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**emodpy-tbhiv**

**Institute for Disease Modeling**

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emodpy-tbhiv is a collection of Python scripts and utilities created to streamline user interactions with EMOD and idmtools for modeling measles. Much of the functionality is inherited from the [emod\\_api](#) and [emodpy](#) packages.

Additional information about how to use idmtools can be found at in [Welcome to idmtools](#). Additional information about EMOD TBHIV parameters for modeling tuberculosis can be found in [EMOD parameter reference](#).



## INSTALLATION

You can install emodpy-tbhiv using the instructions in the GitHub repository README.





## EMODPY\_TBHIV

### 2.1 emodpy\_tbhiv package

The emodpy-tbhiv module is intended to house scripts and tools that enable disease modelers to work more easily with the IDM EMOD TBHIV model.

#### 2.1.1 Subpackages

**emodpy\_tbhiv.demographics package**

**Submodules**

**emodpy\_tbhiv.demographics.TBHIVDemographics module**

```
class emodpy_tbhiv.demographics.TBHIVDemographics.TBHIVDemographics(nodes=None,  
                                                                    idref='Gridded  
                                                                    world  
                                                                    grump2.5arcmin',  
                                                                    base_file=None)
```

Bases: `emod_api.demographics.Demographics.Demographics`

This class is derived from emod\_api.demographics' Demographics class so that we can set certain defaults for TBHIV in construction. Keen observers will note thatt SetDefaultProperties does not look like a TBHIV-specific function. But as we add other disease types the generatlizations and speicfics will become clearer. The architectural point is solid.

**SetHIVCoInfectionDistribution()**

Insert some notion of a default HIVCoInfection distribution.

**SetHIVTBCoInfectionMortalityDistribution()**

Insert some notion of a default HIVTBCoInfection Mortality distribution.

```
class emodpy_tbhiv.demographics.TBHIVDemographics.TBHIVDemographicsWithGenderExtrapolation
```

Bases: `emodpy_tbhiv.demographics.TBHIVDemographics.TBHIVDemographics`

**do\_extrapolation** (*add\_to\_list=True*)

**makeplots** (*save=None*)

**create\_json\_overlay** (*template, output\_name='Extract\_demog.json', csv\_out=False, n=0, results\_scale\_factor=0.0027397260273972603*)

This almost certainly needs to be refactored to use the base class 'generate\_file' functionality.

```
emodpy_tbhiv.demographics.TBHIVDemographics.fromBasicNode (lat=0, lon=0,
                                                             pop=1000000.0,
                                                             name=1,
                                                             forced_id=1, im-
                                                             plicit_config_fns=None)
```

This function creates a single-node TBHIVDemographics instance from the params you give it.

```
emodpy_tbhiv.demographics.TBHIVDemographics.fromData (pop=1000000.0, file-
                                                         name_male='Malawi_male_mortality.csv',
                                                         file-
                                                         name_female='Malawi_female_mortality.csv')
```

## emodpy\_tbhiv.interventions package

```
emodpy_tbhiv.interventions.purge_campaign_event (camp_event)
```

## Submodules

### emodpy\_tbhiv.interventions.active\_diagnostic module

```
emodpy_tbhiv.interventions.active_diagnostic.ActiveDiagnostic (camp, trigger_treatment_list,
                                                                    ac-
                                                                    tive_sensitivity=1.0,
                                                                    ac-
                                                                    tive_specificity=1.0,
                                                                    pos_event='TBTestPositive',
                                                                    treat-
                                                                    ment_fraction=1,
                                                                    start_day=0,
                                                                    duration=-
                                                                    1, prop-
                                                                    erty_restrictions_list=[],
                                                                    nodeIDs=[],
                                                                    black_period=0,
                                                                    black_trigger='Blackout',
                                                                    event_name='TB
                                                                    Diagnosis Active
                                                                    Simple')
```

:param TBD Note start\_day is initialized as 1, recommend that this be aligned with the start of the simulation

```
emodpy_tbhiv.interventions.active_diagnostic.new_intervention_as_file (camp,
                                                                           start_day=1,
                                                                           file-
                                                                           name=None)
```

