC/3TC/DTG group than in the TDF/FTC/EFV group (88% vs. 81%). Was due primarily to discontinuations because of adverse events (2% in the ABC/3TC/DTG group and 10% in the TDF/FTC/EFV group). At week 144, ABC/3TC/DTG remained superior (71% vs 63% viral suppression).[9, 10] |
| FLAMINGO                   | 2 NRTIs plus DRV/r or DTG     | 484 tx-naive       | At 48 weeks, DTG outperformed DRV/r (viral suppression 90% vs 83%, respectively). Discontinuation due to adverse effects was higher in the DRV/r group than the DTG group (2% vs 4%, respectively), which contributed to the difference in the response rate. DTG continued to outperform DRV/r at 96 weeks (viral suppression 80% vs 66%)[11, 12]  |
| SPRING-2                   | 2 NRTIs plus DTG or RAL       | 822 tx-naive       | At 48 and 96 weeks, once-daily DTG was non-inferior to twice-daily RAL (88% vs 85% viral suppression at 48 weeks, and 81% vs 76% at 96 weeks), with a similar safety profile[13, 14]  |
| ARIA                       | ABC/3TC/DTG vs. TDF/FTC+ATV/r | 495 tx-naive women | At 48 weeks, ABC/3TC/DTG was superior in terms of virologic suppression (82% vs 71%). There were fewer virological nonresponses and fewer discontinuations due to adverse events in the ABC/3TC/DTG arm[15]   |
| Trial 1490                 | TAF/FTC/BIC vs. TAF/FTC/DTG   | 657 tx-naive       | At week 96, HIV-1 RNA less than 50 copies per mL was achieved by 269 (84%) of 320 participants in the bicitegravir group and 281 (86%) of 325 in the dolutegravir group (difference -2.3%, 95% CI -7.9 to 3.2), demonstrating non-inferiority of the bicitegravir regimen compared with the dolutegravir regimen.[16]   |
| Trial 1489                 | TAF/FTC/BIC vs. ABC/3TC/DTG   | 631 tx-naive       | At week 96, bicitegravir, emtricitabine, and tenofovir alafenamide was non-inferior to dolutegravir, abacavir, and lamivudine, with 276 (88%) of 314 participants in the bicitegravir group versus 283 (90%) of 315 participants in the dolutegravir group achieving HIV-1 RNA less than 50 copies per mL (difference -1.9%; 95% CI -6.9 to 3.1).[17]   |

# Education Sheet: Dosing and Rationale

Education Sheet for BIC/TAF/FTC

Info Sheet Dosing Info **!** Rationale

Recommended Dosing (includes renal and hepatic adjustments)

BIC/TAF/FTC 50mg/25mg/200mg oral (BIC/TAF) with 1 pill once per day

Food E

- BIC/TAF polyvalent alafen

Comorb

- There

Co-med

- There

ART Int

- There

Info Sheet Dosing Info **!** Rationale

| Score (Change)   | Explanation  |
|------------------|--|
| 1 (+1)           | Base score for this regimen  |
| 1 (+0)           | Pill burden: All regimens with more than one pill once per day incur a pill burden penalty.                      |
| 1 (+0)           | Mutations: A mathematical mutation penalty was incorporated based on mutation scores from the Stanford Database. |
| <b>1 (Final)</b> | <b>Final weighted score</b>  |

# HIV-ASSIST in the Literature

- **Development and validation of the tool<sup>1</sup>**
  - Cohort of 17 experienced providers reviewing 10 hypothetical cases
  - 99% concordance for ARV-naïve patient cases
  - 84-88% concordance for ART-experienced patient cases
- **Evaluating the concordance of the tool<sup>2</sup>**
  - Retrospective chart review of 106 patients at two clinics
  - 100% concordance for ART-naïve patients
  - 88-89% concordance for ART-experienced patients
- **Using HIV-ASSIST vs DHHS Guidelines<sup>3</sup>**
  - Randomized study of 118 medical trainees given HIV-ASSIST tool or DHHS guidelines to select ART for 10 hypothetical patient case scenarios
  - Appropriate ART selections made 40% of the time with guidelines vs 90% of the time with HIV-ASSIST

# Using HIV-ASSIST in Different Clinical Scenarios

# Input: ART Start in a Newly Diagnosed PWH

A 26-year-old man presents with a new diagnosis of HIV. CD4 cell count is 360 cells/mm<sup>3</sup>. HIV-1 RNA is 34,000 copies/mL.

