

HIV Care Continuum System Dynamics Model: Variables, Definitions and Calibrations

TABLE 2: HIV PREVENTION AND TESTING SERVICES MODULE

(green: parameters that can be modified by users) (blue: dynamic formula) (purple: dynamic outcomes 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
Estimated initial total HIV incidence rate for catchment area	auxiliary	Persons/month	HIV INFECTION AND TREATMENT AS PREVENTION."Initial documented HIV incidence (diagnosis) rate for catchment area" * (1 + HIV INFECTION AND TREATMENT AS PREVENTION.State DPH estimate of UNDIAGNOSED PLWH)	Initial monthly rate of HIV diagnoses plus the estimated undiagnosed HIV infected in the catchment area (HRSA Ryan White designated Hartford TGA, including Hartford, Middlesex, and Tolland Counties, CT) at the start of the run. These variables are imported from the "HIV Infection and Treatment as Prevention" module.
Ratio of current HIV incidence to initial HIV incidence	auxiliary	dmnl	HIV INFECTION AND TREATMENT AS PREVENTION.HIV infection rate / Estimated initial total HIV incidence rate for catchment area	Simulates new infections in the catchment area relative to the initial estimated infection rate in the catchment area, which is imported from the "HIV Infection and Treatment as Prevention" module.
HIV Testing in General Low Prevalence Settings				
HIV test rate of General testing in LOW prevalence settings	flow	Persons/Month	(EXPANDING HIV TESTING AND SEXUAL HEALTH SCREENING IN PRIMARY CARE.Patient appts completed with PCPs delivering routine HIV testing + EXPANDING HIV TESTING AND SEXUAL HEALTH SCREENING IN PRIMARY CARE.Patient appts completed with PCPs delivering CSHS + PEER OUTREACH TO PROMOTE HIV TESTING.HIV tests per month added by PO Program) * HIV INFECTION AND TREATMENT AS PREVENTION.Prop of total population living in low prevalence communities * MOBILIZING COMMUNITY INITIATIVES TO SUPPORT PLWH.Effect of HIV stigma on HIV testing rate * MOBILIZING COMMUNITY INITIATIVES TO SUPPORT PLWH.Effect of Medical Mistrust on HIV testing rate * MOBILIZING COMMUNITY INITIATIVES TO SUPPORT PLWH.Effect of Community Knowledge of HIV on HIV testing rate * MOBILIZING COMMUNITY INITIATIVES TO SUPPORT PLWH.Effect of HR pop engaged on HIV testing rate {UNIFLOW}	Monthly rate of HIV testing conducted in general settings (community clinics, private clinics, home HIV testing, etc.) in low HIV prevalence communities. These settings serve people living all communities in the catchment area (Hartford TGA) that are NOT designated as highest prevalence, that is, in cities and towns with <500/10K population who have HIV. HIV testing rates in these settings are affected by several Action Strategies to increase HIV testing in the community, imported from the "Expanding HIV Testing and Sexual Health Screening in Primary Care" module and the "Peer Outreach to Promote HIV Testing" module. The HIV testing rate in these settings are also affected by the dynamic variables stigma, medical mistrust, community knowledge of HIV, and programs for high risk populations imported from the "Mobilizing Community Initiatives to Support PLWH" module.
Persons Tested in General HIV Testing in LOW Prevalence Settings	stock	Persons	Persons Tested in General HIV Testing in LOW Prevalence Settings(t - dt) + (HIV test rate of General testing in LOW prevalence settings - Negative test rate in General testing in LOW prevalence settings - Positive test rate in General testing in LOW prevalence settings) * dt {NON-NEGATIVE} <u>Initial value</u> = .001	Number of people who are tested in general settings (community clinics, private clinics, home HIV testing, etc.) in low HIV prevalence communities over time. These settings serve people living all communities in the catchment area (Hartford TGA) that are NOT designated as highest prevalence, that is, in cities and towns with <500/10K population who have HIV.
General HIV Testing in LOW Prevalence Settings Reach	auxiliary	dmnl	Persons Tested in General HIV Testing in LOW Prevalence Settings / HIV INFECTION AND TREATMENT AS PREVENTION.Total Population in Catchment Area	Proportion of the total population in the catchment area reached by general HIV testing in low prevalence testing settings. Total population is imported from the "HIV Infection and Treatment as Prevention" module.