## emodpy\_tbhiv.interventions.art module

```
emodpy_tbhiv.interventions.art.ART(camp, trigger_treatment_list, start_day=0, duration=-
    1, property_restrictions_list=[], nodeIDs=[],
    black_period=0, black_trigger='Blackout',
    event_name='ART')
    :param TBD Note start_day is initialized as 1, recommend that this be aligned with the start of the simulation
emodpy_tbhiv.interventions.art.new_intervention_as_file(camp, filename='art.json')
```

## emodpy\_tbhiv.interventions.bcg module

```
emodpy_tbhiv.interventions.bcg.BCG(camp, trigger_treatment_list, initial_efficacy=1.0, vac-
    cine_take=1, age_take_decay=1.0, box_duration=365,
    immune_decay=3650, start_day=0, duration=- 1, prop-
    erty_restrictions_list=[], nodeIDs=[], black_period=0,
    black_trigger='Blackout', event_name='Vaccine Health
    Seeking')
    BCG Vaccine :param TBD Note start_day is initialized as 1, recommend that this be aligned with the start of
    the simulation
emodpy_tbhiv.interventions.bcg.new_intervention_as_file(camp, filename=None)
```

## emodpy\_tbhiv.interventions.cd4diag module

```
emodpy_tbhiv.interventions.cd4diag.get_thresh(name, low, high, camp)
emodpy_tbhiv.interventions.cd4diag.get_threshes(group_names, camp)
emodpy_tbhiv.interventions.cd4diag.CD4Diag(camp, trigger_treatment_list,
    event_200='Below200',
    event_350='Below350',
    event_500='Below500',
    event_above_500='Above500', start_day=0,
    duration=- 1, property_restrictions_list=[],
    nodeIDs=[], black_period=0,
    black_trigger='Blackout', event_name='CD4
    Diagnostic')
    ART :param TBD Note start_day is initialized as 1, recommend that this be aligned with the start of the simula-
    tion
emodpy_tbhiv.interventions.cd4diag.new_intervention_as_file(camp, file-
    name='cd4.json')
```

## emodpy\_tbhiv.interventions.diag\_treat\_neg module

```
emodpy_tbhiv.interventions.diag_treat_neg.DiagnosticTreatNeg(camp,          trigger_treatment_list,
                                                                base_sensitivity=1.0,
                                                                base_sensitivity_smeapos=1.0,
                                                                base_sensitivity_smeaneg=1.0,
                                                                pos_event='TBTestPositive',
                                                                neg_event='TBTestNegative',
                                                                def_event='TBTestDefault',
                                                                treat-
                                                                ment_fraction=1,
                                                                start_day=0,
                                                                duration=- 1, prop-
                                                                erty_restrictions_list=[],
                                                                nodeIDs=[],
                                                                black_period=0,
                                                                black_trigger='Blackout',
                                                                event_name='TB
                                                                Diagnosis')
    :param TBD Note start_day is initialized as 1, recommend that this be aligned with the start of the simulation
emodpy_tbhiv.interventions.diag_treat_neg.new_intervention_as_file(camp, file-
                                                                name='dtn.json')
```

## emodpy\_tbhiv.interventions.hiv\_diag module

```
emodpy_tbhiv.interventions.hiv_diag.HIVDiagnostic(camp,          trigger_treatment_list,
                                                                base_sensitivity=1.0,
                                                                base_specificity=1.0,
                                                                pos_event='HIVTestedPositive',
                                                                neg_event='HIVTestedNegative',
                                                                treatment_fraction=1,
                                                                start_day=0,      duration=- 1,
                                                                property_restrictions_list=[],
                                                                nodeIDs=[],      black_period=0,
                                                                black_trigger='Blackout',
                                                                event_name='HIV Diagnostic')
    :param TBD Note start_day is initialized as 1, recommend that this be aligned with the start of the simulation
emodpy_tbhiv.interventions.hiv_diag.new_intervention_as_file(camp,          file-
                                                                name=None)
```