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- Suppressed (<50) for more than 6 months
- Suppressed (<50) for less than 6 months or Low Level Viremia (<200)
- Low (200 - 100,000)
- High (100,000 - 500,000)
- Very high (≥ 500,000)
- Unknown

Select the patient's HIV viral load (if known).

**CD4 Cell Count**

- ≤ 50
- ≤ 100
- ≤ 200
- > 200
- Unknown

Select the patient's CD4 cell count (if known).

**HLA-B5701**

- Positive (or unknown)
- Negative

Select the patient's HLA-B5701 status (if known).

**Tropism**

- R5 virus
- X4 virus
- Dual Tropic virus
- Unknown

Select the patient's HIV tropism (if known).

**Comorbidities, ARV Side Effects, or Pregnancy**

Select the patient's comorbidities or side effects from current ARV medications, or if the patient is pregnant.

**Co-medications**

Select the patient's current medications.

# Output: ART Start in a Newly Diagnosed PWH

Home / ARV Selection Tool / Results

**Mutations:** None  
**Comorbidities:** None  
**Comedications:** None  
**Treatment history:** None  
**Current regimen:** None

**Adherence:** No options selected  
**CD4:** > 200  
**Viral load:** Low (200 - 100,000)  
**HLA-B5701:** Negative  
**Tropism:** Unknown

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| Regimen     | Weighted Score ^ | Active Drugs | Total Pills | Frequency (x/day) |
|-------------|------------------|--------------|-------------|-------------------|
| BIC/TAF/FTC | 1                | 3            | 1           | 1                 |
| DTG/ABC/3TC | 1                | 3            | 1           | 1                 |
| DTG+TAF/FTC | 1                | 3            | 2           | 1                 |
| DTG/3TC     | 1                | 2            | 1           | 1                 |

# What if the patient has pill aversion?

### Mutations

Enter the patient's HIV mutations here, either with or without the mutated amino acid but using uppercase (eg, M184V or 184V). You can use "INSERTION" or "DELETION" as needed (eg, K67DELETION). Separate mutations with commas. Example: 184V, 65R

### Adherence

- Patients with pill aversion (prioritize smaller pills) 
- Patients who prefer once daily dosing
- Patients with intermittent adherence
- Increase prioritization of at least 3 active drugs
- Penalize regimens with IV/IM dosing

Options for patients with poor adherence.

### Viral Load

- Suppressed (<50) for more than 6 months
- Suppressed (<50) for less than 6 months or Low Level Viremia (<200)
- Low (200 - 100,000)
- High (100,000 - 500,000)
- Very high ( $\geq$  500,000)

### CD4 Cell Count

- $\leq$  50
- $\leq$  100
- $\leq$  200
- > 200
- Unknown

Select the patient's CD4 cell count (if known).

### HLA-B5701


- Positive (or unknown)
- Negative

Select the patient's HLA-B5701 status (if known).


### Tropism

- R5 virus
- X4 virus
- Dual Tropic virus
- Unknown

Select the patient's HIV tropism (if known).

| Regimen     | Weighted Score  | Active Drugs | Total Pills | Frequency (x/day) |
|-------------|--|--------------|-------------|-------------------|
| DTG+TAF/FTC | 1.1  | 3            | 2           | 1                 |
| BIC/TAF/FTC | 1.25   | 3            | 1           | 1                 |
| DTG/3TC     | 1.25   | 2            | 1           | 1                 |
| DTG/ABC/3TC | 1.6  | 3            | 1           | 1                 |