Variable Name	Variable Type	Unit	Initial Parameter Values and Formulas	Variable Definition/Specification and Sources of Initial Parameters and Stock Values
Proportion Testing HIV pos in low prevalence areas	auxiliary	person/ month/ person	HIV INFECTION AND TREATMENT AS PREVENTION.HIV infection rate in low prevalence communities / Persons Tested in General HIV Testing in LOW Prevalence Settings	Proportion of the population being HIV tested in general low prevalence settings who are HIV infected. The HIV infection rate in low prevalence settings is imported from the "HIV Infection and Treatment as Prevention" module.
Time to test	auxiliary	month	1.1	Stakeholder-estimated ^a time it takes to receive confirmatory HIV test results in general HIV testing settings in low prevalence communities.
Positive test rate in General testing in LOW prevalence settings	flow	Persons/ Month	(Persons Tested in General HIV Testing in LOW Prevalence Settings * Proportion Testing HIV pos in low prevalence areas * Ratio of current HIV incidence to initial HIV incidence) / Time to test {UNIFLOW}	Monthly rate of people testing HIV positive in general test settings in low prevalence areas over time.
Negative test rate in General testing in LOW prevalence settings	flow	Persons/ Month	((Persons Tested in General HIV Testing in LOW Prevalence Settings) * (1 - Proportion Testing HIV pos in low prevalence areas) * (1 / Ratio of current HIV incidence to initial HIV incidence)) / Time to test {UNIFLOW}	Monthly rate of people testing HIV negative in general test settings in low prevalence areas over time.
HIV Testing in General High Prevalence Settings				
Prop served by targeted HIV testing in HIGH prevalence areas	auxiliary	dmnl	.20	Estimated proportion of people being tested in high prevalence areas who are reached through testing programs targeting high risk special populations over all tested persons in high HIV prevalence communities (that is, communities with >500/10K population who have HIV, i.e., Hartford and New Britain).
HIV test rate of General testing in HIGH prevalence settings	flow	Persons/ Month	((EXPANDING HIV TESTING AND SEXUAL HEALTH SCREENING IN PRIMARY CARE.Patient appts completed with PCPs delivering routine HIV testing + EXPANDING HIV TESTING AND SEXUAL HEALTH SCREENING IN PRIMARY CARE.Patient appts completed with PCPs delivering CSHS + (PEER OUTREACH TO PROMOTE HIV TESTING.HIV tests per month added by PO Program * (1 - Prop served by targeted HIV testing in HIGH prevalence areas))) * HIV INFECTION AND TREATMENT AS PREVENTION.Prop of total population living in high prevalence communities) * MOBILIZING COMMUNITY INITIATIVES TO SUPPORT PLWH.Effect of HIV stigma on HIV testing rate * MOBILIZING COMMUNITY INITIATIVES TO SUPPORT PLWH.Effect of Medical Mistrust on HIV testing rate * MOBILIZING COMMUNITY INITIATIVES TO SUPPORT PLWH.Effect of Community Knowledge of HIV on HIV testing rate * MOBILIZING COMMUNITY INITIATIVES TO SUPPORT PLWH.Effect of HR pop engaged on HIV testing rate {UNIFLOW}	Monthly rate of HIV testing conducted in general settings (community clinics, private clinics, home HIV testing, etc.) in high HIV prevalence communities. These settings serve people living all communities in the catchment area (Hartford TGA) that are designated as highest prevalence, that is, in cities and towns with >500/10K population who have HIV (Hartford and New Britain). HIV testing rates in these settings are affected by several Action Strategies to increase HIV testing in the community, imported from the "Expanding HIV Testing and Sexual Health Screening in Primary Care" module and the "Peer Outreach to Promote HIV Testing" module. The HIV testing rate in these settings are also affected by the dynamic variables stigma, medical mistrust, community knowledge of HIV, and programs for high risk populations imported from the "Mobilizing Community Initiatives to Support PLWH" module.
Persons Tested in General HIV Testing in HIGH Prevalence Settings	stock	Persons	Persons Tested in General HIV Testing in HIGH Prevalence Settings(t - dt) + (HIV test rate of General testing in HIGH prevalence settings - Negative test rate in General testing in HIGH prevalence settings - Positive test rate in General testing in HIGH prevalence settings) * dt {NON-NEGATIVE} Initial value = .01	Number of people who are tested in general settings (community clinics, private clinics, home HIV testing, etc.) in high HIV prevalence communities over time. These settings serve people living in all communities in the catchment area (Hartford TGA) that are designated as highest prevalence, that is, in cities with >500/10K population who have HIV (Hartford, New Britain).

