TABLE 8: EXPANDED HIV TESTING AND SEXUAL HEALTH SCREENING IN PRIMARY CARE

(green: parameters that can be modified by users) (blue: dynamic formula) (purple: dynamic effect exported to other module[s])

Variable Name	Variable Type	Unit	Initial Parameter Values and Formulas	Variable Definition/Specification and Sources of Initial Parameters and Stock Values
Initiation of the Expanded HIV Testing and Sexual Health Screening (CSHS) in Primary Care Action Strategy				
Expanded Primary Care HIV Tests and CSHS OFF ON	auxiliary	dmnl	0	This is a mechanism used in the model to turn "On" (1) and "Off" (0) each of the community Action Strategies independently. Because community level programs like this one are not available or in place in all communities, this switch allows model users to select whether or not to engage this Action Strategy during model simulations.
Expanded PC HIV Program 6 month kickoff	auxiliary	dmnl	IF (TIME > 6) THEN Peer Advocacy ON OFF ELSE 0	This is a mechanism to initiate the "On" condition (variable set to 1) at Month 6 of simulation runs, to allow a period of base case simulation prior to initiating the Action Strategy. The default of the Action Strategy is "Off" (set to 0).
Initial Values of Primary Care Providers (PCP)				
Init primary care providers in catchment area	auxiliary	Providers	1500	Stakeholder-estimated[a] number of primary care providers (PCP) with prescribing privileges in the catchment area who are available to serve the total population. This includes MDs, DOs, APRNs, and PAs.
Providers per primary care service per month	auxiliary	1/Month	1	This is a function used to limit the number of patient visits to a PCP to one per month.
Primary care provider migration factor	auxiliary	dmnl	.010	Stakeholder-estimated[a] fraction of PCP who leave the catchment area per month.
New providers starting primary care services	flow	Providers/ Month	Primary care provider migration factor * Total Primary Care Providers PCP in Catchment Area * Providers per primary care service per month {UNIFLOW}	Monthly rate at which new primary care providers (PCP) enter the catchment area and begin to provide primary care services to the total population.
Total Primary Care Providers PCP in Catchment Area	stock	Providers	Total Primary Care Providers PCP in Catchment Area(t - dt) + (New providers starting primary care services - Providers exiting catchment area) * dt {NON-NEGATIVE} **Initial value** = Init primary care providers in catchment area	Number of primary care providers (PCP) over time who are available in the catchment area to serve the total population.
Providers exiting catchment area	flow	Providers/ Month	Total Primary Care Providers PCP in Catchment Area * Primary care provider migration factor * Providers per primary care service per month {UNIFLOW}	Monthly rate at which primary care providers (PCP) leave the catchment area and no longer provide primary care services to the population.
Initial prop of providers conducting CSHS	auxiliary	dmnl	.005	Stakeholder-estimated[a] proportion of PCP who are providing comprehensive sexual health screenings (CSHS) with their patients at the start of the simulation run.
Initial prop of providers NOT conducting routine HIV testing	auxiliary	dmnl	.85	Stakeholder-estimated[a] proportion of PCP who are NOT providing routine HIV testing with their patients at the start of the simulation run.

