Keyword `Action ()` is used as a stable frame by Evolvix to implement recurrent events of Continuous Time Markov Chain (CTMC) processes that run concurrently

Copy-Paste-Adapt cascades
This Action is from the S→I→R core facilitating progress along states of infection (see list) until recovery or death. The code is ready for copy-paste-adjust replacing of defaults for **Virus genotype** (`Vg00` wildtype), **Training level** (`Amateur`), and **Mental approach** (`Edge`); see text

ASHA: a recurrent code motif for managing a **population of units** of the type given in its name (see text for details). The 2nd fragment in ASHA names always indicates the ASHA component accessed. ASHAs are here used for modifying the default Decay rate.

ASHA `StopHarm` is a skill-**population** that reduces the rate of this Action by several orders of magnitude (or at most inreases it by 100%); it is switched off, since the product of _Dice_ * _With_ * _InIt_ evaluates to 1 at all times in 'Scenario 1' models.

Rate: Actions multiply all required Parts as specified before their arrow to determine their rate; thus, the impact of extra factors like ASHAs is easy to remove by switching **factors off** at value **=1**; they can be used to switch **Actions off** at value **=0**. Thus, staying in the middle of a log-scale with many orders of magnitude can be achieved by 2 equally flexible ASHAs, one for increasing, one for decreasing effects. (In the prototype code, rates are written on both sides of the arrow and thus effectively not changed by Actions).

ASHA `CallHelp` is a population of skill units increasing the rate of this Action by several orders of magnitude (or at most halves it); it is the polar opposite of `StopHarm`; both are switched off in 'Scenario 1' models.

Code of an Action that extends SIR models by allowing infection only from an environmental Load, **enabling decay and use of virus-defense skills**

```
Action Ac__Vg00___Amateur_Edge___________Decay__Durable_Virus          (
                                                         ASHA_InIt_ViroSkill_Decay_Durable_StopHarm_Amateur_Edge + ASHA_OuOf_ViroSkill_Decay_Durable_CallHelp_Amateur_Edge +
                                                         ASHA_With_ViroSkill_Decay_Durable_StopHarm_Amateur_Edge + ASHA_Lack_ViroSkill_Decay_Durable_CallHelp_Amateur_Edge +
  ASHA_With_ViroLoad_Durable_Vg00 + Decay_Durable_Vg00_Rt + ASHA_Dice_ViroSkill_Decay_Durable_StopHarm_Amateur_Edge + ASHA_Dice_ViroSkill_Decay_Durable_CallHelp_Amateur_Edge
  ------------------------------------------------------------------------------------------[Rate = 1]-------------------------------------------------------->
  ASHA_Lack_ViroLoad_Durable_Vg00 + Decay_Durable_Vg00_Rt + ASHA_Dice_ViroSkill_Decay_Durable_StopHarm_Amateur_Edge + ASHA_Dice_ViroSkill_Decay_Durable_CallHelp_Amateur_Edge +
                                                         ASHA_With_ViroSkill_Decay_Durable_StopHarm_Amateur_Edge + ASHA_Lack_ViroSkill_Decay_Durable_CallHelp_Amateur_Edge +
                                                         ASHA_InIt_ViroSkill_Decay_Durable_StopHarm_Amateur_Edge + ASHA_OuOf_ViroSkill_Decay_Durable_CallHelp_Amateur_Edge +

  Sum_Decay_Durable_All + Sum_Decay_Durable_Vg00_All + Sum_Decay_Amateur_Edge_All + Sum_Decay_Amateur_All + Sum_Decay_Durable_Edge_All
  Sum_Decay_All         + Sum_Decay_Vg00_All + Sum_Decay_Durable_Amateur_Edge_All + Sum_Decay_Durable_Amateur_All + Sum_Decay_Edge_All
)
```

Base rates of Actions are marked by _Rt.