Variable Name	Variable Type	Unit	Initial Parameter Values and Formulas	Variable Definition/Specification and Sources of Initial Parameters and Stock Values
General HIV Testing in HIGH Prevalence Settings Reach	auxiliary	dmnl	Persons Tested in General HIV Testing in HIGH Prevalence Settings / HIV INFECTION AND TREATMENT AS PREVENTION.Total Population in Catchment Area	Proportion of the total population in the catchment area reached by general HIV testing in high prevalence testing settings. Total population is imported from the "HIV Infection and Treatment as Prevention" module.
Proportion Testing HIV pos in High Prev Gen	auxiliary	person/ month/ person	(HIV INFECTION AND TREATMENT AS PREVENTION.HIV infection rate in high prevalence communities / Persons Tested in General HIV Testing in HIGH Prevalence Settings) * (1 - Prop served by targeted HIV testing in HIGH prevalence areas)	Proportion of the population being HIV tested in general high prevalence settings who are HIV infected. The HIV infection rate in high prevalence settings is imported from the "HIV Infection and Treatment as Prevention" module.
Positive test rate in General testing in HIGH prevalence settings	flow	Persons/ Month	(Persons Tested in General HIV Testing in HIGH Prevalence Settings * Proportion Testing HIV pos in High Prev Gen * Ratio of current HIV incidence to initial HIV incidence) / Time to test {UNIFLOW}	Monthly rate of people testing HIV positive in general test settings in high prevalence areas over time.
Negative test rate in General testing in HIGH prevalence settings	flow	Persons/ Month	((Persons Tested in General HIV Testing in HIGH Prevalence Settings) * (1 - Proportion Testing HIV pos in High Prev Gen) * (1 / Ratio of current HIV incidence to initial HIV incidence)) / Time to test {UNIFLOW}	Monthly rate of people testing HIV negative in general test settings in high prevalence areas over time.
HIV Testing in Targeted Testing Programs in High Prevalence Settings				
State funded Targeted HIV Tests per Month	auxiliary	Persons/ Month	400	Number of HIV tests per month targeting special high risk populations through state-funded testing programs (e.g., Outreach, Treatment, Linkage to Care [OTL], Early Intervention Services [EIS], syringe service programs [SSP], etc.). Estimate is derived from 2015 and 2016 number of tests conducted by these three programs in Hartford TGA.
Highest Risk Targeted HIV testing services test rate	flow	Persons/ Month	((PEER OUTREACH TO PROMOTE HIV TESTING.HIV tests per month added by PO Program * Prop served by targeted HIV testing in HIGH prevalence areas) + State funded Targeted HIV Tests per Month) * MOBILIZING COMMUNITY INITIATIVES TO SUPPORT PLWH.Effect of HIV stigma on HIV testing rate * MOBILIZING COMMUNITY INITIATIVES TO SUPPORT PLWH.Effect of Medical Mistrust on HIV testing rate * MOBILIZING COMMUNITY INITIATIVES TO SUPPORT PLWH.Effect of Community Knowledge of HIV on HIV testing rate * MOBILIZING COMMUNITY INITIATIVES TO SUPPORT PLWH.Effect of HR pop engaged on HIV testing rate {UNIFLOW}	Monthly rate of HIV testing conducted in targeted HIV testing programs for highest risk special populations in high HIV prevalence communities in the catchment area (Hartford TGA), that is, in cities and towns with >500/10K population who have HIV (Hartford and New Britain cities). HIV testing rates in these settings are affected by the "Peer Outreach to Promote HIV Testing" Action Strategy module to increase HIV testing in the community. The HIV testing rate in these settings is also affected by the dynamic variables stigma, medical mistrust, community knowledge of HIV, and programs for high risk populations imported from the "Mobilizing Community Initiatives to Support PLWH" module.
Highest Risk Persons Tested in Targeted HIV Testing Services	stock	Persons	Highest Risk Persons Tested in Targeted HIV Testing Services(t - dt) + (Highest Risk Targeted HIV testing services test rate - Highest Risk Targeted HIV testing services neg test rate - Highest Risk Targeted HIV testing services pos test rate) * dt {NON-NEGATIVE} Initial value = .01	Number of people who are tested through targeted HIV testing programs for highest risk special populations in high HIV prevalence communities in the catchment area (Hartford TGA), that is, in cities and towns with >500/10K population who have HIV (Hartford and New Britain cities).