Variable Name	Variable Type	Unit	Initial Parameter Values and Formulas	Variable Definition/Specification and Sources of Initial Parameters and Stock Values
Initial prop of providers conducting routine HIV screening	auxiliary	dmnl	1 - (Initial prop of providers NOT conducting routine HIV testing + Initial prop of providers conducting CSHS)	Model-calibrated number of PCP who ARE providing routine HIV testing (but are not providing comprehensive sexual health screenings—CSHS) with their patients at the start of the simulation run.
"PCPs Conservation Check (Should be 1.0, 100%)"	auxiliary	dmnl	Prop of PCP NOT conducting routine HIV testing + Prop of PCPs conducting routine HIV testing + Prop of PCPs conducting CSHS	This is a mechanism used in the model to check that all PCP in the catchment area are accounted for, including those conducting routine HIV testing, those not conducting routine HIV testing, and those conducting comprehensive sexual health screenings (CSHS). It should always be 1.0.
Resources and Their Effects to Improve Comprehensive Sexual Health Screening (CSHS) in Primary Care				
Quality of TRAINING for CSHS practice range 0 to 2	auxiliary	dmnl	0	This represents an intervention to provide training to PCP on provision of routine HIV testing and delivery of comprehensive sexual health screening (CSHS) with their patients. Quality of this intervention can range from 0 to 2, representing no training (0), low quality training (1), or high quality training (2).
Effect of TRAINING on practice change	auxiliary	dmnl	GRAPH(Quality of TRAINING for CSHS practice range 0 to 2 * Expanded PC HIV Program 6 month kickoff) (0.000, 0.000), (0.286, 0.337), (0.571, 0.648), (0.857, 0.931), (1.143, 1.189), (1.429, 1.419), (1.714, 1.623), (2.000, 1.800)	This is a graphic function of the effect of a training intervention to conduct routine HIV testing and comprehensive sexual health screening on PCP's implementation of these practices with their patients. This relationship follows a non-linear curve that advances and then levels off, with lowest quality of training (0.000) associated with the lowest effect on PCP practice (0.000), and highest quality of training (2.000) associated with the greatest effect on PCP practice (1.800). (Interim points on the curve graph are indicated in the formula and in **Fig. 8.1**.)
Level of INCENTIVE for CSHS practice range 0 to 2	auxiliary	dmnl	2	This represents an intervention to provide incentives to PCP to provide routine HIV testing and deliver comprehensive sexual health screening (CSHS) to their patients. Quality of this intervention can range from 0 to 2, representing no incentive (0), limited incentives (1), or high incentives (2).
Effect of INCENTIVE on practice change	auxiliary	dmnl	GRAPH(Level of INCENTIVE for CSHS practice range 0 to 2 * Expanded PC HIV Program 6 month kickoff) (0.000, 0.000), (0.286, 0.429), (0.571, 0.800), (0.857, 1.114), (1.143, 1.371), (1.429, 1.571), (1.714, 1.714), (2.000, 1.800)	This is a graphic function of the effect of an incentives intervention to encourage conducting routine HIV testing and comprehensive sexual health screening on PCP's implementation of these practices with their patients. This relationship follows a non-linear curve that advances and then levels off, with lowest level of incentive (0.000) associated with the lowest effect on PCP practice (0.000), and highest level of incentive (2.000) associated with the greatest effect on PCP practice (1.800). (Interim points on the curve graph are indicated in the formula and in **Fig. 8.2**.)
Quality of TELEHEALTH SUPPORT for CSHS practice range 0 to 2	auxiliary	dmnl	2	This represents an intervention to provide telehealth support to PCP on provision of routine HIV testing and delivery of comprehensive sexual health screening (CSHS) with their patients. Quality of this intervention can range from 0 to 2, representing no telehealth support (0), low quality telehealth support (1), or high quality telehealth support (2).