## emodpy\_tbhiv.interventions.hiv\_seeding module

```
emodpy_tbhiv.interventions.hiv_seeding.HIV(camp, time_offset=0, disease='HIV', reps=-
                                                                1, interval=1, start_day=0, nodeIDs=[],
                                                                event_name='HIV Incidence')
emodpy_tbhiv.interventions.hiv_seeding.new_intervention_as_file(camp,      file-
                                                                name='hiv.json')
```

**emodpy\_tbhiv.interventions.hsb module**

```
emodpy_tbhiv.interventions.hsb.HSB(camp, trigger_treatment_list, output_event, probability_per_step=1.0, start_day=0, duration=- 1, property_restrictions_list=[], nodeIDs=[], black_period=0, black_trigger='Blackout', event_name='HSB')
    :param TBD Note start_day is initialized as 1, recommend that this be aligned with the start of the simulation
emodpy_tbhiv.interventions.hsb.new_intervention_as_file(camp, file_name='hsb_diag.json')
```

**emodpy\_tbhiv.interventions.ramp\_dtn module**

```
emodpy_tbhiv.interventions.ramp_dtn.RampDTN(camp, trigger_treatment_list,
    ramp_time=30,
    base_sensitivity_smearpos=1.0,
    base_sensitivity_smearneg=1.0,
    base_sensitivity_smearpos2=1.0,
    base_sensitivity_smearneg2=1.0,
    treatment_fraction=1.0,
    treatment_fraction2=1.0,
    pos_event='TBTestPositive',
    neg_event='TBTestNegative', de-
    faulters_event='TBTestDefault',
    pos_event2='TBTestPositive',
    neg_event2='TBTestNegative', de-
    faulters_event2='TBTestDefault',
    start_day=0, duration=- 1, property_restrictions_list=[], nodeIDs=[],
    black_period=0, black_trigger='Blackout',
    event_name='RampDTN')
    :param TBD Note start_day is initialized as 1, recommend that this be aligned with the start of the simulation
emodpy_tbhiv.interventions.ramp_dtn.new_intervention_as_file(camp, file_name='ramp.json')
```

**emodpy\_tbhiv.interventions.resist\_diag module**

```
emodpy_tbhiv.interventions.resist_diag.ResistanceDiagnostic(camp, trigger_treatment_list,
                                                             sensitivity=1.0,
                                                             specificity=1.0,
                                                             pos_event='TBMDRTestPositive',
                                                             neg_event='TBMDRTestNegative',
                                                             def_event='TBMDRTestDefault',
                                                             treatment_fraction=1,
                                                             treatment_fraction_negative_test=1,
                                                             start_day=0,
                                                             duration=- 1, property_restrictions_list=[],
                                                             nodeIDs=[],
                                                             black_period=0,
                                                             black_trigger='Blackout',
                                                             event_name='TB Diagnosis MDR')
    :param TBD Note start_day is initialized as 1, recommend that this be aligned with the start of the simulation
emodpy_tbhiv.interventions.resist_diag.new_intervention_as_file(camp, filename='resist_diag.json')
```

**emodpy\_tbhiv.interventions.smear\_diag module**

```
emodpy_tbhiv.interventions.smear_diag.SmearDiagnostic(camp, trigger_treatment_list,
                                                         base_sensitivity_smearpos=1.0,
                                                         base_sensitivity_smearneg=1.0,
                                                         pos_event='TestPositiveOnSmear',
                                                         treatment_fraction=1,
                                                         start_day=0, duration=- 1,
                                                         property_restrictions_list=[],
                                                         nodeIDs=[], black_period=0,
                                                         black_trigger='Blackout',
                                                         event_name='TB Diagnosis Smear Simple')
    :param TBD Note start_day is initialized as 1, recommend that this be aligned with the start of the simulation
emodpy_tbhiv.interventions.smear_diag.new_intervention_as_file(camp, filename='smear_diag.json')
```