Variable Name	Variable Type	Unit	Initial Parameter Values and Formulas	Variable Definition/Specification and Sources of Initial Parameters and Stock Values
Highest Risk Targeted HIV Testing Services Reach	auxiliary	dmnl	Highest Risk Persons Tested in Targeted HIV Testing Services / HIV INFECTION AND TREATMENT AS PREVENTION.Total Population in Catchment Area	Proportion of the total population in the catchment area reached by targeted HIV testing in high prevalence testing settings. Total population is imported from the HIV Infection and Treatment as Prevention module.
Prop Testing HIV pos in High Prev Targeted	auxiliary	person/ month/ person	(HIV INFECTION AND TREATMENT AS PREVENTION.HIV infection rate in high prevalence communities / Highest Risk Persons Tested in Targeted HIV Testing Services) * Prop served by targeted HIV testing in HIGH prevalence areas	Proportion of the population being HIV tested in targeted programs in high prevalence communities who are HIV infected. The HIV infection rate in high prevalence settings is imported from the HIV Infection and Treatment as Prevention module.
Highest Risk Targeted HIV testing services pos test rate	flow	Persons/ Month	(Highest Risk Persons Tested in Targeted HIV Testing Services * Prop Testing HIV pos in High Prev Targeted * Ratio of current HIV incidence to initial HIV incidence) / Time to test {UNIFLOW}	Monthly rate of people testing HIV positive in targeted test programs in high prevalence communities over time.
Highest Risk Targeted HIV testing services neg test rate	flow	Persons/ Month	((Highest Risk Persons Tested in Targeted HIV Testing Services) * (1 - Prop Testing HIV pos in High Prev Targeted) * (1 / Ratio of current HIV incidence to initial HIV incidence)) / Time to test {UNIFLOW}	Monthly rate of people testing HIV negative in targeted test settings in high prevalence areas over time.
Summary HIV Testing Outputs				
Total HIV negative tests per month	auxiliary	Persons/ Month	Negative test rate in General testing in LOW prevalence settings + Negative test rate in General testing in HIGH prevalence settings + Highest Risk Targeted HIV testing services neg test rate + Partners HIV test neg rate	Sum of all negative HIV tests from all test settings, including general settings in low prevalence communities, general settings in high prevalence communities, targeted testing programs for high risk special populations, and testing associated with Partner Services programs.
Total HIV positive tests per month	auxiliary	Persons/ Month	Positive test rate in General testing in LOW prevalence settings + Positive test rate in General testing in HIGH prevalence settings + Highest Risk Targeted HIV testing services pos test rate + Partners HIV test pos rate	Sum of all positive HIV tests from all test settings, including general settings in low prevalence communities, general settings in high prevalence communities, targeted testing programs for high risk special populations, and testing associated with Partner Services programs.
Monthly HIV Testing Rate	auxiliary	Persons/ Month	Total HIV negative tests per month + Total HIV positive tests per month	Total negative and positive HIV tests from all settings.
Newly diagnosed persons per month	flow	Persons/ Month	Total HIV positive tests per month {UNIFLOW}	Monthly rate of newly diagnosed PLWH entering the HIV care system and awaiting linkage to medical care.
Newly Diagnosed Pending Initial Clinical Appt	stock	Persons	Newly Diagnosed Pending Initial Clinical Appt(t - dt) + (Newly diagnosed persons per month - Newly diagnosed persons referred for initial clinic appt) * dt {NON-NEGATIVE} Initial value = 0	Number of newly diagnosed PLWH awaiting linkage to HIV medical care over time.
Time to be scheduled for initial clinical visit	auxiliary	Months	.25	Stakeholder-estimated ^a time needed to schedule newly diagnosed PLWH for first HIV medical appointment after diagnosis, based on case management experience scheduling PLWH to medical care in the catchment area.
Newly diagnosed persons referred for initial clinic appt	flow	Persons/ Month	Newly Diagnosed Pending Initial Clinical Appt / Time to start care {UNIFLOW}	Monthly rate of newly diagnosed PLWH getting linked to HIV medical care.