Variable Name	Variable Type	Unit	Initial Parameter Values and Formulas	Variable Definition/Specification and Sources of Initial Parameters and Stock Values
Effect of TELEHEALTH SUPPORT on practice change	auxiliary	dmnl	GRAPH(Quality of TELEHEALTH SUPPORT for CSHS practice range 0 to 2 * Expanded PC HIV Program 6 month kickoff) (0.000, 2.000), (0.500, 1.800), (1.000, 1.600), (1.500, 1.373), (2.000, 1.000)	This is a graphic function of the effect of a telehealth support intervention on encouraging PCP to conduct routine HIV testing and comprehensive sexual health screening with their patients. This relationship follows a non-linear curve that drops modestly, with lowest quality of telehealth support (0.000) associated with the highest effect on PCP stopping routine testing and CSHS (2.000), and highest level of telehealth support (2.000) associated with the lowest rate of PCP ending preferred practices (1.000). (Interim points on the curve graph are indicated in the formula and in **Fig. 8.3**.)
Primary Care Provider (PCP) Implementation of Routine HIV Testing and Comprehensive Sexual Health Screening (CSHS)				
NEW Non routine HIV testing PCP joining catchment	flow	Providers/ Month	Initial prop of providers NOT conducting routine HIV testing * New providers starting primary care services {UNIFLOW}	Monthly rate of new PCP entering the catchment area who do NOT provide routine HIV testing to their primary care patients.
Primary care providers NOT conducting routine HIV testing	stock	Providers	Primary care providers NOT conducting routine HIV testing(t - dt) + (NEW Non routine HIV testing PCP joining catchment + Rate of PCPs stopping routine HIV testing - Rate of PCPs starting routine HIV testing - Non routine HIV testing PCP leaving catchment) * dt {NON-NEGATIVE} **Initial value** = Init primary care providers in catchment area * Initial prop of providers NOT conducting routine HIV testing	Number of PCP in the catchment area over time who do not provide routine HIV testing to their patients.
Prop of PCP NOT conducting routine HIV testing	auxiliary	dmnl	Primary care providers NOT conducting routine HIV testing / Total Primary Care Providers PCP in Catchment Area	Model-generated proportion of PCP who do not provide routine HIV testing to their patients out of all PCP in the catchment area.
Non routine HIV testing PCP leaving catchment	flow	Providers/ Month	Providers exiting catchment area * Prop of PCP NOT conducting routine HIV testing {UNIFLOW}	Monthly rate at which PCP who do NOT provide routine HIV testing to their patients leave the catchment area.
Rate of PCPs starting routine HIV testing	flow	Providers/ Month	(Prop of PCP NOT conducting routine HIV testing * Providers exiting catchment area * Effect of TRAINING on practice change) + (Prop of PCP NOT conducting routine HIV testing * Providers exiting catchment area * Effect of INCENTIVE on practice change) {UNIFLOW}	Monthly rate at which PCP in the catchment area who did not provide routine HIV testing to their patients begin to do so. This rate is impacted by the quality of training and incentive interventions designed to increase routine HIV testing by primary care providers.
New PCPs conducting routine HIV testing joining catchment	flow	Providers/ Month	New providers starting primary care services * Initial prop of providers conducting routine HIV screening {UNIFLOW}	Monthly rate of new PCP entering the catchment area who DO provide routine HIV testing to their patients.
Primary care providers conducting routine HIV testing but not CSHS	stock	Providers	Primary care providers conducting routine HIV testing but not CSHS(t - dt) + (Rate of PCPs starting routine HIV testing + Rate of PCPs stopping CSHS + New PCPs conducting routine HIV testing joining catchment - Rate of PCPs starting CSHS - Primary care providers conducting routine HIV testing leaving catchment area - Rate of PCPs stopping routine HIV testing) * dt {NON-NEGATIVE} **Initial value** = Init primary care providers in catchment area * Initial prop of providers conducting routine HIV screening	Number of PCP in the catchment area over time who provide routine HIV testing to their patients but do not conduct comprehensive sexual health screenings (CSHS) with their primary care patients.