Change that removes 1 viral packet from this Load ASHA

These sums trace impact of various factors by counting how often a related Action was done

Edge: Scenario 1 models only people who use the best mental approach to the pandemic (i.e. Edge vs Fear, Defy, Trap), but have not received any special training in how to navigate the virus-risks in their specific environment; they follow official advice, and might do a bit more, but have not visited a boot-camp for virus-defense to further reduce the specific risks they face in their particular situation. The model has been prepared for including components that integrate the effects of using the work-logic cascade described in the main text to assess how efforts in learning by the population could slow viruses.

Viral 2-site **genotype**, can add mutation, recombination via transition while host-free (i.e. in ViroLoad)

Comparing to SIR models without external virus load (Durable or Fragile)
The perfect S→I transmission of typical SIR models can be approximated in this model, by setting the Shed rate (I→L) and Catch rate (S+L→I) to appropriately chosen values and removing this action by setting its rate to zero; thus, viruses can no longer be lost in the environment (as in SIR models). Yet the question arises, whether (presumably larger) virus packets are removed from the environment upon infection or stay there to infect others. The difference can be substantial, especially at the early stages, where not many viruses exists, but can be countered by increasing the Shed-rate etc again until the empirically observed doubling time of ca 3 days is matched. In Scenario 1, the viruses deposited stay in the environment until degraded by this action shown here. Individuals are only infected with a Viral genotype, regardless of the infection pathway. To allow for mutation and recombination rates to be calculated correctly while in the environment, , they must be scaled relative to the time in host (where they presumably actually recombine). All population genetics processes are switched off in Scenario 1. Durable an Fragile load are two completely independent transmission pathways to allow for different decay rates to co-occur.

State of Virus Infection

State	Test	Exp	Summarizing Definition for Core State of Virus Infection of Persons PandemicSociety101 Scenario_1 QQ0r3p0
Susceptible		--	Susceptible to Catch Infect of Virus genome Vg00 [0S K0 KS] from Places Shared; other states cannot be infected
Starts**0**grow		1d	Starting virus growth (deterministic for Vg chosen); not yet infectious; co-infection & recombination impossible
-----------	100%	--	--- 1. Simplified TestingFlow FORCES a test for all individuals entering Infect1Hide to check for linear fooling
Infect**1**Hide		2d	Infectious, high virus sheds stay hidden as no symptoms visible; status hidden; TestA is pos TestB is neg
Infect**2**Mark		3d	Infectious, high virus sheds still hidden as no symptoms visible; status marked; TestA is pos TestB is pos
	100%		--- 2. Simplified TestingFlow enforced for all Infect3Mild to explore linear fooling (not for capacity planning)
Infect**3**Mild		2w	Infectious, high virus sheds as people react to illness symptoms virus defense may go up; Test PCR pos AntiB pos
----------------			--- Beyond here COVID becomes severe enough to require HOSpitalBED-ICU care; assumed const best care, no errors
Infect**4**Strong**HOS**		2w	Infectious, Strong symptoms, holds hospital bed; would live at home; looks like Infect5CritclBED
Infect**5**CritclBED		2w	Infectious, Critcl symptoms, needs hospital bed or dies
Infect**6**Deadly**ICU**		2w	Infectious, Deadly symptoms, needs IntensiveCareUnit or dies
Infect**7**ExpectICU		2w	Infectious, Expect death as deadly symptoms are even beyond ICU ability to help; symptoms like Infect6DeadlyICU
----------------			--- Removed from pandemic: individuals either Healed to Recover or Died outof/in hospitals; cannot be reinfected
RecoveredHealthC		--	Recovered by health care in hospital; assumed immune now
RecoveredOutside		--	Recovered outside; assumed immune now
Died_preHospital		--	All deaths occuring above up to including Infect3Mild, but none after, i.e. none in hospital by definition
Died_in_Hospital		--	All deaths from only the later stages of COVID (assumed in hospital, see Infect4StrongHOS to Infect7ExpectICU)