Total HIV Testing Services Reach	auxiliary	dmnl	General HIV Testing in LOW Prevalence Settings Reach + General HIV Testing in HIGH Prevalence Settings Reach + Highest Risk Targeted HIV Testing Services Reach	Reach of all testing services, including those in general low prevalence settings, general high prevalence settings, and targeted HIV test programs to the total population in the catchment area (Hartford TGA).

Variable Name	Variable Type	Unit	Initial Parameter Values and Formulas	Variable Definition/Specification and Sources of Initial Parameters and Stock Values
Pre-exposure Prophylaxis (PrEP) Referral and Implementation for HIV-Negative People At High Risk				
Prop of HIV neg testers who receive PrEP education	auxiliary	dmnl	.15	Stakeholder-estimated ^a proportion of all people who test negative for HIV who receive PrEP education from their HIV test site, clinic or other source.
Rate of identifying potential PrEP candidates	flow	person/month	(Total HIV negative tests per month * Prop of HIV neg testers who receive PrEP education) + EXPANDING HIV TESTING AND SEXUAL HEALTH SCREENING IN PRIMARY CARE. Estimated PrEP screenings {UNIFLOW}	Monthly rate of HIV-negative testers who are identified as potential PrEP candidates. This rate may be affected by increased screening in primary care settings when the Action Strategy "Expanding HIV Testing and Sexual Health Screening in Primary Care" module is turned on.
Pending Medical Screening for PrEP	stock	Persons	Pending Medical Screening for PrEP(t - dt) + (Rate of identifying potential PrEP candidates - PrEP screening rate) * dt {NON-NEGATIVE} Initial value = 2000	The number of people over time identified as potential PrEP candidates the Hartford TGA who are awaiting screening for eligibility by a medical care provider.
Proportion of HIV neg testers screened for PrEP	auxiliary	dmnl	.10	Stakeholder-estimated ^a proportion of all HIV-negative testers who are likely to be screened for PrEP eligibility by a medical provider.
PrEP screening rate	flow	person/month	Pending Medical Screening for PrEP * Proportion of HIV neg testers screened for PrEP {UNIFLOW}	Monthly rate of HIV-negative testers being screened for PrEP by a medical provider.
Screened for PrEP by Medical Provider	stock	Persons	Screened for PrEP by Medical Provider(t - dt) + (PrEP screening rate - PrEP initiation rate - PrEP refusal rate - Not eligible for PrEP rate) * dt {NON-NEGATIVE} Initial value = 50	Number of high-risk HIV-negative testers who are screened for PrEP over time.
Prop PrEP refusal	auxiliary	dmnl	0.6	Stakeholder-estimated ^a proportion of people screened for PrEP who refuse PrEP, based on clinical experiences in the local area.
PrEP refusal rate	flow	person/month	(Screened for PrEP by Medical Provider * Prop PrEP refusal) / Time to start PrEP {UNIFLOW}	Monthly rate at which people who are screened for PrEP decide to refuse it.
Prop PrEP ineligible	auxiliary	dmnl	1 - Prop PrEP eligible	Proportion of high-risk HIV-negative testers screened for PrEP who are determined by a clinical provider to be ineligible for PrEP..
Prop PrEP eligible	auxiliary	dmnl	0.7	Stakeholder-estimated ^a proportion of high-risk HIV-negative testers screened for PrEP who are determined by a clinical provider to be eligible for PrEP, based on clinical experiences in the local area.
Not eligible for PrEP rate	flow	Persons/month	(Screened for PrEP by Medical Provider * Prop PrEP ineligible) / Time to start PrEP {UNIFLOW}	Monthly rate at which people screened for PrEP are determined by a clinical provider to be ineligible for PrEP.
Time to start PrEP	auxiliary	Months	0.25	Stakeholder-estimated ^a time it takes for people who are determined by a clinical provider to be eligible for PrEP to receive a prescription and start taking it, based on clinical experiences in the local area.
Prop receiving PrEP payment support	auxiliary	dmnl	.90	Stakeholder-estimated ^a proportion of people who are eligible for PrEP who receive financial support to pay for the medication (e.g., insurance, Gilead payment support, etc.), based on clinical experiences in the local area.

Variable Name	Variable Type	Unit	Initial Parameter Values and Formulas	Variable Definition/Specification and Sources of Initial Parameters and Stock Values
PrEP initiation rate	flow	Persons/ month	$(\text{Screened for PrEP by Medical Provider} * \text{Prop PrEP eligible} * \text{Prop receiving PrEP payment support} * (1 - \text{Prop PrEP refusal})) / \text{Time to start PrEP} \{ \text{UNIFLOW} \}$	Monthly rate at which people determined by a clinical provider to be eligible for PrEP begin to take the medication.