# What if the baseline viral load is > 500,000?

|   |  |   |   |
|---|--|---|---|
| <b>Viral Load</b><br><input type="radio"/> Suppressed (<50) for more than 6 months<br><input type="radio"/> Suppressed (<50) for less than 6 months or Low Level Viremia (<200)<br><input type="radio"/> Low (200 - 100,000)<br><input type="radio"/> High (100,000 - 500,000)<br><input checked="" type="radio"/> Very high ( $\geq 500,000$ ) <br><input type="radio"/> Unknown<br>Select the patient's HIV viral load (if known). | <b>CD4 Cell Count</b><br><input type="radio"/> $\leq 50$<br><input type="radio"/> $\leq 100$<br><input type="radio"/> $\leq 200$<br><input checked="" type="radio"/> $> 200$<br><input type="radio"/> Unknown<br>Select the patient's CD4 cell count (if known). | <b>HLA-B5701</b><br><input type="radio"/> Positive (or unknown)<br><input checked="" type="radio"/> Negative<br>Select the patient's HLA-B5701 status (if known). | <b>Tropism</b><br><input type="radio"/> R5 virus<br><input type="radio"/> X4 virus<br><input type="radio"/> Dual Tropic virus<br><input checked="" type="radio"/> Unknown<br>Select the patient's HIV tropism (if known). |
|---|--|---|---|

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| Regimen     | Weighted Score <sup>▲</sup> | Active Drugs | Total Pills | Frequency (x/day) |
|-------------|-----------------------------|--------------|-------------|-------------------|
| BIC/TAF/FTC | 1                           | 3            | 1           | 1                 |
| DTG/ABC/3TC | 1                           | 3            | 1           | 1                 |
| DTG+TAF/FTC | 1                           | 3            | 2           | 1                 |

# What if the person starting ART is pregnant?

A 22-year-old woman is pregnant (16 weeks) and receives a positive screening HIV test at visit when she is establishing prenatal care.

**Viral Load**

Suppressed (<50) for more than 6 months

Suppressed (<50) for less than 6 months or Low Level Viremia (<200)

Low (200 - 100,000)

High (100,000 - 500,000)

Very high ( $\geq 500,000$ )

Unknown

Select the patient's HIV viral load (if known).

**CD4 Cell Count**

$\leq 50$

$\leq 100$

$\leq 200$

$> 200$

Unknown

Select the patient's CD4 cell count (if known).

**HLA-B5701**

Positive (or unknown)

Negative

Select the patient's HLA-B5701 status (if known).

**Tropism**

R5 virus

X4 virus

Dual Tropic virus

Unknown

Select the patient's HIV tropism (if known).

**Comorbidities, ARV Side Effects, or Pregnancy**

Select the patient's comorbidities or side effects from current ARV medications, or if the patient is pregnant.

**Co-medications**

Select the patient's current medications.

| Regimen     | Weighted Score <sup>^</sup> | Active Drugs | Total Pills | Frequency (x/day) |
|-------------|-----------------------------|--------------|-------------|-------------------|
| DTG/ABC/3TC | 1                           | 3            | 1           | 1                 |
| DTG+TDF/FTC | 1.15                        | 3            | 2           | 1                 |
| DTG+TAF/FTC | 1.2                         | 3            | 2           | 1                 |

# What if the person has an M184V mutation?



**Mutations**

Enter the patient's HIV mutations here, either with or without the mutated amino acid but using uppercase (eg, M184V or 184V). You can use "INSERTION" or "DELETION" as needed (eg, K67DELETION). Separate mutations with commas. Example: 184V, 65R

**Adherence**

- Patients with pill aversion (prioritize smaller pills)
- Patients who prefer once daily dosing
- Patients with intermittent adherence
- Increase prioritization of at least 3 active drugs
- Penalize regimens with IV/IM dosing

Options for patients with poor adherence.

**Viral Load**

- Suppressed (<50) for more than 6 months
- Suppressed (<50) for less than 6 months or Low Level Viremia (<200)
- Low (200 - 100,000)
- High (100,000 - 500,000)
- Very high (≥ 500,000)
- Unknown

Select the patient's HIV viral load (if known).