Variable Name	Variable Type	Unit	Initial Parameter Values and Formulas	Variable Definition/Specification and Sources of Initial Parameters and Stock Values
Prop of PCPs conducting routine HIV testing	auxiliary	dmnl	Primary care providers conducting routine HIV testing but not CSHS / Total Primary Care Providers PCP in Catchment Area	Model-generated proportion of PCP who provide routine HIV testing (but not comprehensive sexual health screenings—CSHS) to their patients out of all PCP in the catchment area.
Primary care providers conducting routine HIV testing leaving catchment area	flow	Providers/ Month	Prop of PCPs conducting routine HIV testing * Providers exiting catchment area {UNIFLOW}	Monthly rate at which PCP who provide routine HIV testing to their patients leave the catchment area.
Rate of PCPs stopping routine HIV testing	flow	Providers/ Month	Prop of PCPs conducting routine HIV testing * Providers exiting catchment area * Effect of TELEHEALTH SUPPORT on practice change {UNIFLOW}	Monthly rate at which PCP who provide routine HIV testing to their patients stop doing so (for any reason). This rate is partly affected by the quality of telehealth support programs designed to increase routine HIV testing by primary care providers.
Rate of PCPs starting CSHS	flow	Providers/ Month	(Prop of PCPs conducting routine HIV testing * Providers exiting catchment area * Effect of TRAINING on practice change) + (Prop of PCPs conducting routine HIV testing * Providers exiting catchment area * Effect of INCENTIVE on practice change) {UNIFLOW}	Monthly rate at which PCP who provide routine HIV testing to their patients begin also to provide their patients with comprehensive sexual health screenings (CSHS). This rate is impacted by the quality of training and incentive interventions designed to increase routine HIV testing by primary care providers.
New PCPs conducting CSHS joining the catchment	flow	Providers/ Month	New providers starting primary care services * Initial prop of providers conducting CSHS {UNIFLOW}	Monthly rate of new PCP entering the catchment area who provide their patients with comprehensive sexual health screenings (CSHS).
Primary care providers conducting Comprehensive Sexual Health Screening CSHS	stock	Providers	Primary care providers conducting Comprehensive Sexual Health Screening CSHS(t - dt) + (Rate of PCPs starting CSHS + New PCPs conducting CSHS joining the catchment - PCP conducting CSHS leaving catchment area - Rate of PCPs stopping CSHS) * dt {NON-NEGATIVE} **Initial value** = Init primary care providers in catchment area * Initial prop of providers conducting CSHS	Number of PCP in the catchment area over time who conduct comprehensive sexual health screenings (CSHS) with their primary care patients.
Prop of PCPs conducting CSHS	auxiliary	dmnl	Primary care providers conducting Comprehensive Sexual Health Screening CSHS / Total Primary Care Providers PCP in Catchment Area	Model-generated proportion of PCP who provide comprehensive sexual health screenings (CSHS) to their patients out of all PCP in the catchment area.
PCP conducting CSHS leaving catchment area	flow	Providers/ Month	Providers exiting catchment area * Prop of PCPs conducting CSHS {UNIFLOW}	Monthly rate at which PCP who provide comprehensive sexual health screenings (CSHS) to their patients leave the catchment area.
Rate of PCPs stopping CSHS	flow	Providers/ Month	Prop of PCPs conducting CSHS * Providers exiting catchment area * Effect of TELEHEALTH SUPPORT on practice change {UNIFLOW}	Monthly rate at which PCP who provide comprehensive sexual health screenings (CSHS) to their patients stop doing so (for any reason). This rate is partly affected by the quality of telehealth support programs designed to increase CSHS by primary care providers.
Patients Receiving Routine HIV Testing and Comprehensive Sexual Health Screening (CSHC) in Primary Care				
Prop of total population seeking primary care	auxiliary	dmnl	.25	Stakeholder-estimated[a] proportion of the total population in the catchment area who are seeking primary health care.
Population seeking primary care in catchment area	auxiliary	Persons	HIV INFECTION AND TREATMENT AS PREVENTION.Total Population in Catchment Area * Prop of total population seeking primary care	Number of people in the catchment area over time who are seeking primary care from a PCP.

Variable Name	Variable Type	Unit	Initial Parameter Values and Formulas	Variable Definition/Specification and Sources of Initial Parameters and Stock Values
Appt per patient per month	auxiliary	1/Month	1	This is a function used to limit the number of appointments to a PCP per patient to one per month.
Patient appts scheduled with PCPs delivering routine HIV testing	flow	Persons/ Month	Population seeking primary care in catchment area * Prop of PCPs conducting routine HIV testing * Appt per patient per month {UNIFLOW}	Monthly rate at which patients in the catchment area are scheduled with a PCP who delivers routine HIV testing.
Primary care patients receiving routine HIV testing	stock	Persons	Primary care patients receiving routine HIV testing(t - dt) + (Patient appts scheduled with PCPs delivering routine HIV testing - Patient appts completed with PCPs delivering routine HIV testing - Routine HIV test refusal rate) * dt {NON-NEGATIVE} **Initial value** = Population seeking primary care in catchment area * Initial prop of providers conducting routine HIV screening	Number of primary care patients in the catchment area over time who are receiving routine HIV testing (but not comprehensive sexual health screening—CSHS) from their PCP.
Prop patients refused HIV testing	auxiliary	dmnl	.25	Stakeholder-estimated[a] proportion of primary care patients who refuse HIV testing from their PCP who provides routine HIV testing.
Routine HIV test refusal rate	flow	Persons/ Month	Primary care patients receiving routine HIV testing * Prop patients refused HIV testing * Appt per patient per month {UNIFLOW}	Monthly rate at which primary care patients refuse HIV testing from their PCP who provides routine HIV testing.
Average time to next primary care visit	auxiliary	Months	18	Stakeholder-estimated[a] time until the primary care patient's next visit to a PCP.
Patient appts completed with PCPs delivering routine HIV testing	flow	Persons/ Month	Primary care patients receiving routine HIV testing / Average time to next primary care visit {UNIFLOW}	Monthly rate of primary care patients completing a medical appointment with a PCP who provides routine HIV testing. This rate is exported to the "HIV Prevention and Testing" module to contribute to the monthly rate of testing conducted in general settings in low prevalence and high prevalence areas.
Patient appts scheduled with PCPs delivering CSHS	flow	person/ month	Population seeking primary care in catchment area * Prop of PCPs conducting CSHS * Appt per patient per month {UNIFLOW}	Monthly rate at which patients in the catchment area are scheduled with a PCP who delivers comprehensive sexual health screening (CSHS).
Primary care patients receiving CSHS	stock	Persons	Primary care patients receiving CSHS(t - dt) + (Patient appts scheduled with PCPs delivering CSHS - Patient appts completed with PCPs delivering CSHS - CSHS HIV test refusal rate) * dt {NON-NEGATIVE} **Initial value** = Population seeking primary care in catchment area * Initial prop of providers conducting CSHS	Number of primary care patients in the catchment area over time who are receiving comprehensive sexual health screening (CSHS) from their PCP.
CSHS HIV test refusal rate	flow	person/ month	Primary care patients receiving CSHS * Prop patients refused HIV testing * Appt per patient per month {UNIFLOW}	Monthly rate at which primary care patients refuse HIV testing from their PCP who provides comprehensive sexual health screening (CSHS).
Patient appts completed with PCPs delivering CSHS	flow	person/ month	Primary care patients receiving CSHS / Average time to next primary care visit {UNIFLOW}	Monthly rate of primary care patients completing a medical appointment with a PCP who provides comprehensive sexual health screening (CSHS). This rate is exported to the "HIV Prevention and Testing" module to contribute to the monthly rate of testing conducted in general settings in low prevalence and high prevalence areas.