On PrEP	stock	Persons	$\text{On PrEP}(t - dt) + (\text{PrEP initiation rate} + \text{Readherence to PrEP rate} - \text{No longer needing PrEP rate} - \text{Non adherence to PrEP rate}) * dt \{ \text{NON-NEGATIVE} \}$ Initial value = 500	Number of people in the catchment area who are on PrEP over time.
Avg time on PrEP	auxiliary	Month	24	Stakeholder-estimated ^a average time for a person who is prescribed PrEP to stay on it before ending PrEP use, based on clinical experience in the catchment area.
No longer needing PrEP rate	flow	person/ month	$\text{On PrEP} / \text{Avg time on PrEP} \{ \text{UNIFLOW} \}$	Monthly rate at which PrEP users no longer need PrEP, for any reason, and stop using it.
Prop non adherent to PrEP	auxiliary	dmnl	0.2	Stakeholder-estimated ^a proportion of PrEP users who are not adherent to the daily medication, based on clinical experiences in the local area.
Time to change adherence to PrEP	auxiliary	Months	1	Estimated time after which people who initiate PrEP become non-adherent, and for non-adherent PrEP users to become adherent again.
Non adherence to PrEP rate	flow	person/ month	$(\text{On PrEP} * \text{Prop non adherent to PrEP}) / \text{Time to change adherence to PrEP} \{ \text{UNIFLOW} \}$	Monthly rate at which PrEP users become non-adherent to taking the daily medication.
Non adherent to PrEP	stock	Persons	$\text{Non adherent to PrEP}(t - dt) + (\text{Non adherence to PrEP rate} - \text{Readherence to PrEP rate}) * dt \{ \text{NON-NEGATIVE} \}$ Initial value = 100	Number of people over time who have been prescribed PrEP who are non-adherent to taking the daily medication or following the requirements for medical follow-up visits.
Prop readherent to PrEP	auxiliary	dmnl	0.5	Stakeholder-estimated ^a proportion of PrEP users who become adherent to PrEP after having been non-adherent for a period of time, based on clinical experiences in the local area.
Readherence to PrEP rate	flow	person/ month	$(\text{Non adherent to PrEP} * \text{Prop readherent to PrEP}) / \text{Time to change adherence to PrEP} \{ \text{UNIFLOW} \}$	Monthly rate at which people who had been non-adherent to PrEP become adherent again and continue using PrEP.
Partner Services Referral				
Proportion of newly diagnosed who are provided PS	auxiliary	dmnl	.5	CT Dept. of Public Health report to CDC for 2017 ¹ proportion of newly diagnosed PLWH who are interviewed for partner services in Connecticut. This proportion was use for the catchment area.
Proportion of newly diagnosed who agree to participate in PS	auxiliary	dmnl	0.95	CT Dept. of Public Health report to CDC for 2017 ¹ proportion of newly diagnosed PLWH who participate in partner services in Connecticut. This proportion was use for the catchment area.
Rate of newly diagnosed initiating PS	flow	Persons/ Month	$\text{Total HIV positive tests per month} * \text{Proportion of newly diagnosed who agree to participate in PS} * \text{Proportion of newly diagnosed who are provided PS} \{ \text{UNIFLOW} \}$	Monthly rate at which newly diagnosed HIV-positive persons initiate partner services (PS), based on the proportion who agree to participate and the proportion who are actually provided PS.
Newly Diagnosed Engaged in PS	stock	Persons	$\text{Newly Diagnosed Engaged in PS}(t - dt) + (\text{Rate of newly diagnosed initiating PS} - \text{Rate of newly diagnosed ending use of PS}) * dt \{ \text{NON-NEGATIVE} \}$ Initial value = .001	Number of newly diagnosed PLWH who are engaged in partner services (PS) over time. This stock must have an initial value of something above 0 to avoid a division by 0.
Avg time engaged in PS	auxiliary	Months	3	CT DPH Disease Intervention Specialist reported average time for a case file to be open to provide newly diagnosed PLWH with partner services (PS).