**CD4 Cell Count**

- ≤ 50
- ≤ 100
- ≤ 200
- > 200
- Unknown

Select the patient's CD4 cell count (if known).

**HLA-B5701**

- Positive (or unknown)
- Negative

Select the patient's HLA-B5701 status (if known).

**Tropism**

- R5 virus
- X4 virus
- Dual Tropic virus
- Unknown

Select the patient's HIV tropism (if known).

**Comorbidities, ARV Side Effects, or Pregnancy**

Select the patient's comorbidities or side effects from current ARV medications, or if the patient is pregnant.

**Co-medications**

Select the patient's current medications.

**Treatment History (Prior Failing Regimens)**

Enter the patient's previous ART medications on which the patient had detectable viremia (i.e., failing regimen). Do not include the current regimen (if any).

**Current Regimen**

Enter the patient's current regimen (if any).

# Output: M184V that developed while on *Genvoya*<sup>®</sup>

**Mutations:** M184V

**Comorbidities:** None  
**Comedications:** None  
**Treatment history:** EVG/c/TAF/FTC (Genvoya)  
**Current regimen:** EVG/c/TAF/FTC (Genvoya)

**Adherence:** No options selected  
**CD4:** > 200  
**Viral load:** Low (200 - 100,000)  
**HLA-B5701:** Negative  
**Tropism:** Unknown

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| Regimen           | Weighted Score <sup>^</sup> | Active Drugs | Total Pills | Frequency (x/day) |
|-------------------|-----------------------------|--------------|-------------|-------------------|
| DRV/c/TAF/FTC     | 0.75                        | 2            | 1           | 1                 |
| DRV/r+TAF/FTC     | 0.95                        | 2            | 3           | 1                 |
| DTG+DRV/c/TAF/FTC | 1                           | 3            | 2           | 1                 |
| DTG+TAF/FTC       | 1                           | 2            | 2           | 1                 |

# What if the person has multi-drug resistant HIV?

A 40-year-old with HIV (last CD4 350 cells/mm<sup>3</sup>, HIV-1 RNA undetectable) has M184V, K65R, T219E, and K210Y mutations.

**Mutations:** M184V, K65R, T219E, K210Y  
**Comorbidities:** None  
**Comedications:** None  
**Treatment history:** None  
**Current regimen:** None

**Adherence:** No options selected  
**CD4:** > 200  
**Viral load:** Suppressed (<50) for less than 6 months or Low Level Viremia (<200)  
**HLA-B5701:** Negative  
**Tropism:** Unknown

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| Regimen   | Weighted Score <sup>▲</sup> | Active Drugs | Total Pills | Frequency (x/day) |
|-----------|-----------------------------|--------------|-------------|-------------------|
| DTG+DRV/c | 2                           | 2            | 2           | 1                 |
| DTG+DRV/r | 2.55                        | 2            | 3           | 1                 |

# HIV-ASSIST & Comorbidities

A 56-year-old man with CAD & HIV (last CD4 560 cells/mm<sup>3</sup> and HIV-1 RNA undetectable) on ABC/3TC/DTG is seen for follow-up.

|  |   |   |   |
|--|---|---|---|
| <b>Viral Load</b><br><input checked="" type="radio"/> Suppressed (<50) for more than 6 months<br><input type="radio"/> Suppressed (<50) for less than 6 months or Low Level Viremia (<200)<br><input type="radio"/> Low (200 - 100,000)<br><input type="radio"/> High (100,000 - 500,000)<br><input type="radio"/> Very high (≥ 500,000)<br><input type="radio"/> Unknown<br>Select the patient's HIV viral load (if known). | <b>CD4 Cell Count</b><br><input type="radio"/> ≤ 50<br><input type="radio"/> ≤ 100<br><input type="radio"/> ≤ 200<br><input checked="" type="radio"/> > 200<br><input type="radio"/> Unknown<br>Select the patient's CD4 cell count (if known). | <b>HLA-B5701</b><br><input type="radio"/> Positive (or unknown)<br><input checked="" type="radio"/> Negative<br>Select the patient's HLA-B5701 status (if known). | <b>Tropism</b><br><input type="radio"/> R5 virus<br><input type="radio"/> X4 virus<br><input type="radio"/> Dual Tropic virus<br><input checked="" type="radio"/> Unknown<br>Select the patient's HIV tropism (if known). |
| <b>Comorbidities, ARV Side Effects, or Pregnancy</b><br><input checked="" type="checkbox"/> Coronary Artery Disease or other Cardiovascular Disease (e.g., Hypertension, HTN, Myc<br>Select the patient's comorbidities or side effects from current ARV medications, or if the patient is pregnant.   | <b>Co-medications</b><br>Select the patient's current medications.  |   |   |
| <b>Treatment History (Prior Failing Regimens)</b><br>Enter the patient's previous ART medications on which the patient had detectable viremia (i.e., failing regimen). Do not include the current regimen (if any).  | <b>Current Regimen</b><br><input checked="" type="checkbox"/> DTG/ABC/3TC (Triumeq)<br>Enter the patient's current regimen (if any).  |   |   |