**emodpy\_tbhiv.interventions.tb\_treat\_basic module**

```
emodpy_tbhiv.interventions.tb_treat_basic.TBDrugTreatment (camp,          trig-
                                                             ger_treatment_list,
                                                             drug_name='DOTS',
                                                             inactivation_rate=0,
                                                             mortality_rate=0,
                                                             clearance_rate=0,
                                                             resistance_rate=0,
                                                             relapse_rate=0,      re-
                                                             duced_transmit=1.0,
                                                             start_day=0,      treat-
                                                             ment_duration=180,
                                                             duration=- 1, prop-
                                                             erty_restrictions_list=[],
                                                             nodeIDs=[],
                                                             black_period=0,
                                                             black_trigger='Blackout',
                                                             event_name='TBDrugTreatment')
    :param TBD Note start_day is initialized as 1, recommend that this be aligned with the start of the simulation
emodpy_tbhiv.interventions.tb_treat_basic.new_intervention_as_file (camp, file-
                                                                    name=None)
```

**emodpy\_tbhiv.interventions.tbhiv\_treat module**

```
emodpy_tbhiv.interventions.tbhiv_treat.TBHIVDrugTreatment (camp,          trig-
                                                             ger_treatment_list,
                                                             drug_name,          la-
                                                             tent_multiplier=1.0,
                                                             active_multiplier=1.0,
                                                             start_day=0,
                                                             duration=- 1, prop-
                                                             erty_restrictions_list=[],
                                                             nodeIDs=[],
                                                             black_period=0,
                                                             black_trigger='Blackout',
                                                             event_name='TBHIVDrugTreatment')
    :param TBD Note start_day is initialized as 1, recommend that this be aligned with the start of the simulation
emodpy_tbhiv.interventions.tbhiv_treat.new_intervention_as_file (camp,      file-
                                                                    name='tb_drug_treat.json')
```

## emodpy\_tbhiv.interventions.triggered\_pvc module

```
emodpy_tbhiv.interventions.triggered_pvc.TPVC(camp, trigger_treatment_list, prop-
    erty_to_change, final_prop_value,
    revert=0, daily_prob=1,
    start_day=0, duration=-1,
    property_restrictions_list=[],
    nodeIDs=[], black_period=0,
    black_trigger='Blackout',
    event_name='PropertyValueChanger')
```

Triggered Property Value Changer :param TBD Note start\_day is initialized as 1, recommend that this be aligned with the start of the simulation

```
emodpy_tbhiv.interventions.triggered_pvc.new_intervention_as_file(camp, file-
    name='tpvc.json')
```

## emodpy\_tbhiv.interventions.vaccine module

```
emodpy_tbhiv.interventions.vaccine.Vaccine(camp, trigger_treatment_list, ini-
    tial_efficacy=1.0, vaccine_take=1,
    vtype='AcquisitionBlocking',
    box_duration=365, immune_decay=3650,
    start_day=0, duration=-1, prop-
    erty_restrictions_list=[], nodeIDs=[],
    black_period=0, black_trigger='Blackout',
    event_name='Vaccine')
```

:param TBD Note start\_day is initialized as 1, recommend that this be aligned with the start of the simulation

```
emodpy_tbhiv.interventions.vaccine.new_intervention_as_file(camp, file-
    name='vaccine.json')
```

## emodpy\_tbhiv.reporters package

### Submodules

## emodpy\_tbhiv.reporters.plugin module

```
class emodpy_tbhiv.reporters.plugin.Report_TBHIV_ByAge(name: str = 'Re-
    port_TBHIV_ByAge',
    Enabled: bool = True,
    Reports: list = <fac-
    tory>, dll_file: str =
    'lib_customreport_TBHIV_ReportByAge.dll')
```

Bases: `emodpy.reporters.base.CustomReporter`

**name:** str = 'Report\_TBHIV\_ByAge'

**dll\_file:** str = 'lib\_customreport\_TBHIV\_ReportByAge.dll'

**configure\_report** (max\_age\_yrs, min\_age\_yrs, start\_year, stop\_year, events=None)



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