Variable Name	Variable Type	Unit	Initial Parameter Values and Formulas	Variable Definition/Specification and Sources of Initial Parameters and Stock Values
Rate of newly diagnosed ending use of PS	flow	Persons/ Month	Newly Diagnosed Engaged in PS / Avg time engaged in PS {UNIFLOW}	Monthly rate at which newly diagnosed PLWH stop using partner services over time.
Expected number of partners per newly diagnosed PS client	auxiliary	dmnl	.4	CT Dept. of Public Health report to CDC for 2017 ¹ reported number of partners over PLWH interviewed for partner services in Connecticut. State number is being applied to the catchment area.
Rate of partners being named for PS	flow	Persons/ Month	Expected number of partners per newly diagnosed PS client * Rate of newly diagnosed initiating PS {UNIFLOW}	Monthly rate at which newly diagnosed HIV-positive persons are naming their sexual and injecting partners.
Avg number of partners pending PS Contact	auxiliary	dmnl	Partners Pending PS Contact / Newly Diagnosed Engaged in PS	Average number of newly diagnosed HIV-positive persons engaged in Partner Services (PS) who are pending PS contact. This is determined by the number of sexual and injecting partners the newly diagnosed person can name.
Partners Pending PS Contact	stock	Persons	Partners Pending PS Contact(t - dt) + (Rate of partners being named for PS - Partners contact rate - Unable to contact rate) * dt {NON-NEGATIVE} Initial value = .001	Number of sexual and injecting partners of newly diagnosed PLWH who are pending contact by partner services (PS) Disease Intervention Specialist (DIS) staff to receive PS over time.
Prop of partners contacted	auxiliary	dmnl	0.9	CT Dept. of Public Health report to CDC for 2017 ¹ reported number of partners of newly diagnosed PLWH contacted by DIS in CT. State number is being applied to the catchment area.
Unable to contact rate	flow	Persons/ Month	Avg number of partners pending PS Contact * (1 - Prop of partners contacted) * Rate of newly diagnosed ending use of PS {UNIFLOW}	Monthly rate of partners of newly diagnosed PLWH who cannot be contacted and therefore are no longer pending partner services.
Partners contact rate	flow	Persons/ Month	Avg number of partners pending PS Contact * Prop of partners contacted * Rate of newly diagnosed ending use of PS {UNIFLOW}	Monthly rate at which sexual or injecting partners of newly diagnosed PLWH are contacted by Disease Intervention Specialists (DIS) or the PLWH to receive partner services.
Partners Pending HIV Testing	stock	Persons	Partners Pending HIV Testing(t - dt) + (Partners contact rate - Partners HIV test pos rate - Partners refuse to test rate - Partners HIV test neg rate) * dt {NON-NEGATIVE} Initial value = 0	Number of sexual and injecting partners of newly diagnosed PLWH who are pending HIV testing over time after being contacted by partner services (PS) staff and receiving PS.
Prop of partners who receive an HIV test	auxiliary	1/ Months	0.5	CT DPH report to CDC for 2017 ¹ reported number of partners of newly diagnosed PLWH contacted by DIS in CT who get tested for HIV. State number is being applied to the catchment area.
Partners refuse to test rate	flow	Persons/ Month	Partners Pending HIV Testing * (1 - Prop of partners who receive an HIV test) {UNIFLOW}	Monthly rate of partners of newly PLWH who refuse to test for HIV and therefore are no longer pending HIV testing.
Prop partners HIV pos	auxiliary	dmnl	.07	CT DPH report to CDC for 2017 ¹ reported number of partners of newly diagnosed PLWH contacted by DIS in CT who test positive for HIV. State number is being applied to the catchment area.
Partners HIV test pos rate	flow	Persons/ Month	Partners Pending HIV Testing * Prop partners HIV pos * Prop of partners who receive an HIV test {UNIFLOW}	Monthly rate of partners of newly diagnosed PLWH reached by Disease Intervention Specialists (DIS) providing partner services who test HIV positive for HIV.
Partners HIV test neg rate	flow	Persons/ Month	Partners Pending HIV Testing * Prop of partners who receive an HIV test * (1 - Prop partners HIV pos) {UNIFLOW}	Monthly rate of partners of newly diagnosed PLWH reached by Disease Intervention Specialists (DIS) providing partner services who test HIV negative for HIV.

^a Stakeholder-estimated 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. Centers for Disease Control & Prevention. Partner Services Annual Report. In: National Center for HIV/AIDS VH, STD, and TB Prevention, Division of HIV/AIDS Prevention, ed. Atlanta, GA2017.