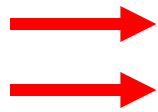
# Output: Patient with heart disease on abacavir

| Regimen     | Weighted Score ^ | Active Drugs | Total Pills | Frequency (x/day) |
|-------------|------------------|--------------|-------------|-------------------|
| BIC/TAF/FTC | 1                | 3            | 1           | 1                 |
| CAB/RPV     | 1                | 2            | 0           | 0.03              |
| DTG/3TC     | 1                | 2            | 1           | 1                 |

| Regimen                       | Weighted Score ^ | Active Drugs | Total Pills | Frequency (x/day) |
|-------------------------------|------------------|--------------|-------------|-------------------|
| DRV/c+3TC                     | 1.75             | 2            | 2           | 1                 |
| DTG/ABC/3TC [Current regimen] | 2                | 3            | 1           | 1                 |
| DRV/r+DTG/3TC                 | 2.4              | 3            | 3           | 1                 |

| Score (Change)   | Explanation   |
|------------------|---|
| 1 (+1)           | Suppressed viral load: Modified base score (for INSTI + NRTI +/- another ARV(s) with current viral suppression)   |
| 1 (+0)           | Pill burden: All regimens with more than one pill once per day incur a pill burden penalty.   |
| 1 (+0)           | Mutations: A mathematical mutation penalty was incorporated based on mutation scores from the Stanford Database.  |
| 2 (+1)           | Comorbidities: This regimen incurred a penalty due to use of ABC in Coronary Artery Disease or other Cardiovascular Disease (e.g., Hypertension, HTN, Myocardial infarction). |
| <b>2 (Final)</b> | <b>Final weighted score</b>   |

# HIV-ASSIST & Drug-Drug Interactions



**Mutations:** None  
**Comorbidities:** None  
**Comedications:** Warfarin  
**Treatment history:** None  
**Current regimen:** EVG/c/TAF/FTC (Genvoya)

**Adherence:** No options selected  
**CD4:** > 200  
**Viral load:** Suppressed (<50) for less than 6 months or Low Level Viremia (<200)  
**HLA-B5701:** Negative  
**Tropism:** Unknown

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| Regimen                         | Weighted Score <sup>▲</sup> | Active Drugs | Total Pills | Frequency (x/day) |
|---------------------------------|-----------------------------|--------------|-------------|-------------------|
| BIC/TAF/FTC                     | 1                           | 3            | 1           | 1                 |
| DTG/ABC/3TC                     | 1                           | 3            | 1           | 1                 |
| DTG/3TC                         | 1                           | 2            | 1           | 1                 |
| EVG/c/TAF/FTC [Current regimen] | 2.1                         | 3            | 1           | 1                 |

# Conclusions

- HIV-ASSIST is a helpful tool to aid in ART decision support
- The user can input as little or as much information as they would like
- Information comes from guidelines, clinical trials, Stanford Resistance Database, National HIV Curriculum, Liverpool HIV Drug Interactions, and a scientific advisory panel
- HIV/ID experts keep the tool up to date, and several new functionalities are on the way

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