Variable Name	Variable Type	Unit	Initial Parameter Values and Formulas	Variable Definition/Specification and Sources of Initial Parameters and Stock Values
Prop of Primary care patients receiving CSHS who are potential PrEP candidates	auxiliary	dmnl	.1	Stakeholder-estimated[a] proportion of primary care patients receiving comprehensive sexual health screening (CSHS) from their PCP who are potential PrEP (pre-exposure prophylaxis) candidates.
Estimated PrEP screenings	auxiliary	Persons/ Month	Patient appts completed with PCPs delivering CSHS * Prop of Primary care patients receiving CSHS who are potential PrEP candidates	Number of people per month who are screened for PrEP by their PCP who provides comprehensive sexual health screening to primary care patients.

[a] Stakeholder-estimated and stakeholder-proposed parameters were set through a deliberative process with a broadly mixed stakeholder community modeling group that represented the spectrum of HIV medical and other care services and PLWH.

1. CT Department of Public Health. Epidemiological Profile of HIV in Connecticut. 2018.

Fig. 8.1 Effect of TRAINING on practice change

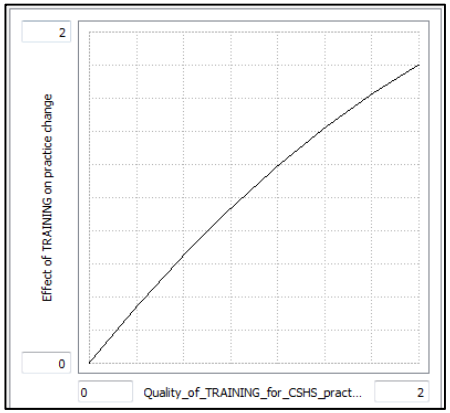

Fig. 8.2 Effect of INCENTIVE on practice change

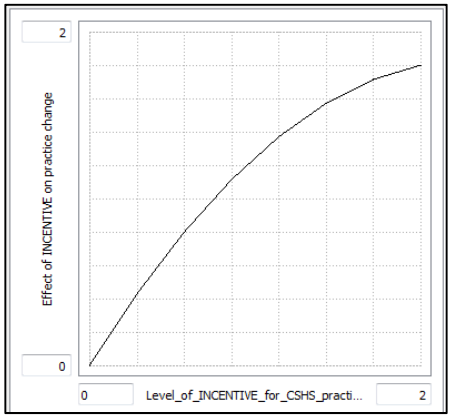

Fig. 8.3 Effect of TELEHEALTH SUPPORT on practice change